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Erakıncı G. Searching for antibodies against parasites in donors. İzmir: Ege University Health Sciences Institute. 1997.
Article in Electronic Format
Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) l995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http:/ www.cdc.gov/ncidodlElD/cid.htm.

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APRIL 2020 VOLUME 6 ISSUE 1

CONTENTS

EDITORIAL

The year 2020…

We publish the first issue of our journal in 2020 while our country and the world are fighting with our Covid -19 pandemic. We have taken care not to disrupt our academic studies while we are fighting with this infectious disease as a country in this challenging period.

In this issue of our journal, there are 19 articles, a case report and a review in the fields of dentistry, nursing, anesthesia, orthopedics, family medicine, gynecology, nephrology, emergency medicine, general surgery, neurosurgery, medical biology and histology. Endless thanks to everyone who contributed in this issue.

We hope to publish the second issue of our journal on beautiful days.

PhD, Assoc. Prof. Ülkü KARAMAN

Editor

Middle Black Sea Journal of Health Science April 2020; 6(1):1-5

RESEARCH ARTICLE

Anterior Single Odontoid Screw Fixation for Type II Odontoid Fractures: In A Cohort Study of 11 Patients and Literature Review

Hüseyin Bozkurt[1], Densel Araç[2]

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Abstract

Objective: We aim to demonstrate the fusion efficiency of anterior screw fixation technique in all types of type 2 odontoid fracture by presenting a study of 11 cases and updating the literature.

Methods: Retrospectively we analyzed 11 (8 males and 3 females) patients with type 2 odontoid fracture treated through anterior odontoid screw fixation in the Neurosurgery Department of XXX University Hospital between 2015 and 2018. All patient records were evaluated with current clinical, neurophysiological examination, radiological studies, and results. In operation we used retropharyngeal approach of Robinson and Smith and created a gutter in the superior edge of C3 corpus for proper trajection of screw. The patients were followed over a minimum period of eighteen months with a range (18-24 months). Assessments of the union, nonunion, screw displacement and overall, with complications were all recorded.

Results: 10 patients had no postoperative complication. Separation of odontoid fracture was observed in 1 patient after discharge from hospital, but during follow up period computerized tomography revealed fusion of the odontoid of the patient. Our patients had no complication such as screw related problems, pseudo-arthrosis and dysphagia.

Conclusion: We recommend surgical treatment in all cases of type 2 odontoid fractures, including the anterior oblique fracture. The method used in our study is more reliable for trajection of screw and suitable for type 2 odontoid fracture, also fusion rate is higher than the other techniques

Key words: Odontoid, fractures, Screw fixation

Suggested Citation: Bozkurt H, Arac D. Anterior Single Odontoid Screw Fixation for Type II Odontoid Fractures: In A Cohort Study of 11 Patients and Literature Review. Middle Black Sea Journal of Health Science, 2010; 6(1):1-5.

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Introduction

Fracture of the odontoid process of the axis is a common type of all cervical spine injuries. The fracture occurs at the junction of the odontoid and vertebral body of the axis (Anderson and D'Alanzo., 1974). Anderson and D'Alonzo classified the odontoid fractures into 3 groups according to their types the most frequently observed type is type II fractures and they are thought to be unstable (Keskin et al., 2014).

Conservative treatment methods using for type 1 and 3 odontoid fractures includes halo vests (Ryan et al., 1982; Lind et al.,1988). and cervical orthoses

(Wang et al.,1984). In unstable fractures these methods are poorly tolerated in the elderly and polytrauma patients (Chi et al.,2007).

There are many surgical techniques for the treatment of C2 fractures including anterior odontoid screw fixation (AOSF) (Apfelbaum et al., 2000; Platzer et al., 2007), posterior stabilization techniques, such as the methods described by Brooks and Jenkins (Brooks et al., 1978), Gallie (1939) and Sonntag et al (1996), and posterior trans articular screw fixation of C1–C2 (Koller et al., 2006). However, posterior fusion of C1-C2 is associated with considerable mortality and morbidity and results in a decrease in the range of movement of the neck (Fielding at all., 1976; Koller H et al., 2006). Direct anterior screw fixation provides immediate spinal stabilization, preserves rotation of C1 on C2, and allows rapid return to normal lifestyle (Hanssen et al., 1987). Therefore, anterior odontoid screw fixation is considered ideal technique for unstable odontoid fractures. This method was performed first by Bohler (Hanssen et al., 1987) in year 1982 and it's become increasingly popular day by day.

We treated eleven cases with unstable odontoid type II fractures with anterior odontoid screw fixation technique in our institution and good functional results were achieved. In this paper we discuss the clinical, radiological and physical applications of the patients treated with anterior single odontoid screw fixation.

Methods

We reviewed eleven patients with acute type II odontoid fractures managed with anterior single odontoid screw fixation between 2015-2018. This study was approved by the local ethical committee with the number 2018-01/07. Written consent for the management was obtained from all the patients.

All patients records were reviewed for clinical presentation, neurological examination, imaging studies and outcomes. There were 8 males and 3 females. Their mean age at presentation was 64,54 (with a range 28-89). All cases were Type II odontoid fracture, classified by the Anderson and D'Alonzo system. 7 cases of them had fracture line from anterior to postero-superior and 4 cases of them had fracture line from posterior to anterior. There were no other spinal column injuries identified in the patients. The patients had no additional traumatic abdominal, thoracal or orthopedic pathology. The patients were first evaluated with X-ray examination, thereafter computerized tomography (CT) and magnetic resonance imaging (MRI) of the spine were evaluated.CT is the most effective and rapid diagnostic method for detecting traumatic brain and cervical injury with head trauma(Yılmaz et al., 2019). CT was performed to diagnose the type and pattern of the C2 vertebra fracture and to rule out other accompanied bony injuries. MRI was performed to determine the integrity of the transvers ligament, other soft tissue injuries and cord injuries. Instability and the direction of displacement were determined using the method described by Roy-Camille et al (Mestdagh et al., 2014).

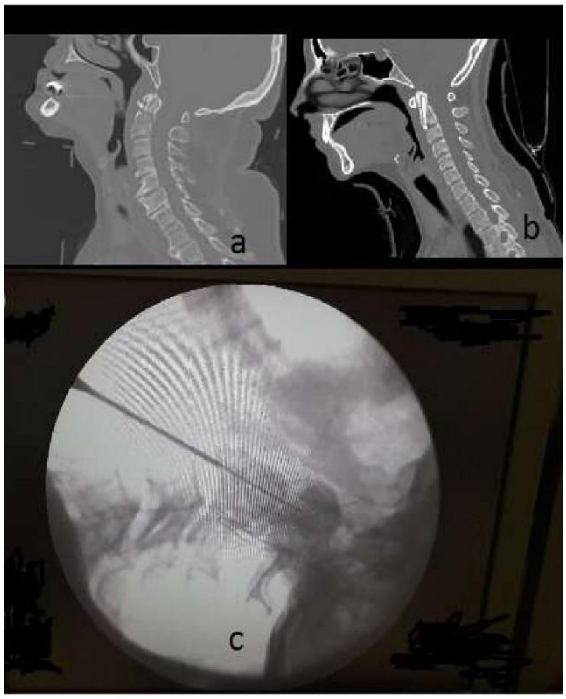
The patients were operated with anterior odontoid single screw technique and followed over a minimum period of eighteen months with a range (18-24 months). Assessments of the union, nonunion, screw displacement and overall, with complications were all recorded. Cervical tomography was performed to the patients on 1st day for the location and trajectory of screw and in the next 1,3 and 6 months for the fusion of odontoid.

Operative Technique

We used the retropharyngeal approach of Robinson and Smith (Robinson RA et al., 2014). During surgery, the patient was placed in the supine position under general anesthesia. With a right transverse skin incision at the level of the C5-6 disc space, performed an anteromedial approach. Blunt dissection was used to arrive at the anterior border of the spinal column and to expose the antero-inferior margin of C2. For image control with C-arm, a puncture needle was inserted into the C2-3 disc space. After the image control we curetted so as to make a gutter on the superior aspect of the C3 body (Figüre 1). This is very helpful for accurate placement of the odontoid screw.

The correct angle of the screw is about in line with the cervical spine and therefore sufficiently definition of the sternum is necessary. For correct positioning of the patient to ensure the trajectory of the screw in the midline, we assured that the tip of the nose, supra-sternal notch and the sternum were in the same line.

The C-arm images in the antero-posterior and lateral view usually ensure the correct location of the dens. The sharp tipped 1.2 mm K-wire was inserted through the guide into the odontoid distal fragment with a power-drill. To achieve compression the thread of the screw must also extend through the posterior apical cortex of the dens (Figüre 1).



Figüre 1: Pre-op type 2 odontoid fracture (a) and post-op CT image are seen (b). During surgery trajection of guide is seen; placed in a gutter on C3 antero-superior part and oriented towards to fractured dens apex (c).

Results

In our cohort study, there was a male preponderance (male: female ratio of 8:3). Age of the patients ranged from 28 to 89 years and mean age was 64.54.The causes of injury,5 of the patients had fall from height (45,45%), 3 of them were motor vehicle accident (27,27%) and 3 of them fell down stairs (27,27%). All of the patients were in Frankel grade E status at presentation (100%).

In our cohort study, 10 cases had nopostoperative complication. One case was discharged in the early postoperative period with a suitable cervical tomography images. At the month control, CT scan revealed separation of C2 along the screw line on the sagittal axis. Because of fusion of C2 during follow-up period of this patient we did not think to revision. There were no instances of wrong trajectory or false location of the screw head in our study. During the follow up visits, we found good union of all the fractures without any reports of screw malfunctioning. None of our cases had to be re-operated because of screw related problems or pseudo-arthrosis. The most frequent postoperative complaint was dysphagia in anterior odontoid fixation surgery, while no complication was observed in any of our patients.

Discussion

The technique of minimally invasive spinal surgery has developed rapidly in the recent decades. Percutaneous anterior odontoid screw fixation was reported in a cadaveric study (Kazan et al., 1999). Clinical research and minimally invasive surgical results have shown that blood loss is low. Rapid recovery was observed in those who applied C5-based midline incision from the medial border of the sternocleidomastoid muscle. Dissection then proceeds in a similar fashion as compared to the anterior cervical disectomy procedure (Matz et al., 2009).

We preferred this technique because of better surgical exposure, avoiding injury to adjacent structure and screw was sent to tip of the odontoid with a better and easier angle. We created a small gutter on the superior aspect of C3 body like as Sunil Munakomi et al technique, by this method we ensure accurate placement of the odontoid screw behind the anterior cortex of C2 body without deviation from midline. The groove also provides the proper shelter for the screw head avoiding damage to the eosephagus (Munakomi et al., 2016).

Apfelbaum in a follow-up of 129 patients with recent odontoid fracture, found significantly higher nonunion rates in case of anterior oblique fracture compared to the other forms (Apfelbaum et al., 2000). Likewise, Dantas et al. (2002) reported 94% union in posterior oblique and horizontal fracture and advised against anterior screwing in anterior oblique fractures. In contrast to these studies, nonunion complication was not seen in our three cases (27,27%) because of direct observation of dens and C2 corpus during procedure and we could manipulate the neck of the patients.

Pepin et al (1985) made special reference to 19 odontoid fractures in patients older than 60 years. In their series, three (16%) who died were all older than 78 years and had been treated with a halo device. They found this treatment to be poorly tolerated in the elderly and recommended early surgical treatment. 2 of our patients (18.18%) were more than 80 years old and had multisystemic pathologies but no mortality. We can depend this situation to the short duration of our surgery.

Major limitations of the procedure are the need for intact integrity of the transverse ligament and the prerequisite of attaining normal alignment of the spine before screw placement (Munakomi et al., 2016). Therefore, preoperative cervical MRI was

seen in all our cases and the integrity of the transverse ligament was confirmed.

Through this method, the rate of fusion increases to as high as 80-100% (Aebi et al., 1989; Dickman et al., 1995). Compared to the posterior approach, the most important advantages of this method are the protection of the atlantoaxial joint movements, no need for a bone graft, better postoperative comfort of the patients, and shorter length of stay in the hospital (Hadley et al., 2002). In all of our cases we only used one screw but still attained satisfactory union of the fracture. Anterior odontoid screw methodcan causecomplication such as vascular injury, spinal cord injury and disphagia related to implant malpositioning and nonunion. We did not have such complications in our cohort study.

Conclusion

Anterior odontoid screw method has not yet been accepted as a single treatment modality for odontoid fracture. Anterior screwing is a successful technique in case of horizontal or posterior oblique fractures, conserving C1–C2 joint mobility in literature.

Our experience with the management of odontoid fractures with the anterior placement of screw for the fixation of fractured bones supports the use of this techniques as a satisfactory measure. We recommend surgical treatment independently of the age and type of fracture in all casesof type 2 odontoid fractures, including the anterior oblique fracture. The method used in our study is more reliable for trajection of screw and suitible for type 2 odontoid fracture, also fusion rate is higher than the other techniques.

Ethics Committee Approval: Ethics committee approval was received for this study from local ethical committee with the number 2018-01/07, Clinical Research Ethics Committee of Cumhuriyet University.

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RESEARCH ARTICLE

The Effect of Workload Perception and Occupational Stress on Medical Error Attitudes of Nurses Working in Surgical Clinics

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Abstract

Objectives: The study was conducted to determine workload perception and effects of occupational stress on medical error attitudes of nurses working in surgical clinics.

Method: This descriptive study was conducted with 100 nurses employed at surgery clinics, Ordu State Hospital and Training and Research Hospital of Ordu University, Turkey. The data were collected using Descriptive Questionnaire Form, Occupational Stress Scale, Individual Workload Perception Scale and Medical Error Attitudes Scale between September and December 2015.

Results: There is not any significant relationship between the average scores of all three scales when they are compared with each other ($p>0.05$). The surgical nurses' average score on the individual workload perception scale is 73.37±9.06, their average score on the occupational stress scale is 42.21±4.99, and their average score on the medical error attitude scale is 40.86 ±5.40. It was determined that workload perception and occupational stress in the nurses employed in surgical clinics did not have effect on the medical error attitudes. ($r=0.712$).

Conclusion: In this study, it was observed that nurses' perception of work stress and work overload did not affect medical error attitudes. The overall average scores of surgical nurses on the scales of individual workload perception, occupational stress, and medical error attitude are directly proportional.

Key words: Nursing care, occupational stress, medical error attitudes, overload, surgical patient, surgical nurse

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Note: This study is presented as a thesis

Introduction

Nowadays, medical errors rank definitely first among the issues occupying the health care sector most. Medical errors are one of the important issues emphasized in Turkey like other countries around the world. One of the basic causes of this issue's significance is primarily about human life and human health. The errors made intentionally or unintentionally threaten a human's life. The suspension of practices, knowledge and skill deficiency of healthcare employees, wrong practices, intense workload, inadequacy in patient care and

communication between team members spring from medical (Hillin and Hicks, 2010, Nguyen et al, 2010).

Medical error should be defined exactly first of all, in order to reduce the damages emanated from medical errors. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) defines the medical error term as "unethical and inappropriate behavior of a professional offering healthcare, his/her negligence and deficiency in professional practices that lead patient to suffer (JCAHO, 2006). Stress due to working conditions and heavy workload in nursing play role in the occurrence of insufficiency and negligence in professional practices. In a resource regarding this issue, it was found that 1200 people died because of wrong drugs administration in the United Kingdom in 2001 (Indepeler and Dursun, 2012). After examining 33 documents about wrong drug administration, it was underlined that it is required to be careful while administering or preparing drug for patients in order to prevent wrong drug errors (Wright, 2010). Wrong dose (36.1%) and wrong drug (26.4%) errors place in the first rank of the most common wrong drug errors (Tang et al, 2007).

Medical errors may appear at any stage of health care. These errors can be classified under the titles below Wrong drug errors, surgical errors, diagnostic errors, errors related to system deficiencies and others which some important issues such as hospital infections and wrong blood transfusion are also among the medical errors (Sayek, 2011).

Nurses comprising the majority of medical professionals encounter the risk of medical errors more frequently than other professional groups, because of the multitude and variety of dependent and independent functions, and the continuity of their relationship with patient relatives (Tang et al, 2007, Anezz, 2006). Determination of medical errors made by medical professionals may enable to detect the source of errors and catch and correct an error before it reaches any patient (Anderson et al, 2009).

Workload of nursing can be defined as total nursing care required to be performed within a fixed period of time. Some of the factors affecting the workload in nursing care are the features of the related unit, the number of patients offered care, the knowledge and skill level of nurses in charge (Er and Altuntas, 2016). The technological circumstances of developing world are increasing the workload. Consequently, it results in the rise of occupational stress (Aytac, 2002). Among the causes increasing the occupational stress of nurses, there are intense work pace, patient care, supporting patients physically, socially, and psychologically, constant connection with patient relatives, and administrative problems (Kebapcı and Akyolcu, 2011).

The direct involvement of nurses in patient care and being constantly together with patients and patient relatives are among the factors increasing the health risk (Karwowski et al, 2005, Parlar, 2008, Mollaoğlu et al, 2010). The negative working conditions of nurses, staying up continuously, and night duty are among the factors increasing the health risks (Parlar, 2008, Alcelik et al, 2005).

Nurses being occupied with something else while administering a drug, new patient registrations, and heavy workload may pave the way for medical errors (Gunes et al, 2014). It was detected that 91.7% of nurses make error due to events distracting them (such as answering the phone), 43.7% of them due to the problems in material conditions (Eser and Khorshid, 2007). The relationship between work stress, work overload and medical error should be briefly addressed.

This study with the aim of identifying the workload perception of nurses, their occupational stress and its effects on the medical error attitude of nurses conducted or carry out.

Methods

Study Subjects and Design

This study is a descriptive research. This study was conducted between September and December 2015, with nurses employed at general surgery, urology, neurosurgery, cardiovascular surgery, orthopedics and traumatology in the clinics at Ordu State Hospital and Training and Research Hospital of Ordu University.

Data Collection Tools

A Nurse Identification Form was constructed by the researchers based on the literature and included identifying characteristics of the participants.

Occupational Stress Scale: This scale was developed by Revicki et al. In 1991, and its validity and reliability were validated by Aslan et al. In 1996 and adapted into Turkish (Aslan et al,1998). The Occupational Stress Scale consists of 18 items and has 4-point Likert-type and no subscales. Items 2, 4, 8, 9, 11, 15 of the scale are scored in reverse. The highest score is 72 and the lowest score is 18. Occupational Stress Scale increases as the score from the scale increases. In Aslan's study, the Cronbach's alpha value was 0.78 and the original scale was 0.85-0.90. In our study, Cronbah Alpha value was found to be 0.698.

Individual Workload Perception Scale: The validity and reliability of the scale were performed by Cox et al in 2003 and Turkey also made the validity and reliability study of the scale of Saygili (Saygili and Celik, 2011). In the study conducted by Cox et al., Cronbach's alpha value was found to be 0.87 in the administrative support dimension, 0.84 in the peer support dimension, 0.66 in the unit support dimension, 0.75 in the workplace workload dimension, and 0.86 in the intention to continue the current job (Cox et al., 2007). In our study, Cronbach's alpha value was found to be 0.667.

The Individual Workload Perception Scale consists of executive support, colleague support, unit support, work environment workload features and existing job resume sub-dimensions. The scale consists of 31 questions, Consisting of 5 sub-dimensions and 5 of the five-point Likert-type. The lowest score is 31 and the highest score is 155. The increase in the average of the intention to pursue the current job indicates that the intention to pursue the current job is low. The increase in the other sub-neck averages is perceived positively.

Medical Error Attitudes Scale: The scale was developed by Gulec and Indepeler (Gulec, 2013). The scale is 16 items and has a five likert type. The lowest score is 16 and the highest score is 80. The medical error behaviors of the employees who scored 38-40 points in the scale are negative, and the medical error attitudes of the areas over this score are evaluated as positive. The Cronbach's alpha reliability coefficient of the MEAS has been reported as .75; in this study, it was found to be .66.

Data Collection

Data were collected by the nurses themselves using face to face interview technique. Nurses work at the clinics for 40 hours minimum per week between 08:00-16:00 or 16:00-08:00 with 8 and 16 hours shifts changing weekly.

Data Analysis

The data were analyzed by computer. Data were evaluated using percentages, mean values, arithmetic mean. In these statistical comparisons, the control for the normal distribution of data was conducted by Kolmogorov-Smirnov test, and the homogeneity control of group variances by Levene test. As of parametric tests, one-way ANOVA, Tukey multiple comparison test and t test were used in comparing the averages of data validating the hypotheses. As of non-parametric tests, Kruskal-Wallis test, Mann Whitney U and Dunn multiple comparison test were used for the data not validating the hypotheses.

Cronbach Alfa values were calculated for the reliability analysis of the scales. In analyzing the differences between the groups, the significance level was set as 0.05.

Results

91% of the nurses involved in the study are female and 9% male. 76% of the nurses are married and 22% single and 2% separated from spouse. 22% of 100 nurses, married or separated has 3 or more children, while 53% of them less than three children. 44% of nurses graduated from associate' degree, 42% of them have an undergraduate degree. The age average of nurses is 36.63±7.69. (min:19, max:55).

56% of nurses tell that they have a dependent relative. 90% of nurses are surgical clinic nurse, 53% of surgical nurses work willingly and 30% partly willingly. 41% of nurses express that they find their salary insufficient. 57% of them express that she is able to take legal leave. 20% of them work on a permanent day shift basis and 66% on a rotating day and night basis. 60% of them have 4-6 night duty in average per month. The length of service of 42% of nurses is between 11-20 years, 31% of nurses have a length of service at the institution between 2-5 years, 25% of them have that between 0-1 year and 34% of nurses take care of 7-10 patients a day.

On Table 1, the comparison of average scores on the scales of individual workload perception, occupational stress, and medical error attitude according to the descriptive attributes of nurses can be observed. Any significant association cannot be found between the scales of individual workload perception, occupational stress, medical error attitude and the age, sex, marital status, number of children, educational status, existence of dependents, salary satisfaction, taking official leaves ($p>0.05$). The score of surgical nurses, working unwillingly at their clinics on the occupational stress scale (43.29±6.46) is found significantly higher than that of the nurses working willingly (39.6±5.10) and partly willingly (41.70±4.76). A significant difference is discovered between the average score of surgical nurses on the scale of occupational stress and the willingness to work at the related clinic ($p= 0.037$), (Table 1).

There is no significant difference between the average scores on the scales of individual workload perception, occupational stress, medical error attitude and the work unit, assignment, working pattern, monthly average number of night duty, length of service at the institution, daily number of patients taken care ($p>0.05$), (Table 1).

Table 1. Comparison of Personal Characteristics and Scale Score Average of Nurses

Descriptive Characteristics	S	Workload Perception X ± SD	Occupational Stress X ± SD	Medical Error Attitude Scale X ± SD
Age groups				
Age average of nurses	36.63±7.69			
19-30 years	21	73.38± 9.80	41.52±6.33	40.48±3.68
31-40 years	48	73.00± 8.67	40.50±4.90	42.77±5.81
41-55 years	31	73.94± 9.40	40.97±5.59	42.52±4.18
		H= 0.051	H= 0.355	H= 4.58
		p= 0.975	p= 0.837	p= 0.101
Gender				
Female	91	72.97±9.12	40.98 ± 5.50	42.36 ± 4.97
Male	9	77.44 ±7.65	39.65 ± 4.24	40.67 ± 5.17
		Z=-1.52	Z=-0.525	Z=-0.815
		p=0.129	p=0.601	p=0.415
Marital status				
Married	76	73.04±9.67	40.83± 5.17	42.20±4.92
Single	24	74.42±6.83	40.96± 6.17	42.25± 5.31
		Z= -0.186	Z= -0.222	Z=-0.291
		p= 0.853	p= 0.824	p=0.771
Number of children (n=76)*				
<3 Children	41	73.85±9.09	40.81±5.67	42.04±4.63
≥3 Children	17	73.05±8.91	40.36±4.05	43.23±5.50
No Child	18	72.64±9.43	41.40±5.97	41.68±5.32
		H=0.569	H= 0.269	H= 2.41
		P= 0.752	p= 0.874	p= 0.301
Education status				
High School	11	76.55±5.94	41.00±7.33	41.55±4.32
Associate degree	44	72.16±9.76	41.86±5.07	41.73±5.31
Undergraduate and Graduate	45	73.78±8.91	39.84±5.11	42.84±4.83
		H= 1.57	H= 3.31	H= 1.01
		p= 0.455	p= 0.191	p= 0.604
Existence of dependants				
Yes	56	74.25±8.63	40.71±5.24	42.46±5.11
No	44	72.25±9.56	41.05±5.64	41.89±4.87
		z= -0.977	z= -0.251	z= -0.941
		p= 0.329	p=0.802	p= 0.347
Willingness to work				
Yes	53	74.60±9.15	39.60±5.10	43.00±5.29
No	17	72.00±8.55	43.29±6.46	42.00±4.77
Partially	30	71.97±9.16	41.70±4.76	40.93±4.39
		H= 1.555	H= 6.591	H= 3.012
		p= 0.459	**p= 0.037**	p= 0.222
Salary satisfaction				
Sufficient	6	73.17±7.52	40.17±4.26	40.67±5.39
Partly Sufficient	35	74.83±8.74	40.34±5.14	42.51±5.80
Insufficient	41	72.39±8.64	40.12±5.02	42.63±4.86
Quite Insufficient	18	72.83±11.21	43.78±6.42	41.17±3.29
		H= 2.958	H= 5.458	H= 2.622
		p= 0.398	p= 0.141	p= 0.454
Taking official leave				
Yes	57	73.93± 8.95	41.05± 5.65	41.89± 5.70
No	43	72.63± 9.25	40.60± 5.10	42.63± 3.87
		Z= -1.108	Z= -0.464	Z= -0.409
		p= 0.268	p= 0.643	p= 0.683

Footnote: ***n** is accepted as the number of married nurses.

Table 2. Comparison of Working Characteristics of The Nurses and The Mean Scale Score

Work unit	S	Workload Perception X ± SD	Occupational Stress X ± SD	Medical Error Attitude Scale X ± SD
Cardiovascular Surgery Service	16	72.75±9.35	40.31± 4.80	43.50± 5.22
Plastic+ Neurosurgery Service	10	75.40±6.65	43.00± 7.09	40.20± 3.91
Urology+ Thoracic Surgery Service	12	72.25±7.41	43.58± 5.74	41.67± 5.37
General Surgery Service	10	75.30±8.12	39.00± 6.63	42.70± 5.25
Orthopedics Service	10	77.10±6.49	40.10± 5.38	42.90± 4.77
Pediatric +General Surgery Service	11	74.36±7.80	39.73±4.43	42.82± 7.90
ENT+ Eye Service	8	74.38±14.9	39.38± 5.40	42.38± 3.20
All Surgery Services	23	70.22±9.96	41.09± 4.54	41.61± 4.04
		H= 6.04	H= 7.51	H= 4.53
		p= 0.534	p= 0.378	p= 0.717
Assignment				
Head of Clinic	10	74.90± 8.63	39.90± 4.20	42.70± 5.12
Clinic Nurse	90	73.20± 9.14	40.97± 5.52	42.16± 5.00
		z= -0.271	z= -0.345	z= -0.432
		p= 0.787	p= 0.731	p= 0.666
Working pattern				
Permanent Day Shift	20	75.30± 6.79	39.40± 3.95	41.25± 5.00
Permanent Night Shift	14	75.71± 6.19	42.86± 6.11	40.36± 3.93
All-Total	66	72.29± 10.02	40.88± 5.55	42.89± 5.09
		H= 2.352	H= 2.542	H= 4.31
		p= 0.308	p= 0.281	p= 0.116
Monthly average number of night shift				
1-3 duty	17	75.18± 9.39	40.41± 4.40	41.65± 5.59
4-6 duty	60	73.55± 8.74	41.13± 5.76	42.58± 5.31
7-10 duty	17	70.12± 10.25	41.00± 5.62	41.53± 4.05
No Duty	6	75.67± 7.17	39.00± 4.10	42.00± 1.67
		H= 3.87	H= 0.679	H= 0.732
		p= 0.276	p= 0.878	p= 0.866
Total length of service				
0-1 year	8	78.50± 8.07	40.88± 5.25	40.63± 3.62
2-5 years	16	75.19± 4.71	41.06± 6.14	38.94± 4.64
6-10 years	8	69.25± 12.51	40.13± 4.12	42.50± 5.13
11-20 years	42	71.52± 9.63	41.19± 5.43	43.57± 5.45
21-35 years	26	74.92± 8.57	40.42± 5.60	42.42± 3.87
		H= 5.7	H= 0.357	H= 10.829
		p= 0.223	p= 0.986	p=0.029
Length of service at the institution				
0-1years	25	74.24± 9.96	41.00± 5.24	41.36± 6.26
2-5years	31	72.90± 8.60	39.84± 4.68	42.68± 4.64
6-10years	23	71.78± 9.07	41.61± 6.53	42.30± 4.35
11-20years	14	75.14± 8.31	42.00± 5.88	42.29± 4.53
21-35 years	7	74.00± 10.74	40.14± 4.30	42.71± 5.19
		H= 1.587	H= 1.684	H= 1.636
		p= 0.811	p= 0.794	p= 0.802
Daily number of patients taken care				
1-3 patients		74.00± 6.18	40.59± 6.17	43.12± 6.37
4-6 patients	17	72.17±7.23	40.42± 4.25	42.67± 5.30
7-10 patients	12	72.71± 11.41	41.21± 5.13	41.50± 4.97
11-14 patients	34	70.83± 9.33	39.17± 4.02	43.17±2.04
15-25 patients	6	74.71± 8.31	41.13± 6.05	42.13± 4.57
	31	H= 1.755	H= 1.025	H= 11.055
		p= 0.781	p= 0.906	p= 0.901

The average score of surgical nurses, with a length of service between 2-5 years, on the medical error attitude scale is 38.94±4.64, that of the nurses with a length of service between 11-20 years 43.57±5.45. A statistically significant difference is detected between the total length of service of surgical nurses and their average score on the medical error attitude scale (p= 0.029). Also, the difference between the average scores on the scales of individual workload perception, and occupational stress and the total length of service is not statistically significant (p>0.05), (Table 2).

Any statistically significant different is not found between the surgical nurses' average scores on the scales of individual workload perception, occupational stress, and medical error attitude and their responses to the questions "have you ever made at least one error jeopardizing the patient safety during your length of service?" and "have you ever seen any error of your team mates jeopardizing the patient safety?" (p>0.05), (Table 2).

On Table 3, the average scores on the sub-dimensions of individual workload perception scale are displayed. A significant correlation is found between the average scores on the individual workload perception scale's sub-dimensions are manager support, peer support, unit support, and work environment- and the total average scores of individual workload perception (p<0.05). On the other hand, no significant association is observed between the intent to keep the present job and the total average scores on the scale of individual workload perception (p>0.05). As the score on the sub-dimension of manager support increases, the scores on the sub-dimensions of peer support and unit support increase. When the unit's support increases, the score on work environment also increases (Table 3).

On Table 4, the comparison of the average scores on the scales of individual workload perception, occupational stress, and medical error attitude is displayed. The surgical nurses' average score on the individual workload perception scale is 73.37±9.06, their average score on the occupational stress scale is 42.21±4.99, and their average score on the medical error attitude scale is 40.86 ±5.40. Any significant association is not detected between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude (p>0.05), (Table 4).

No statistically significant association is found between the scales of individual workload perception, occupational stress, and medical error attitude. (p>0.05), (Table 5).

Table 3. Association Between Average Scores on The Sub-Dimensions of Individual Workload Perception Scale

Sub-dimensions of Individual Workload Perception Scale	Average Scores X ± SS	Min. Max.	p	r *
Manager Support	17.49 ± 4.18	6 – 26	0.000	-0.712***
Peer Support	26.85 ± 5.32	14 – 40	0.000	-0.685***
Unit Support	5.37 ± 2.21	2 – 10	0.000	-0.410***
Work Environment	14.47 ± 2.77	5 – 21	0.004	-0.287***
Intent to Keep the Present Job	9.19± 1.96	6 – 15	0.283	-0.108
Overall average score on individual workload perception scale	73.37 ± 9.06	40- 94	0.419	-0.082
			—	

*r: Pearson korelasyon analizi
***p<0.01

Table 4. Comparison of Average Score of Individual Workload Perception Scale, Occupational Stress Scale, And Medical Error Attitudes Scale

Scales	Average Scores X ± SS	Min. - Max.	p
Individual Workload Perception Scale	73.37 ± 9.06	31 – 155	0.419
Occupational Stress Scale	42.21 ± 4.99	18 – 72	0.168
Medical Error Attitude Scale	40.86 ± 5.40	16 – 80	0.084

Table 5. Association Between Score on the Scales of Individual Workload Perception, Occupational Stress and Medical Error Attitude Scale the Surgical Nurses'

	Medical Error Scale Attitude Scale		Occupational Stress Scale		Individual Workload Perception Scale	
	r	p	r	p	r	p
Individual Workload Perception Scale	-.082	.419	.-174	.084	_	_
Medical Error Attitude Scale	_	_	.-139	.168	-.052	.187
Occupational Stress Scale	.-069	.152	_	_	.-066	.276

r: Pearson Correlation Analysis

Discussion

Any statistically significant difference is not identified between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude and the variable of age. Like our study, Cebeci (2012) ascertained in the study on nurses that the age variable has not any impact on the proneness to make a medical error. No statistically significant difference is discovered among the scales of individual workload perception, occupational stress, and medical error attitude and the sex variable. Yigitsoy (2014) pointed out in the study on nurses that the sex variable affects the medical error. Similarly, to our study, Tel et al (2012) found that the sex variable does not result in any significant difference in the scores of occupational stress. No statistically significant difference is identified between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude and the marital status. Arikan and Karabulut (2004), Ercevik (2010) and Kopuz (2013) stated also in their studies that the occupational stress is not affected by the marital status. Mohsen, Marzieh and Negin (2012) stated nurses' experiences, the following items were some of the stress factors for the nurses: lack of experience, poor social status, lack of proper logistics, nurse shortages, irregularities in the organization, managers' poor performance, colleagues' poor relations, and patients' conditions.

No statistically significant difference is discovered between the scales of individual workload perception, occupational stress, and medical error attitude and the number of nurses' children. Kopuz (2013) and Ercevik (2010) expressed in their studies that as the number of children increases, the occupational stress decreases. In the study of Arikan and Karabulut (2004) it was ascertained that the occupational stress is not affected by the number of children.

Any statistically significant difference is not found between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude and the educational status and the existence of surgical nurses' dependent. However, Yang et al. (2017) found that education had a negative relationship with job stress, namely, that nurses with higher levels of education had lower levels of perceived job stress. Tunaligil (2013) pointed out in the study on Emergency Medical Technicians that the educational status and the number of persons in the household do not have any impact on the occupational stress. This result is similar to our study (Eroglu, 2011).

The scores of the nurses, working unwillingly at their clinics, on the occupational stress scale is found

statistically significantly higher than those of the nurses working willingly or partly willingly. Eroglu (2011) discovered in the study on nurses that the burnout level of the nurses working willingly is lower. This finding leads to think that the professional satisfaction of the nurses working willingly is high and their occupational stress is less, thus. Likewise, it can be deduced that the nurses with higher professional satisfaction and lower occupational stress have a higher awareness about the medical error attitude.

Any statistically significant difference is not identified between the average scores on the scales of individual workload perception, occupational stress, and medical error and the salary satisfaction of surgical nurses. Unlike our study, Kopuz (2013) determined in her study that the nurses dissatisfied with their salary have a higher occupational stress.

No statistically significant difference is detected between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude and the surgical nurses' state of taking legal leave. Eroglu (2011) found in the study on nurses that the nurses do not encounter any problem in taking legal leave. This result is similar to that of our study.

No significant difference is found between the average scores on the scales of individual workload perception, occupational stress, and medical error attitude and the work units. Differently from our study, Dikmen et al (2014) determined in their study on nurses that the work units (surgical clinics) have an impact on the probability of making medical error. Dagget, Molla and Belachew (2016) in this study; working unit/department particularly working in the chronic illness follow-up clinic, mutual understanding at work between nurse, physician and job satisfaction were predictor variables for overall job related stress. This finding may result from the similarity between the physical conditions, work intensity, and the number of working nurses at the surgical clinics where the study was conducted.

Any statistically significant difference is not discovered between the average scores on the scales of individual workload perception, occupational stress, and medical error and the assignment. Unlike our study, Tel et al (2012) stated in their study that the occupational stress level of clinical nurses is higher than that of clinic head nurses. It can be thought that the limited number of nurses working as the head of clinic in our study leads to this result.

The average scores of the surgical nurses, working permanent night shift, on the scales of individual workload perception (72.29±10.02) and occupational stress (40.88± 5.55) are lower but their scores on the medical error attitude scale (42.89± 5.09) are higher. Any statistically significant difference is not discovered between the working pattern of surgical nurses and their average scores on the scales of individual workload perception, occupational stress, and medical error attitude. Hughes and Ortiz (2005) pointed out in their study that the shift work increases the incidence of making medical error. Hongxia et al (2019) found that shift work impinged on quality of life; some researchers reported shift work as an important cause of long-term stress, particularly for those involving night duty rotations. Although any statistical difference is not found in our study, the occupational stress, individual workload perception, and medical error attitude have a directly proportional trend.

Any statistically significant difference is not found between the monthly average number of night duty and the average scores of surgical nurses on the scales of individual workload perception (75.67±7.17), occupational stress (41.13±5.76), and medical error attitude (75.67±7.17). While the individual workload perception of surgical nurses with no night duty is higher, the average scores of surgical nurses, being on duty 4-6 times a month, on the scales of occupational stress and medical error attitude are higher.

Ercevik (2010) and Kopuz (20139 stated in their study that the nurses working in shifts and with more weekly work hours have a higher occupational stress. The causal mechanism behind this result can be considered that the nurses being on night duty 4-6 times a month have to work daily in order to complete weekly work hours, which is 40 hours, and it leads to increase their workload perception and occupational stress, and a negative medical error attitude, thus.

A statistically significant difference is identified between the nurses' total length of service and their average score on the medical error attitude scale. The overall average scores of the nurses -working 6 months-1 year and 2-5 years in surgical clinics- on the medical error scale are statistically significantly lower than those of nurses working 6-10 years, 11-20 years, and 21-35 years. Unlike our study, Parshuram et al (2008) ascertained that the nurses working more than 10 years make less medical error. Sheu et al (2008) discovered in their study that 53.7% of nurses have less than 2 years of professional experience and 31.1% of nurses have 25 years; the nurses with little or no experience make more medical error. Balcik (2013) determined in her study that the nurses working less than five years have more occupational stress. This finding may be interpreted that while the nurses working less than five years' experience more

occupational stress and medical error, they do not behave in an self-confident and brave manner due to their inexperience.

No statistically significant difference is detected between the number of patients taken care by surgical nurses and the average scores of nurses on the scales of individual workload perception, occupational stress, and medical error attitude. Differently from our study, Ercevik (2010) discovered in the study that as the number of patients rises, the occupational stress of nurses rises. This result can be explained by the fact that as the number of patients per nurse increases, the support of units such as secretariat, physiotherapy, social service expert increases at the institution the study was conducted.

Any statistically significant difference is not identified between the average scores of nurses on the scales of individual workload perception, occupational stress, and medical error attitude and their state of making at least one error jeopardizing the patient safety during their length of service. In the research conducted by Ozata and Altunkan (2010), 93.8% of nurses responded as "No" to this question. Our study is in accordance with the literature.

The average score of surgical nurses, participating in our study, on the individual workload perception scale is 73.37 ± 9.06. Considering the fact that the scale ranges between 31 and 155, this result demonstrates that the surgical nurses' individual workload perception is within the normal level. Tan et al (2012) determined in their study that the working environment perception of nurses is high. Our study results are not similar to the literature (Cox. 2007).

The average score of nurses, participating in our study, on the scale of occupational stress is 40.86 ± 5.40. Regarding the fact that the scale ranges from 18 to 72, the surgical nurses experience the occupational stress at the medium level. Kopuz (2013) found in her study the score of nurses on the occupational stress scale as 38.89 ± 8.92. In the study done by Ercevik (2010) the occupational stress score of nurses is 40.77 ± 682. Our study is in accordance with the literature (Ayaz and Beydag, 2014).

The average score of nurses, participating in our study, on the scale of medical error attitude is 42.21 ± 4.99. Considering the fact that the scale of medical error attitude ranges from 16 to 80, the scores of surgical nurses on the medical error attitude scale is at the medium level. Güleç21 ascertained that the nurses are more positive in reporting the medical error in case a medical error is made. Dikmen et al (2014) and Cebeci et al (2012) expressed in their studies on nurses that their score of proneness to medical error is low. Our study is not similar to the literature at this point.

The highest correlation of total score on the individual workload perception scale is with the score of manager support. After that, the peer support score, unit support and working environment support score are correlated respectively. No significant association is found between the intent to keep the present job and the total score on the individual workload perception scale.

The analysis of individual workload perception scale's sub-dimensions demonstrates that the nurses perceive the peer support more positive. Then, the manager support, working environment perception, unit support, and the intent to keep the present job come respectively. Cox (2007), Saygili and Celik (2011) stated, in their studies on pediatric nurses and medical professionals respectively, that the sub-dimension perceived positive most is the peer support. Our study is not in congruence with the literature. The average scores of surgical nurses, participating in our study, on the scale of individual workload perception is 73.37 ± 9.06. Considering the fact that the scale ranges between 31 and 155, this result shows that the individual workload perception of surgical nurses is within the normal level. Tan et al (2012) identified in their study that the nurses have a high working environment perception. Our study is not similar to the literature.

The average score of nurses, participating in our study, on the occupational stress scale is 40.86±5.40. Taking into consideration that the scale ranges from 18 to 72, the surgical nurses have a medium level occupational stress. Kopuz (2013) determined in her study that the nurses' score on the occupational stress is 38.89±8.92. The nurses' score on the occupational stress is found as 40.77 ± 682 in Ercevik's (2010) study. Our study is in congruence with the literature. The average score of surgical nurses, participating in our study, on the scale of medical error attitude is 42.21 ± 4.99. Considering the fact that the scale ranges between 16 and 80, the surgical nurses perceive the medical error attitude scale at the medium level. Gulec (2012) as certained in the study that the nurses are more positive in reporting the medical error as the latter occurs. Dikmen at al (2014) and Cebeci et al (2012) identified in their studies that the nurses have low score on the proneness to medical error. Our study is not in accordance with the literature.

Any statistically significant association is not discovered between the total scores on the scales of individual workload perception, occupational stress, and medical error attitude. As Kopuz (2013) stated in

her study that the optimistic approach decreases, obedient approach increases, and seeking a social support decreases, when the occupational stress increases. Saygılı and Celik (2011) asserted in their study that the rise of workload leads the treatment and care to be interrupted, distraction, medical errors to be made.

Conclusion

It was identified that the overall average scores of surgical nurses on the scales of individual workload perception, occupational stress, and medical error attitude are directly proportional.

The facts that no association is found between the scales employed in our study; the surgical nurses' overall scores and average scores on the sub-dimensions of the scale of individual workload perception are within the normal level; the surgical nurses experiencing a medium level occupational stress have a positive medical error attitude lead us to think that any significant association is not found between them. As the subscale score of executive support of individual workload perception scale increases in surgical nurses, peer support and unit support score also increase. As the unit support score increases, so does the work environment score. The involuntary employees' job-related tension scale score in the service was significantly higher than the willing and partially willing employees. The difference between individual workload perception scale, work-related tension scale, attitude scale in medical errors and other independent variables was not statistically significant.

Mean score of the intention to carry out the current job of the individual workload perception scale in surgical nurses is more negative in nurses between 19-30 age group. The average score of the peer support subscale of the individual workload perception scale was higher in male nurses. The average score of peer support subscale of individual workload perception scale is higher in surgical nurses who do their job voluntarily.

The overall average scores of surgical nurses on the scales of individual workload perception, occupational stress, and medical error attitude are directly proportional.

Ethics Committee Approval: Ethics committee approval was received for this study from Clinical Research Ethics Committee of Ordu University. (Decision Number: 12.02.2016-2016/2)
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RESEARCH ARTICLE

The Perception of Health and Cyberbullying Sensitivity in Adolescents

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Abstract

Objective: This study aims to determine the relationship between adolescents' perceptions of health and their susceptibility to cyberbullying and the factors that affect them.

Method: The targeted population of this descriptive study is the students of middle schools managed by the Directorate of National Education in a province in the Black Sea region. The selection of subjects was made by a simple random sampling method from two determined middle schools in the city center (n=381). The data of the study were collected with the Introductory Information Form, the Perception of Health Scale and the Cyberbullying Sensitivity Scale. The face-to-face interview method was used in data collection. The research was conducted according to ethical principles.

Results: Of the adolescents who participated in the study, 55.4% were girls and 72.7% lived in a nuclear family and most of the parents' educational level was high school graduated. There is a significant difference between the cyberbullying sensitivity scale score averages according to the gender of adolescents ($p<0.05$). There was a negatively significant association between the precision sub-dimension of the perception of health scale and the cyberbullying sensitivity scale for adolescents ($p<0.05$).

Conclusion: The study found that both male and female adolescents had a high level of cyberbullying sensitivity, good health perceptions, higher cyberbullying sensitivity of female students and a negative relationship between the 'precision' sub-dimension of health perception and the cyberbullying sensitivity. It is suggested that the awareness of adolescents should be raised about their perception of good health and similar studies should be repeated.

Key words: Adolescent, Perception of Health, Cyberbullying

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Introduction

The perception of health is a combination of an individual's personal feelings, thoughts, prejudices, and expectations regarding his/her own health (Velderman et al., 2010). Having positive beliefs about the individual's own health is defined as "the perception of good health" while having negative beliefs is defined as "the perception of bad health". The perception of good health aims to ensure that people acquire and sustain life behaviors that improve

health (Velderman et al., 2010; Bademli and Lok, 2018).

The perception of health in the adolescent period, which has its own characteristics and is complex, is decisive for the following years. Adolescents may adopt patterns of behavior that improve their health or gain unhealthy lifestyle behaviors that would harm both themselves and others (WHO, 2016). Cyberbullying is one of the conditions that has become increasingly common during the adolescent periods, considered a major public health issue, and thought to cause unhealthy lifestyle behaviors (Baldry et al., 2019).

Cyberbullying is the use of information and communication technologies by an individual or group maliciously and repetitively with the intent to harm other individuals (Katz et al., 2019). Adolescents are the most exposed ones to the act of cyberbullying (Baldry et al., 2019; Katz et al., 2019). Studies with adolescents in Turkey have found that cyberbullying is at a fairly high level (Akbulut and Eristi, 2011; Yaman and Sonmez, 2015; Kilinç and Gunduz, 2017; Uludasdemir and Kucuk, 2019).

Studies have shown that sociodemographic characteristics, media, school, and psychological factors can also affect cyberbullying, hence, cyberbullying sensitivity (Shin and Ahn, 2015; Olenik-Shemesh and Heiman, 2017; Al-Rahmi et al., 2018), and the perception of health is thought to be one of these variables. We encounter no studies on adolescents' health perceptions and sensitivities to cyberbullying in the literature. For this reason, this study was conducted to determine the relationship between adolescents' health perceptions and sensitivities to cyberbullying.

Methods

Study Aim and Design

The design of this study is descriptive-correlational. This study investigated the relationship between the health perceptions of adolescents between the ages of 12 and 15 and their sensitivity to cyberbullying and the factors affecting them. The criteria for participation in the survey were to be willing to participate in the survey and to be in the mentioned age range.

Participants

The population of this study consists of the 5, 6 and 7th-grade students of twenty middle schools in a province in the Black Sea region. In the study, the sample size was determined as 370 with 95% confidence interval by the known population sampling method. To ensure equal representation of the population, two secondary schools from all socio-economic levels (low, medium, high) were determined by a simple random sampling method. The classes to be sampled in 5, 6 and 7th grades of the determined schools were also determined using a simple random sampling method. Written and oral consent was obtained from the parents and students who were studying in these classes and voluntarily wanted to participate in the research. The study was completed with 381 adolescents after excluded 43 students who did not agree to participate in the research and 18 students who did not come to school or were on leave at the date of data collection (n = 381).

Data Collection

In this research, the Introductory Information Form, Perception of Health Scale (PHS) and Cyberbullying sensitivity scale were used as data collection tools. The face-to-face interview method was used as a method of data collection. The questionnaire was filled out in the class and it took approximately 25-30 minutes to complete each form.

Introductory Information Form: This form, prepared by the researchers, consists of 7 questions about sociodemographic characteristics such as age, gender, family type, and health status and social activity

Perception of Health Scale (PHS); The scale developed by Diamond et al (2007) was translated into Turkish by Kadioglu and Yildiz (2012). PHS is a five-point Likert scale consisting of 15 items and four sub-factors. The item numbers of sub-dimensions of the scale are as follows; The control center, 1,2,3,4,5; Precision, 6,7,8,9; Importance of health, 10,11,12; Self-awareness, 13,14,15. For the scale, positive statements are rated as "very agreeable= 5", "I agree= 4", "I am undecided= 3", "Disagree= 2", "I do not agree at all. Also, 2, 3, 4, 6, 7, 8, 12, 13rd and 15th articles are negative expressions. Negative expressions were reverse scored. The minimum score on the scale is 15 and the maximum score is 75. The Cronbach alpha value of the scale is 0.82 (Diamond et al., 2007; Kadioglu and Yildiz, 2012). In this study, the scale Cronbach alpha value was found to be 0.51.

Cyberbullying Sensitivity Scale (CBSS); The scale developed by Tanrikulu et al. (2013) consists of 14 items and is answered on a triple scale (Yes, Sometimes, No). Questions on the scale are evaluated as "Yes"-3 points, "Sometimes"-2 points, "No"-1

point. The scale has a single factor structure, and the highest score from the scale is 42, and the lowest score is 14. The scale Cronbach alpha value is 0.87 (Tanrikulu et al., 2013). In this study, the Cronbach alpha value of scale was found to be 0.82.

Data Analysis

IBM SPSS Statistics for Windows, (Version 20.0; Armonk, New York) statistical package software was used to evaluate research data. Number, percentage, arithmetic mean, standard deviation and median (min, max) values were given for the descriptive properties of the data. Shapiro-Wilk normality test was used to see if the data showed normal distribution. The data did not show a normal distribution. Therefore, Mann Whitney U, Kruskal Wallis H, and Spearman nonparametric correlation tests were performed to statistical tests for hypothesis testing and their assumptions. The level of statistical significance was accepted as $p<0.05$.

Ethical Consideration

For the research, approval from the ethics committee of a university (Protocol Number: 2019-4/8 Date:10.07.2019), the written permission from the relevant institutions, and the oral and written consent from the students and their families who participated in the research were obtained.

Results

Looking at the characteristics of adolescents, 55.4% of the participants were female students, 72.7% had the nuclear family, high school was the most common level of education as 36.7% in the mother's education, and as 40.7% in the father's education, also, 87.7% of the participants expressed themselves as healthy and 53.5% of those used to involve in a social activity. When the sensitivity levels of cyberbullying according to the characteristics of adolescents were examined, the difference between the score averages of adolescents from the cyberbullying sensitivity scale was found to be statistically significant according to their gender. ($p\leq0.001$) (Table 1).

Table 1. The Levels of Cyberbullying Sensitivity by Descriptive Characteristics of Adolescents (n=381)

Age Mean±SD 13.25±1.187				
Descriptive Characteristics	**n**	**%**	**Median (Min-Max)**	**Test and p**
Gender				
Female	211	55.4	36.00 (13.00-42.00)	U=14334.500
Male	170	44.6	34.00 (21.00-39.00)	**p=0.001**
Family Type				
Nuclear family	277	72.7	36.00 (13.00-42.00)	KW=.804 p=0.669
Extended family	80	21.0	35.00 (22.00-39.00)	
Broken Family	24	6.3	35.00 (26.00-40.00)	
Mother's Education Status				
First-secondary education	116	30.4	33.50 (26.00-39.00)	KW=.651 p=0.722
High school	140	36.7	36.00 (29.00-39.00)	
University and higher	125	32.8	35.50 (13.00-42.00)	
Father's Educational Status				
First-secondary education	109	28.6	35.00 (16.00-39.00)	KW=.699 p=0.705
High school	155	40.7	35.00 (21.00-40.00)	
University and higher	117	30.7	36.00 (13.00-42.00)	
Health situation				
Healthy	334	87.7	35.50 (13.00-42.00)	U=6786.000 p=0.130
Not healthy	47	12.3	34.00 (21.00-39.00)	
Social Activity				
Involving	204	53.5	36.00 (13.00-40.00)	U=17045.500
Not involving	177	46.5	35.00 (16.00-42.00)	p=0.344

The control center sub-dimension score average for the perception of health scale of adolescents is 16.62±2.45, the precision sub-dimension score average is 12.67±2.75, the importance of health sub-dimension score average is 10.29±2.16, the self-awareness sub-dimension score average is 8.21±1.79 and the total health perception score average is 47.81±4.79 (Table 2).

Table 2. The Perception of Health Score Averages of Adolescents (n=381)

The Perception of Health Sub-dimensions	Mean±SD	Min-Max
Control Center	16.62±2.45	7-21
Precision	12.67±2.75	4-20
The Importance of Health	10.29±2.16	3-15
Self-Awareness	8.21±1.79	3-14
Total	47.81±4.79	34-61

It was found that there was a negative correlation between the precision sub-dimension score averages of the adolescents' health perception scale and the cyberbullying sensitivity ($p<0.05$). When the relationship between the perception of health and cyberbullying sensitivity total scores was examined, it was not found a statistically significant correlation ($p>0.05$) (Table 3).

Table 3. The Relationship Between Adolescents' Perception of Health and Cyberbullying Sensitivities (n=381)

	The Sensitivity to Cyberbullying	
The Perception of Health Sub-Dimensions	**r**	**p**
Control Center	-.22	0.668
Precision	-.116	**0.024**
The Importance of Health	.079	0.122
Self-Awareness	.038	0.456
Total Points	.006	0.908

Discussion

The findings of the study, which aimed to determine the relationship between the health perceptions of adolescents in Turkey and their sensitivity to cyberbullying, were discussed in this section. The cyberbullying sensitivity score of adolescents participating in the study was 36.00 for female students and 34.00 for male students. Accordingly, it is observed that both male and female adolescents have a high level of sensitivity to cyberbullying. In a study of adolescents, the sensitivity score for cyberbullying was expressed as high as 33.04 for girls and 30.81 for boys (Bridge and Duman, 2019). In a study conducted to determine the cyberbullying sensitivity of teacher candidates, the scale score of the participants was stated as similarly high as 32.37 (Uysal et al., 2014). The high level of cyberbullying sensitivity in both male and female students may be thought to be due to increased bullying exposure. Some studies have shown that exposure to bullying develops sensitivity (Herge et al., 2015; Fridh et al., 2015).

In the study, it was determined that there was a significant correlation between the average score of cyberbullying sensitivity scale according to the gender of the adolescents ($p\leq.001$). Accordingly, female students were determined to be more sensitive than male students. When the literature is examined, it is thought that the problems that adolescents experience with cyberbullying are closely related to main characteristics such as gender, race, and culture (Horzum and Ayas, 2013; Tomé-Fernández et al., 2019). Many studies support these findings of our study. In a study on the students of the public relations department, it was stated that women were more sensitive to cyberbullying than men (Aktan and Cakmak, 2015). Another study on school counselors reported that female participants were much more sensitive to cyberbullying than men (Horzum and Ayas, 2013). This difference in male and female students can be explained by the fact that women are more sensitive, empathetic, helpful, tolerant and responsible than men.

In the study, the control center sub-dimension score average of the adolescents' health perception scale was 16.62±2.45, the precision sub-dimension score average was 12.67±2.75, the importance of health sub-dimension score average was 10.29±2.16, the self-awareness sub-dimension score average was 8.21±1.79 and the total health perception points average was 47.81±4.79. In this study, the sub-dimension in which adolescents scored the highest was the 'control center', while the 'self-awareness' score average was the lowest. In one of the restricted studies evaluating the health perception of adolescents, the highest score among the scale sub-dimensions was ‘control center’ while the lowest score was ‘self-awareness’ similar to this study (Kurt, 2019). In a study evaluating the relationship between nursing students' health perception and health improvement behaviors, participants stated to perceive their health as 'good' and have the highest level of belief in 'controlling their health' (Aciksoz et al., 2013). This indicates that students have control over their health, as in our study. Also, another study on nursing students' health perceptions reported that the highest score in the sub-dimensions of health perception was the 'control center' and the lowest was expressed as the mean of 'self-awareness' score (Ozdelikara et al., 2018). Adolescent's high perception of health may have an advantage in increasing positive health behaviors for future years

(Zaybak and Fadıloglu, 2004; Kurtuncu et al., 2015). In this study, it can be said that adolescents have a good level of health perception.

It was found that there was a negative correlation between the 'precision' sub-dimension of the health perception scale of adolescents and the score averages for their sensitivity to cyberbullying ($p<0.05$). Accordingly, as the precision on the perception of health decreases, the sensitivity to cyberbullying increases. A study on peer victimization in adolescents in the United States found that peer victimization and cyberbullying are directly and indirectly related to general health perception and somatic complaints (Herge et al., 2015). The limited studies available in the literature support the relationship between health perception and cyberbullying sensitivity in our study. The rapid change of scientific and technological knowledge, in other words, the lack of "precision" in the field of health can increase the cyberbullying sensitivity. That is why the perception of health is a factor that affects the individual's responsibility, behavior and sensitivity (Velderman et al., 2010).

Conclusion

In this study, which was conducted to determine the relationship between adolescents' health perceptions and their cyberbullying sensitivity and the factors affecting them, it was found that both male and female adolescents had a high sensitivity to cyberbullying, those female students had higher sensitivities about cyberbullying by gender, that their perceptions of health were at a good level, that there was a negative relationship between the sub-dimension of health perception 'precision' and the sensitivity to cyberbullying.

The increase of studies in different regions and with different samples to demonstrate health perception and sensitivity to cyberbullying, the expansion of the studies to include the school-family and social circle, and the rise of awareness about the good perception of health were recommended.

Ethics Committee Approval: Ethics committee approval was received for this study from Faculty of Nursıng Clinical Research Ethics Committee of Atatürk University. Ethics no: 2019-4/8.

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RESEARCH ARTICLE

Clinicopathological Profile of Thyroid Carcinomas: A 10-Year Experience in a Tertiary Care Institute

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Abstract

Objective: Thyroid gland is an important endocrine gland and thyroid cancers (TC) are the most noteworthy disease of the thyroid gland. Although thyroid surgery is performed for most particularly for malignancy, thyroidectomies still maintain a large part of surgical operations. We aimed to investigate the incidence and subtypes of the thyroid cancers in present study, with our 10 years' experience of thyroid surgery.

Methods: Data of patients who underwent thyroidectomy were retrospectively analyzed. The patients who underwent bilateral total thyroidectomy were included to the study. Patients' age, gender and histopathological results were recorded. According to the histopathological reports we divided the patients into two groups either as benign or malignant.

Results: A total of 3632 patients were included in the study. 2999 (82.6%) patients were in benign group and 633(17.4%) patients were in malignant group. The subtypes of malignant tumors were papillary carcinoma in 591 (93.4%), medullary carcinoma in 16 (2.5%), follicular carcinoma in 14 (2.2%), oncocytic (hurtle cell) carcinoma in 7 (1.1%) and undifferentiated (anaplastic) in 5(0.8%) of the cases.

Conclusion: Incidental thyroid cancers are not a rare entity after pathological examination of thyroid specimen after surgery. Therefore, we suggest careful evaluation and bilateral leb lobectomy ectomy in surgical treatment of thyroid conditions

Key words: Thyroid, Benign, Malignant, Multicentricity

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Introduction

Thyroid gland is an important endocrine gland associated with plenty of diseases which are classified as congenital, genetic and sporadic. Surgery is indicated when cosmetic problems, compression symptoms and malignancy is the case. Although thyroid surgery is performed as the most particularly for malignancy, thyroidectomies for other reasons still maintain a large part of surgical interventions of the thyroid gland. However, there might be establishment of diagnosis of malignancy or a suspicion for malignancy before the surgery, incidental cancers should also be encountered by physicians. Thyroid cancers (TC) are the most

important diseases of the thyroid gland. İt is the most prevailing malignant tumor of the endocrine system (Hu et al., 2018). İt constitutes approximately 1% of all human malignancies and is the main cause of mortality among endocrine tumor-related deaths(Are & Shaha, 2006) İn 2010, Jemal et al. reported 44700 new cases of thyroid cancers per year, worldwide, and 1700 deaths annually due to thyroid cancer(Jemal, Siegel, Xu, & Ward, 2010) Annual increase of 5.3% in TC incidence was reported by Magreni et al. in 2015 (Magreni, Bann, Schubart, & Goldenberg, 2015). Despite vast majority of thyroid cancers have low mortality and morbidity, aggressive cancer types of thyroid gland should not be ignored.

We aimed to investigate the incidence and subtypes of the thyroid cancers in this study, with our 10 years experience of thyroid surgery.

Methods

We retrospectively analyzed the data of patients who underwent thyroidectomy between January 2008 and December 2017 in General Surgery Department of University Hospital. This work has been approved by the directorate of the institution date 02.03.2016/349. We included all subjects undergone thyroid surgery. Clinical and radiological records of all patients, especially thyroid sonography, laboratory tests and fine needle aspiration cytology (FNAC) results were recorded and evaluated. The patients who underwent bilateral total thyroidectomy were included the study. The patients with lobectomy were excluded. Patients' age, gender and histopathological results were recorded from the institutional database. According to the histopathological reports we divided the patients into two groups either as benign or malignant. The subtypes of malignant group were classified as papillary carcinoma, follicular carcinoma, medullary carcinoma, oncocytic (hurtle cell) carcinoma and undifferentiated (anaplastic) carcinoma. Malignant group was also investigated for tumor size and presence of multicentricity.

Statistical Analyses

The demographic parameters and pathological results of all patients were recorded and statistically analyzed by SPSS software (SPSS 15.0 for Windows, İBM İnc, Chicago, İL, USA). Comparison of the non-homogenously distributed quantitative variables in study groups were compared by Mann-Whitney U Test and expressed as median (İQR) and qualitative variables were conducted by Chi-Square test and expressed as n (%). A p value less than 0.05 was considered as statistically significant.

Results

A total of 3632 patients included to the study. 2999 (82.6%) patients' histopathological results were benign and the average age of this group was 47.1±12.5 years. 633 (17.4%) patients' histopathological results were malignant with an average age of 47 ± 12.6 years. The age was not statistically significant between benign and malignant groups (p=0.711). Benign group consisted of 2399 (80%) female and 600 (20%) male while malignant group consisted of 509 (80.4%) females and 124 (19.6%) males. As shown in Table 1, gender was not statistically different between benign and malignant groups (p=0.811).

Table 1. Demographic results

		Benign (n=2999)	Malignant (n=633)	p
Mean age (years)		47.1±12.5	47 ± 12.6	0.711
Gender	Female (n, %)	2399 (80%)	509 (80.4%)	0.811
	Male (n, %)	600 (20%)	124 (19.6%)	

Median tumor diameter in malignant group was 15.75 mm (1-90 mm). The tumor diameter was smaller than 10 mm in 319 (50.3%) and bigger than 10mm in 314 (49.7%) of the cases in the malignant group. The subtypes of malignant tumors were as follows: papillary carcinoma in 591 (93.4%), medullary carcinoma in 16 (2.5%), follicular carcinoma in 14 (2.2%), oncocytic (hurtle cell) carcinoma in 7 (1.1%) and was undifferentiated (anaplastic) in 5 (0.8%) of the cases.

The tumor was multicentric in 195 (30.8%) and unicentric in 438 (69.2%) cases in malignant group. Multicentrcity rates of subtypes were 31.1% (n=184) in papillary, 31.2% (n=5) in medullary, 14.3% (n=2) in follicular, 14.3% (n=2) in oncocytic (hurtle cell) and 60% (n=3) in undifferentiated (anaplastic) carcinomas. The relationship between multicentricity and malignant subtypes was not statistically significant (p=0.317).

Patients' histopathological results younger than 50 years of age were consisted of 1718 (82.6%) benign and 361 (17.4%) malignant. For the patients over 50 years of age, 1281 (82.5%) were benign and 272 (17.5%) were malignant tumors. As shown in table 2, malignancy rates of the subgroups according to the age (over or under 50 years) were not statistically different (p=0.906).

Table 2. Histopathological Results

Malignant		n	%	p
Age (years)	<50	361	17.4	0.90
	>50	272	17.5	
Tumor diameter (mm)	<10	319	50.3	0.81
	>10	314	49.7	
Tumor subtype and multicentricity	papillary	591/184	93.4/29.1	0.31
	medullary	16/5	2.5/0.8	
	follicular	14/2	2.2/0.3	
	oncocytic	7/1	1.1/0.2	
	anaplastic	5/3	0.8/0.5	

Discussion

Although the majority of the pathology results after thyroid surgery are benign conditions, the rate of malignancies is increasing day by day. The higher number of incidental malignant pathologies contribute to these increased rates. Rather than compression symptoms and cosmetic problems, main indications of thyroid surgery in recent years are established malignancy and malignancy suspicion. One of the promising results of thyroid surgery is that the prognosis of thyroid malignancies is better than other organ malignancies.

Thyroid surgery is the mostly performed in women. İn the literature, the ratio of women and men varies between 3.4-7.6% (Akgun et al., 2007; Benek et al., 2015). İn our study this ratio was 4.1. The mean age of patients who underwent thyroid surgery ranged from 43 to 51 years in the literature (Benek et al., 2015; Lefevre et al., 2007). İn our study, the mean age was found to be 47 years. Although thyroid surgery is performed initially due to a benign disease, in histopathological examination 3-16.6% of incidental cancer is detected (Efremidou, Papageorgiou, Liratzopoulos, & Manolas, 2009; Erbil et al., 2006; Prades et al., 2002). İn our study, the rate of cancer in the whole series was found to be 17.4%.

Thyroid cancers are generally classified into two categories as differentiated and undifferentiated. The most common subtypes are papillary cancers. Prognosis of papillary cancer is better than other subtypes. İn the differentiated thyroid cancer series of 1005 cases by Nickel B et al., the most common subtype was papillary cancer with a rate of 88.6% (Nickel et al., 2019). The most common pathologic diagnosis in thyroid surgery performed by Ohtsuru et al. was papillary cancer with a rate of 98% (Ohtsuru et al., 2019). Similar to the literature knowledge, in our series of 633 thyroid cancers, the most common pathologic diagnosis was papillary cancer (93.4%). Today, due to the development and availability of diagnostic methods, thyroid cancer is diagnosed at micro (<10mm) levels and even may be followed up without surgery. Papillary thyroid microcarcinoma (PTMC), accounts for 39% of the cases of thyroid cancer in the USA and 43.1% of the cases in Korea (Davies & Welch, 2014; Lee & Shin, 2014). İn our study, we found the microcarcinoma ratio as high as 50.3%. This is due to the advanced imaging and laboratory facilities of our institution as a tertiary referral hospital.

One of the most important problems in thyroid cancer is the multifocality of the tumors. Multicentricity of Papillary thyroid cancer is a well-described feature of this tumor, with estimated frequency range from 22% to 49% (Grigsby, Gal-or, Michalski, & Doherty, 2002). İn our study, multicentricity rate was 30.2% in all patients diagnosed with thyroid cancer, and the rate of multicentricity in the papillary cancer was 31.2%.

Retrospective design is a limitation of our study, however, important results of the present study suggesting literature knowledge may add significant contribution to the current medical literature.

Conclusion

Incidental thyroid cancers are not a rare entity after pathological examination of thyroid specimen after surgery. Therefore, we suggest careful evaluation and bilateral lobectomy in surgical treatment of thyroid conditions.

Ethics Committee Approval: Ethics committee approval was received for this study from Clinical Research Ethics Committee of Haseki Education and Research Hospital. (Date: 02.03.2016, Decision Number:349).

Peer-review: Externally peer-reviewed.

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RESEARCH ARTICLE

Determination of Intergeneration Differences of Nurses and Student Nurses About Lifelong Learning in The Changing World: Eastern Black Sea Sample

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Abstract

Objective: Advances in medicine and technology have caused professional knowledge to develop and change. The aim of the present study is to find out the intergeneration differences of nurses and student nurses about lifelong learning in the changing world.

Methods: This descriptive study was conducted on 532 student nurses and nurses in a city of Eastern Black Sea region. The data were collected through a questionnaire form prepared to find out the views of nurses about lifelong learning. Descriptive statistics and Chi-square test were used in the assessment of data.

Results: One third of the participants who were student nurses were in their third of study and nurses were found to be working in the profession with a mean of five years. It was found that the participants thought it should be obligatory for nurses to participate in continuing education activities so that they can work in health institutions. It was found that 68.5% of the nurses preferred applicability feature and 82.6% preferred visual and audio educational materials in lifelong learning programs. It was found that nurses participated in educational programs more and 84.4% of the nurses were found to have received basic electrocardiography education and 60.8% of the nurses stated that they would like to receive education on nutrition nursing. It was found that nurses wanted to participate in education programs for professional development, while student nurses wanted to participate for career development.

Conclusions: It can be seen that nurses working participated in education programs more and wanted to participate in educational activities if they were given the opportunity. The awareness for lifelong learning and reaching related programs should be raised starting from years at the university and these studies should be included in the curriculum so that nurses can hear about professional development and changes.

Key words: Thyroid, Benign, Malignant, Multicentricity

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Introduction

In nursing profession, lifelong learning is very important in terms of members of the profession following up-to-date information and practices in the field of health (Hirst et. al., 2017). Nurses' being able to have the information, skills and competence that they need for safe nursing practices, maintaining health care services with high quality and improving these services show the necessity for nurses to learn continually during their lives (Hirst et. al., 2017; Brunt, 2019). Especially American Nurses Association (ANA), American Association of Critical-Care Nurses (AACN) and a great number of accredited institutions emphasize the lifelong learning responsibilities of nurses (Dee and Reynold, 2013; Dawis et.al., 2014). Competence of students of nursing department, who are prospective nurses of today and nurses of tomorrow, in lifelong learning will be effective in creating healthy social change (Dikmen et al., 2016). At the same time, within the context of tenth development plan prepared to increase the society's level of welfare, the need "to give individuals the skills and competence required by working life considering the perspective of lifelong learning and to improve man power in health" was emphasized (10th state development plan).

Lifelong learning in nursing is defined as a dynamic process that covers both personal and professional life and it includes both formal and informal process. Lifelong learning includes gaining a new perspective and at the same time researching and appreciating new worlds or ideas to question life, knowledge, skills and interactions. The most basic characteristics of lifelong learners can be listed as reflection, investigation, enjoying learning, understanding the dynamic nature of information and participating in learning by using active learning opportunities. Keeping the mind active is necessary for both lifelong learning and for turning knowledge into the capacity to provide high quality nursing care (Dawis et al., 2014).

Working in a profession is a significant trigger for professional development irrespective of age. Fulfilling new tasks outside the unit individuals work in or fulfilling new duties encourage learning. In addition, experiences in personal life can contribute in terms of nurses' professional development. In addition to these similarities, data have shown differences in personal life and professional life which has been found to be associated with differences in professional development strategy. It has been reported that especially younger nurses aim for "balance between profession and personal life", while middle aged nurses aim for "consistency in profession" and older nurses aim for "career and experience" (Pool et. al., 2015). When lifelong learning was examined in different professions, it was found that a study was conducted to assess the knowledge and awareness of managers of public library and librarians about lifelong learning and the results showed that 41.4% of the participants were not informed in university about lifelong learning and at the same time 86.0% of the participants did not receive in-service training about lifelong learning (Ersoy and Yılmaz, 2009). In line with these results, it can be seen that necessary interventions are not made for lifelong learning in university education and professional life.

When the average ages of working nurses were examined, about 40% were in X generation (born between 1965 and 1980) and 60% were born in Y generation (millennium generation, born between 1981 and 2000), and X and Y generation nurses were found to work actively in the profession (Sherman, 2006; Yilmaz Esencan and Ozdil, 2017). X generation individuals are open minded individuals who have feelings of cooperation and liberty and who like things they can feel comfortable with in their lives (Takase et al., 2007). Y generation individuals care about the balance between professional life and personal life and they expect a fun and innovative professional life (Yilmaz Esencan and Ozdil, 2017). Giving opportunities to increase their professional content and quality of life to nurses who are actively working will increase level of contentment both for nurses and patients. When it is considered that a great majority of nursing students also consist of Y generation and Z generation which includes deep sensuality (crystal children born after 2000), finding out their views about lifelong learning is very important in terms of showing the differences in the changing world.

Questioning the current states of nurses and student nurses about lifelong learning with the present study will contribute to lifelong adjustments that can be made. The aim of the present study was to find out the intergeneration differences of nurses and student nurses in terms of lifelong learning in the changing world through Eastern Black Sea sample.

Methods

Study Design and Setting

This descriptive study was conducted to find out the views of nurses and student nurses about lifelong learning. The universe of the study consists of 300 nursing students studying at the Health School of a

university in Eastern Black Sea region during the 2017-2018 Academic Year and 300 nurses actively working in Research and Training Hospital. Sample was not chosen, and the sample was formed with a total of 532 participants, 285 nursing students and 247 nurses, who agreed to participate in the study. The aim was to find out the intergeneration differences between the groups. The inclusion criteria were being nursing department student in the Health School of the university, a nurse working in the Research and Training Hospital and agreeing to participate in the study.

Data collection

The data were collected by the researcher with face-to-face interview method by using questionnaire form in 10-15 minutes.

Instruments

In data collection, "**Views on Lifelong Learning Form**" prepared in line with the literature was used to find out participants' socio-demographic characteristics (age, income, marital status, monthly income, level of education, years in the profession, years in the current hospital, unit nurses worked in and job in the institution) and their views on lifelong learning**. Views on Lifelong Learning Form** includes questions about the necessity of lifelong learning education, questioning participants' views on lifelong learning, their wishes to participate in such education, the necessity of having such education to work in health institutions, the characteristics lifelong learning should have, materials and tools preferred in lifelong learning, education programs they received within the context of lifelong learning or education programs they would like to receive if they were given the opportunity and the reasons.

Data analysis

The data were assessed with IBM SPSS 23.0 (Chicago, USA). Descriptive statistics (frequency, percentage, average) and Chi-square test were used in the assessment of data. $p<0.05$ was considered as statistically significant.

Ethical consideration of study

Before starting the study, written permission was taken from the institution the study was conducted in and approval from Recep Tayyip Erdogan University Non-interventional Clinical Researches Ethics Board (decision number: 2018/30, 16.02.2018). In addition, the participants were informed about the study and they were told that their personal information would be protected and those who volunteered were included in the study.

Limitation of the study

The study was limited to nurses working in a training and research hospital in the northeast of Turkey and nursing students studying in Health School.

Results

When the distribution of the descriptive characteristics of the participants were examined, it was found that mean age of the student nurses was 20.89±1.72 (min: 17; max:29) years, 98.2% were single, 51.2% were found to have equal income and expenditure, 28.8% were found to be in their third year of study. Mean age of the nurse group was found as 26.00 ± 6.78 (min: 20; max:54) years, 84.2% were female, 57.1% were single, 44.9% were found to have equal income and expenditure, 59.1% were found to have undergraduate or higher level of education, 60.7% were found to be working in surgical clinics, with a mean working years of 5.00 ± 6.73 (min: 1; max: 35), while 89.1% working as clinic nurses with a mean of 3.00± 5.38 (min: 1; max: 35) (Table 1-2).

Table 1. Descriptive characteristics of student nurses (n=285)

Characteristics	n	%
	Mean ±SD (min; max)	
Age	20.89±1.72 (min: 17; max:29)	
Gender		
Female	215	75.4
Male	70	24.6
Marital status		
Married	5	1.8
Single	280	98.2
Monthly income level		
Income higher than expenditure	30	10.5
Income equal to expenditure	146	51.2
Income lower than expenditure	109	38.2
Year of study		
1st year	66	23.2
2nd year	77	27.0
3rd year	82	28.8
4th year	60	21.1

In the distribution of the participants' views about lifelong learning, it was found that participants' views about the necessity of professional lifelong learning, their wishes to participate in lifelong learning activities for professional development, considering learning new information or skill as an indispensable part of life were not found to be statistically significant ($p>0.05$). The state of thinking that it should be obligatory to participate in lifelong learning activities for the permission to work in health

institutions was statistically significant in terms of profession groups and that nursing group thought that participating in lifelong learning activities should be obligatory more than the student group ($p<0.05$). When the participants were asked about what features lifelong learning program should have, it was found that 68.4% of the participants thought they should be applicable by students, while 82.6% thought that visual and auditory educational materials were preferred by students (Table 3).

Table 2. Descriptive characteristics of nurses (n=247)

Characteristics	n	%
	Median (min; max)	
Age	26.00 (min: 20; max:54)	
Years in the profession	5.00 (min: 1; max:35)	
Years in the hospital	3.00 (min: 1; max:35)	
Gender		
Female	208	84.2
Male	39	15.8
Marital status		
Married	106	42.9
Single	141	57.1
Monthly income level		
Income higher than expenditure	31	12.6
Income equal to expenditure	111	44.9
Income lower than expenditure	105	42.5
Level of education		
High school	39	15.8
Two-year degree	56	22.7
Undergraduate and higher	146	59.1
Unit		
Internal medicine clinics	61	24.7
Surgical clinics	150	60.7
Other units	36	14.6
Job in the unit		
Clinic nurse	220	89.1
Clinic head nurse	24	9.7
Nurse manager	3	1.2

When the top 5 education programs received by the participants were compared between the groups, it was found that the rate of participation in education programs was higher in the nurse group and the difference was found to be statistically significant ($p<0.05$). The education which was most received by the nurses was basic electrocardiography with a rate of 84.4%. When the top 5 education programs the participants would like to participate in were compared between the groups, it was found that the nurse group was more willing to participate in education programs and the rate was found to be statistically significant ($p<0.05$). It was found that 60.8% of the participants would like to receive nutrition nursing education if they were given the opportunity (Table 4).

When the distribution of the participants' views about their reasons and wishes to participate in education programs were analyzed, it was found that the nurse group participated for professional development and there were significant differences in terms of groups. ($p<0.05$). It was found that nurses and student nurses would like to participate in education programs if given the opportunity and the reasons why they wanted to participate were found to show statistically significant difference ($p<0.05$) (Table 5).

Table 3. Distribution of participants' views on lifelong learning

	Student group		Nurse group		Test and p value
	n	%	n	%	
Thinking that lifelong learning is necessary in the profession					
Those who agree	258	90.5	234	94.7	X^2=3.374, p=0.66
Those who disagree	27	9.5	13	5.3	
Wishing to participate in lifelong learning activities for professional development					
Yes	250	87.7	225	91.1	X^2=1.574, p=0.210
No	35	12.3	22	8.9	
Thinking that learning new information and skill is an indispensable part of life					
Yes	257	90.2	230	93.1	X^2=1.479, p=0.224
No	28	9.8	17	6.9	
Thinking that it should be obligatory to participate in lifelong learning activities for permission to work in health institutions					
Those who agree	182	63.9	180	72.9	X^2=17.264**p=0.000**
Those who disagree	90	31.6	43	17.4	
No opinion	13	4.6	24	9.7	
Features that a lifelong learning program should have *					
Motivation	149	53.4	155	63.3	
Selectivity	55	19.7	68	27.8	
Applicability	191	68.5	153	62.4	
Other (innovative)	2	0.7	1	0.4	
Instruments preferred in lifelong learning education*					
Programmed teaching materials	185	67.0	149	61.8	
Visual and auditory teaching materials	228	82.6	192	79.7	
Advisor teachers	188	68.1	158	65.6	

*Percentages were calculated from the multiple answers given

Table 4. Comparison of the top five education programs the participants received or would like to receive if provided

Teaching program	Nurse		Student nurse		Test and p value
	n	**%***	**n**	**%***	
Top 5 education programs received					
1. Basic electrocardiography	38	84.4	7	15.6	X^2=28.923, p=**0.000**
2.Family consulting	16	84.2	3	15.8	X^2=11.330, p=**0.003**
3.Research in nursing	15	83.3	3	16.7	X^2=10.165, p=**0.006**
4.Basic life support (BLS)	61	81.3	14	18.7	X^2=42.917, p=**0.000**
5.Wound care	28	77.8	8	22.2	X^2=15.355, p=**0.000**
Education programs participants would like to receive if provided					
1.Nutrition nursing	59	60.8	38	39.2	X^2=23.510, **p=0.000**
2.Basic electrocardiography	65	56.0	51	44.0	X^2=18.781, **p=0.000**
3.Health law and ethical principles in health	62	55.4	50	44.6	X^2=13.241, **p=0.001**
4.Trainer education	55	55.0	45	45.0	X^2=16.625, **p=0.000**
5.Management in nursing	68	54.0	58	46.0	X^2=13.456, **p=0.001**

*Percentage of rows was taken

Table 5. Distribution of participants' views on why they participate or want to participate in education programs

	Nurse		Student		Test and p value
	n	%	n	%	
Reasons why they participated in education programs previously					
Professional development	13	76.5	4	23.5	X^2=6.744
Career development	4	36.4	7	63.6	p=0.034
No reason given	230	45.6	274	54.4	
Reasons why they would like to participate in education programs if provided					
Professional development	26	49.1	27	50.9	X^2=40.719
Career development	13	15.1	73	84.9	p=0.000
No reason given	208	52.9	185	47.1	

* Percentage of rows was taken

Discussion

In this section, the results of the study were analyzed regarding the intergeneration differences between participants' views on lifelong learning.

In the present study, it was found that participants thought nurses should be obliged to participate in lifelong learning activities for permission to work in health institutions (Table 3). Studies conducted show that managers of institutions define the concept of lifelong learning (LLL) with metaphors such as "obligation, human product, life, continuity, health and guiding" and emphasized the significance and necessity of LLL. Health professionals have also stated that LLL approach should be made more widespread (Dogan and Kavtelek, 2015). It is stated in the studies that nurses think that continuous education is necessary in order to provide quality health care and to save lives (Caporiccio et al., 2019).

According to another study conducted, generation Y workers change their jobs due to their wishes of education and development. Caring about education and development opportunities is very important in terms of expectations from professional life (Metin and Kızıldag, 2017). In the present study, the fact that especially working generation Y nurses were aware of this situation is an indicator that they are aware of their needs for lifelong learning in terms of professional development.

In terms of the features a life-learning program should have, it was found that the features of being applicable by students and visual and auditory educational materials were preferred (Table 3). According to literature, it has been stated that there are no significant differences between generations Y and Z in terms of "perceptive-intuitional", "visual-auditory" and "sequential-integrated" learning styles. It is stated that when compared with generation Y, generation Z prefers perceptive-intuitional learning, while generation Y prefers "visual-auditory" and "sequential-integrated" learning (Kavalci and Unal, 2016). In addition, generation Y shows that they are more inclined to lifelong learning with their beliefs that they can succeed when they want, their ambition to promote quickly, their entrepreneurial spirit, their sophistication and their command on technology (Erden, 2017). When considered that "seen-heard-told-done" information provide 90% permanence (Hacialioglu, 2013), it is thought that this might be the reason why the feature of being applicable by students was the feature most wanted by the participants.

It is recommended by prospective nurses to be open to innovations, to learn how "they can access information and how they can use information" in undergraduate education and to develop these during their profession as a necessity of following technological developments in health (Nayda and Rankin, 2008). It is seen that nurses use computers at work or out of work to access continuous education and resources (Caporicio et al., 2019). With the use of materials, the number of senses can be increased in the learning process and more permanent learning can be supported. This situation shows that permanence in education process can be provided through being applicable. Studies show that self-learning increases creativity (Nayda and Rankin, 2008). In studies conducted to find out educational needs, it is emphasized that professionals' active participation should be provided and professional studies should be shared (Serbet and Ulupinar, 2010). It is advocated that by teaching students self-learning in their undergraduate education, their skills such as "criticizing, thinking and creating" can be developed and thus their curiosity to learn can be made permanent (Guclu et al., 2013). Studies have shown that using lifelong learning strategies in student nurses such as "independence in intellectual practice, cooperative learning, inquisitive thinking, permanent learning, needs based learning, learning management, suitable learning environment and development" is

important in terms of increasing the quality of education, developing nurses' competence and increasing quality of patient care (Qalehsari et al., 2017). In addition, the emphasis was placed on the need for a more consistent and standardized nursing education in lifelong learning (Caporiccio et al., 2019). According to the literature, it is emphasized that nursing students' self-directed learning skills should be increased (Kaulback, 2020).

In the present study, it was found that there were too many educations working nurses received and the education received most by the nurses was basic electrocardiography and if they were given the opportunity, they would like to participate in more education programs and they wanted to receive especially nutrition nursing education program (Table 4). Studies have shown that in units except for intensive care and emergency units, level of knowledge is not sufficient in terms of taking and reading ECG and does not differ in terms of level of education or years of working (Dogan and Mehmet, 2012). It can be seen that a great majority of nurses think that they need in-service training and ECG is one of the top five educations they would like to receive with a rate of 10,8% (Bugdayli and Akyurek, 2017). In nursing practices, considering the active role of nurses in patient follow ups and the significance of electrocardiography education while making these follow-ups and the effect of these on patients' quality of life, it can be seen that receiving electrocardiography education is important in terms of emergency situations. The results of the study show that there are no differences between generations in terms of this and it is equally important for groups. It is a known fact that nutrition is important to maintain the continuity of life cycle from birth to death and some chronic diseases can be prevented with healthy eating habits. When nurses teach individuals eating habits that they can turn into lifestyle, the continuity of healthy life style behaviors can be increased. Considering the active role of nurses in conducting health educations, nurses can increase individuals' awareness in using health recommendations specific for the individual and thus contribute to developing the health states of individuals (Yilmaz Yavuz, 2018). The reason why nurses stated that they would like to have nutrition nursing education can be assessed as their being aware of the fact that nutrition is the basic need in increasing health care quality and as a step of providing a high quality health service.

When the participants' views on the reasons for receiving education programs were analyzed, it was found that nurse group received education for professional development and nursing students wanted to receive education for career development if given the opportunity (Table 5). In a study which was conducted on intensive care nurses who give complicated and technology assisted patient care, it was found that almost all of the nurses expected education given to contribute to professional developments, to contribute to personal development and to increase the quality of health services, and in addition education programs given were expected to increase skills of team work (Celen et al., 2007). When it is considered that generation Y was higher in number in the study, the fact that career expectations, which is a general characteristic of the generation, is also desired by the students shows that "expertise in a profession" is cared by students who have not started their professions yet and that they are aware of the fact that they should specialize in their field in terms of professionalism. Managers and nurse managers should be aware of career planning, management processes and career development approaches of their employees and thus guide their expectations. In addition, employees should be able to make career plans which are not confined to an organization or profession (Tatar Baykal and Yalcin, 2014).

Conclusion

In the present study which was conducted to find out the intergeneration differences between nurses' views on lifelong learning, it was emphasized that continuous education should be made obligatory to be able to work in health sector. It was concluded that especially working nurses participated in more education programs and that they would like to participate in more education activities if given the opportunity. The necessity of professional development is obvious for hearing about professional development and changes. Within this context, awareness should be built about lifelong learning and reaching related programs starting from university years and these should be included in the curriculum.

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RESEARCH ARTICLE

Determining the Obstacles of Type 2 Diabetes Patients

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Abstract

Objective: This study was carried out to identify the obstacles faced by Type 2 diabetes patients.

Methods: The study was conducted in the descriptive type and included 112 patients hospitalized in the internal medicine clinics of the Ondokuz Mayıs University Health Practices and Research Hospital. The descriptive form and the "Diabetes Obstacles Questionnaire in Type-2 Diabetes Patients" were used in the study. As the average score obtained in the subscales of the questionnaire rises, the level of obstacles related to that area felt by patients increases.

Results: Of the patients who participated in the study, 60.7% were women, 53.6% were housewives, 48.2% were primary school graduates, 27.7% lived in districts and 92% reported the presence of at least one chronic disease other than diabetes. It was identified that 54.5% of the patients had been diagnosed with diabetes for 11 years and longer, 50.9% had received diabetes education, 72.3% had relatives with diabetes, 64.3% used oral antidiabetics and 72.3% received insulin treatment. Among the patients, 35.7% stated that the hardest aspect of diabetes was "following a diabetic diet". Among the subscales of the Diabetes Obstacles Questionnaire, the lowest average score was -0.34 in the obstacles in "receiving advice and support" subscale, and the highest average score was 0.34 in the "obstacles in coping with diabetes" subscale

Conclusion: The fact that 7 of the 8 subscales of the diabetes obstacles questionnaire had negative averages in the study indicates that the patients' perception of obstacles in these areas was low. The only subscale with a positive average was the "barriers in coping with diabetes" subscale and the patients' perception of obstacles related to this area was higher. Based on the findings, it is recommended to increase the accessibility of diabetes education and the rate of receiving diabetes education, and that educated patients be re-evaluated periodically by the diabetes education nurse.

Key words: Diabetes, Handicap, Nursing

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Introduction

Diabetes Mellitus (DM) is a chronic metabolic disease that results in impaired carbohydrate, fat and protein metabolism caused by the insufficiency, absence or deficiency of the hormone insulin. There are different types of DM (Olgun and Celik, 2017). Type 2 diabetes accounts for more than 90% of all diabetes types and is the most common type (Olgun et al., 2014).

The prevalence of Type 2 diabetes is increasing rapidly due to factors such as population growth, aging societies, obesity and the increase in sedentary lifestyle (Samancioglu, 2016). The prevalence of diabetes in people between the ages of 20-79 in the world has been reported as 9.3%. It is estimated that this will increase up to 10.9% in the world by 2045 (Saeedi et al., 2019). According to the 2016 World Health Organization (WHO) data, diabetes ranks seventh among the causes of death worldwide (WHO, 2018 Date Accessed: 13.01.2020). In the International Diabetes Federation (IDF) Atlas of Diabetes 2017, the prevalence of diabetes in Turkey has been reported as 12.54% (IDF, 2017). Diabetes is an important public health problem in Turkey and the world.

Since diabetes is a long-term disease, it requires life-long care and management (Uren and Yilmaz Karabulutlu, 2018). The management of diabetes includes lifestyle changes and multi-component self-care activities such as diet, exercise, foot care, medication/insulin use and self-monitoring of blood glucose (Akaltun and Ersin, 2016). As patients must develop a lifestyle based on behavioral choices and practices, they are in the center of diabetes care (Uren and Yilmaz Karabulutlu, 2018).

In patients with type-2 diabetes, living with the disease leads to various obstacles (handicaps) (Pilv et al., 2016). The barriers patients face in self-monitoring are related to their mental and personal characteristics and hinder their management of the disease (Kahraman et al, 2016). It has been shown that patient attitudes significantly affect the diabetes care, that the metabolic control levels of individuals with negative attitudes is worse, and that their HbA1c and blood pressure levels are also negatively affected (Kara and Cinar, 2011). Identifying obstacles that prevent adherence to diabetes management recommendations enables the planning of personalized diabetes education and provides guidance for better diabetes management (Orhan and Karabacak, 2016; Cimo and Dewa, 2017). This research was carried out to identify the obstacles experienced by type-2 diabetes patients.

Methods

This study was carried out in the internal medicine clinics of the Ondokuz Mayıs University Hospital between June 2018 - and August 2018. This study included voluntary individuals receiving inpatient treatment, 18 years and older, living with the diagnosis of type-2 diabetes for at least 1 year, no neuropsychiatric disabilities.

The ethics committee approval and permission were obtained from the institution where the study would be conducted, and verbal consent was obtained from all participants. The descriptive form prepared by the researchers and The Diabetes Obstacles Questionnaire (DOQ) were administered to the participants.

The descriptive form was prepared according to the literature to obtain sociodemographic and disease related data in line with the objectives of the study. The form consists of 12 questions in total, 5 of which are related to sociodemographic data and 7 are related to data pertaining to the disease diabetes.

The validity and reliability of the Diabetes Obstacles Questionnaire was studied by Kahraman et al. (2016) and it is a five-point Likert scaled questionnaire. It contains 8 subscales: medication obstacles, obstacles in self-monitoring, knowledge and belief obstacles, obstacles in diagnosis, obstacles in relationships with healthcare professionals, obstacles in lifestyle changes, obstacles in coping with diabetes, and obstacles in receiving advice and support. There is no total score or reverse scored item in the questionnaire that consists of 68 questions. Each item in the scale is valued between -2 and +2. Evaluation is performed based on the average scores of the questionnaire's subscales. Negative scores indicate that the patients do not experience difficulty in the relevant area, and positive scores indicate that they do. The average score determined for each subscale reflects the degree of difficulty the patient faces in regard to this obstacle. Accordingly, positive scores obtained from the relevant subscale indicate the increasing severity of the obstacles encountered, while negative scores indicate the severity of the positive situation (Kahraman et al., 2016).

The analysis of the data was carried out using the IBM Statistical Package for Social Sciences Version-23. Percentage, average, Levene's test, ANOVA, Tukey HSD and the Mann Whitney-U test were used in the analysis of the data. Data that did not conform to normal distribution were presented as median (min-max) and the level of significance was taken as $p < 0.05$. Research results were limited to the relevant sample and could not be generalized.

Results

It was identified that among the 112 patients who participated in the study, 60.7% were women, 53.6% were housewives, 48.2% were primary school graduates, 60.7% had an income between 1001-2500TL, all of them over 50 years old and 27.7% lived in districts. It was identified that 50.9% of the patients had received diabetes education, 54.5% had been diagnosed with type-2 diabetes for 10 years and longer, 92% also had a chronic disease other than diabetes, 72.3% had a relative with diagnosed diabetes, 64.3% used oral antidiabetics and 72.3% used insulin. Among the patients, 35.7% stated that the hardest aspect of diabetes was "following a diabetic diet". The descriptive characteristics of the patients participating in the study and data related to the disease have been presented in Table-1.

The average scores of the questionnaire's subscales have been presented in Table-2. It was identified that the lowest average score among the questionnaire subscales belonged to the "obstacles in receiving advice and support" subscale with a score of -0.34 ± 0.72 and that the highest score belonged to the "obstacles in coping with diabetes" subscale with a score of 0.34 ± 0.50 (Table-2).

When the distribution of the questionnaire subscale average scores of the patient's descriptive characteristics and disease related data was examined, it was identified that a difference was present in relation to the gender variable in the knowledge and belief obstacles subscale, and that women scored higher in this subscale ($p \leq 0.05$).

It was identified that there were differences between in the knowledge and belief obstacles and obstacles in relationships with healthcare professionals subscales in relation to education levels and that illiterate patients scored higher and had a higher perception of obstacles ($p<0.05$). It was also identified that the same patient group had a high average in the self-monitoring obstacles, obstacles in diagnosis, and obstacles in lifestyle changes subscales ($p>0.05$).

It was determined that there was a statistically significant difference between the income level and the obstacles in self-monitoring and knowledge and the belief obstacles subscales. It was identified that the scores of these subscales and perception of obstacles related to this area increased as the income level decreased ($p<0.05$).

It was identified that the differences in the knowledge and belief obstacles and obstacles in relationships with healthcare professionals' subscales in relation to the area of residency were statistically significant ($p<0.05$). It was identified that the average

Table 1. Descriptive Characteristics and Disease-Related Data

Variable	Number (n)	Percent (%)
Gender		
Male	44	39.3
Female	68	60.7
Profession		
Housewife	60	53.6
Retired	23	20.5
Civil Servant	6	5.4
Self employed	19	17.0
Unemployed	4	3.6
Education		
Illiterate	34	30.4
Primary school	54	48.2
Middle school	9	8.0
High school	6	5.4
University	9	8.0
Income		
0 - 500 TL	21	18.8
501 - 1000 TL	8	7.1
1001 - 2500 TL	68	60.7
2501 - 5000 TL	13	11.6
5001 TL and higher	2	1.8
Area of residence		
Village	30	26.8
Small town	2	1.8
District	31	27.7
City	19	17.0
Metropol	30	26.8
Diabetes education		
Yes	57	50.9
No	55	49.1
Years of Diabetes		
1 - 3 years	13	11.6
4 - 6 years	16	14.3
7 - 9 years	22	19.6
10 years and longer	61	54.5
Presence of non-diabetes disease		
Yes	103	92.0
No	9	8.0
Presence of diabetes in relatives		
Yes	81	72.3
No	31	27.7
Oral antidiabetic use		
Yes	72	64.3
No	40	35.7
Insulin use		
Yes	81	72.3
No	31	27.7
The most difficult aspect of diabetes	40	35.7
Life-long diet	7	6.3
Doctor supervision	1	0.9
Sexual problems	25	22.3
Blood sugar imbalance	29	25.9
Chronic complications	10	8.9
Other		

scores were higher than other groups for patients living in villages in the knowledge and belief obstacles subscale and for patients living in small towns in the obstacles in relationships with healthcare professional's subscale ($p<0.05$).

The mean value of the knowledge and belief obstacles scale score of patients who had not received diabetes education was found to be significantly high ($p<0.05$) (Table 3).

Table 2. Descriptive Data Related to the subscales of the Diabetes Obstacles Questionnaire

Subscales of the Diabetes Obstacles Questionnaire	Mean ± Standard Deviation	Min	Max
Medication obstacles	-0.28±0.55	-2.00	1.00
Self-monitoring obstacles	-0.19±0.90	-2.00	2.00
Knowledge and belief obstacles	-0.22±0.73	-2.00	1.88
Obstacles in diagnosis	-0.11±0.73	-2.00	2.00
Obstacles in relationships with healthcare professionals	-0.28±0.51	-1.88	1.29
Obstacles in lifestyle changes	-0.09±0.57	-1.42	1.67
Obstacles in coping with diabetes	0.34±0.50	-1.00	1.71
Obstacles in receiving advice and support	-0.34±0.72	-2.00	1.57

Discussion

In the study, it was identified that patients experienced the most obstacles in the "coping with diabetes" subscale (Table 2). Similar to this study, Kahraman et al. also reported that patients experienced the most obstacles in the coping with diabetes area (Kahraman et al., 2016). As with all chronic diseases, diabetes also makes it mandatory to maintain treatment follow-up and lifestyle changes besides the treatment process. It is reported that patients experience obstacles related to initiating and continuing treatment due to pre-conceived opinions of treatment, insulin injections, fear of pricking the finger and blood sugar monitoring (Celik and Pinar, 2014; Ong et al., 2014; Patel et al., 2015; Hassan et al., 2013). It has also been stated that functional insufficiency and feelings such as denial, shame, depression caused by the diagnosis of diabetes are also obstacles in the management of the disease (Akman and Olgun 2016; Baskurt et al., 2012).

In the study, it was determined that the gender variable affected the obstacles in the knowledge and belief area and that female patients experienced more obstacles related to this area ($p = 0.05$). There are studies in the literature reporting that women encounter more obstacles in the management of diabetes (Mansyur et al., 2015; Orhan and Karabacak, 2016; Uren and Karabulutlu, 2018; Egan et al., 2013). The result of the study is consistent with the literature.

In the study, it was determined that there were differences in the knowledge and belief obstacles and the obstacles in relationships with healthcare professionals subscales in relation to the education level, and that illiterate patients experienced more obstacles related to these areas ($p<0.05$). In the study of Tol et al. (2012), the education level of the patients was determined as one of the obstacles in coping with diabetes. In a study conducted by Akgun Sahin (2015), it was concluded that patients lacking information about the disease led them to display negative attitudes and that this result was related to their low education level. In the study by Akar et al. (2014), it was reported that the education level and the perception of obstacles related to diabetes was inversely correlated. In the literature, it has been reported that an insufficient education level poses an obstacle in various areas related to diabetes (Uchenna et al., 2010; Rhee et al., 2005). The result of the research is similar to the literature. Coping with diabetes requires cooperation with healthcare professionals and the effective use of more than one skill, in particular, literacy. Therefore, as the education level decreases, skills related to comprehending knowledge, questioning and making sense of it may become limited. It is thought that this is why the result was affected.

In the study, it was determined that the income level affects the self-monitoring and the knowledge and belief obstacles areas ($p<0.05$). It was determined that as the income level decreased, patients experienced more obstacles in the self-monitoring and knowledge and belief areas. Results similar to the results of this study have been reported in the literature (Akar et al., 2014; Tol et al., 2012). It has been reported that low income levels in diabetes patients created obstacles in treatment and lifestyle

Table -3. The Distribution of the Diabetes Obstacles Questionnaire Data According to the Sociodemographic and Disease-Related Variables

Variables / Questionnaire Subscales	Medication obstacles	Self-Monitoring Obstacles	Knowledge and belief obstacles	Obstacles in diagnosis	Obstacles in relationships with healthcare professionals	Obstacles in lifestyle changes	Obstacles in coping with diabetes	Obstacles in receiving advice and support
Gender	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)
Male	-0.22 (-1.67-0.67)	-0.50 (-2.00-1.25)	-0.50 (-2.00-1.50)	0.00 (-2.00-1.00)	-0.17 (-1.47-1.29)	-0.16 (-1.00-1.67)	0.35 (-1.00-1.43)	-0.42 (-2.00-1.57)
Female	-0.27 (-2.00-1.00)	-0.25 (-2.00-2.00)	-0.12 (-2.00-1.88)	0.00 (-2.00-2.00)	-0.29 (-1.88-0.94)	-0.12 (-1.42-1.42)	0.35 (-0.86-1.71)	-0.28 (-2.00-1.29)
	U= 1490.0	U= 1362.0	U = 1170.0	U = 1426.0	U = 1464.0	U= 1363.5	U= 1384.5	U = 1432.5
	p = 0.971	p = 0.421	*p = 0.050	p = 0.673	p = 0.849	p = 0.429	p = 0.503	p = 0.704
Education	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Illiterate	-0.23 ± 0.45	0.02 ± 0.84	(0.24 ± 0.55) a	-0.02 ± 0.84	(-0.07 ± 0.38) a	-0.05 ± 0.51	0.37 ± 0.49	-0.39 ± 0.64
Primary school	-0.37 ± 0.63	-0.34 ± 0.99	(-0.31 ± 0.70) b	-0.17 ± 0.73	(-0.39 ± 0.54) b	-0.10 ± 0.63	0.32 ± 0.51	-0.37 ± 0.76
Middle school	-0.09 ± 0.63	-0.16 ± 0.61	(-0.36 ± 0.81)abc	-0.25 ± 0.54	(-0.13 ± 0.56) ab	0.17 ± 0.46	0.25 ± 0.53	0.14 ± 0.83
High school	-0.14 ± 0.43	-0.16 ± 1.12	(-1.16 ± 0.53) c	0.12 ± 0.83	(-0.47 ± 0.60) ab	-0.31 ± 0.43	0.50 ± 0.46	-0.42 ± 0.65
University	-0.22 ± 0.35	-0.13 ± 0.58	(-0.72 ± 0.47) bc	-0.13 ± 0.43	(-0.46 ± 0.49) ab	-0.25 ± 0.56	0.26 ± 0.60	-0.46 ± 0.66
	F = 0.82	F = 0.87	F = 9.33	F = 0.42	F = 2.83	F = 0.96	F = 0.29	F = 1.15
	p = 0.514	p = 0.479	***p = 0.000	p = 0.793	*p = 0.028	p = 0.433	p = 0.822	p = 0.337
Income								
0 - 500 TL	-0.21 ± 0.52	(0.33 ± 1.07) a	(0.21 ± 0.76) a	-0.03 ± 0.88	-0.20 ± 0.54	0.01 ± 0.70	0.56 ± 0.51	-0.31 ± 0.73
501 - 1000 TL	-0.22 ± 0.54	(0.06 ± 0.86) ab	(-0.06 ± 0.95) ab	0.12 ± 0.91	-0.10 ± 0.61	-0.18 ± 0.71	0.44 ± 0.52	-0.55 ± 0.65
1001 - 2500 TL	-0.33 ± 0.53	(-0.39 ± 0.80) b	(-0.29 ± 0.61) b	-0.11 ± 0.70	-0.30 ± 0.44	-0.10 ± 0.52	0.29 ± 0.47	-0.35 ± 0.74
2501 - 5000 TL	-0.16 ± 76	(-0.03 ± 0.85) ab	(-0.58 ± 0.87) b	-0.32 ± 0.53	-0.33 ± 0.74	-0.14 ± 0.46	0.24 ± 0.51	-0.19 ± 0.72
5001 TL and higher	-0.55 ± 0.47	(-0.87 ± 0.17) ab	(-0.93 ± 0.44) ab	-0.75 ± 0.35	-0.91 ± 0.29	-0.08 ± 1.17	-0.14 ± 1.21	-0.64 ± 0.50
	F = 0.51	F = 3.45	F = 3.69	F = 0.90	F = 1.14	F = 0.25	F = 1.89	F = 0.38
	p = 0.729	*p = 0.011	**p = 0.007	p = 0.461	p = 0.340	p = 0.904	p = 0.117	p = 0.822
Area of residence								
Village	-0.21 ± 0.49	-0.07 ± 0.87	(0.10 ± 0.62) a	-0.00 ± 0.83	(-0.12 ± 0.42) a	0.09 ± 0.57	0.41 ± 0.48	-0.36 ± 0.78
Small town	-0.16 ± 0.07	0.00 ± 1.41	(0.00 ± 0.70) ab	-0.12 ± 0.17	(-0.05 ± 0.24) ab	0.16 ± 0.70	0.71 ± 0.40	-0.07 ± 0.50
District	-0.33 ± 0.65	-0.26 ± 0.98	(-0.27 ± 0.88) ab	-0.20 ± 0.76	(-0.28 ± 0.64) ab	-0.18 ± 0.62	0.23 ± 0.52	-0.50 ± 0.76
City	-0.44 ± 0.67	-0.52 ± 0.96	(-0.37 ± 0.76) ab	-0.14 ± 0.87	(-0.58 ± 0.58) b	-0.23 ± 0.63	0.27 ± 0.58	-0.43 ± 0.73
Metropolis	-0.19 ± 0.43	-0. 04 ± 0.78	(-0.43 ± 0.56) b	-0.10 ± 0.53	(-0.26 ± 0.33) ab	-0.11 ± 0.43	0.39 ± 0.46	-0.13 ± 0.61
	F = 0.83	F = 1.05	F = 2.50	F = 0.28	F = 2.52	F = 1.37	F = 0.89	F = 1.12
	p = 0.505	p = 0.502	*p = 0.046	p = 0.887	*p = 0.045	p = 0.247	p = 0.473	p = 0.350
Diabetes Education Status								
	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)	Median (Min - Max)
Yes	-0.22 (-2.00-1.00)	-0.25 (-2.00-1.75)	-0.50(-2.00-0.88)	0.00(-2.00-1.50)	-0.29(-1.88-0.29)	-0.16(-1.17-1.42)	0.42(-1.00-1.29)	-0.14(-1.86-1.29)
No	-0.22 (-1.78-1.00)	-0.50 (-2.00-2.00)	0.00(-1.50-1.88)	-0.25(-2.00-1.88)	-0.17 (-1.47-1.29)	-0.08(-1.42-1.68)	0.14(-1.00-1.71)	-0.57(-2.00-1.57)
	U = 1561.5	U = 1367.0	U=926.0	U=1309.0	U=1297.0	U=1384.0	U=1323.5	U=1346.5
	p = 0.972	p = 0.240	***p = 0.000	p = 0.127	p = 0.115	p = 0.285	p = 0.152	p = 0.196

F: ANOVA test statistic value
U: Mann Whitney-U test statistic value
*a-b: The difference between different groups was statistically significant.
Tukey HSD was used for multiple comparison related with ANOVA.
p<0,05 value was considered statistically significant.

changes (Arda Surucu and Samancioglu, 2018; Marcy et al., 2011).It was identified in the study that there were differences in the knowledge and belief obstacles and obstacles in the relationships with healthcare professionals subscales in relation to the area of residency, and that the group that experienced the most barriers comprised patients who lived in villages and small towns ($p<0.05$). In Gedik's research, it was determined that diabetes patients who lived in villages had significantly low levels of self-efficacy in their management of diabetes, and that living in a
rural area would increase obstacles in changing health behaviors (Gedik 2016; Schwarzer and Fuchs, 1995). It was stated that individuals living in rural areas experienced difficulty in access to healthcare services due to physical and social infrastructure insufficiency, that they could not benefit from home health services or municipal care services, and that this would pose an obstacle to disease management. In addition, the insufficiency of healthcare workers working in rural areas also prevents access to health care services (Avci and Gozum, 2018). This increases the obstacles of diabetes patients living in rural areas. It has also been reported that the low likelihood of rural individuals benefiting from applications such as telehealth and web-based education is also one of the obstacles that negatively affects the management of diabetes (Ross et al., 2015). The findings of the study are consistent with the literature. It was concluded that the disparity in healthcare accessibility and education levels between urban and rural residential areas in our country had affected the result.

In the study, it was identified that individuals who did not receive diabetes education experienced obstacles in the knowledge and belief area ($p<0.05$). In the study they conducted, Laranjo et al., 2015, reported that diabetes education was one of the fundamental interventions that reduced obstacles in the management of diabetes. There are research results indicating that receiving diabetes education is effective in facilitating diabetes related lifestyle changes (Austin 2006, Whittemore 2004).

Conclusion

Individuals living with the diagnosis of diabetes experience difficulties in making lifestyle changes in some areas of their lives. This creates a perception of obstacles in such individuals. In the study, it was identified that the patients' perception of obstacles was highest in the area of "coping with diabetes" and that the perception of obstacles in different areas was affected by gender, income levels, area of residence and receiving diabetes education.

In light of the findings, to increase the levels of receiving diabetes education among individuals diagnosed with diabetes, it is recommended to expand educational nursing services and to include strategies to cope with the disease and lifestyle changes beside technical skills in diabetes education programs for nurses. In addition, the delivery of diabetes nursing services to rural individuals will facilitate rural individuals in overcoming their obstacles.

Conflict of Interest Disclosure

Ethics Committee Approval: Ethics committee approval was received for this study from Ondokuz Mayıs University Clinical Research Ethics Committee

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Author Contributions: Concept–A.O., Design-A. O.; Supervision A.O.; Materials- O.D.; Data Collection and/or Processing-B. A.; Analysis and/or Interpretation – B.A.; Literature Review-B.A., Writing-B.A., O.D., A.O.; Critical Review- A.O.

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RESEARCH ARTICLE

Planning of Large Odontogenic Cysts Treatment Using Panoramic and CBCT Images

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Abstract

Objective: We explored the utility of Cone Beam Computed Tomography (CBCT) and Orthopantomography (OPG) in terms of treatment planning to determine which form of radiography can more reliably assess cyst volume.

Methods: 'We evaluated the panoramic and CBCT images of nine patients who consulted our clinic for treatment of large cystic lesions. Overall, 27 images were reviewed and analyzed by 21 oral and maxillofacial surgeons. We asked five questions (detailed in the main text).

Results: We evaluated the 189 answers in the questionnaire. The surgeons recommended marsupialization followed by enucleation, marsupialization, and enucleation (70.89 %, 14.28 %, and 14.81 %, respectively). The answers to the reasons of these treatment choices showed that the size of the cysts and relationship with the adjacent anatomical structures are the most effective factors. In after marsupialization challenges, 85.71% of the answers considered that the lesion had shrunk sufficiently to allow enucleation according to OPG's, however, this rate decreased to 42.23% when the same surgeons evaluated the CBCT images of the patients after marsupialization. Ninety-nine percent of the responses reported that CBCT was much more reliable than OPG.

Conclusion: In this study, we concluded that OPG imaging method can be used for the diagnosis and follow-up of cystic lesions, but in order to determine the accuracy of timing, adequacy of new bone formation and whether the cyst has shrunk sufficiently in volume, during the transition from the marsupialization process to the enucleation process, it is necessary to use CBCT imaging method. Further clinical trials should be conducted to define the effects of three dimensions images regarding surgical treatments of different kinds of oral and maxillofacial region cystic lesions.

Key words: CBCT, panoramic, odontogenic cysts, marsupialization, enucleation

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Introduction

Cysts are pathological cavities commonly found in the maxilla and mandible. Cysts feature a wall of connective tissue and are filled with epithelium or a liquid/semi-liquid. They are often localized in the jaws are often rich in epithelial tissue. Cysts are classified as odontogenic and non-odontogenic depending on the epithelium from which they originate (Rosai 2011). Cysts tend to expand and grow, causing resorption of bone tissue. Depending on the extent of resorption, cysts may cause severe damage such as bone fractures. There are many treatment options including enucleation, marsupialization, fenestration, and decompression. The treatment regimen is chosen upon the basis of cyst size, the extent of tissue damage, the availability of surgical access, patient's age, the proximity of the cyst to vital tissues, and the significance of the affected teeth in terms of eruption. In some cases, one approach is adequate; sometimes, several techniques are used in combination (Partsch 2005, Anavi et al., 2011, Wang et al., 2012). Marsupialization is the most minimally invasive procedure; a bony window is created in the cyst, facilitating new bone formation, reducing the cyst volume, and minimizing the iatrogenic neurovascular injury (Yahara et al., 2009). Cysts can be removed by enucleation alone, or enucleation may follow decompression or marsupialization, which reduces the cyst's size and the proximity of the cyst to important anatomical structures. Secondary surgery is less invasive than primary surgery; initial marsupialization or decompression followed by enucleation is widely recommended (Giuliani et al., 2006; Ecker et al., 2016).

Orthopantomography (OPG) is commonly used by oral and maxillofacial surgeons to evaluate vertical bone volume, to diagnose cysts and tumors, to evaluate maxillofacial trauma, and to identify dental caries and periodontal disease. OPG remains the gold standard in clinical practice. However, two-dimensional radiographs can be affected by tissue superimposition attributable to a malocclusion deformity or other issues (Tang et al., 2017).

Cone-beam Computed Tomography (CBCT) is an improved form of Computed Tomography (CT) which introduced at the end of the 1990s to yield three-dimensional images of maxillofacial structures. CBCT is better than traditional CT in many aspects. CBCT reveals the relationships among impacted teeth, foreign bodies, supernumerary teeth, and anatomical structures; it also yields data on the mandibular condyle and peripheral bones. CBCT precedes dental implant surgery and other orthodontic procedures. CBCT optimally reveals root anomalies, dilatation, and "dens in dente" prior to endodontic treatment (Adibi et al., 2012).

The diagnosis of jawbone lesions is often difficult; such lesions are very variable. Imaging plays crucial roles in terms of detection, treatment, and follow-up. Although initial OPG remains the gold standard, CBCT is commonly used to create three-dimensional images. CBCT requires a higher radiation dose than OPG, but a lower dose than traditional CT (Shahidi et al., 2015). Thus, the purpose of this study was to evaluate the influence of 2D and 3D imaging techniques on the decision-making process of enucleation after marsupialization in large odontogenic cyst cases by questionnaire sent to 21 experienced oral and maxillofacial surgeons.

Methods

The Harran University Ethics Committee approved this study. (Date: 11/03/2019, Decision Number: HR/19.03.26.) We evaluated the OPG and CBCT images of nine patients admitted to a University Hospital in Turkey for the treatment of large cyst lesions. One female and eight male patients' radiographic and demographic records were included in this study and the mean age of patients was 26.33 years. The inclusion criteria were following; lesions of the maxilla or mandible at least 3 cm in diameter, preoperative OPG radiographs that indicated a high risk of iatrogenic damage during enucleation, the absence of any systemic disease such as a psychiatric conditions, diabetes mellitus, pregnancy, cardiovascular disease, or immunosuppression; and only patients with histopathological diagnosis of odontogenic cyst (Odontogenic Keratocyst n:3 , Dentigerous Cyst n:3, Residual Cyst n:1, Radicular Cyst n:2). Also, patients who were imaged with CBCT simultaneously with the control OPG (film at the end of the marsupialization). There were 9 patients meeting these inclusion criteria.

Marsupialization treatment was initiated, and the patients were followed-up at two-week intervals. Patients were imaged with OPG approximately 3 months after the treatment to check the changes in the size of the cyst. When the lesion was evaluated as sufficiently shrunk, an appointment for enucleation was given to patient. In the first few patients, the cyst was found to be larger in size during the surgical procedure than it was estimated in OPG. It was observed that the lesion did not shrink sufficiently for enucleation. Then simultaneous CBCT was performed in subsequent patients when the cyst was evaluated as shrunken enough for enucleation

according to the control OPG. The size of the cyst was compared in both films. And as a result of this comparison, it was observed that the cyst volume was greater than predicted in the control OPG film, both in CBCT records and clinically during enucleation. Then we decided to implement this study to examine if there is a difference between two imaging methods in terms of enucleation decision after marsupialization process.

Study Design and Questionnaire

We made a questionnaire survey, which includes questions regarding timing of treatment, reliability of two imaging methods and treatment choices (including reasons) of each patient with radiographic data, to 21 oral and maxillofacial surgeons who have at least 5 years of experience with CBCT and OPG diagnoses. The detailed version of the questionnaire is presented in Table 1. Totally, 27 images and 45 questions were reviewed by 21 oral and maxillofacial surgeons The surgeons evaluated 18 OPG images (9 OPG preoperative (Figure 1), 9 OPG at the end of marsupialization (Figure 2) and 9 CBCT (taken simultaneously with OPG's at the end of marsupialization (Figure 3). The surgeons also had knowledge of the odontogenic cyst pathologically diagnosed for all cases. The prepared electronic questionnaire was sent to 21 oral and maxillofacial surgeons by e-mail. This e-survey included 5 questions and 3 radiographic images for each patient. The answers of the survey statistically evaluated.

Statistical Analyses

The data were analyzed with IBM SPSS V23 (Chicago, USA). Analysis results were expressed as frequency and percentage for all categorical data. Chi-square test was used to compare categorical data. The significance level was taken as $p < 0.05$.

Results

The study includes nine patients (eight males and one female) with a mean age of 26.33 years (range, 13–49 years). All cysts underwent marsupialization followed by enucleation. The mean marsupialization time of the patients was calculated as 10.22 (±5.44) months. The 189 responses for the first question showed that the surgeons favored marsupialization followed by enucleation, marsupialization, and enucleation (70.89, 14.28, and 14.81%, respectively; Table 2). Regarding the factors affecting the treatment of choice, option a received 157 votes, option b 156, option c 104, option d 104, option e 85, option f 43, and option g 56. Of 189 answers (Table 2) to the third question, 162 were 'yes' and 27 were 'no'. Thus, 85.71 % considered that the lesion had shrunk adequately to allow enucleation, and 14.29 % did not (Table 2). For the fourth question (evaluation of the CBCT images), 57.67% (of 109 answers) were 'no'; the lesion had not sufficiently shrunk (Table 2). The proportion of 'yes' answers was significantly lower than that for question 3 (Table 3, $p<0,05$) For the last question, CBCT received 188 votes and OPG only 1; CBCT was more reliable than OPG (Table 2).

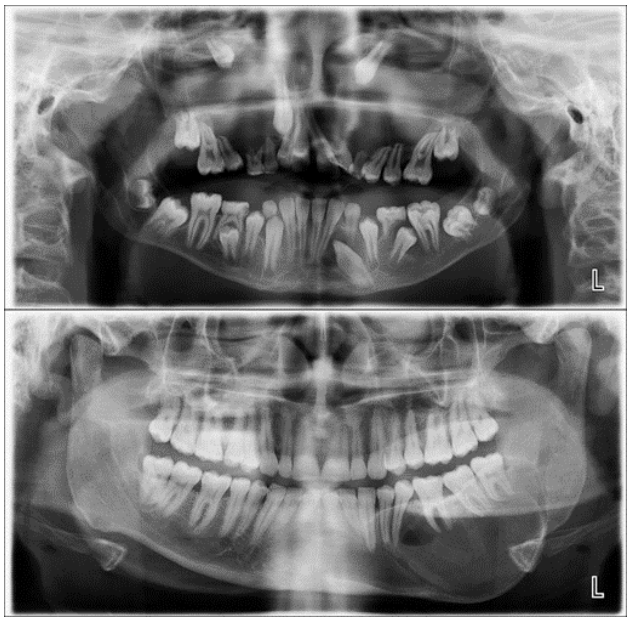

Figure 1. First OPG (Patients 1 and 2)

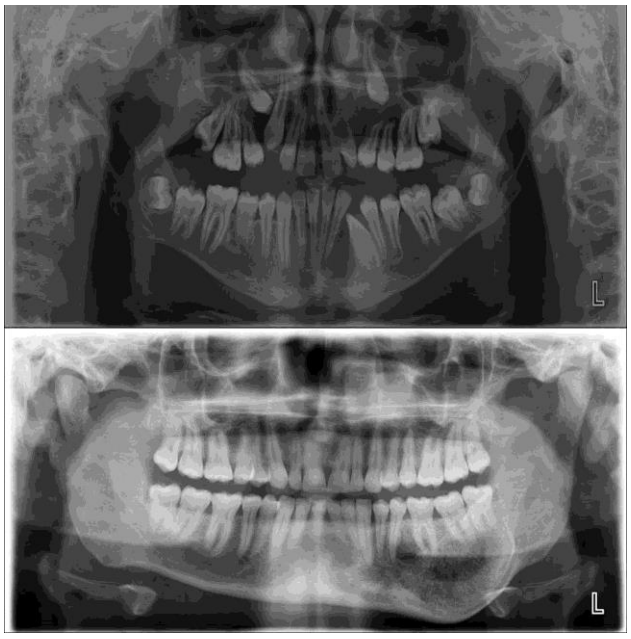

Figure 2. Control OPG taken after marsupialization treatment. (Patients 1 and 2).

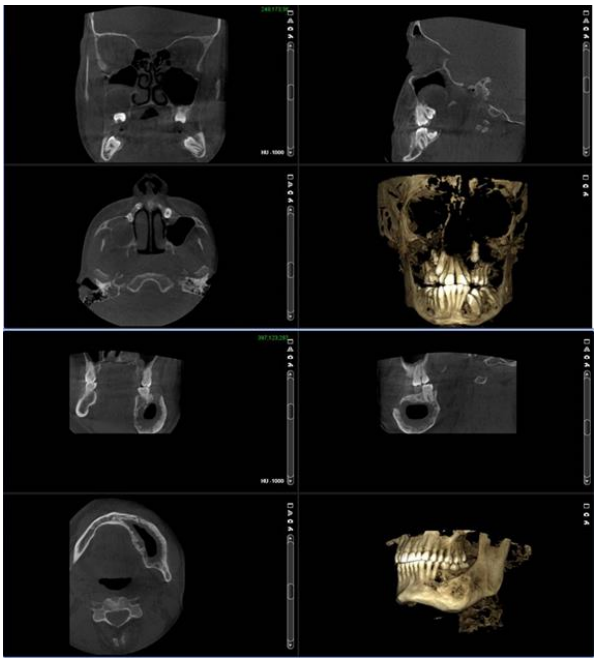

Figure 3. CBCT which was taken at the same time control panoramic film. (Patients 1 and 2)

Table 1. Questions and Options

	Questions	Options	
Q1	What is the best treatment option regarding the first panoramic film?	a)Marsupialisation b) Enucleation c)Marsupialisation+enucleation	
Q2	What prompted your answer to question 1?	a) The size of the cyst b) The relationship between other anatomical features and the cyst, and the risk of damage to the regional anatomy c) The possibility of complete cyst removal via surgery d) The possibility of fracture during or after surgery e) Patient age f) The likelihood of maintaining teeth associated with the lesion g) The likelihood that the tissue available for prosthetic treatment after enucleation will be inadequate	
Q3	Assume that you plan to treat the lesion via marsupialization + enucleation. The lesion must shrink maximally prior to enucleation, by reference to the OPG film taken after marsupialization. Is the cyst sufficiently shrunken to allow enucleation?	1) Yes	2) No
Q4	Looking at the CBCT scan taken at the same time as the OPG film, has the cyst shrunk sufficiently to allow enucleation?	1) Yes	2) No
Q5	Which of the following imaging modalities more reliably identify the boundaries of the lesion and the optimal treatment?	1) OPG film	2) CBCT film

Table 2. Questions and vote distrubutions

Questions		n	%
Q1	Marsupialization + enucleation	134	70,9
	Marsupialization	27	14,3
	Enucleation	28	14,8
Q2	a	157	83,1
	b	156	82,5
	c	104	55,0
	d	104	55,0
	e	85	45,0
	f	43	22,8
	g	56	29,6
Q3	Yes	162	85,7
	No	27	14,3
Q4	Yes	109	57,7
	No	80	42,3
Q5	CBCT	188	99,0
	Panaromic	1	1,0

Table 3. Statistical analyses of the 3th and 4th questinairres.

Questinnaires	**Panoramic**		**p**
Q3. Assume that you plan to treat the lesion via marsupialization + enucleation. The lesion must shrink maximally prior to enucleation, by reference to the OPG film taken after marsupialization. Is the cyst sufficiently shrunken to allow enucleation?	Yes	No	<0.001
	162	27	
	CBCT		
Q4. Looking at the CBCT scan taken at the same time as the OPG film, has the cyst shrunk sufficiently to allow enucleation?	Yes	No	
	80	109	

P value of <0.05 was considered statistically significant

Discussion

In this retrospective study, we evaluated the optimal radiographic imaging modality in terms of surgical planning and evaluation of cyst volume after marsupialization.

In previous studies, the authors compared CBCT and OPG on many different aspects such as: surgical technique of maxillary and mandibular third molar, classifying of lower third molar, upper molar root protrusion into maxillary sinus, relation of impacted mandibular third molars to the inferior alveolar nerve, presurgical evaluation of bony implant sites, impacted maxillary canines, and anatomical characteristics and visibility of mental foramen and accessory mental foramen (Ghaeminia et al.,2009; Aravindaksha et al., 2015; Lorenzo et al., 2015; Pico et al., ;2017; Araujo et al., 2019; Hermann et al., 2019; Brasil et al., 2019; Themkumkwun et al., 2019; Nirmalendu et al., 2019; Fortes et al., 2019). None of the prior studies compared CBCT and OPG films taken after the marsupialization of odontogenic cysts in terms of evaluating whether the odontogenic cyst volume allows enucleation.

Although various treatments are used for the surgical removal of large odontogenic cysts, no standard protocol is available. Treatment seeks

complete removal of the lesion and minimization of postoperative complications. Cystectomy, accounting for the entire enucleation of the lesion, is a technique which is faster than marsupialization, but it has some disadvantages such as damaging the important anatomical structures nearby the lesions (Lizio et al. 2013; Wakolbinger et al. 2016). Wakolbinger et al. and Lizio et al. offer marsupialization, followed by enucleation in such cases to diminish these risks. Marsupialization is a technique described by Partsch, 2005, reduces the intra-cystic pressure and induces new bone formation. In this technique, the communication path between the oral cavity and the lesion is conducted with the use of various devices (tube, stent). In this study, serum drainage tube was used to maintain oral and intracystic connection. Marsupialization allows the fulfilment of both aims and is a useful conservative treatment for large jaw cysts (Lee et al., 2017). Marsupialization followed by enucleation minimizes anatomical damage in the patients with odontogenic cysts, associated with few postoperative complications and a better quality of life. The cyst volume reduces gradually; there is no risk of jaw fracture, adjacent tissues are protected and also it is suggested that decompression followed by enucleation has a lower relapse rate compared with enucleation alone (Shudou et al., 2012; Oliveros et al., 2017).

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The surgeons were asked to choose an optimal treatment, and then to explain the reason for their choice (from the several possible reasons listed in the question). Of the 189 replies, marsupialization followed by enucleation, marsupialization, and enucleation received 70.89, 14.28, and 14.81% of the votes, respectively (first question). In terms of the reasons behind the choice, option a received 157 votes, option b 156, option c 104, option d 104, option e 85, option f 43, and option g 56 (second question). The preferred treatment was marsupialization followed by enucleation; marsupialization alone and enucleation alone received similar (low) numbers of votes. For the reason of the two-step treatment, cyst size and possible damage to nearby anatomical structures were of concern to the majority of surgeons, who also thought that complete cyst removal might be difficult without marsupialization, thus associated with a fracture risk. The surgeons were not concerned about the patient's age, tooth condition, or possible difficulties with prosthetic treatment after enucleation. In general, the authors agreed that if a cystic lesion was large, laying adjacent to an important anatomical structure, involving a tooth, or was associated with a fracture risk, marsupialization followed by enucleation should be preferred.

This approach (marsupialization followed by enucleation) has certain disadvantages; patient compliance is essential in terms of careful oral hygiene, daily irrigation of the drain and the surrounding tissues, and several follow-up visits. The tube entrance may become blocked, the tube may be lost, and further treatment may be required prior to enucleation (Oliveros et al., 2017). Indeed, lost tubes, patients who do not keep follow-up appointments and irrigation problems were encountered in this study. All patients underwent enucleation after marsupialization.

Radiography plays a significant role in the diagnosis of odontogenic cysts; they are commonly found incidentally on routine radiographic examinations. Conventional radiographs (periapical and panoramic films) are useful and are routinely taken; CT and CBCT radiographs are essential for correct diagnosis and treatment by oral and maxillofacial surgeons (Ghaeminia et al., 2009). Plain radiographs are sometimes unreliable because of the superimposition of anatomical structures, ghost

images, and/or horizontal and vertical distortions (Bouquet et al., 2004). CBCT requires a little more radiation than does OPG but far less than CT; further, CBCT is useful and practicable (Ludlow et al., 2008). CBCT delivers full-size three-dimensional images; axial, coronal, and sagittal sections may be viewed separately if required. CBCT is of great assistance preoperatively, for surgical planning, and during the follow-up of jawbone lesions (Bouquet et al., 2004; Prabhusankar 2014).

The studies regarding surgical planning and imaging methods were present in the literature about tooth removal. Most of these studies stated that there were no statistically significant differences in surgical planning when panoramic and CBCT images were compared before surgery (Aravindaksha et al., 2015). Aravindaksha et al. (2015) assessed the impact of CBCT images on mandibular third molar removal in terms of elevator placement, tooth sectioning, direction of tooth removal and removal of buccal bone. They stated that the CBCT images did not change the surgical treatment plan in mandibular third molar removal. In addition, Araujo et al. (2019) reported that no statistically significant changes were present between CBCT and panoramic images in mandibular third molar removal. Nevertheless, Ghaeminia et al. (2009) reported that CBCT images before mandibular third molar surgery had a dramatic effect in surgical planning in the direction of tooth removal regarding buccolingual relationship between tooth and mandibular canal. Also, Hermann et al (2019) determined that CBCT images changed the treatment plan regarding external root resorption compared to panoramic images. According to Hermann el al. (2019) decision to remove second molars are more often encountered after CBCT examinations. Brasil et al. (2019) performed a comparison of panoramic and CBCT findings for classification of impacted lower third molars according to the parameters of the Pell and Gregory classification. In their study, two oral and maxillofacial radiologists evaluated OPG and CBCT images and as a result of this study OPG shows similar performance compared with CBCT in the classification of impaction. Themkumkwun et al. (2019) conducted a study to determine correlation between Panoramic and CBCT images in terms of upper molar root protrusion into the maxillary sinus and they highlighted that there was a respective correlation between two imaging methods. In a study evaluating the relationship between IAN and impacted lower molar roots in terms of OPG and CBCT imaging methods, it was reported that CBCT was more effective in evaluating the relationship of these anatomical structures (Nirmalendu et al., 2019). The study conducted by Fortes et al. (2019) assessed the influence of 2D and 3D imaging methods on implant surgery planning. According to their results, the linear measurements in Panoramic radiography was not accurate and image magnification-distortion were expected and vertical measurements in Panoramic radiography might result with overestimation. Lorenzo et al. (2015) aimed to compare the skills of CBCT and OPG in terms of mental foramen and accessory mental foramen visualization. According to their results 83.87% of the mental foramens and 45.83% of the accessory mental foramens identified on CBCT were also visible on panoramic images. A questionnaire implemented by Pico et al. (2017) reported that the CBCT imaging gave further information when compared to panoramic radiography regarding the impacted upper canine assessment. This questionnaire was performed with nine orthodontists and they were asked to analyze different topics regarding the impacted maxillary canines.

According to these studies, the superiority of CBCT over OPG is still controversial. While most of the authors stated that CBCT was superior, some stated that there was no difference between the two imaging techniques. In this study, the experienced surgeons were asked “Is the cyst sufficiently shrunken (on the OPG film) to allow enucleation?”. Overall, 85.71% of the respondents replied ‘yes’. We then asked the same question but referred the surgeons to the CBCT film; 57.67% replied ‘no’. This result means that; 85.71% of surgeons stated that cysts had shrunk enough for enucleation according to OPG, whereas this rate decreased to 42.33% when the same surgeons evaluated the same patients' CBCT images taken simultaneously with the control OPG. Thus, CBCT revealed the real cyst size by accurately defining the boundaries thereof; a majority of surgeons felt that more time should pass prior to enucleation. Almost all surgeons stated that CBCT was more reliable than OPG.

One of the limitations of this study was defining the surgeons with 5 years of professional background as experienced. In fact, experience should be based not only on the number of years studied but on more subjective data such as the number of operations performed or complication rates. In previous studies the examiners’ experienced term was explained in detail but Lambert et al., (1997) defined professionals’ experience level by the number of implants they had placed previously in an implant planning study.

Although the effects of CBCT and panoramic imaging systems on surgical techniques have been investigated in the literature, no studies on the surgery of odontogenic cysts have been found. In the present study, the surgical planning of large odontogenic cysts is clearly changed when experienced surgeons' answers were evaluated.

Conclusion

In conclusion, it seems that examination of the cyst volume by CBCT may change the final treatment decision at the end of the marsupialization process. CBCT and OPG data differed significantly when the techniques were used to define size of cystic lesions. In this study, we concluded that OPG imaging method can be used for the diagnosis and follow-up of cystic lesions, but in order to determine the accuracy of timing, adequacy of new bone formation and whether the cyst has shrunk sufficiently in volume, during the transition from the marsupialization process to the enucleation process, it is necessary to use CBCT imaging method. Further clinical trials should be conducted to define the effects of three dimensions images regarding surgical treatments of different kinds of oral and maxillofacial region cystic lesions.

Ethics Committee Approval: Ethics committee approval was received for this study from Non-clinical Research Ethics Committee of Harran University Medical Faculty. (Date: 11/03/2019, Decision Number: HR/19.03.26.)
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RESEARCH ARTICLE

The Investigation of Anti-Proliferative Effects of [Ag2(sac)2(dap)2] Complex on Different Types of Cancer

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Abstract

Objective: Cytotoxic features of silver and saccharine compounds have taken attention due to the fact that most of them have showed a cytotoxic effect against tumor cells. In this study, it is aimed to investigate anti-proliferative effects of [Ag2(sac)2(dap)2] complex on different types of cancer cell lines.

Methods: HeLa (cervical cancer), PC-3 (prostate cancer), DU-145 (prostate cancer), A549 (non-small cell lung cancer), K562 (chronic myeloid leukemia) and MRC-5 (normal lung fibroblast) cell lines were grown in plates. In order to determine anti-proliferative effects, IC 50 values of [Ag2(sac)2(dap)2] and cisplatin on these cell lines were determined by MTT method**.**

Results: IC 50 value of [Ag2(sac)2(dap)2] complex was 19.53 ± 1.74 µM for HeLa cell line, 17.14 ± 1.41 µM for PC-3 cell line, 18.56 ± 4.04 for DU 145 cell line, 17.93 ± 1.06 µM for A549 cell line, 3.18 ± 0.04 µM for K562 cell line and 7.25 ± 1.00 µM for MRC-5 cell line. Also, IC 50 value of cisplatin was 4.00 ± 0.47 µM for HeLa cell line, 12.29 ± 1.60 µM for PC-3 cell line, 5.05 ± 0.65 for DU 145 cell line, 12.74 ± 1.26 µM for A549 cell line, 5.90 ± 0.59 µM for K562 cell line and 5.91 ± 0.32 µM for MRC-5 cell line. Only in K562 cell line, IC 50 of [Ag2(sac)2(dap)2] complex was lower than IC 50 of cisplatin.

Conclusion: Anti-proliferative activity of [Ag2(sac)2(dap)2] complex is more than cisplatin on chronic myeloid leukemia cells so this complex may be possible to be used as a treatment option especially for chronic myeloid leukemia.

Key words: [Ag2(sac)2(dap)2]; inorganic complex; cancer cell lines; anti-proliferation

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Introduction

Saccharin is an organic compound with a melting point of 225-227 ºC, systematically called 1,2-benzisothiazol-3 (2H) -one 1,1-dioxide or o-sulfobenzimide. Saccharin, which is 500 to 700 times sweeter than sugar, is not metabolized in the body and it is used as a reliable artificial sweetener for diabetics because of this feature. The use of saccharin as an antidote to metal poisoning, its features listed above and its use in the food, beverage, toothpaste, mouthwash and pharmaceutical industries are increasing the importance of studies conducted on saccharin (Baran and Yilmaz, 2006).

In addition, saccharin is a highly preferred ligand in recent years since it has a multi-functional ligand feature. Sodium saccharinate, the sodium salt of saccharin, is highly soluble in water (830 g / L at 20 °C) and is suitable for use both as a ligand and as a sweetener. When sodium saccharinate is used as the ligand, the saccharinate anion recovered in the solution has both negatively charged N atoms and CO and SO2 groups and is coordinated to metals with all these donor parts. The presence of anti-bacterial and anti-carcinogenic effects of metal saccharin complexes synthesized in the literature also increases the importance of studies on these complexes. In recent years, Pt (II) and Pd (II) complexes with mixed ligands containing saccharinates were synthesized and their anticancer effects were determined (Henderson et al., 1999; Yilmaz et al., 2018; Ari et al. 2013)

Since cisplatin complexes, which are the first and most widely used inorganic complex in cancer treatment, have serious side effects, the researchers focused on the synthesis of new metal complexes that are more effective in cancer cells (Florea and Büsselberg, 2011). In our previous study, [Ag2(sac)2(dap)2] complex was successfully synthesized and the chemical structure of it was characterized via spectroscopic techniques. In this study, anti-proliferative effects of [Ag2(sac)2(dap)2] complex on different types of cancer cell lines were investigated.

Methods

This study is designed as experimental in vitro study. HeLa (cervical cancer), PC-3 (prostate cancer), DU-145 (prostate cancer), A549 (non-small cell lung cancer), K562 (chronic myeloid leukemia) and MRC-5 (normal lung fibroblast) cell lines were placed overnight in the incubator after changing the medium of the cell lines. Then, the cells in the centrifuge tube containing a mixture of RPMI-1640, 10% FCS and 1% penicillin + streptomycin were rotated at 1000 rpm and 4 ºC for 5 minutes. The supernatant was discarded and the cells in the bottom were planted in flasks with medium and placed in an incubator containing 5% CO2 and 100% humidity at 37 ºC. The flasks in the incubator were checked by an inverted microscope during the incubation period and the proliferation of the cells was observed, provided that the cells were not displaced for the first two days. Aged media were emptied with the help of a pipette and renewed every 2-3 days with a medium containing 0.1 mL penicillin + streptomycin, 1mL FCS and 8.9 mL RPMI-1640. After the cells covered the flask base by 85-90%, the cells remaining in the flask base were counted with trypan blue staining method, the number of viable cells in 1 ml was determined and the cells seeded in 96-well containers with 1x104 cells per well. In order to determine the effect of the complex on the proliferation of cells and the level of inhibitory concentration 50% (IC50), the cells were treated with concentrations of 0, 250, 500, 750, 1000 and 1250 µM of [Ag2(sac)2(dap)2] complex for 24 and 48 hours. Also, the cells were treated with cisplatin as a control in order to compare anti-proliferative effects of [Ag2(sac)2(dap)2] complex. The primary output measurements of the study were IC50 values of complex on specified cell lines.

MTT method is based on the conversion of the tetrazolium ring of the compound MTT (3- (4,5-Dimethylthiazol-2-Yl) -2,5-Diphenyltetrazolium Bromide) into formazan by a mitochondrial enzyme, succinate dehydrogenase enzyme in the cells (live and mitochondrial functions are intact). Pale yellow MTT in the living cell turns into a dark blue-purple insoluble formazan product as a result of the destruction of the tetrazolium ring. Thus, the cells that live and have intact mitochondrial function are stained in purple, whereas the cells that are dead and have impaired mitochondrial function are not stained. After the cells are dissolved with organic solvent (eg isopropanol, DMSO, etc.), the color intensity of the formazan solution is measured spectrophotometrically at 590 nm. The reduction of MTT occurs only in cells that are metabolically active, and the level of this activity is measured by the viability of the cells. MTT solution was obtained by dissolving 5 mg of MTT in 1 mL of 1 x CMF-PBS. The solution was stored in the dark at + 4ºC. Cultured cells were treated with [Ag2(sac)2(dap)2] complex and cisplatin to each cell line at specified concentrations separately. 20 µL of MTT solution was added to each well of 96-well microplate containing incubated cells. The cells were kept in an orbital shaker outside the incubator at 150 rpm for 5

minutes. The cells were incubated for 3 hours in 5% CO2 incubator at 37°C. Supernatant liquid in the wells was discarded and 100 µL DMSO was added to the wells. Again, the cells were kept in an orbital shaker outside the incubator at 150 rpm for 5 minutes. The intensity of resulting color was measured at 590 nm (against the reference wavelength of 670 nm) on a microplate reader spectrophotometer. The formula specified was used to calculate % of cell viability: [% of cell viability = (total number of cells-total number of dead cells)/total number of cells x 100] (Tam et al., 2011).

SPSS v24 (IBM SPSS Statistics for Windows, Version 24, IBM Corp., Armonk, NY, USA) was used in statistical analysis to evaluate the anti-proliferative effect of [Ag2(sac)2(dap)2] complex on HeLa, PC-3, DU-145, A549, K562 and MRC-5 cell lines. As statistical analysis, Student's t test was used for binary comparisons and one-way ANOVA test was used for more than two comparisons.

Results

Anti-proliferative effects of [Ag2(sac)2(dap)2] complex on HeLa, PC-3, DU-145, A549, K562 and MRC-5 cell lines were investigated.

For this purpose, IC 50 values of [Ag2(sac)2(dap)2] complex on cell lines was determined by MTT method (Table 1). According to this analysis, IC 50 value of [Ag2(sac)2(dap)2] complex was 19.53 ± 1.74 µM for HeLa cell line, 17.14 ± 1.41 µM for PC-3 cell line, 18.56 ± 4.04 for DU 145 cell line, 17.93 ± 1.06 µM for A549 cell line, 3.18 ± 0.04 µM for K562 cell line and 7.25 ± 1.00 µM for MRC-5 cell line. Also, IC 50 values of cisplatin on cell lines was determined in order to compare with [Ag2(sac)2(dap)2] complex. IC 50 value of cisplatin was 4.00 ± 0.47 µM for HeLa cell line, 12.29 ± 1.60 µM for PC-3 cell line, 5.05 ± 0.65 for DU 145 cell line, 12.74 ± 1.26 µM for A549 cell line, 5.90 ± 0.59 µM for K562 cell line and 5.91 ± 0.32 µM for MRC-5 cell line.

Moreover, schematic representation of inhibitory concentrations of [Ag2(sac)2(dap)2] complex on cell lines in comparison with cisplatin was presented in Figure 1.

As can be seen, IC 50 values of [Ag2(sac)2(dap)2] complex on all cell lines were higher when compared to IC 50 value of cisplatin, except K562. Only in K562 cell line, IC 50 of [Ag2(sac)2(dap)2] complex was lower than IC 50 of cisplatin. This means that [Ag2(sac)2(dap)2] complex shows more anti-proliferative effect than cisplatin on chronic myeloid leukemia cells.

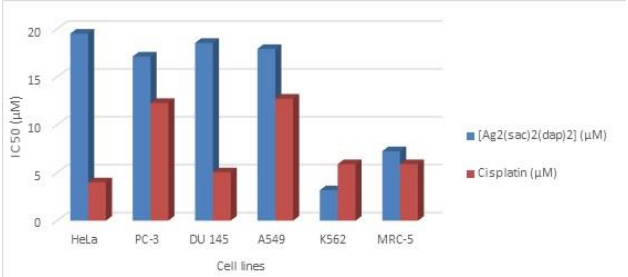

Figure 1. Schematic representation of inhibitory concentrations of [Ag2(sac)2(dap)2] complex on cell lines in comparison with cisplatin

Table 1. Inhibitory concentrations of $[Ag_2(sac)_2(dap)_2]$ complex and cisplatin on cell lines

		IC50 (µM)	
		$[Ag_2(sac)_2(dap)_2]$	Cisplatin
Cell lines	HeLa	19.53 ± 1.74	4.00 ± 0.47
	PC-3	17.14 ± 1.41	12.29 ± 1.60
	DU 145	18.56 ± 4.04	5.05 ± 0.65
	A549	17.93 ± 1.06	12.74 ± 1.26
	K562	3.18 ± 0.04	5.90 ± 0.59
	MRC-5	7.25 ± 1.00	5.91 ± 0.32

Discussion

Mostly, metals are fundamental components of cells chosen by nature. They are commonly placed in the enzyme catalytic region and are included in various biological pathways, from the exchange of electrons to structural and catalysis functions. They are widely utilized in cellular processes. Such metals are silver, gallium, cobalt, zinc, strontium, vanadium, copper and manganese, which are needed in trace quantities to activate catalytic activities (Mourino et al., 2012). Therefore, a homeostasis between cellular requirement and the amount present in the body is crucial for the normal physiological condition. In contrast, metals, including cadmium, nickel, arsenic and chromium, can trigger tumor formation and thus are less useful to the body. These boundaries have encouraged a study for platinum-based complexes showing higher selectivity, lower toxicity and a wider spectrum of function (Benedetti et al., 2011). Platinum (II) complexes like oxaliplatin and carboplatin, also other platinum analogs, are the products of this study. Other metal complexes containing ions like copper, gold and zinc (II) chelating agents have taken significant attention as anti-proliferative molecules. Lately, the chemistry of gold-based and ruthenium complexes has taken intensive examination, owing to renewed attention in giving an alternate to cisplatin and their encouraging

cytotoxic and probable anti-proliferative characteristics (Ndagi et al., 2017).

Newly, cytotoxic characteristics of silver (I) compounds have taken attention thank to the fact that most silver (I) compounds have been observed to show a better cytotoxic effect than cisplatin with comparatively lower toxicity and higher selectivity against tumor cells. In an in vitro research performed to evaluate the cytotoxic features of silver(I) compounds toward tumoral B16 (murine melanoma) and non-tumoral 10T1/2 (murine fibroblast) cell lines, silver compounds containing hydroxymethylene group presented higher cytotoxic activity for B16 (murine melanoma) than cisplatin AgSD and AgNO3. These compounds were detected to show comparatively lower toxicity against non-tumoral 10T1/2. Correspondingly, a research group studying to define the anticancer characteristics of silver (I) and gold (I) N-heterocyclic carbene compounds showed that these complexes displayed similar anticancer effect on H460 lung cancer cell line when compared to cisplatin. Moreover, silver complexes were synthesized from 2,6-disubstituted pyridine ligands. The complexes and the ligands were assessed in vitro in lung adenocarcinoma (A549), hepatocellular carcinoma (HepG2), breast adenocarcinoma (MCF7) and colon carcinoma (HT29) via MMT method by comparing with reference agent doxorubicin. All synthesized compounds displayed greater significant activity than the corresponding ligands and most of synthesized silver compounds showed magnificent cytotoxic activity against cancer cell lines in comparison with doxorubicin (Siciliano et al., 2011; Ali et al., 2013; Kalinowska-Lis et al., 2016). All these features made silver compounds potential metal compounds to be used for chemotherapy in future.

In this study, anti-proliferative effects of [Ag2(sac)2(dap)2] complex on HeLa, PC-3, DU-145, A549, K562 and MRC-5 cell lines were investigated. According to MTT analysis results, IC 50 value of [Ag2(sac)2(dap)2] complex was 19.53 ± 1.74 µM for HeLa cell line, 17.14 ± 1.41 µM for PC-3 cell line, 18.56 ± 4.04 for DU 145 cell line, 17.93 ± 1.06 µM for A549 cell line, 3.18 ± 0.04 µM for K562 cell line and 7.25 ± 1.00 µM for MRC-5 cell line. Also, IC 50 values of cisplatin on cell lines was determined in order to compare with [Ag2(sac)2(dap)2] complex. IC 50 value of cisplatin was 4.00 ± 0.47 µM for HeLa cell line, 12.29 ± 1.60 µM for PC-3 cell line, 5.05 ± 0.65 for DU 145 cell line, 12.74 ± 1.26 µM for A549 cell line, 5.90 ± 0.59 µM for K562 cell line and 5.91 ± 0.32 µM for MRC-5 cell line.

As similar to data of the literature about especially different silver complexes, anti-proliferative activity of [Ag2(sac)2(dap)2] complex on HeLa, PC-3, DU-145, A549, K562 and MRC-5 cell lines was considerably high. Especially, IC 50 of [Ag2(sac)2(dap)2] complex on K562 was lower than IC 50 of cisplatin. This means that [Ag2(sac)2(dap)2] complex shows more anti-proliferative effect than cisplatin on chronic myeloid leukemia cells.

Conclusion

Cytotoxic features of silver compounds have taken attention thank to the fact that most silver compounds have been observed to show a better cytotoxic effect than cisplatin with comparatively lower toxicity and higher selectivity against tumor cells. In our study, as similar to data of the literature about especially different silver complexes, cytotoxic activity of [Ag2(sac)2(dap)2] complex on HeLa, PC-3, DU-145, A549, K562 and MRC-5 cell lines was noticeably high. Especially, IC 50 of [Ag2(sac)2(dap)2] complex on K562 was lower than IC 50 of cisplatin. This means that [Ag2(sac)2(dap)2] complex shows more anti-proliferative effect than cisplatin on chronic myeloid leukemia cells. Even if, anti-proliferative activity of [Ag2(sac)2(dap)2] complex is needed to be confirmed with more complex experimental procedures. If verified, [Ag2(sac)2(dap)2] complex may be possible to be used as a treatment option especially for chronic myeloid leukemia.

Ethics Committee Approval: Ethics committee approval was not required because this is an in vitro study.
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RESEARCH ARTICLE

Comparison of Endometrial Biopsy Results of Premenopausal and Postmenopausal Patients

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Abstract

Objective: To evaluate the histopathological results of endometrial biopsy specimens obtained from patients who referred to our clinic with a complaint of abnormal uterine bleeding (AUB) and to compare the results of premenopausal and postmenopausal patients.

Methods: In this retrospective study, the records of patients who referred to our clinic due to AUB between 2013 and 2017, and who had undergone endometrial biopsy with pipelle were evaluated. Demographic data and menopausal status of the patients were recorded. Endometrial biopsy results of all patients were investigated. In addition, the patients were divided into two groups as premenopausal and postmenopausal. Endometrial biopsy results of both groups were compared.

Results: While 2808 (56.1%) of the 5000 patients who referred with AUB and who had undergone endometrial sampling were premenopausal, 2192 (43.8%) were postmenopausal. The mean age of the premenopausal and postmenopausal groups was found to be 41.6 ± 1.8 and 54.2 ± 5.9, respectively. Secretory endometrium was significantly higher in the premenopausal group than the postmenopausal group ($p < 0.001$). While atrophic endometrium and malignancy were significantly higher in the postmenopausal group than the premenopausal group, chronic endometritis was significantly higher in the premenopausal group.

Conclusion: Endometrial biopsy, which is a simple, inexpensive and easy technique, is the most preferred method for the exclusion of malignancy in patients with complaint of AUB. In patients with complaint of AUB, malignancy exclusion decision by endometrial biopsy must be made considering the age interval, risk factors that may cause estrogen exposure, and menopausal status of the patients.

Key words: Pipelle, Endometrial sampling, Abnormal uterine bleeding, Premenopausal, Perimenopausal

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Introduction

Abnormal uterine bleeding (AUB) accounts for about one-third of the referral reasons to the outpatient clinic in gynecology practice (Turan et al. 2018). PALM-COEIN acronym, which is used for the classification of uterine bleeding abnormalities according to hemorrhagic pattern and etiology in women of reproductive age, was introduced by the International Federation of Gynecology and Obstetrics (FIGO) in 2011. While PALM is classified as polyp, adenomyosis, leiomyoma, malignancy, and hyperplasia; COEIN is classified as coagulopathy,

ovulatory dysfunction, endometrial causes, iatrogenic and not yet classified (Munro et al. 2011).

As well as endometrial biopsy is a safe and effective diagnostic method in women with complaint of AUB, its main purpose is to eliminate malignancy. Nearly 80% of endometrial biopsies taken due to AUB are benign both in premenopausal and postmenopausal women. When the endometrial biopsy results of premenopausal and postmenopausal women with complaint of AUB are considered, while the rate of malignancy in premenopausal women is 0.4%, it raises up to 7% in postmenopausal women (Brinton et al. 2013; Jayawickcrama & Abeysena 2019). Approximately 2/3 of the women who undergo hysterectomy are women with AUB complaints (Kotdawala et al. 2013). Depending on the physician's preference or patient's suitability, abdominal, vaginal or laparoscopic hysterectomy can be performed (Peker et al. 2019).

The aim of our study is to evaluate the histopathological results of endometrial biopsy specimens obtained from patients who referred to our clinic with complaint of AUB and to compare the results of premenopausal and postmenopausal groups.

Methods

Patients older than 40 years who had undergone endometrial biopsy with pipelle due to complaint of between January 2013 and January 2017 were included in the study. After the approval of our hospital's ethics committee (ethics committee no: 2018.9.08), the study was planned retrospectively.

Patients who had undergone curettage for obstetric reasons, patients with previously known genital system malignancies, patients whose endometrial biopsy results were reported as just blood and mucus or inadequate material, were excluded from the study. Patients who did not receive any treatment due to abnormal uterine bleeding were included in the study. The patients were divided into two groups as premenopausal and postmenopausal. Age, gravida, parity, abortus, body mass index (BMI) and endometrial biopsy results of the patients in both groups were recorded. Patients who had no period for a year or more were accepted as postmenopausal. Endometrial biopsy samplings of all patients were performed under local anesthesia and pipelle curettage was performed in all. Collected endometrial biopsy materials were kept in 10% formal saline. Biopsy reports were evaluated by the pathologists of our hospital. The results were recorded as benign (proliferative and secretory endometrium, endometrium under progesterone effect, endometrium under estrogen effect, endometrial polyp), malignant and hyperplasia (complex, simple).

The Statistical Package for Social Sciences 20.0 (SPSS Inc.; Chicago, IL, the USA) was used for the statistical analysis of the study data. The distribution of the data was evaluated with the Kolmogorov-Smirnov Test. The descriptive statistical methods (mean and standard deviation) were used in evaluating the normally-distributed data, and the Independent t-test was used to compare the paired groups. The one-way Chi-square test were used for comparison between categorical variables. The results were evaluated at $p<0.05$ significance level.

Results

A total of 5850 biopsy specimens obtained from endometrial sampling due to complaint of AUB were investigated. A total of 5000 patients fulfilling the study criteria were included in the study. When the endometrial sampling results of all patients were investigated, endometrial biopsy results of 1142 (22.8%) of the 5000 patients were found to be endometrium under progesterone effect, whereas endometrial polyp (22.2%) was the second most common endometrial biopsy result in the general population, leiomyoma was the rarest (0.1%). While 2808 (56.1%) of the patients were premenopausal, 2192 (43.8%) were postmenopausal, whereas the mean age of all the patients was 44,7±8,06, the mean age of premenopausal and postmenopausal groups were found to be 41.6 ± 1.8 and 54.2 ± 5.9, respectively. Age, gravida, parity, abortus numbers and BMI of the groups are listed in Table-1. While the gravida numbers of the patients in the postmenopausal group were significantly higher than the premenopausal group, there was no difference between parity, abortus numbers and, BMI values. When the endometrial biopsy results of both groups were considered (Table-2), while endometrium under progesterone effect (premenopausal and postmenopausal were 22.4% and 23.3%, respectively) was found to be the most common endometrial biopsy result in both groups, endometrial polyp (premenopausal and postmenopausal were %21.9 and %22.5, respectively) was the second most common result. There was no difference between the groups in terms of endometrium under progesterone effect, endometrium under estrogen effect, endometrial polyp, endometrial hyperplasia, proliferative endometrium, malign mesenchymal tumor and leiomyoma ($p>0.05$). The secretory endometrium was significantly higher in the premenopausal group than the postmenopausal group ($p<0.001$). While atrophic endometrium and

malignancy were significantly higher in the postmenopausal group than the premenopausal group, chronic endometritis was significantly higher in the premenopausal group.

Table 1. Demographic Data of Patients

Demographic data	All patients n=5000 (%100)	Premenopausal n=2808 (%56,1)	Postmenopausal n=2192 (%43,8)	P *
Age	44,7 ± 8,06	41,6 ± 1,8	54,2 ± 5,9	**0,002**
Gravida	3,87 ± 0	3 ± 2,1	4,75 ± 2,2	**0,001**
Parity	3 ± 2	3,3 ± 1,8	2,6 ± 1,7	0,500
Abortus	1 ± 0,9	0,8 ± 1,2	1,2 ± 0,8	0,500
BMI (kg/m2)	32,5 ± 8,5	32,6 ± 8,8	32,4 ± 8,3	0,900

*Premenopausal and postmenopausal patients are compared.

Table 2. Comparison of the Endometrial Biopsy Results of Premenopausal and Postmenopausal Groups

Endometrial biopsy results	Premenopausal (n=2808)	Postmenopausal (n=2192)	P
Effect of Progesterone (n=1142, %22,8)	631 (%22,4)	511 (%23,3)	0.470
Effect of Estrogen (n=465, %9,3)	281(%10)	184 (%8,3)	0.053
Endometrial polyp (n=1112, %22,2)	617 (%21,9)	495 (%22,5)	0.650
Simple-complex hyperplasia (n=527, %10,5)	291 (%10,3)	236 (%10,7)	0.637
Secretory endometrium (n=496, %9,9)	357 (%12,7)	139 (% 6,3)	**<0.001**
Proliferative endometrium (n= 812, %16,2)	476 (%16,9)	336 (%15,3)	0.126
Atrophic endometrium (n=206, %4,1)	27 (%0,9)	179 (%8,1)	**<0.001**
Chronic endometritis (n=169, %3,3)	108 (%3,8)	61 (%2,7)	**0.040**
Malignancy (n=60, %1,2)	14 (%0,4)	46 (%2)	**<0.001**
Malign mesenchymal tumor (n=7, %0,14)	4 (%0,14)	3 (%0,13)	0.900
Leiomyoma (n=5, %0,1)	2 (%0,07)	2 (%0,09)	0.071

Discussion

In our study, histopathological results of patients who presented with complaint of AUB and who had undergone endometrial biopsy with pipelle were investigated and the results of premenopausal and postmenopausal patients were compared. While atrophic endometrium and malignancy were significantly higher in the postmenopausal group, secretory endometrium and chronic endometritis were significantly higher in the premenopausal group. Being one of the most common referral reasons to gynecology outpatient clinics, AUB affects 10-35% of women of reproductive age, whereas approximately 50% of postmenopausal women are affected (Turan et al. 2018). According to PALM-COEIN classification, the most common reasons for AUB are myoma, polyp and endometrial cancer (Munro et al. 2011). In 2013, it was reported by ACOG that endometrial biopsy is required for malignancy exclusion in women older than 45 with complaint of AUB or younger than 45 with estrogen exposure (Wright et al. 2017). As well as endometrial

cancer is the most common gynecologic malignancy, its most common symptom is AUB. While endometrial cancer is observed in 70% of postmenopausal and 25% of premenopausal women in general, it is seen in 10-15% of postmenopausal patients referring with AUB (Dangal 2003).

In a study conducted by Abdullah et al., consisting of 2295 patients with complaint of AUB, proliferative endometrium was found to be present in 21.7% of patients, secretory endometrium in 24.9%, endometrial polyp in 9.9%, atrophic endometrium in 3.1%, malignancy in 1.8%, chronic endometritis in 5.8% and endometrial hyperplasia in 9.1% (Abdullah & Bondagji 2011). In our study, when the distribution of patients presenting with complaint of AUB are considered, proliferative endometrium is found to be present in 16.2% of patients, secretory endometrium in 9.9%, endometrial polyp in 22.2%, atrophic endometrium in 4.1%, malignancy in 1.2%, chronic endometritis in 3.3% and endometrial hyperplasia in 10.5%.

In a study conducted by Burbos et al., the rate of malignancy was found to be 5.8% in 4454 postmenopausal women with complaint of AUB (Burbos et al. 2012). Similarly, the rate of malignancy in the study conducted by Ewies et al. in postmenopausal patients was found to be 5.5% (Ewies, A. A., Musonda 2010). In a study conducted, endometrial cancer was detected in 0.4% of premenopausal who presented with AUB whereas the rate was 7% in postmenopausal women (Britton et al. 2019). In our study, while malignancy was detected in 0.42% of premenopausal patients with complaint of AUB, it was detected in 2% of postmenopausal patients. This rate occurs to be lower compared to data in literature. This can be explained by the presence or absence of endometrial cancer risk factors. The probability of endometrial cancer increases in patients with risk factors such as anovulation, obesity, nulliparity, diabetes and tamoxifen treatment (Britton et al. 2019). However, in our study, enough data on additional risk factors in the patient groups could not be retrieved.

In the study conducted by Jairajpuri et al., in which endometrial sampling was performed with D&C on 219 perimenopausal patients aged 40-50, with complaint of AUB, endometrial polyp was detected in 2.7% of the patients (Jairajpuri et al. 2013). In our study, the incidence of endometrial polyp was higher both totally and individually in each of the two groups than in the study by Jairajpuri et al. The reason for this difference may be due both to the higher number of patients in our study and to endometrial sampling being performed with pipelle curettage rather than D&C, meaning the technical difference. In addition, since the endometrial polyp may be focally located, the diagnosis may not always be possible with endometrial sampling. In the same study, most common pathology was found to be secretory endometrium (Jairajpuri et al. 2013). In our study, the most common endometrial biopsy result observed both in the premenopausal and postmenopausal groups was endometrium under progesterone effect. In addition, the difference of our study from the study of Jairajpuri et al. is that the premenopausal and postmenopausal groups were investigated separately and both groups were compared.

While chronic endometritis was found to be 6.4% in a study conducted by Khare et al., in which endometrial sampling was performed on patients with complaint of AUB (Khare, A., Bansal, R. 2012), it was reported as 20.7% in a similar study by Michail et al. (Michail et al. 2007). In case of our study, chronic endometritis was observed in 169 patients (3.3%) of 5000 patients (108 patients in the premenopausal group (3.8%) and 61 patients in the postmenopausal group (2.7%)). A higher rate of chronic endometritis was observed in both studies than our study. In our study, chronic endometritis was found to be significantly higher in the premenopausal group than in the postmenopausal group. The reason for the presence of more cases in the premenopausal group may be since the sexually-active period is more prevalent in this age group. The reason why the chronic endometritis was detected less in the present study of ours compared to the data in the literature may be the rates of polygamy or monogamy, which show differences among countries, and the different prevalence of infections among countries.

Endometrial hyperplasia was detected in 15 patients (15%) in a study by Takreem et al., consisting of 100 perimenopausal patients with complaint of AUB (Takreem et al. 2009). In the study by Khare et al., this rate increased up to 51% (Khare, A., Bansal, R. 2012). In our study, endometrial hyperplasia was observed in 10.3% premenopausal and 10.7% of postmenopausal patients. Although this rate is below the rates in literature, it may still be considered as close to the literature rates. In this study, there are some failures in the analysis of the endometrial hyperplasia results due to the lack of enough data retrieval and therefore the results of endometrial hyperplasia could not be divided into subgroups in detail. When the numbers of endometrial hyperplasia in our study (without dividing to subgroups) were considered, no difference was observed between the two groups.

The limitation of our study is that, because it is a retrospective study some data could not be retrieved. However, the strength of our study is the large number of cases and the comparison of the results according to the menopausal status.

Conclusion

The main purpose of endometrial biopsy is to reveal the organic pathology that may cause ARF. Endometrial biopsy, which is a simple, inexpensive and easy technique for diagnosis, is the most preferred method. In patients with AUB complaints, it should be decided to exclude the AUB. Nowadays, endometrial biopsy, which is a simple, inexpensive and easy technique, is the most preferred method for diagnosis. In patients with complaint of AUB, malignancy exclusion decision by endometrial biopsy must be made considering the age interval, risk factors that may cause estrogen exposure, and menopausal status of the patients. In our study, more frequent occurrence of endometrial cancer in postmenopausal patients also supports this situation.

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RESEARCH ARTICLE

Investigating the Effect of Mesenchymal Stem Cells on Peripheral Nerve Repair with Quantitative Methods

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Abstract

Objective: The aim was to research the possible effects of bone marrow stromal cells on the effective method for peripheral nerve injuries of end-in-end repair for sciatic nerves using quantitative histologic methods.

Methods: Five adult male New Zealand rabbits had both sciatic nerves cut and then the end-in-end repair technique performed. Then while nothing was administered to the left side, the right side had autologous mesenchymal stem cell injection from previously cultured material administered. Four weeks later the repair area was removed, and sections were stained with S100 and CD31 antibodies. Stained sections were investigated for Schwann cells and vessels. Evaluations of the left and right sides were made by comparing their Schwann cell density and vessel density determined by estimating their volume fractions, separately.

Results: The repair areas on both sides showed no significant differences for the degree of immunoreactivity for S100 and CD31 (p=0.003). But the volume fractions of Schwann cells and vessels within the repair areas were found to be increased for the cell-treated nerves, but statistically there was no difference for vessels (p=0.073).

Conclusion: These results support the findings already reported in the literature, that increased Schwann cell density will probably promote regeneration of the peripheral nerve.

Key words: Mesenchymal stem cells, peripheral nerve regeneration, end-in-end repair, volume fraction

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Introduction

Schwann cells (SC) are an element of the peripheral nervous system that wraps nerve fibers. These cells are responsible for synthesis and maintenance of myelin. At the same time, they have important roles in nerve regeneration. They synthesize bioactive molecules as a result of nerve injury ensuring formation of more cells in the regenerating area and support axon regeneration (Ishikawa et al., 2009). Using these features, experimental research has studied the effects of SC on peripheral nerve injuries; however, use is limited due to difficulties with purification and proliferation.

As a result, researchers have searched for other cellular resources that can be easily accessed and proliferated. One of these resources is bone marrow.

Bone marrow stromal cells are multipotential mesenchymal stem cells with the ability to transform into different cell types in appropriate conditions. One of the cells they can differentiate to is SC. Studies have shown that SC differentiated from bone marrow stem cells has great potential for induction of peripheral nerve regeneration (Tohill et al., 2004; Dezawa, 2002; Choi et al., 2005; Fernandes et al., 2008; Mahay et al., 2008). Additionally, bone marrow cells ensure production of many trophic factors and were shown to induce angiogenesis in areas of administration (Fernandes et al., 2008; Orlic et al., 2001; Perin et al., 2003).

The end-in-end nerve repair method (Siemionow et al., 2002) is one of the peripheral nerve repair techniques. This repair method has many positive features. It prevents axons from escaping the repair line, ensures accumulation of neurotrophic factors in the environment, prevents surrounding scar tissue from entering the regeneration area and reduces neuroma formation. In our study, noting the potential of bone marrow mesenchymal stem cells (MSC) we researched the effect on nerve regeneration.

Methods

Five adult white New Zealand rabbits weighing between 2500-3000 g were used in the study. Surgical procedures and care of animals were performed at Ondokuz Mayıs University Surgical Research and Application Center.

Obtaining mesenchymal stem cells

Before performing surgical procedures on animals, the bone marrow retrieval process was completed. With an injector mounted on a special device, bone marrow aspiration was performed from the right crista iliaca. Aspirate with 3-6 cc volume obtained from each animal was placed in special cell culture medium under sterile conditions. The aspirates were preserved in the medium at +4 °C and sent to a special facility (ATİ Technology Center, Trabzon, Turkey) to obtain MSC.

The obtained bone marrow aspirates were mixed with MSC production medium (Dulbecco's Modified Eagle Medium [DMEM], Fetal Bovine Serum [FBS] ((HyClone, Logan, UT, USA)), antibiotic [penicillin]) and centrifuged two times (2000 rpm, 5 minutes). The supernatant was obtained and suspended in cell pellet production medium. Mononuclear cell counts were performed, and certain numbers were transferred to the cell culture medium and cultured in an incubator at 37 °C in 5% CO_2, and 95% relative humidity. MSC forming confluence were removed for the trypsinization procedure, cell counts were performed and cultured in the same production medium to create advanced passages. When completing quality control tests (Okarma et al., 1992), some of the passage cells were used in experiments and the remaining section were placed in cryopreservation (Im et al., 2001; Kernan et al., 1987).

MSCs were delivered nearly two weeks later and the surgical procedure was performed.

Surgical procedure

The study was performed on the right and left sciatic nerves. The left side was assessed as the control group, while the right side had experimental procedures performed. For this, animals had vertical incision of both sciatic nerves. The proximal section of the epineurium was sutured to the distal section of the epineurium with the end-in-end repair method. Thus, a 5 mm long epineural tube was created. The cultured autologous mesenchymal stem cells were injected into the epineural tube for sciatic nerve repair only on the right side. The left side had no procedure performed within the tube.

Four weeks after the procedure, the repair area was removed on both sides and fixed in formalin. After routine histologic monitoring procedures, tissues submerged in paraffin had 10 sections obtained with nearly 6µm thickness with systematic random sampling. The sections were placed on poly l-lysine covered slides and labelled with S100 and CD31 antibodies (Cell Signaling Technology, Inc., Beverly, MA, USA) using the peroxidase technique and stained with DAB. Areas stained with S100 were accepted as Schwann cells while areas stained with CD31 were accepted as vessel. Evaluation between the right and left sides calculated the volume fractions for Schwann cell (V_{SC}) and vessel densities (V_D) and compared them (Howard and Reed, 1998). Comparison was completed by increasing magnification for areas on images. Sampling and point counts for the cross-section areas on the monitor were completed using two separate templates (Figure 1).

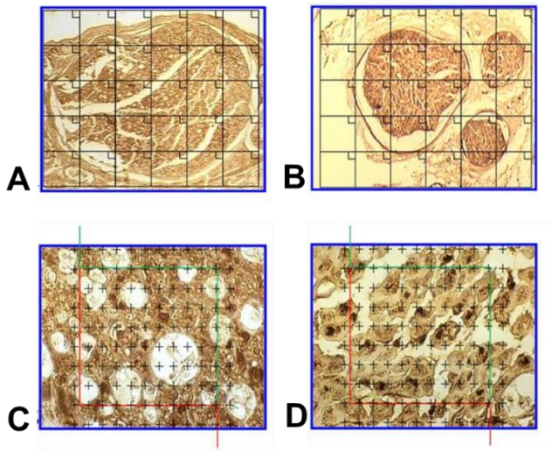

Figure 1. Calculations were completed in two steps. Firstly, areas were sampled at 4 x magnification (A, B). Then points in the sampled areas were examined in order with counts at 60x magnification (C, D). A and C are areas with cells injected, B and D are from the control group.

Statistical analysis

As data had normal distribution, differences between the groups were evaluated using the paired t-test. Those with *p* value lower than 0.05 were accepted as showing significant difference. Data are presented as mean ± standard deviation (SD). All data analyses were conducted using the SPSS (Demo version 25.0, IBM Corp., Armonk, NY, USA) statistical software.

Results

In both repair areas, no difference was observed in terms of immunoreactivity in sections labelled with S100 and CD31. The data for volume fractions obtained from sections labelled with S100 are given in Table 1.

Table 1. Density of Schwann cells in right and left siatic nerve with mean ± standard deviation (SD) and *p* value

Animal no (n=5)	Right side	Left side
1	0.027	0.013
2	0.026	0.01
3	0.021	0.014
4	0.02	0.012
5	0.02	0.01
Mean ± SD	0.0228 ± 0.0034	0.0118 ± 0.0018
***p* value**	0.003**	

** $p<0.01$

As can be seen in Table 1, the SC density for the nerve with stem cells administered (right side) were much higher than sections without (up to two times more). In fact, according to these results there was a statistically significant difference found between the right repair area and left repair area in terms of cell density (V_{SC}) (p=0.003).

Table 2. Vessel density (V_D) in right and left sciatic nerve with mean ± standard deviation (SD) and *p* value

Animal no (n=5)	Right side	Left side
1	0.0061	0.0028
2	0.0031	0.0025
3	0.0029	0.0028
4	0.0049	0.0032
5	0.0048	0.0038
Mean ± SD	0.0043 ± 0.0014	0.0030 ± 0.0005
***p* value**	0.073	

When the data in Table 2 are examined, there were differences in vessel density in the area with stem cell injected compared to the control group for some animals. In fact, in animals numbered 1 and 4, an excess amount of vascularization was observed in the right repair area compared to the left side. However, considering the mean in the groups, there was no significant difference in statistical terms (p=0.073).

Discussion

The use of bone marrow-sourced stem cells for peripheral nerve injury has become more common in the last decade. Advantages of these cells include the ability to differentiate in many ways and being easy to access. Their importance for nerve repair is due to transforming into Schwann-like cells or supporting axonal growth by ensuring proliferation of Schwann cells in the environment. At the same time, they are thought to regulate release of neurotrophic factors and receptors in the repair area. Additionally, they are proposed to ensure secretion of a range of cytokines and growth factors increasing angiogenesis. In this study, these features of mesenchymal stem cells were combined with a new nerve repair technique (Siemionow et al., 2002) and we quantitatively researched the effects on the repair area. The results of the study are in parallel with the results of other studies.

A study by Fernandes et al. (2008) used venous graft for nerve repair in a study of rats. The group using graft were injected with supplementary autologous bone marrow cells. The cell-supplemented group obtained better results compared to the group with autologous nerve graft and they reported the vessel density in the stem cell group was significantly increased compared to the other groups especially. Dezawa et al. (2001) used bone marrow-sourced mesenchymal stem cells for peripheral nerve

repair and showed these cells transformed into Schwann-like cells using S100 and p75 markers. Cuevas et al. (2002) injected previously-labelled adult bone marrow stem cells in peripheral nerve incisions and identified that a portion of these labelled cells differentiated into Schwann cells. A study of rats by Wang et al. (2009) injected mesenchymal stem cells in nerve grafts with length of 10 mm. Compared with the control group, they identified pronounced axon growth and many Schwann cells in stem cell grafts on the 7th and 14th days. Choi et al. (2005) in studies using vein grafts added cultured bone marrow to the grafts and observed these cells transformed into Schwann-like cells. They obtained better outcomes in the repair area compared to the control group. Tohill et al. (2004) used three different cell sources and applied them separately to 1 cm nerve graft used in the sciatic nerve of rats. These were cultured Schwann cells, undifferentiated bone marrow cells and differentiated bone marrow cells. They determined the regeneration distance using S100 antibody. Compared to the control group, they observed clear axon growth and amelioration in the three groups. Undifferentiated bone marrow cells differentiated with cellular and humoral effects in the graft area and they considered S100 specific to glial cells were synthesized. Zhang et al. (2004) injected undifferentiated mesenchymal cells obtained from bone marrow into 10 mm nerve grafts. These previously-labelled cells were identified to synthesize S100, GFAP and p75 reflecting Schwann cell properties.

All these studies show that the presence and amount of Schwann cells in the nerve repair area is important for vascularization of the area and more rapid and quality regeneration. In this sense cultured mesenchymal stem cells provided notable results for peripheral nerve repair. However, the approach to nerve injury repair possesses separate importance in addition to cellular administration. The elements that should be provided by repair methods include accumulation of growth factors and cytokines in the repair area, prevention of foreign object reactions, prevention of surrounding scar tissue entering the repair area, preventing axons from leaving the repair line and thus reducing neuroma formation. The repair method in our study ensures these situations, in addition to allowing accumulation of injected stem cells in the area. In fact, the higher S100 and CD31 positive areas compared to the control group appear to confirm this situation. When we compare our parameters with other studies, no quantitative data was given for comparison. The amounts of Schwann cells and vessels in the repair area in this study were revealed comparatively with the control group.

It is clear that these types of studies will continue in future years. Just as studies to be performed can use different stem cell sources with our applied repair method, the inclusion of different healing weeks will expand these studies.

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RESEARCH ARTICLE

Influence of Reciprocating NiTi Instruments on the Accuracy of Apex Locator Integrated Endomotors During Simultaneous Working Length Determination

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Abstract

Objective: To compare simultaneous working length determination efficiency and electrical resistance of thermally treated NiTi files and their counterfeits.

Methods: Access cavities were prepared for sixty human mandibular premolar teeth, which were then numbered with a marker. Actual working length was determined visually by introducing a #10 K-file into the root canal and the reference point was marked for further steps. By using flowable composite, the teeth were fixed at the cementoenamel junction to a hole in the center of a glass bottle cap and a second hole prepared on it for lip clip. Alginate impression material was filled into glass bottle then the tooth was embedded into it. Experimental models randomly divided into 6 groups as Group WOG (WaveOne Gold), Group WO (WaveOne), Group W+ (Superline W+), Group RB (Reciproc Blue), Group R (Reciproc), Group V (Superline V). Root canals were prepared until the endomotor stopped when reaching the apical foramen and the silicon stopper was moved to the previously marked reference point to determine the simultaneous working length. The electrical resistance of the files (from tip of file to notch of the shaft) was measured using a multimeter.

Results: No readings could be obtained via apex locator for Group V. Group W+ was significantly less accurate compared the other groups ($p<0.05$). No significant difference was found among the groups WO, WOG, R, and RB ($p>0.05$).

Conclusion: Thermal treatments of NiTi alloys had no effect on the accuracy of simultaneous working length determination. However, counterfeit endodontic files failed to show of accurate simultaneous working length determination.

Key words: Electrical resistance, Endodontics, Nitinol, Root Canal Preparation

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Introduction

Accurate determination of the working length is among the indispensable steps of endodontic treatment. Failure to measure the working length correctly could result in two possibilities: the insufficient chemo-mechanical root canal preparation, which might lead to failure of endodontic treatment eventually due to untouched sites in the root canal system harboring microorganisms and pulp remnants (Sipavičiūtė and Manelienė, 2014); and over-instrumentation of the root canal, leading to acute periapical irritation as a result of extruded instrumentation, irrigants, pulp remnants, microorganisms, and their toxins. Moreover, the overfilling of a root canal might follow over-instrumentation if the over-instrumentation is not corrected, which can result in treatment failure (Ricucci et al., 2011). Radiographs and electronic apex locators are primarily used to determine the working length in clinics (Orafi and Rushton, 2013; Martins et al., 2014).

Electronic apex locators' fundamental operating principles are mainly based on the assumption that living human tissues have certain electrical characteristics (Nekoofar et al., 2006). These devices measure the resistance or the impedance changes of the dental tissues to determine the apical foramen (Nekoofar et al., 2006).

Manufacturers have integrated electronic apex locators into endodontic motors to allow simultaneous working length control during root canal preparation (Wiggler et al., 2014). Most of these apex locator integrated endomotors that have two selections regarding how they signal to reach the apical foramen. They could automatically stop instrumentation or turn the file reverse to easily withdraw it from the root canal; the latter property had been associated with lower postoperative pain levels (Arslan et al., 2017).

NiTi file systems have become common armamentarium among the general dentists and specialists for endodontic treatment for over the past two decades. Reciproc Blue [(RB) (VDW, Munich, Germany)] and WaveOne Gold [(WOG) (Dentsply Sirona, Ballaigues, Switzerland)] are among the most popular NiTi file systems; both are reciprocal, single-file instruments intended for single use. Similarly, they are developed from their ancestor file systems (Reciproc and WaveOne, respectively) by enhancing file designs and applying thermal treatment. As a result of the thermal treatment, a modified titanium oxide layer is produced upon the surface of the instruments. The thickness of the titanium oxide layer gives the instruments either its blue or gold color and compensates the cutting ability while the innovative thermal treatment increases cyclic fatigue resistance and flexibility of the instruments. NiTi instruments have recently been upgraded by application of thermal treatments before or after manufacturing to minimize the instrument separation rate, while widespread consensus has been reached upon single-use of instruments in consideration with mechanical and biological concerns (Gavini et al., 2018). However, single-use of such expensive instruments with high-quality standards is a financial burden for common clinicians. Therefore, especially in developing countries, gray markets that claim to market cheaper equivalent dental products would appear without a proper introduction of the alloy or kinematics of the instruments. Unfortunately, these instruments are counterfeit and usually far from meeting expectations (Rodrigues et al., 2018).

Here we address two principal questions:

1. Is there any difference between the counterfeit and the original thermally-treated NiTi file systems on working length determination efficiency of apex locator integrated endomotor during root canal preparation?

2. Is there any difference in electrical resistivity between the NiTi file types, and does this contribute to working length determination?

Null hypotheses of this study were;

1. Counterfeit files detrimentally affects simultaneous working length determination via electronic apex locator integrated endomotors.

2. Electrical resistivity of the NiTi files is related with working length determination via electronic apex locator integrated endomotors.

Methods

The local university clinical research ethics committee approved the protocol of this study (KAEK 2018-26). A priori sample size determination was performed using the effect size calculated from a previous study (Guise et al., 2010). Ten specimens were indicated as the minimum ideal size after sample size determination with X2 family and goodness of fit contingency tables (0.05 alpha-type error and 0.80 power beta) (G*Power 3.1 for Macintosh; Heinrich Heine, Universitat Dusseldorf, Dusseldorf, Germany).

Sixty extracted human mandibular premolar teeth with a single root, single canal, and fully developed roots were collected for this study. Endodontic access cavities were prepared using diamond fissure bur under water-cooling. Every specimen was numbered using a marker. Then, a #10 K-file was inserted into the root canal until the tip of the file seen at the apical

foramen, and then 0.5 mm was subtracted from the measurement to determine the working length of every specimen. A reference point on the crown was marked to be used during simultaneous working length determination. To blind the operator, the working lengths of the samples were recorded according to their assigned specimen number by one of the researchers (C.K.).

Sixty experimental models were prepared using the teeth. Each of the teeth was fixed using flowable composite (Bisco, Inc, Schaumburg, IL) at the cementoenamel junction to a hole in the center of a glass bottle cap. Crowns of teeth were left outside of the glass bottle. A second hole for the lip clip of the VDW Gold Reciproc Endomotor (Munich, Germany) was also made in the cap of the bottle. Afterward, the bottle was filled with alginate impression material, and then the sample, which was attached to the bottle cap, was embedded into it. All experimental models were randomly divided into six groups as below:

Group WOG: WaveOne Gold (Primary 25#, 25 mm, gold heat-treated NiTi alloy)

Group WO: WaveOne (Primary 25#, 25 mm, m-wire NiTi alloy)

Group W+: Superline W+ file (primary 25#, 25 mm, gold-wire NiTi alloy, counterfeit of WOG) (Shenzhen Superline Technology Co. Ltd, Shanghai, China) (http://en.supline.com/product/detail/99.html)

Group RB: Reciproc Blue (R25, 25 mm, Blue heat-treated NiTi alloy)

Group R: Reciproc (R25, 25 mm, m-wire NiTi alloy)

Group V: Superline V file (R25 25 mm, austenite alloy, counterfeit of RB) (Shenzhen Superline Technology Co. Ltd, Shanghai, China) (http://en.supline.com/product/detail/97.html)

The VDW Gold Reciproc endomotor was set to the "Reciproc All" mode for root canal preparations for all groups. The apex locator mode of the endomotor was set to stop when the file reaches the apical foramen during root canal preparation. The canals were irrigated with 5 mL of 5.25% NaOCl during preparation using a 30-G side-vented needle attached to the plastic syringe placed 2 mm short of the working length. An experienced endodontist (E.S) prepared all teeth in gentle in-out pecking motions. The flutes of the file were cleaned after every three pecking movements. The preparation was continued until the endomotor stops due to reaching the apical foramen. Then, the silicone stopper was positioned to touch the reference point, which was marked previously. Next, the length of the file was measured using the same digital micrometer (DHDL 25 mm/0.001 mm digital Micrometer, China) that was used for the actual working length determination step. Then, the first and second measurements were compared, and the reading of apex locator was classified as -1.0 mm, -0.5 mm, correct, +0.5 mm, +1.0 mm and >1.0 mm according to the actual length of the canal.

The electrical resistance of the files, which might have an effect on working length determination via electronic apex locators, was also measured using a multimeter device (TT T-ECHNI-C Vc97 Digital Multimeter, China) according to manufacturer's recommendations. Measuring probes of the multimeter were connected to the tip of each file and to the notch of the shaft.

Statistical analysis

Differences among the ability of instruments to measure working length were analysed using chi-square test with 5% significance threshold (SPSS v. 23. 0, IBM, Chicago, IL, USA).

Results

Table 1 presents the frequency of the determination rates of the tested instruments. The group V was not included in the statistical analyses because no readings could be obtained via the apex locator integrated endomotor. No significant difference was found among the WO, WOG, R, and RB file systems about working length determination ($p=0.628$); however, the group W+ was statistically less accurate ($p=0.002$) (Table 1). Table 2 presents the electrical resistance of the tested NiTi files. The Superline W+ and Superline V files have significantly more electrical resistance values compared to the WO, WOG, R, and RB file systems (Table 2).

Table 1. Accurate simultaneous working length determination rates via the NiTi files that mounted on electronic apex locator integrated endomotor

	WOG		WO		W+		R		RB		V	
EAL measurement	**n**	%	**n**	%	**n**	%	**n**	%	**n**	%	**n**	%
-1 mm	-	-	1	10	-	-	1	10	-	-	-	-
-0.5 mm	3	30	-	-	-	-	2	20	2	20	-	-
Correct	7	70	7	70	1	10	6	60	6	60	-	-
+0.5 mm	-	-	1	10	4	40	-	-	-	-	-	-
+1 mm	-	-	1	10	1	10	1	10	2	20	-	-
> +1 mm	-	-	-	-	4	40	-	-	-	-	-	-

Table 2. Electrical resistance of the files (Ω) and kind of NiTi alloy

	WOG	WO	W+	R	RB	V
NiTi Alloy type	Gold heat treatment	M-wire	Gold-wire	M-wire	Blue Heat Treatment	Austenite
Electrical resistance (Ω)	0.1	0.1	0.6	0.1	0.1	1.0

Discussion

Endodontic NiTi instruments are usually manufactured using equiatomic NiTi alloy due to its unique properties, such as the shape memory effect and superelasticity (Thompson, 2000; Shen et al., 2013). These superior properties mainly depend on the unique transformation ability of the crystallographic structure of the alloy induced by temperature or physical stress (Zupanc et al., 2018). Despite these favorable abilities of the material, separation risk of the NiTi instrument in the root canal is still a matter of concern (Shen et al., 2013). If a NiTi instrument is broken in the root canal, the case would become more complicated and it may even result in tooth extraction (Madarati et al., 2013). Therefore, many manufacturers focus their efforts to improve the mechanical properties of endodontic NiTi instruments by surface, mechanical, and thermal treatments to increase flexibility and enhance resistance to fracture (Zupanc et al., 2018).

One of the primary purposes of this study is to seek an answer to the question of does the crystallographic structure of the NiTi alloy influence the effectiveness of the apex locator that integrated into an endomotor. Therefore, Reciproc and WaveOne files, which are produced by using m-wire alloy, were compared to their successors, which are RB and WOG that are thermally treated. The results of this study revealed that there was no statistically significant difference among these endodontic instruments regarding their effect on working length determination. However, the tested counterfeit files failed to accurately determine the working length. As discussed above, the electronic apex locators were developed upon the electrical principles. Therefore, electrical resistances of the files, which might have effect working length determination via electronic apex locators, were also measured for this study, revealing that the counterfeit files have much greater electrical resistance values compared to the original files (Table 2).

The electrical resistance of a material depends on three main factors: resistivity, length, and cross-sectional area of the material (Nekoofar et al., 2006). The length factor was constant for all groups in this study due to the study design. However, the cross-sectional area of the files was slightly different due to taper differences in the tested files. Besides, the electrical resistivity of NiTi alloy phases is differing among the austenite (100×10^{-6} ohm-cm for 55-Nitinol austenite) and martensitic (80×10^{-6} ohm-cm for 55-Nitinol martensite) (Thompson, 2000). Therefore, it is logical to expect to have electrical resistance differences among the tested files due to the reasons discussed above. However, the electrical resistance values of the WO, WOG, R, and RB files were the same (0.1 Ω). The most reasonable explanation for this is that the sensitivity of the multimeter must be insufficient to determine such tiny differences. However, the V files and W+ files have much more electrical resistance that could easily be determined by using the multimeter. However, the

V and W+ files showed greater electrical resistance that could easily be determined by using the multimeter. Higher electrical resistance and failure to provide accurate working length determination via electronic apex locator integrated endomotors using V and W+ files might be related with their alloy type of either handle or working part of the instruments or manufacturing process.

Previous studies had reported that counterfeit or counterfeit dental products are rapidly introduced into dental markets and are usually of insufficient quality for use in dental interventions (Rodrigues et al., 2018; Hancocks, 2016; Proffitt, 2016). In line with these articles, the results of this study revealed that the counterfeit endodontic files might cause the failure of accurate simultaneous working length determination via apex locator integrated endomotors.

Conclusion

Within the limits of this study, thermal treatments on NiTi alloys have no effect on simultaneous working length determination via apex locator integrated endomotors. However, counterfeit endodontic files might cause the failure of accurate simultaneous working length determination

Ethics committee approval: The Ordu University Clinical Research Ethics Committee approved the protocol of this study (KAEK 2018-26).
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RESEARCH ARTICLE

The Assessment of the Efficacy of Carboxymethyl Chitosan in the Surgical Treatment of Carpal Tunnel Syndrome: A Retrospective Study

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Abstract

Objective: Carpal Tunnel Syndrome (CTS) is the most commonly encountered entrapment neuropathy of the upper extremity characterized by the compression of the median nerve at the level of the wrist. The objective of the treatment is to eliminate the symptoms stemming from compression and to preserve the neurological function by relieving the median nerve of pressure. Conservative and surgical treatment methods are used effectively in Carpal Tunnel Syndrome. Anti- Adhesion barriers are used during surgery. The aim of this study is to investigate the postoperative effectiveness of carboxymethyl chitosan and methylprednisolone used intraoperatively.

Methods: 87 patient files (26 males, 61 female) who were operated with the diagnosis of moderate degree Carpal Tunnel Syndrome. Peroperative local carboxymethyl chitosan gel was applied following the surgical decompression of the transverse carpal ligament in 32 patients, after surgical decompression peroperative local methylprednisolone was applied in 28 patients and only surgical decompression was performed in 27 patients. Preop and post op complaints of patients were evaluated using Symptom Severity Scale (SSS), Functional Status Score (FSS), Boston Symptom Severity Scale (BSSS), Visual Analogue Scale (VAS).

Results: When pre and postoperative CNS values were evaluated according to gender and intervention groups, male patients had higher CNS values than female patients (P = 0.046). When preop and postop FSS values were evaluated according to gender and intervention groups, FSS values decreased significantly in all surgical intervention groups compared to preoperative values (P <0.001). When preop and postop VAS scores were assessed with emphasis on sex and intervention groups, VAS scores of the patients in all intervention groups showed a significant decrease as compared to preoperative scores in a time dependent manner (P<0,001).

Conclusion: We compared the groups treated with CMCS and methyl prednisolone during surgical interventions for carpal tunnel syndrome with those who had undergone only surgery; we see that there was a significant decrease in the symptoms at three months.

Key words: Carpal Tunnel Syndrome, Carboxymethyl Chitosan, Surgical Treatment

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Introduction

Carpal Tunnel Syndrome (CTS) is the most commonly encountered entrapment neuropathy of the upper extremity characterized by the compression of the median nerve at the level of the wrist (Hadler, 1993). Its main symptoms are numbness of the first three fingers that specifically appear during nighttime, and findings due to pain in the forearm and loss of strength (Gerritsen et al., 2002). The objective of the treatment is to eliminate the symptoms stemming from compression and to preserve the neurological function by relieving the median nerve of pressure. Conservative and surgical treatment methods are used effectively to this end. Surgery is indicated when conservative treatment methods become insufficient or if there is motor weakness and thenar atrophy (Hadler, 1993; Scholten et al., 1997). Adhesion preventing barriers used during surgery are also effective after surgery by helping people experience less pain due to adhesions. The aim of this study is to investigate the postoperative efficacy of carboxymethyl chitosan and methylprednisolone used intraoperatively for adhesion prevention in patients diagnosed with CTS clinically and electrophysiologically and treated with surgery.

Methods

In this study, after obtaining the relevant clinical ethical committee approval, we retrospectively analyzed 87 patient files (26 male, 61 female) who were operated with the diagnosis of moderate degree Carpal Tunnel Syndrome (maximum duration of complaints: one year, absence of thenar muscle atrophy and weakness, absence of denervation in electromyography, mild effects on nerve conduction.). Peroperative local carboxymethyl chitosan gel was applied following the surgical decompression of the transverse carpal ligament in 32 patients, after surgical decompression peroperative local methylprednisolone was applied in 28 patients and only surgical decompression was performed in 27 patients.

In this study, exclusion criteria were the evidence of pronounced abductor pollicis weakness or significant thenar wasting, prior carpal tunnel surgery on the affected side, the use of narcotic analgesics, a history of wrist or hand fracture on the symptomatic limb, having a current pregnancy or being less than 3 months postpartum, corticosteroid injection into the carpal tunnel within 3 months and having severe or mild carpal tunnel syndrome.

For questioning the symptoms of the patients, 11 question Symptom Severity Scale (SSS) and 8 question Functional Status Score (FSS) were used to evaluate Boston Symptom Severity Scale (BSSS) that has a maximum score of 5, together with Visual Analog Scale (VAS) (6). Visual Analog Scale (VAS) was used to determine the severity of pain (5). VAS is usually a line of 10 cm, either horizontal or vertical, from “No Pain” to “Unbearable Pain”. According to this scale, 0: no pain, 1-3: mild pain, 4-6: moderate pain, 7-10 severe pain. The pain scores of patients before surgery and 3 months after surgery were recorded for statistical evaluation.

Statistical analysis

All statistical analyses were performed with SPSS 20.0 Version statistical package program (SPSS Inc., Chicago, IL, USA). Firstly, the data (ages and the scores of Symptom Severity Scale, Functional Status Score and VAS) were analyzed using Levene’s test and the Shapiro-Wilk test for equality of variance and normality assumption, respectively ($P>0.05$). Secondly, two-way ANOVA was applied to determine whether there were differences among ages for the two groups (Applications: Surgery+CC, surgery+methylprednisolone and surgery group; gender: male and female). Also, data (Symptom severity scale, Functional Status Score and VAS) obtained from two different time periods (preoperative and postoperative) were analyzed for the effects of the intervention methods and gender using repeated measurements of ANOVA and the means were compared by Tukey test. If the p value was below 0.05, the results were considered statistically significant. The research findings were expressed as n, mean and standard deviation.

Results

When preoperative and postoperative SSS values were evaluated based on sex and intervention groups; male patients were found to have higher SSS values than female patients ($P=0,046$). As time passed, preoperative SSS values of the patients decreased significantly in all of the surgical intervention groups ($P<0,001$). However, the groups that had undergone Surgery+CC and surgery+methylprednisolone had higher decreases in perceived SSS values as compared to patients undergoing surgical intervention only ($P=0,002$; Table 1).

Based on sex and intervention groups, when preop and postop FSS values were assessed, FSS values have significantly decreased compared with the preoperative values in all the surgical intervention groups ($P<0,001$). However, the decrease perceived in the FSS values of patients having Surgery+CC and surgery+methylprednisolone was more significant than those perceived by patients who had undergone

surgery only (P=0,003). Perceived FSS values before and after surgery did not differ between male and female patients (P=0,590; Table 2).

When preop and postop VAS scores were assessed with emphasis on sex and intervention groups, VAS scores of the patients in all intervention groups showed a significant decrease as compared to preoperative scores in a time dependent manner (P<0,001). There was no difference between male and female patients in perceived VAS scores before and after surgery (P=0,806; Table 3).

Table 1. preoperative and postoperative SSS values

Applications (A)	Gender (G)	Time (T)					
		PREOP			POSTOP3.AY		
		n	Mean	SD*	n	Mean	SD
SSS							
Surgery+CMCS	Female	24	41.17	4.53	24	17.54	3.46
	Male	8	41.00	4.54	8	17.38	1.92
	Total	32	41.13	4.46	32	17.50	3.12
Surgery+MP	Female	18	39.78	3.93	18	18.89	2.91
	Male	10	41.80	4.05	10	18.90	3.57
	Total	28	40.50	4.02	28	18.89	3.10
Surgery	Female	19	37.79	4.63	19	20.74	4.11
	Male	8	40.75	4.53	8	23.38	4.69
	Total	27	38.67	4.71	27	21.52	4.37
Total	Female	61	39.70	4.55	61	18.93	3.72
	Male	26	41.23	4.20	26	19.81	4.25
	Total	87	40.16	4.48	87	19.20	3.88
Variation sources							
Effects	A	G	T	AxG	AxT	GxT	AxGxT
P-values	0.181	0.046	<0.001	0.144	0.002	0.591	0.824

Discussion

Carpal tunnel syndrome (CTS) is a spectrum of symptoms resulting from the compression of the median nerve in the carpal tunnel while being the most commonly observed entrapment neuropathy. Initial signs can be only nocturnal pain and paresthesia, as it progresses atrophy of thenar muscles and loss of strength can be added to the clinical presentation (Scholten et al., 1997). As connective tissue is exposed to repetitive stress; ensuing edema, vascular sclerosis and fibrosis are thought to exert mechanical pressure on the median nerve. The compression of the median nerve leads to ischemia and focal demyelization. There is axonal loss in severe cases and “Wallerian degeneration” ensues. Several conservative and surgical methods are used for the treatment of CTS. Conservative treatment for CTS includes rest splints, physical therapy modalities, NSAID, diuretics, local and systemic steroids, pyridoxine and yoga techniques (Yagci et al., 2006, Carlson et al.; 2010).

There are several studies investigating the efficacy of local corticosteroid injections among conservative methods. In a prospective study by Gelbermen et al. 50 hands of 41 patients were evaluated; they used a single injection of steroids together with three weeks of rest splint application obtaining favorable results in CTS patients having mild to moderate symptoms If the complaints of the patient do not improve despite conservative treatment and if muscular atrophy starts then surgical treatment would be required. (Gelbermen et al., 1980).

Table2. Preoperative and postoperative FDS values

Applications (A)	Gender (G)	Time (T)					
		PREOP			POSTOP 3.AY		
		n	Mean	SD*	n	Mean	SD
FDS							
Surgery+Cmcs	Female	24	30.58	3.28	24	13.58	3.36
	Male	8	31.00	2.83	8	14.88	2.59
	Total	*32*	*30.69*	*3.14*	*32*	*13.91*	*3.20*
Surgery+mp	Female	18	28.39	2.77	18	12.72	3.18
	Male	10	29.50	2.76	10	13.20	2.70
	Total	*28*	*28.79*	*2.77*	*28*	*12.89*	*2.97*
Surgery	Female	19	26.68	4.55	19	15.53	3.22
	Male	8	26.63	10.82	8	14.50	2.33
	Total	*27*	*26.67*	*6.77*	*27*	*15.22*	*2.98*
	Female	61	28.72	3.90	61	13.93	3.41
	Male	26	29.08	6.40	26	14.12	2.57
	Total	*87*	*28.83*	*4.75*	*87*	*13.99*	*3.16*
Variation sources							
Effects	*A*	*G*	*T*	*AxG*	*AxT*	*GxT*	*AxGxT*
P-values	*0.088*	*0.590*	***<0.001***	*0.650*	***0.003***	*0.845*	*0.812*

Table 3. Preoperative and postoperative VAS values

Applications (A)	Gender (G)	Time (T)					
		PREOP			POSTOP3.AY		
		n	Mean	SD*	n	Mean	SD
VAS							
Surgery +cmcs	Female	24	8.83	1.09	24	2.25	0.85
	Male	8	8.88	1.13	8	2.38	0.52
	Total	*32*	*8.84*	*1.08*	*32*	*2.28*	*0.77*
Surgery+mp	Female	18	8.94	1.06	18	2.61	0.98
	Male	10	8.80	0.92	10	1.90	0.88
	Total	*28*	*8.89*	*0.99*	*28*	*2.36*	*0.99*
Surgery	Female	19	8.58	0.84	19	2.95	0.62
	Male	8	9.00	0.76	8	3.00	0.93
	Total	*27*	*8.70*	*0.82*	*27*	*2.96*	*0.71*
Total	Female	61	8.79	1.00	61	2.57	0.87

At later stages of the disease, atrophy might develop in the nerve fibers distal to the compression due to fibrosis taking place in the epineural and perineural components of the nerve tissue thereby resulting in unfavorable outcomes if the surgical intervention is to be delayed. Furthermore, the symptoms might not resolve completely due to adhesions developing after surgery (Phalen 1970; Ulvi et al., 2004).

Adhesions developing after surgery are independent of hemorrhage; fibrinogen that is activated by tissue factors (tissue thromboplastin-Factor III) released from the injured tissue form a fibrin gel matrix initiating the process. Fibrin polymers are initially soluble, if they stay in the tissue for a long while they get in contact with certain coagulation factors becoming insoluble and they form the fibrin gel matrix (Rodgers and Dizerega ,1993; Holmdahl et al., 1996). This fluid called serous exudate is required for wound healing and by coagulating within the first 3 hours it results in the formation of adhesions between the neighboring organs. If fibrinolytic activity is insufficient and if the formed adhesion stays for longer than 3 days, fibroblastic proliferation appears and these convert into permanent adhesions. Within the first 10 days following the surgery, the order of processes is such that fibrin matrix is replaced by granulation tissue, fibroblasts and collagen accumulate and they get organized within the adhesions. 1-2 months after the injury adhesion formation mechanisms are complete with the organization of collagen fibrils (Milligan and Raftery, 1974; Raftery 1981).

Mechanical, thermal and electrical applications used during surgical procedures cause damage in anatomical layers resulting in the initiation of inflammation. This decreases fibrinolytic activity and expedites the formation of adhesion. Development of the surgical technique, utilization of adhesion preventing drugs and separation of tissues from each other during the healing process can decrease the adhesions (Schnuriger et al., 2011). Ideal adhesion barriers should not hinder wound healing, should be non-reactive, should be effective in the presence of bodily fluids and blood, should be easy to use and bioabsorbable. In the location it is placed, it should be able to separate those tissues that can form adhesions throughout the first seven days when the wound healing is most intensive (Burns et al., 1996; Koc et al., 2003).

Steroids are reported to prevent the formation of adhesions by impeding the accumulation of fibrin and collagen (Alkan et al., 2007). They accomplish this by inhibiting the first inflammatory response to tissue damage; by preventing vascular permeability and fibroblast proliferation (Alkan et al., 2007). Dexamethasone is a steroidal anti-inflammatory agent that is in combination with sodium carboxymethylcellulose; it can prevent the formation of adhesions, impede the migration of inflammatory cells and later it has been shown to decrease the proliferation of fibroblasts (Durmus and Han, 2006; Du et al., 2015). Kirdak et al. reported that when different doses of methylprednisolone were used topically to prevent the formation of peritoneal adhesions there was not any difference among the doses and that steroids did not have any effect in decreasing the formation of peritoneal adhesions (Durmus et al., 2007). In our study, during the surgical decompression of the median nerve the patients that were given methylprednisolone had statistically significant changes in their VAS and BSSS values as compared to patients who had undergone nerve decompression surgery only thereby supporting the literature.

Chitosan (CS) is one of the widely used naturally based polymers in wound healing applications. Carboxymethyl chitosan (CMCS) is a water-soluble CS derivative successfully used as a biomaterial in both research and clinical applications. Due to their favorable biocompatibility, no antigenicity, moisture retention, specific bioadhesion, and antibacterial ability, CS and CMCS are regarded as attractive materials for wound healing agents. (Wan et al., 2010; Liu et al., 2017) The CMCS derivatives can interact with cells which successfully result in cell growth/tissue regeneration and wound healing. They are also employed in the cosmetics production because of their moisture absorption–retention, antimicrobial and emulsion stabilizing characteristics. This work will highlight the most recent applications of CMC derivatives with antimicrobial, anticancer, antitumor, antioxidant and antifungal biological activities in various areas like wound healing, tissue engineering, and drug/enzyme delivery (Chen and Park, 2003)

In the study by Sun et al. when microscopic tissue examination was performed 15 days after the injury; wound healing was cleaner, more regular and had resulted in intensive reepithelialization layer in the group receiving carboxymethyl chitosan locally (Sun et al., 2014). In a study by Safak; hyaluronic acid (HA)/carboxymethyl cellulose (CMC), HA/sodium alginate (NaAlg) and HA/CMC/NaAlg nanofiber surfaces generated with electric traction were used as surgical adhesion barriers and their performances were compared with other adhesion barriers with in vitro and in vivo studies. As a result, in vitro and in

vivo studies proved that three nanofiber surfaces that were produced could be used as adhesion barriers. In our study, in the patient group where CMCS was used during surgery, both VAS and BSSS values were significantly different as compared with the patient group undergoing median nerve decompression only and these findings were supporting the literature. When the groups receiving CMCS and methylprednisolone during surgery were compared, a statistically significant difference could not be found.

In conclusion, when we compared the groups treated with CMCS and methyl prednisolone during surgical interventions for carpal tunnel syndrome with those who had undergone only surgery; we see that there was a significant decrease in the symptoms at three months. However, in order to follow-up adhesion related symptoms in the long run, we need more comprehensive prospective and histopathological studies.

Conclusion

In conclusion, when we compared the groups treated with CMCS and methyl prednisolone during surgical interventions for carpal tunnel syndrome with those who had undergone only surgery; we see that there was a significant decrease in the symptoms at three months. However, in order to follow-up adhesion related symptoms in the long run, we need more comprehensive prospective and histopathological studies.

Ethics committee approval: The Ordu University Clinical Research Ethics Committee approved the protocol of this study (KAEK 2018-210).
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RESEARCH ARTICLE

Psychosocial Problems and Unfulfilled Care Needs of Hospitalized Children as Perceived by Their Parents

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Abstract

Objective: The objective of this study was to determine psychosocial problems and care needs of hospitalized children as perceived by their parents.

Methods: This descriptive study was performed with parents of 124 children receiving treatment in pediatric clinics of a university hospital. Data were gathered with Descriptive Characteristics Form for Parents and Children and Research Information Form.

Results: Of all the parents included in the study, 65,3% reported being anxious, 62,1% reported being unhappy, 46% reported their children were anxious, 42,7% reported their children experienced problems with their eating habits and 41,9% reported their children continuously cried. 56,5% of the parents revealed the nurses were not available, 58,9% revealed their informed consent was not obtained before the procedures, 66,9% revealed they were not listened effectively, 72,6% revealed their children's consent was not obtained before the procedures, 77,4% revealed their children were not allowed to express their opinions and 82,3% revealed their children were not listened effectively.

Conclusion: The parents were found to have such psychosocial problems as anxiety, unhappiness, continuously wanting to cry, fear and despair and their children were found to have such psychosocial problems as anxiety, problems with eating habits, continuously crying and fear. In addition, both parents and children had insufficiently fulfilled psychosocial needs concerning informed consent, effective listening and expressing their opinions.

Key words: Child, Parents, Nursing, Psychosocial problems, Care needs.

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Introduction

Staying in hospital is perceived as a negative experience and can cause various emotional reactions (Oflaz and Vural, 2010). Along with the health problem experienced, it affects emotional processes and predisposes psychosocial problems especially in children (Atay et al., 2011; Ustun et al., 2014; Longhi et al., 2015). They face strangers, are exposed to painful interventions and experience various psychosocial problems, which affects their behavior. It may lead them to have fears and anxiety and worsen their pain and discomfort (Ustun et al., 2014; Longhi

et al., 2015). To what extent children are affected by hospitalization is closely related to many factors such as their age, cognitive development, prior experiences and attitudes of their family (Gunduz et al., 2016). It has been revealed in several studies that children can have several hospitalization-related problems and perceive medical interventions as a reaction to their misbehavior (Gonener and Gorak, 2009; Gunduz et al., 2016). It has also been suggested that they may not completely satisfy their sleeping needs in hospital (Kostak et al., 2016). In a study by Sen-Beytut et al., children were found to picture hospital as something negative and have a higher rate of depression and low self-esteem (Sen-Beytut et al., 2009).

Although psychosocial functions of parents are important for physical and mental health outcomes of children (Commodari, 2010), hospitalization of children affects parents as much as children (Aykanat and Gozen, 2014; Celebi et al., 2015; Gunay et al., 2017). Treatment of children in hospital causes parents to think their children have a severe health problem. Also, increasing care needs of children, restricted daily life and lack of clarity about disease prognosis can lead to fear and anxiety in parents (Cakan and Sezer, 2010). Frequent and long hospital stays increase support needs of families (Arikan et al., 2014). A considerable change in daily life along with restlessness appearing during the disease process creates the risk of affecting caregiving parents. It is a fact that most of the mothers whose children stay in hospital need psychological support (Cakan and Sezer, 2010). It has been shown in the literature that parents whose needs are unmet and who have other children along with an unhealthy child, have low incomes, have children with chronic diseases, do not have an occupation and stay in hospital for a long time require psychosocial support (Tehrani et al., 2012; Arikan et al., 2014; Beyazit, 2017). It has been reported in some researches in Turkey that mothers' perceived inability for they have not been informed about the care of children by nobody, they can not ask questions related to maintenance and treatment, can not reach a nurse (Okyay, 2009; Turan et al., 2006). This highlights the importance of a family-centered care approach that aims to meet the needs of parents and children in nursing services offered in a hospital enviroment (Cooper et al., 2007). However, there have been few studies to deal with how care needs should be fulfilled (Lye, 2010; Aykanat and Gozen, 2014; Tosun and Tufekci, 2015). Determining the needs and psychosocial problems of parents about themselves and their children is important in terms of providing data to family-centered care practices of nurses working with children clinically and academically. Therefore, the present study was performed to determine psychosocial problems and unmet care needs perceived by parents whose children stay in hospital.

Methods

Study Design

The study has a descriptive design.

Study Setting and Sampling

The study was carried out on parents of 124 children receiving treatment between June and August in 2018 in pediatric diseases clinics of a university hospital in the Black Sea Region of Turkey. No sampling method was used. One hundred and twenty-four parents with children receiving treatment in hospital in the study period, being the primary caregivers of their children, not having any mental disabilities, able to communicate verbally and accepting to participate in the study were included in the study. Before conduction of the study, the sample size was determined by using G-power program as described in the literature. It was found to be 124 individuals so that the study should have the confidence interval of 95% and power of 80% (Beyazit, 2017). The data collection process was completed when the determined number was reached.

Data Collection

Data collection was performed by using Descriptive Characteristics Form for Parents and Children and Research Information Form. The forms were administered to illiterate parents at face-to-face interviews and literate parents were asked to fill in the forms individually.

Descriptive Characteristics Form for Parents and Children: This form, created by the researchers, is composed of 11 questions about sociodemographic characteristics of the parents and children included in the study (age, gender, education etc.).

Research Information Form: This form was developed by the researchers in light of the literature (Inal and Akgun, 2003; Gultekin and Baran, 2005; Erdim et al., 2006; Basbakkal et al., 2010) to determine psychosocial problems of and care offered to parents and their children receiving treatment in hospital as perceived by the parents.

Data Analysis

Data gathered were analyzed with SPSS 20.0 and descriptive statistics (frequencies, mean values and percentages).

Ethical Considerations

Ethical approval was obtained from the ethical committee of a university for clinical research and written permission was taken from the directorate of the university hospital.

Results

The mean age of the parents was 33,46±8,18 years. Of all the parents, 51,6% had primary education, 56,5% were living in a small town and 42% had two children. The mean length of hospital stay in the children was 13.25±23.87 days. Of all the children, 57,3% were aged 0-6 years, 61,3% were male, 53,2% had stayed in hospital before, 91,1% did not have an accompanying disease and 59,7% had a chronic disease diagnosed (Table 1).

Based on the distribution of the children by their diseases diagnosed, 41.9% had hematological-oncological diseases (Figure 1).

Table 1. The Distribution of Descriptive Characteristics of the Parents and Children

Characteristics of Parents		**Number**	**%**
Mean age (yrs.)= 33,46±8,18 (Min. 18- Max. 61)			
Gender	Female	112	90,3
	Male	12	9,7
Education	Illiterate	6	4,8
	Primary education	64	51,6
	High school	32	25,8
	University	22	17,8
Place of living	City	43	34,6
	Small town	70	56,5
	Village	11	8,9
Number of Children	One	35	28,2
	Two	52	42,0
	Three or more	37	29,8
Characteristics of Children			
Mean length of hospital stay (day)= 13,25±23,87 (Min. 1- Max. 150)			
Age (yrs.)	0-6	71	57,3
	7-12	32	25,8
	13-18	21	16,9
Gender	Female	48	38,7
	Male	76	61,3
Prior hospital stay	Yes	66	53,2
	No	58	46,8
Having an accompanying disease	Yes	11	8,9
	No	113	91,1
Having a chronic disease	Yes	74	59,7
	No	50	40,3

%: Percent

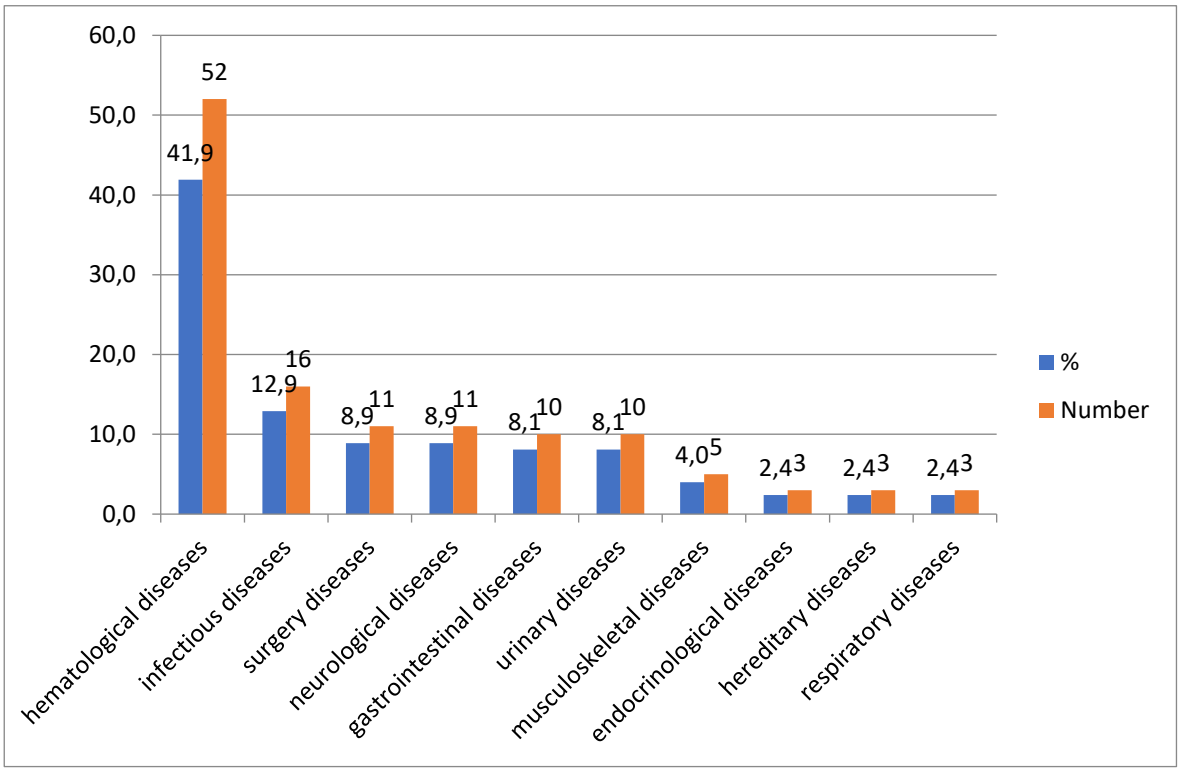

Figure 1. The Distribution of the Children by their Diagnosis

Table 2. The Distribution of the Psychosocial Problems of Hospitalized Children and the Parents as Perceived by the Parents

Perceived Psychosocial Problems of the Parents	YES		NO	
	Number	%	Number	%
Anxiety	81	65,3	43	34,7
Unhappiness	77	62,1	47	37,9
Continuously wanting to cry	57	46,0	67	54,0
Fear	57	46,0	67	54,0
Despair	50	40,3	74	59,7
Anger	34	27,4	90	72,6
Loneliness	28	22,6	96	77,4
Hopelessness	16	12,9	108	87,1
Wanting to rebel	13	10,5	111	89,5
Psychosocial problems of children as perceived by their Parents				
Anxiety	57	46,0	67	54,0
Problems with eating habits	53	42,7	71	57,3
Continuously crying	52	41,9	72	58,1
Fear	50	40,3	74	59,7
Dependency on parents	43	34,7	81	65,3
Unhappiness	40	32,3	84	67,7
Problems with sleeping habits	38	30,6	86	69,4
Aggressiveness	35	28,2	89	71,8
Anger	35	28,2	89	71,8
Becoming introverted	25	20,2	99	79,8
Acting like a baby	23	18,5	101	81,5
Rejecting treatment	21	16,9	103	83,1
Problems with urination /defecation	15	12,1	109	87,9
Difficulty in communication	11	8,9	113	91,1

%: Percent

Table 3. The Distribution of Care Services Offered to Hospitalized Children and their Parents as Perceived by the Parents

Care Services offered to the Parents	YES		NO	
	Number	%	Number	%
Offering adequate and accurate information	85	68.5	39	31.5
Smiling	64	51.6	60	48.4
Accessibility of the nurse	54	43.5	70	56.5
Receiving consent before procedures	51	41.1	73	58.9
Effective Listening	41	33.1	83	66.9
Allowing parents to express their opinions	40	32.3	84	67.7
Effective communication	35	28.2	89	71.8
Care Services offered to the Children				
Offering adequate and accurate information	67	54.0	57	46.0
Smiling	56	45.2	68	54.8
Creating a safe environment	45	36.3	79	63.7
Receiving consent before procedures	34	27.4	90	72.6
Establishing eye-contact	32	25.8	92	74.2
Allowing the children to express their opinions	28	22.6	96	77.4
Effective listening	22	17.7	102	82.3
Playing a game	13	10.5	111	89.5

%: Percent

Off all the parents, whose children stayed in hospital, 65,3% reported feeling anxious, 62,1% reported feeling unhappy, 46% reported having fears and wanting to cry continuously, 40,3% reported experiencing despair, 27,4% reported having anger, 22,6% reported feeling lonely, 12,9% reported experiencing hopelessness and 10,5% reported wanting to rebel (Table 2).

As perceived by the parents, out of all the children, 46% had anxiety, 42,7% had problems with their eating habits, 41,9% continuously cried, 40,3% had fears, 34,7% became dependent on their parents and 32,3% were unhappy. In addition, of all the children, 30,6% had problems with their sleeping habits, 28,2% displayed aggressiveness and anger, 20,2% became introverted, 18,5% acted like a baby, 16,9% rejected treatment, 12,1% experienced changes in urination/defecation and 8,9% had communication problems (Table 2).

In addition to psychosocial problems, whether the care services for parents and children were fulfilled was examined. Although more than 50% of the parents gave a positive feedback about fulfillment of care services, 31,5% of the parents revealed that the nurses did not provide them with adequate and accurate information and 48,4% of the parents revealed the nurses did not smile. In addition, 56,5% of the parents reported the nurses were not accessible, 58,9% of the parents reported their informed consent was not taken before procedures, 66,9% of the parents reported not being listened effectively, 67,7% of the parents reported not being allowed to express their opinions and 71,8% of the parents reported an effective communication was not established with them (Table 3).

Concerning fulfillment of care services for children as perceived by the parents, although 54% of the children were given adequate and accurate information, 54,8% of the children were not smiled at. Furthermore, a safe environment was not created for 63,7% of the children, informed consent was not obtained from 72,6% of the children, 74,2% of the children were not allowed to express their opinions, 82,3% of the children were not listened effectively and health professionals did not play a game with 89,5% of the children (Table 3).

Discussion

It has been reported in the literature that family-centered care practices are very important in terms of meeting the needs of families, giving the most appropriate service to their expectations and speeding up the recovery process by reducing the anxiety of the children and their family (Ahhmann, 2001; Ocakcı, 2006; Cooper et al., 2007; Dunst et al., 2007; Davidson et al., 2017). Researches with hospitalized children and their parents will make easier planning of family-centered care practices. The present study

was performed to determine care needs concerning psychosocial problems perceived by parents whose children stay in hospital.

More than half of the parents reported that they felt anxious and unhappy. Nearly half of the parents continuously wanted to cry, had fears and experienced despair (Table 2). Parents may face many stressors including inability to fulfill their roles and needs during hospital stay of their children (Beyazit, 2017). Some care needs and unclear disease processes due to hospitalization of their children may cause parents to experience some psychosocial problems such as anxiety, restlessness and unhappiness (Cakan and Sezer, 2010). In a study by Erdim et al., 84,2% of the parents with hospitalized children reported feeling anxious about diseases of their children during hospital stay (Erdim et al., 2006). However, a very low rate of these parents (20%) received support for their problems. This may lead the parents to have despair. Gonener and Pek also showed that parents became anxious when they heard their children were hospitalized and when their children stayed in hospital (Gonener and Pek, 2009). Similarly, Günay et al. reported that mothers whose children stayed in hospital had high state and train anxiety levels (Gunay et al., 2017) and that their children's becoming ill and staying in hospital was an important source of fear for the mothers.

As reported by the parents, about half of the children were anxious, had disrupted eating habits, were continuously crying and had fears (Table 2). It has been pointed out in the literature that children have different moods about and respond differently to staying in hospital (Gonener and Gorak, 2009; Basbakkal et al., 2010; Atay et al., 2011; Celebi et al., 2015; Gunduz et al., 2016; Akkavak and Karabudak, 2019). Staying in a different environment, different devices and tools, painful interventions, disease symptoms and presence of crying children may result in several psychosocial problems in children (Celebi et al., 2015). Atay et al. reported that diseases and resultant hospitalizations cause psychosocial stress which has a negative effect on child development (Atay et al., 2011). In Basbakkal et al.'s study, hospitalized children were found to have sleeping and nutrition problems, inability to adjust to the new environment and people and bed-wetting and fears (Basbakkal et al., 2010). In Gonener and Gorak's study, 88,3% of the hospitalized children were anxious about their hospitalization and diseases. In addition, the children thought they would be separated from their friends, die, and suffocate when they wore an oxygen mask, which caused them to have a fear (Gonener and Gorak, 2009).

In the present study, unmet care needs of hospitalized children and their parents were examined. About half of the parents revealed that they were not offered adequate and accurate information and that health professionals did not have a smiling face. More than half of the parents reported that they could not access health professionals, were not asked to give informed consent before procedures, were not listened to and communicated with effectively and were not allowed to express what they thought (Table 3). Satisfaction of hospitalized patients and families is an important element of the quality of care given (Lye, 2010). Family-centered care should be adopted to maintain the quality of care. This allows parents to actively get involved in care of their children and making decisions about their children and have adequate information about their children (Aykanat and Gozen, 2014). Based on evidence in their study, Sener and Karaca drew the conclusion that mothers expected nurses to be friendly and to provide emotional support concerning their problems and anxiety (Sener and Karaca, 2017). In Arıkan et al.'s study, more than half of the family caregivers in pediatrics clinics (56,9%) reported that nurses were the first to refer to when they had problems and more frequently expected nurses to smile, have tolerance and show interest (Arıkan et al., 2007). Tosun and Tüfekci reported that most of the parents with children receiving treatment in hospital were requested to give their consent and that most of the mothers actively participated in decision-making about procedures, could ask questions to nurses, share their anxiety about their children and fulfill their needs (Tosun and Tufekci, 2015). However, Erdim et al. found in their study that 80% of the mothers with hospitalized children could not receive support from health professionals (Erdim et al., 2006). In addition, Boztepe and Cavusoglu discovered that mothers did not have adequate information about care for their children, could not get involved in decisions concerning their children, could not ask questions about treatment of their children and could not share their anxiety with nurses (Boztepe and Cavusoglu, 2009). Arikan et al. found that parents whose needs in hospital were not fulfilled got significantly low scores for satisfaction with technical skills and emotional needs (Arikan et al., 2014). In the present study, more than half of the children were diagnosed with a hematological-oncological disease. The high rate of the parents with unfulfilled care needs suggests their care needs increased depending on

diagnoses of their children. The findings also showed that the parents needed psychosocial care involving in-depth acting and motivation in addition to standard nursing approaches (Table 3).

In the current study, nearly half of the parents reported that nurses did not give sufficient and correct information to their children and most of the parents revealed that nurses did not smile at their children, create a safe environment for their children, obtain informed consent from their children, make an eye contact with their children, let their children talk about their opinions, listen to the children effectively or play with the children (Table 3). Akkavak and Karabudak found that most of the children staying in hospital were afraid of nurses, confused and curious and excited due to lack of information. Also, some children revealed that they were not given information, which caused them to feel uncomfortable and depressed, and get confused about what to do since their curiosity was not satisfied (Akkavak and Karabudak, 2019). Providing hospitalized children with necessary care can not only support child development but also contribute to solution of psychosocial problems (Atay et al., 2011). Interventions directed towards fulfilling children's needs and active involvement of families in the care process are important to offer this care (Er, 2006). Nurses' smiling, being tolerant, communicating with children face-to-face during hospital stay can reduce negative effects of the hospital environment on children (Teksoz and Ocakcı, 2014). Several studies have also attracted attention to the role of nurses' positive interactions in psychosocial adaptation of children during their treatment (Coyne, 2006; Pena and Cibanal, 2011). Furthermore, it has been reported that parents want health professionals to play with their children in hospital and that games have positive effects on both children and their parents (Arslan et al., 2013; Teksoz and Ocakcı, 2014).

Conclusion

In light of the results of this study, which was performed to determine psychosocial problems and unmet care needs perceived by parents of children staying in hospital, the following conclusions were reached:

- Psychosocially, the parents experienced anxiety, unhappiness, fear and despair and continuously wanted to cry and the children had anxiety, fear and nutritional problems and continuously cried as perceived by their parents.
- The parents' needs for adequate and accurate information, smiling and accessible health professionals, informed consent, effective listening, opportunities to express their opinions and effective communication were not fulfilled sufficiently; unmet care needs of children as perceived by the parents were concerned with provision of adequate and accurate information, smiling, safe environment, informed consent before procedures, eye-contact, opportunities to express their opinions, effective listening and playing games.

Based on the abovementioned conclusions, the following recommendations can be made:

- Nurses should implement primary, secondary and tertiary measurements against psychosocial problems likely to appear in children receiving treatment in hospital and their parents,
- Inservice training programs should be planned to improve psychosocial care, creative activities and verbal and nonverbal communication skills of nurses working with children having health problems.
- Needs-centered care should be provided for children and their parents, who should be involved in care-giving processes.

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RESEARCH ARTICLE

Evaluation of Effect of Disinfection Systems on Bond Strength of Root Canal Sealers

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Abstract

Objective: The aim of this in vitro study is to evaluate and compare the effects of different disinfection methods (NaOCl irrigation, CHX irrigation, laser, PDT) on the bond strength of different root canal sealers (AH Plus sealer, MTA Fillapex, EndoSequence BC Sealer).

Methods: In this study, one hundred and twenty extracted human mandibular premolar teeth were used. The teeth were randomly divided into 3 experimental groups and 12 subgroups using the website (3 different sealers and 4 different disinfection methods). Two slices were obtained from apical part, middle part and coronal part of each root. The push-out test was performed on each slice with a universal test machine. The maximum load applied to the filling material before failure was recorded in Newtons (N) and converted to megapascals (MPa). Data were subject to Kruskal- Wallis test. Mann- Whitney U test was used for pairwise comparison with bonferroni correction. Significance level was set at a = 0.05

Results: Kruskal Wallis test indicated that there were significant differences among the sealer groups for apical (p =0 ,000) and middle sections (P = 0,001), and coronal sections (P = 0,000).

Conclusion: Under the study limitation; the bonding strength of root canal sealers is influenced by disinfection methods.

Key words: AH Plus, EndoSequence BC Sealer, MTA Fillapex, Laser, Photodynamic treatment.

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Introduction

The success of root canal treatment depends on preparation, disinfection, and obturation stages. Various disinfection methods are used in endodontics. NaOCl irrigation is the commonly used method for disinfection of root canal system. It has capability of biofilm eradication, elimination of microorganisms and organic tissue dissolution (Haapasalo et al. 2014). However, it has some disadvantages such as tissue necrosis, ecchymosis, and paraesthesia or even life-threatening accidents (Zhu et al. 2013). The other irrigation solution is Chlorhexidine gluconate (CHX). It has several properties such as wide range of antimicrobial

activity, less toxic effect than NaOCl, and reasonable clinical performance (Gomes et al. 2013). Nonetheless, both of these irrigation solutions are not able to disinfect the root canal system completely. So, scientists suggested new methods. The first one is Photodynamic therapy (PDT). It uses the light with a specific wavelength to activate a photosensitizing dye (metilen blue, toluidine blue, and photosensitizer) in the presence of oxygen. Recently studies have confirmed that PDT has bactericidal potential against to Enterococcus Faecalis. The second method is laser root canal irradiation. This method eradicates microorganism from accessory side canals, isthmus, and unprepared area (Plotino et al. 2019).

Various obturation materials have been defined in endodontics. AH Plus sealer (Dentsply Maillefer, Ballaigues, Switzerland) is an epoxy resin-based sealer and has some properties such as low solubility, sufficient viscosity, dimensional stability, and longer setting time (Versiani et al. 2006; Souza et al. 2009).

MTA Fillapex (Angelus Industria de Produtos Odontologicos S/A, Londrina, Brazil) with properties of good sealing ability, low solubility, biocompatibility, bactericidal effect, and low setting expansion, has been introduced based on calcium silicate in endodontics (Gurgel-Filho et al. 2014; Mestieri et al. 2015). It is presented in the form of two pastes. Recently, EndoSequence BC Sealer (Brasseler USA, Savannah, GA), a bioceramic sealer based on calcium silicate composition, has been presented in endodontics. It has properties such as dimensional stability, good flow ability, premixed, and injectable paste containing water-free thickening vehicles (Jafari and Jafari 2017; Lee et al. 2017).

The effects of different irrigation solutions on the bond strength of root canal sealers were evaluated in several studies. However, there are not enough sources in the literature for validating this data. The effects of PDT and laser disinfection methods on the push-out bond strength value of the epoxy resin and calcium silicate-based sealers are unknown. Thus, the aim of this in vitro study was to evaluate and compare the effects of different disinfection methods (NaOCl irrigation, CHX irrigation, laser, PDT) on the bond strength of different root canal sealers (AH Plus sealer, MTA Fillapex, EndoSequence BC Sealer).

Methods

In this study, one hundred and twenty extracted human mandibular premolar teeth, extraction reasons not related to this study, were used. Sample size calculated based on previous study (Cakici et al. 2016) After the external root surfaces of the teeth were cleaned with periodontal curettes, they were kept in distilled water until used. Access cavities were performed by diamond burs (Dimei Royal, Dimei Dental, Anyang, Henan, China) under water cooling then radiographies in bucco-lingully and mesio distally directions were taken. Exclusion criteria were multiple root and canals, calcified canals, internal and external resorptions, extensive root caries, having root canal treatments, root curvature more than 100 according to Schneider 1971 method, and apical diameter more than 10 K file.

Also, root surfaces were inspected with 2,5 magnification dental loop and roots having fractures and cracks were excluded from this study. Working lengths were determined as 1 mm beyond the apex by the aid of 10 K file (VDW, Munich, Germany). K3XF (SybronEndo, Orange, CA USA) rotary file system was used 3 Ncm and 400 Rpm in packing motions to prepare the root canals at full working length with a torque- control motor (X-Smart Plus, Dentsply Maillefer). The instrument sequence of the K3XF system was 10/25 (1/3 working length), 08/25, 04/40, 04/35, 04/30 (encountered resistance) then 04/25 was used for final apical shaping. The root canals were irrigated with 2 mL sterile saline solution after each instrument. Each instrument was used for 3 times. The teeth were randomly divided into 3 experimental groups and 12 subgroups using the website (http://www.random.org) (figure1)

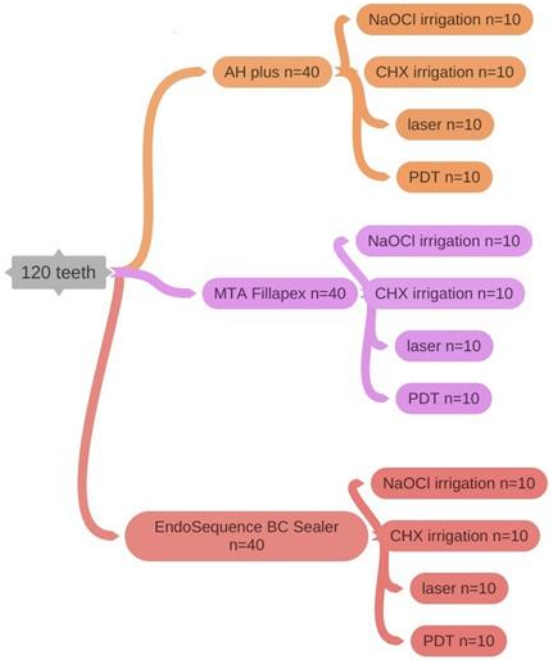

Figure 1. Design of the study

NaOCl irrigation gruops

3 ml 17% EDTA 1 minute, 3 ml NaOCl 1 minute, and 5 ml distilled water 1 minute was used for final irrigation procedure. Root canals were dried with absorbent paper points and obturated with the single cone technique using AH Plus sealer, MTA Fillapex, EndoSequence BC Sealers.

CHX irrigation groups

3 ml 17% EDTA 1 minute, 6 ml 2% CHX 1 minute, and 5 ml distilled water 1 minute was used for final irrigation procedure. Root canals were dried with absorbent paper points and obturated with the single cone technique using AH Plus sealer, MTA Fillapex, EndoSequence BC Sealer

Laser gruops

3 ml 17% EDTA 1 minute, 3 ml NaOCl 1 minute, and 5 ml distilled water 1 minute was used for irrigation procedure. The Methylene blue solution was injected into the root canals using a sterile side port needle, and the Methylene blue was agitated using 04/25 K3XF file. Then Methylene blue had been activated with Nd:YAG laser(Deka smart file, DEKA, Italy) 200 µ tip (1064 nm wave length 1,5 w 15hz 100 mj) for 1 minute. Finally, root canals had been cleaned 5 ml distilled water for 1 minute. Root canals were dried with absorbent paper points and obturated with the single cone technique using AH Plus sealer, MTA Fillapex, EndoSequence BC Sealer.

PDT groups

3 ml 17% EDTA 1 minute, 3 ml NaOCl 1 minute, and 5 ml distilled water 1 minute was used for irrigation procedure. Nd:YAG laser 200 µ tip (1064 nmwave length 1,5 w 15hz 100 mj) had been applied into the root canals for 1 minute. Root canals were dried with absorbent paper points and obturated with the single cone technique AH Plus sealer, MTA Fillapex, EndoSequence BC Sealer.

Remained gutta-percha and sealer were cleaned. The teeth were restorated with glass ionomer cement. All the samples had been stored at 37 0C and 100% humidity for 2 weeks. Each root was sectioned perpendicularly to its long axis using a precision saw (Megatome t180 presi, Eybens, France) at a slow speed under water cooling. 1 mm from apical part of root was removed. Then two slices were obtained from each part of root apical, middle, and coronal. The push-out test was performed on each root with a universal test machine (AGS-X, Shimadzu Corporation, Tokyo, Japan) at a crosshead speed of 1 mm per minute. The maximum load applied to the filling material before failure was recorded in Newtons (N) and converted to megapascals (MPa). N and converted to MPa according to the following formula:

Push-out bond strength (MPa) = maximum load (N)/adhesion area of root filling (A) (mm2).

Statistical Analysis

The descriptive analyses for the groups were calculated. The normality of the variation of the data was verified by the shapiro-wilk test (P<0,05). Data were subject to Kruskal- Wallis test. Mann- Whitney U test was used for pairwise comparison with bonferroni correction. The data were analyzed using IBM Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) for Windows, version 20. Significance level was set at P = 0,05.

Results

Kruskal Wallis test indicated that there were significant differences among the sealer groups for apical (P =0 ,000) and middle sections (P = 0,001), and coronal sections statistically (P = 0,000).

For apical part of the root; there was statistically significant relationship between AH plus +laser disinfection group and MTA Fillapex + PDT disinfection group (P=0,000), EndoSequence BC Sealer +laser disinfection group (P=0,000), AH plus+ PDT disinfection group (P=0,000), MTA Fillapex +laser disinfection group (P=0,006), MTA Fillapex +CHX disinfection group (P=0,025), EndoSequence BC Sealer CHX disinfection group (P=0,036). Also there was statistically significant relationship between EndoSequence BC Sealer + PDT disinfection group and MTA Fillapex + PDT disinfection group (P=0,007), EndoSequence BC Sealer +laser disinfection group (P=0,048), AH plus+ PDT disinfection group (P=0,045) (Table 1)(Figure 2).

Table 1. Median and standard deviation values of apical part of the root of the groups. Same letters indicate a statistical difference (P=0,05)

	NaOCl irrigation	Laser disinfection	CHX Irrigation	PDT disinfection
AH plus	4,63±1,89	7,69±2,40[a,b,c,d,e,f]	5,52±3,06	2,21±2,85[c,h]
MTA Fillapex	5,05±5,03	3,52±3,36[d]	3,97±2,13[e]	3,03±2,04[a,g]
EndoSequence BC Sealer	4,29±2,71	2,78±2,32[b,h]	3,89±2,54[f]	5,61±1,70[g]

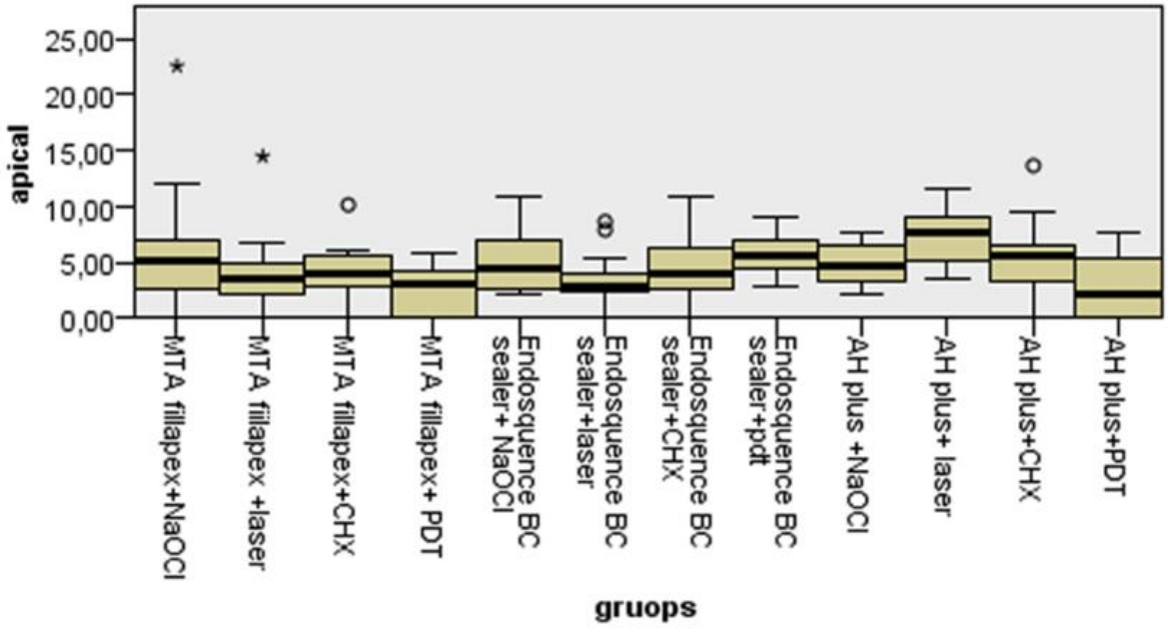

Figure 2. Mean rank value of groups for apical part of root

Table 2. median and standard deviation values of middle part of the root of the groups. Same letters indicate a statistical difference (P=0,05)

	NaOCl irrigation	*Laser disinfection*	*CHX Irrigation*	*PDT Disinfection*
AH plus	*7,01 ±3,23*	*7,24 ±2,83[a]*	*6,42 ±2,02*	*5,53 ±3,14*
MTA Fillapex	*4,65±3,70[a]*	*3,55 ±2,64[a]*	*6,03 ±1,75*	*3,37 ±1,64[a]*
EndoSequence BC Sealer	*5,22 ±2,52*	*5,88 ±3,33*	*4,41 ±3,08*	*6,26 ±1,73*

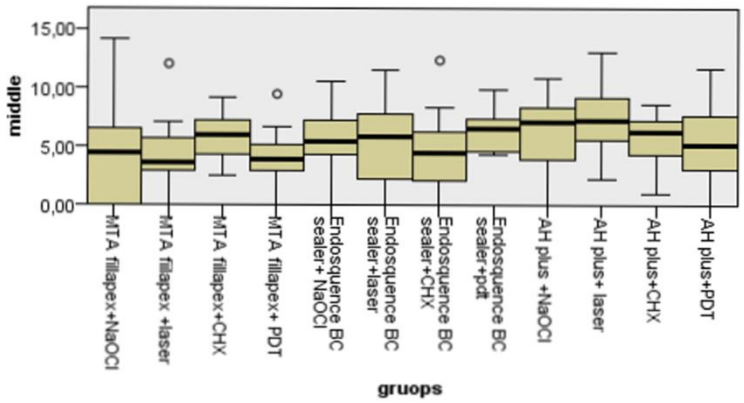

Figure 3. Mean rank value of groups for middle part of root

Table 3. Median and standard deviation values of coronal part of the root of the groups. Same letters indicate a statistical difference (P=0,05).

	NaOCl irrigation	Laser disinfection	CHX Irrigation	PDT Disinfection
AH plus	4,88 ±4,80[a]	8,38±4,63	6,93±3,58	11,00±4,42[a]
MTA Fillapex	4,05 ±2,61	5,61 ±6,61	5,65 ±5,81[a]	4,43 ±2,88[a]
EndoSequence BC Sealer	6,80 ±8,68	7,32 ±4,52	5,41 ±4,04	8,68 ±5,56

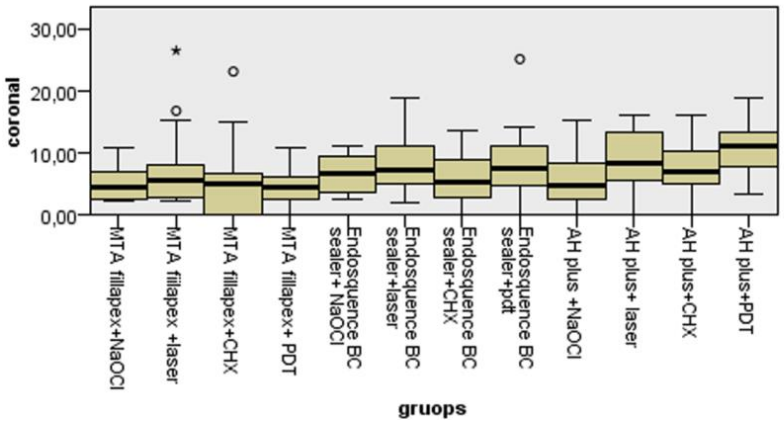

Figure 4. Mean rank value of groups for coronal part of root

For middle part of the root; there was statistically significant relationship between AH plus+ laser disinfection group, MTA Fillapex +PDT disinfection group (P=0,014), MTA Fillapex + NaOCl disinfection group (P=0,024), MTA + laser disinfection group (P=0,037) (Table 2) (Figure 3).
For coronal part of the root; there was statistically significant relationship between Ah plus+ PDT disinfection group and MTA Fillapex + PDT disinfection group (P=0,004), disinfection group and MTA Fillapex + CHX disinfection group (P=0,011), disinfection group and MTA Fillapex + NaOCl disinfection group (P=0,015) (Table 3)(Figure 4).

Discussion

One of the important stages of endodontic treatment is elimination of microorganisms and their products from root canal system. For this purpose, conventional disinfection methods like irrigation with NaOCl and CHX, are used. However, these irrigations may inadequate because of microorganisms and their products in lateral canals, isthmus, apical branches, and depth of dentinal tubules (Haapasalo et al. 2010; Haapasalo et al. 2014). PDT and laser systems can support to overcome this challenge (Plotino et al. 2019; Saydjari et al. 2016). Mentioned systems change the permeability, chemical and structural composition of root canal dentin, and this may affect the sealing ability of the root canal sealers (Ok et al. 2013, 2014).

Root canal shaping procedures produce a layer made of inorganic and organic tissue known as smear layer. It includes necrotic pulp remnants, microorganisms and their products. Smear layer can cause pathway for microbial micro-leakage, sheltering bacteria, reservoir of irritants, prevent the penetration of root canal sealers. Therefore, it should remove before filling the root canal (El-Ma'aita et al. 2013). Because of this reason, smear layer was removed to evaluate the sealing ability of the root canal sealers to the dentin in the present study.

Sagsen et al. 2011 compared push out bound strength values of ah plus, I root sp, mta fillapex in the root canals filled with lateral compaction technique after 2,5 % NaOCl and 17 % EDTA irrigation. They found that there wasn't significant difference in coronal parts of the roots. However, push out bound strength value of mta fillapex was lower than ah plus and I root sp in the middle and apical sections of the roots. Ok et al. 2014 filled root canals with lateral compaction technique after 5,25% NaOCl and 17% EDTA irrigation then compared push out bound strength values of AH plus and MTA fillapex in their study. They reported that there wasn't significant difference between the push out bond strength values of AHplus and mta fillapex. Additionaly, Shokouhinejad et al. 2013 reported that the bond strength value of EndoSequence BC Sealer was compared to AH Plus in case of presence and absence of smear layer. They found that dislocation resistance of EndoSequence BC Sealer was equal to AH Plus and no significant

effect of the smear layer. Similarly, in our study presented that there weren't significant differences among the AH plus, MTA fillapex, and EndoSequence BC Sealers in NaOCl irrigation groups.

Ok et al. 2013 filled root canals with AH plus after 5,25% NaOCl irrigation, 2% CHX gluconate irrigation, and PAD disinfection systems in their study. They reported that there wasn't significant difference among the push out bond strength values of AH plus according to disinfection systems. The results of this study are parallel to our study results.

Ok et al. 2014 presented that PAD disinfection method affects adversely the push out bond strength of MTA Fillapex endodontic sealer. In our study found it as the lowest bond strength value of MTa fillapex + PDT groups. But this result wasn't statistically significant. The difference between the results of the studies can be caused by tip of laser and photo sensitizer.

According to the best of our knowledge, there aren't studies about the effect of PDT on bond strength of EndoSequence BC Sealer in literature. Therefore, we couldn't compare.

According to current literature, laser application increases penetration and bond strength values of sealers (Das et al. 2013; Ayrancı and Koseoğlu 2014). A few studies presented that bond strength of sealers using with Nd:YAG laser better than diod laser (Araujo et al. 2018)(Das et al. 2013). Özkaçak and Sonat 2015 reported that laser application increased bond strength of resin and bioceramic root canal sealers also the resin root canal sealers had higher push-out bond strength than the bioceramic sealer. The results of this study are parallel to our study results.

Razmi et al. 2016 compared the effect of NaOCl and CHX as final irrigation solution. They found that the bond strength of AH-Plus was not affected the irrigant type; however, CHX reduced the bond strength of Endosequence BC sealer. Conversely, Shokouhinejad et al. 2013 reported that using NaOCl and CHX as the final irrigation solution has similar effect on bond strength of EndoSequence BC Sealer to dentinal walls. Another study presented that bond strength of AH plus was negatively affected NaOCl as the final irrigation solution in contrast to CHX. In our study the effects of NaOCl and CHX on bond strength of sealers were similar. To change a single parameter ın studies on bond strength can change all results. Therefore, in order to get better results, more review and meta-analysis are needed.

Conclusion

Under this study limitation, the bonding strength of root canal sealers is influenced by disinfection methods.

Ethics Committee Approval: The Ordu University Clinical Research Ethics Committee approved the protocol of this study. (2016/22).

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RESEARCH ARTICLE

Our New Choice in Labour Analgesia, Combined Spinal-Epidural Analgesia: Our Short Term Results

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Abstract

Objective: Nowadays, the painless childbirth preference of expectant mothers is gradually increasing. The most important and first objective in labor analgesia should be the safety of mother and baby. Our objective in this study is to compare the effects of combined spinal-epidural analgesia (CSE) and epidural analgesia on analgesia quality and labor in labour analgesia.

Methods: Our study was performed prospectively on 40 primigravid pregnant women who requested painless childbirth and were included in the ASAI-II group, between September 1, 2018, and November 30, 2018. Pregnant women who had single fetus at 36-42 weeks, have vertex presentation, no contraindications for regional analgesia, have active contractions and with 3-4 cm cervical opening were randomly divided into two groups in the study. Combined Spino Epidural group (= Group CSE, n = 20), Epidural analgesia group (= Group EPI, n = 20) was determined as the groups. To the pregnant women in the Group CSE, Intrathecal dose in a manner that 2.5 mg hyperbaric bupivacaine + 12.5 µg fentanyl total volume of 1 ml was injected. To the pregnant women in the Group EPI, 20 G epidural catheter was placed with the method used in the first group and fixed to the skin. Epidural analgesia solutions (20 mg bupivacaine + 50 µg fentanyl +15 cc saline) were prepared in 20 cc injectors containing 0.1% bupivacaine + 2.5 µg/ml fentanyl for use in both groups. When the VAS values became 4, these prepared solutions were planned to be given as 10 ml intermittent bolus from these epidural catheters.

Results: The mean values of maternal age, weight, and height, and infant height have not shown any difference according to the groups ($p > 0.05$). The first VAS median value was obtained as 5 in both groups. However, the VAS values were accumulated in the higher values in the combined spinal-epidural group ($p = 0.031$). Although the second VRS and VAS median values were lower in the pure epidural, the outlet VRS and VAS values have been obtained lower in the combined spinal-epidural group.

Conclusion: For normal spontaneous vaginal delivery, every mother should be offered labour analgesia options such as CSE analgesia and epidural analgesia. CSE analgesia may be a good alternative to epidural analgesia because of its advantages such as the onset of fast analgesia, shortening the first stage of labour and increasing the comfort of the mother in the outlet.

Key words: painless childbirth, combined spinal-epidural analgesia, epidural analgesia

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Introduction

Nowadays, the painless childbirth preference of expectant mothers is gradually increasing. However, the desire to have the mother to be given comfortable and painless childbirth should never endanger the safety of the baby and the mother (Thomson et al., 2019). The most important and first objective in labor analgesia should be the safety of mother and baby. The second objective should be the prevention of epidural or subarachnoid local anesthetic application related motor block; in other words, muscle weakness in the legs of the mother (Beilin et al.,2002).

The most effective way to eliminate the pain of labour is the central regional blocks. Epidural analgesia technique used in the relief of labour pain is the most widely accepted technique today due to providing continuous analgesia compared to other techniques, requiring lower concentrations of local anesthetics and analgesics, and not so much affecting the second-period expulsion movements by keeping motor loss to a minimum (Glosten et al.,2000) In our clinic, epidural analgesia is more preferred in labor analgesia. CSEA analgesia is our new choice.

The combined spinal-epidural (CSE) technique is becoming increasingly important in recent years because of the rapid onset of the analgesic effect and excellent analgesia without a significant reduction in motor functions. The reliability and efficacy of labour analgesia formed by this method have been shown in several studies (Gary et al.,2001; Erdine et al.,2005).

Our objective in this study is to compare the effects of combined spinal-epidural analgesia (CSE) and epidural analgesia on analgesia quality and labor in labour analgesia.

Methods

Ethical approval for our study was obtained from Ordu University Clinical Research Ethics Committee. (Decision no: 2018/245, Date: 29.11.2018). Our study was performed prospectively, unblinded on 40 primigravid pregnant women who requested painless childbirth and were included in the ASAI-II group, between September 1, 2018, and November 30, 2018. Randomization was performed according to the preference of the pregnants. The volunteering approval form has been signed by the pregnant women included in the study. Pregnant women who had single fetus at 36-42 weeks, have vertex presentation, no contraindications for regional analgesia, have active contractions and with 3-4 cm cervical opening were randomly divided into two groups in the study. Combined Spino Epidural group (= Group CSE, n = 20), Epidural analgesia group (= Group EPI, n = 20) was determined as the groups. Pregnant women with severe neurological disease, preeclampsia, diabetes mellitus, infection at the insertion site, bleeding and coagulation disorder, who had known to have a susceptibility to amide-type local anesthetics, show excessive agitation and could not be cooperated were not included in the study. Pregnant women were

given information about the "Visual Analog Scale" (= VAS) which they will evaluate their pain during labour (0 cm = no pain, 10 cm = the most severe pain). The cases were also informed about the VRS (= Verbal Rating Scale). They were told that 0: no pain, 1: mild pain, 2: irritating pain, 3: moderate pain, 4: severe pain, 5: very severe pain. VAS and VRS scores were recorded at the time of the implementation of the first and second epidural analgesia doses. Our researcher fellows and clinician doctors followed the cases. Before starting the analgesia, the pregnant women were established vascular access with 18 G intravenous cannula on the forearm, and 10 ml/kg/h Ringer Lactate solution was started to be given. It was planned to start giving analgesia to the cases when cervical dilatation was 4 cm, and VAS was 4 or higher. Systolic and diastolic arterial pressures, heart rate and VAS and VRS values of the pregnant women were measured and recorded before the starting of the procedure. Uterus contractions and fetal heart sounds were monitored by cardiotocograph monitor. After all pregnant women were provided skin disinfection in sitting position with an appropriate antiseptic solution, 40 mg of lidocaine (Jetmonal 2% ampul, Adeka İlaç, Turkey) infiltration was performed from the L3-L4 or L4- L5 spaces subcutaneously and to the skin.

Epidural space was reached by using the loss of resistance technique on the midline with 18 G Touhy needle (BBraun Combined Spinal / Epidural AG, Germany) in the pregnant women included in the Group CSE. Forty mg of 2% lidocaine containing 3 ml of test dose was administered through the catheter.

After this procedure, we waited for 5 minutes and the procedure was resumed upon not observing motor block in the patient.

Then, with 27 G, 136.5 mm spinal needle, subarachnoid space was reached by needle through needle technique, and after the clear CSF flow is seen, the intrathecal dose was injected in a manner that 2.5 mg hyperbaric bupivacaine + 12.5 µg fentanyl with a total volume of 1 ml. Immediately following the removal of the spinal needle, the 20 G epidural catheter was guided through a Touhy needle into the cephal. Once it was seen that no blood and CSF at the epidural catheter, the catheter tip was placed in a way that the 5 cm of the catheter tip to be in the epidural region, by making the centimeter calculation, and fixed. Similarly, in the pregnant women included in the Group EPI, epidural space was reached by using the loss of resistance technique on the midline with the 18G Touhy epidural needle (Perifix, BBraun Melsungen AG, Germany), and 20 G epidural catheter was placed with the technique used in the first group and fixed to the skin. Epidural catheters were placed in the painless period between two contractions in all cases. Epidural analgesia solutions (20 mg bupivacaine + 50 µg fentanyl +15 cc saline) were prepared in 20 cc injectors containing 0.1% bupivacaine + 2.5 µg/ml fentanyl for being used in both groups. When the VAS values became 4, these prepared solutions were planned to be given as 10 ml intermittent bolus from these epidural catheters. After epidural catheterization procedure, the pregnant women were placed in the left side position in order to prevent vena cava compression of the uterus. Hemodynamic values at this stage were recorded. A 20% decrease in blood pressure or 90 mm/Hg of systolic arterial pressure was considered as hypotension, and it was planned to administer ephedrine 5 mg/ml intravenously if necessary. The pain scores of the pregnant women were recorded as VAS 1, VRS 1 at the time of the administration of the first dose from the epidural catheter, as VAS 2, VRS 2 at the time at which the second dose was administered, and as VAS end, VRS end at the time of suturing the episiotomy. After catheter removal, patients were asked for their satisfaction. The patient's sensory block was evaluated using the widely used Pinprick test (0 = normal sensation, 2 = blinded sensation, 3 = no senses) and the motor block was evaluated using the modified Bromage Scale (0 = can straighten both legs, 1 = do not have enough power to straighten the leg, 2 = able to move only the knee , 3 = able to move only the foot). Sensory and motor blocks were evaluated at 5th, 10th, 15th, 30th, 45th, 60th minutes, and then every 30 minutes until full cervical dilatation was reached. The amount of the first dose of labor analgesia (how many ml), time of second dose (how long after the first dose) and the total labor duration were recorded separately for each case. The VAS and VRS scores of the cases were recorded when the first dose and second dose were administered through the epidural catheter. The height, weight and head circumference of each newborn infant were recorded separately. VAS: Marked scale on 10-point line was used. The left side was referred to having no pain (0 point) and the right side was referred to unbearable pain (10 points). The patient was asked to show her pain on this line. Effective analgesia was considered to be provided in those with the VAS score of 4 and less. The levels of sensorial block were determined with the "pinprick" (pricking with the tip of needle) method. Sensory block was considered to develop in the lower extremities when numbness and hypoalgesia were felt between the dermatomes of L1 and S5. The cases were informed also about VRS. It was expressed as 0: no pain, 1: mild pain, 2: disturbing pain, 3: moderate pain 4: severe pain 5: very severe pain. The VAS and VRS scores were recorded when the first and second dose of epidural analgesia were administered. The time for cervix to open from 3-4 cm to 10 cm was recorded as the 1st stage, and the time from the full opening to the birth of the baby was recorded as the 2nd stage. Patients that were to undergo cesarean section were administered 15 ml (2%) lidocaine and 5 ml (0.5%) bupivacaine through epidural catheter and were taken to the operation. The patients were asked about their satisfaction level after the removal of the catheter. Satisfaction level was evaluated as poor, moderate and good.

Statistical Analysis

The data were analyzed with the IBM SPSS v23 (IBM Corp., Armonk, NY, USA). Compliance with normal distribution was examined with Shapiro-Wilk. The unpaired t-test was used to compare the parameters showing normal distribution according to the groups, while the Mann Whitney -U test was used for non-normally distributed ones. The Friedman test was used for the change in time of in-group VRS and VAS values. Normally distributed data were presented as mean ± standard deviation, while non-normally distributed data were presented as median (min-max). The significance level was accepted as $p<0.05$.

Results

The comparisons of our groups with respect to quantitative data are presented in Table 1.

The mean values of maternal age, weight, and height, and infant height have not shown any difference according to the groups (p= 0.193,0.322,0.777,0.931 respectively). The median values of infant height did not show any difference according to the groups (p = 0.066). The infant head circumference median value was obtained as 35.5 in those with a pure epidural, while as 35 in those with combined spinal-epidural. The median value of the first opening was obtained similar in both groups. However, a significant difference was observed in the group with pure epidural due to accumulation at the higher places (p = 0.021). The second opening median value was obtained higher in the combined group.

Table 1: Comparisons of quantitative data by groups

	Group Epidural (Group EPI) (n=20)	Group Combined Spino Epidural (Group CSE) (n=20)	p
Maternal Age*	24.0 ± 4.0	25.6 ± 4.9	0.193
Maternal weight **	72.7 ± 10.6	75.8 ± 13.2	0.322
Maternal height **	160.2 ± 5.0	160.6 ± 6.2	0.777
Infant weight**	3268.5 ± 474.4	3257.5 ± 646.9	0.931
Infant height*	50 (47 - 51)	50 (47-53)	0.066
Infant head circumference*	35.5 (33-50)	35 (33-38)	**0.005**
The first cervical dilatation**	5 (4 - 6)	5 (4-7)	**0.021**
The second cervical dilatation *	(0-10)	7(5-10)	**0.002**
The first VRS *	2 (1-6)	2 (1-3)	0.533
The first VAS *	5 (2-7)	5 (3-9)	**0.031**
The second VRS *	0 (0-4)	1 (1-2)	**0.001**
The second VAS *	0 (0-7)	3 (1-4)	**0.010**
VRS end *	1 (0-2)	0 (0 - 1)	**<0.001**
VAS end*	2 (0-4)	0 (0 - 1)	**<0.001**

* Mann Whitney U test, ** Unpaired t-test
VAS: Visual Analog Scale VRS: Verbal Rating Scale

The first VRS median values did not show any difference according to the groups (p = 0.533). The first VAS median value was obtained as 5 in both groups. However, the VAS values were accumulated in the higher values in the combined spinal-epidural group (p= 0.031). Although the second VRS and VAS median values were lower in the pure epidural, the VRS end and VAS end values have been obtained lower in the combined spinal-epidural group.

When the first, second and outlet VRS values were compared in the groups themselves, the first VRS median value was obtained higher than the second and the outlet in the pure epidural group. There is no difference between the second and outlet median values. In the combined spinal-epidural application, while there was no difference between the first and second VAS values, the VAS end value was obtained lower.

In the VAS median value, there was no difference between the VAS end and the second values in the pure epidural group and the first VAS value was obtained higher than the others. In the combined spinal-epidural group there is a difference between the whole times. We did not have a case taken to C-section. Labor analgesia shortened the second stage of labor. All of our cases were satisfied with labor analgesia. All patients satisfaction levels are good. None of our cases had postspinal headache.

Discussion

Our pain scores were very low in the combined spinal-epidural group compared to the epidural analgesia group. We found that labour pain ended faster in the CSE group, and our VAS end and VRS end scores were significantly lower in the CSE group compared to the epidural analgesia group. The infant head circumference was found to be higher in the CSE group and was statistically significant. This suggests that infants with larger head circumference may be delivered without the need for intervention or caesarean section delivery with CSE analgesia. In addition, the fact that the higher cervical opening values measured at the time of the second dose were higher in the CSE group, suggests that CSE analgesia shortened the first stage of labour and accelerated cervical effacement and dilatation. It can be said that

CSE analgesia is a good choice due to its advantages such as providing more active, effective analgesia in labour analgesia, shortening the first stage of delivery and facilitating the suturing of episiotomy without the need for additional analgesia.

CSE, which is used to provide rapid labour analgesia induction with minimal side effects, is a technique in which analgesia maintenance is provided with infusion by the epidural catheter placed after spinal analgesic medications. In a study comparing epidural analgesia with CSE analgesia, no difference was found in terms of normal vaginal, operative vaginal or caesarean section delivery, APGAR scores, umbilical artery blood gases, anesthesia complications and success percentages (Wong et al., 2009; Chestnut et al., 2009). The starting of the complete analgesia is significantly faster in CSE than the epidural. In particular, sacral analgesia starts very quickly compared to the lumbar epidural. This situation is very advantageous for pregnant women who want analgesia in the late period of the first stage of labour or whose labour is advancing fast. Since the doses required for spinal analgesia are much less than those of the epidural, the risk of systemic toxicity is low. Because of the less systemic absorption of spinal anaesthetic medications into the maternal circulation, the fetal plasma drug concentrations are even lower than the epidural. This results in less drug delivery to the mother and baby, which makes CSE analgesia superior to epidural analgesia (Wong et al., 2009; Chestnut et al., 2009). The risk of motor block and hypotension is eliminated by avoiding the sympathetic block with performed spinal analgesia by administering only opioid lipid-soluble drugs (Sezer AO et al., 2007; Wong CA et al., 2009; Chestnut DH et al., 2009; Gunaydin B et al., 2010). This method not only enables the mobilization of pregnant women but also provides ideal complete analgesia in pregnant women with stenotic heart disease. In addition, sometimes the catheter may not work in lumbar epidural analgesia. If the CSE technique is chosen from the beginning, the failure rate may be less. Nevertheless, CSE has some undesirable side effects. Although the risk of post dural puncture headache (PDPH) with fine-tipped spinal needles does not increase, a dural puncture is required in CSE to start analgesia. Another concern is the risk of postpartum neuraxial infection, which is rarely seen after dural puncture. Intrathecal opioid application induced pruritus is higher than the epidural. In addition, whether the epidural catheter is in place cannot be clearly understood until 1-2 hours after the start of analgesia. Therefore, CSE is not preferred in pregnant women in whom a functional epidural catheter is mandatory, difficult airway expected or with the risk of fetal heart rate (FHR) anomalies. CSE analgesia is frequently started by using the needle-through-needle technique on the midline in the lumbar region, and analgesia is maintained from the epidural catheter (Wong et al., 2009; Chestnut et al., 2009).In our study, no postspinal headache complications were encountered in none of the pregnant women to whom we applied CSE.

In another randomized controlled trial on the comparison of epidural analgesia and CSE neuraxial labour analgesia, it was shown that the ratios of labour and caesarean section were similarly affected (Sezer et al., 2007). In our study, none of the pregnant women in both groups had received intervention and taken into the caesarean section. Considering the effects of neuraxial analgesia only on the course of labour, the start of analgesia was shown to be 2-8 minutes with CSE, while it was 15-20 minutes with epidural (Wong et al., 2009).In our study, the start of analgesia in the CSE group was in a very short period of 2-3 minutes. In Group EPI, analgesia was started in 15-20 minutes as in the study of Wang et al. Our study results are compatible one-to-one with the literature. However, CSE analgesia, compared to epidural analgesia, has been shown to increase the rate of cervical dilatation and accelerate the labour, on the other hand, there is no difference between the two techniques (Wong et al., 2009; Chestnut et al., 2009). In spite of all these, the opinion of there is no need to be concerned on this issue is widely accepted in the world today. Because, the fact that women who complain more about pain during labour demand more analgesia, and thus the rate of delivery by caesarean section is higher, can be ranked among other factors of not progressing of labour. Fetal macrosomia, malposition (e.g., occiput posterior) and non-functional labour are painful conditions with high rates of operative labour such as forceps and caesarean section (Wong et al.,2009). In our study, we observed that in group CSE, cervical dilatation accelerated compared to the group EPI, and shortened the active phase of the first stage of labour, i.e., accelerated cervical dilatation.

The combined spinal-epidural technique has become increasingly important in labour analgesia in recent years due to the rapid start of the analgesic effect and providing excellent analgesia without significant reduction in motor functions (Olmez et al.,2003). In addition to the rapid start of analgesia, combined spinal-epidural analgesia (CSE) technique may prevent several problems in conventional epidural applications such as incomplete block, motor block, and weak sacral involvement. The epidural

component plays an important role in the continuation of analgesia if the pregnant woman does not give birth in the duration of the action of intrathecal agents after the application of CSE analgesia (Bilgin et al., 2007). In previous studies, it was reported that especially most of the pregnant women who underwent the combined spinal-epidural technique in the advanced stages of fast-progressing labours gave birth at the spinal component of the technique without requiring epidural infusion (Landau et al.,2002; Apiliogulları et al.,2010; Poma et al.,2018; Braga et al.,2019). Since our study was performed on primigravid pregnant women, the number of our cases that gave birth at the spinal component of the neuraxial analgesia was low. However, in the CSE group, we determined that the first stage of labour was significantly shorter compared to the epidural analgesia group. CSE analgesia has been accelerating cervical dilatation. Our results are consistent with the literature.

In a recent 124-series study, Stocks et al. have found that the duration of analgesia duration was 56 min, 68 min, and 77 min, respectively, in their study of adding 5μg, 15μg and 25μg fentanyl in 2.5 mg bupivacaine in CSE analgesia. They have detected that as the dose of intrathecal fentanyl increased, the duration of pruritus and analgesia increased, and low-dose fentanyl was found to be similar with high doses in providing fast and effective analgesia, however, the analgesic effect was shortened (Stocks et al.,2001). In our study, we added 12.5 mcg fentanyl to 2.5 mg bupivacaine, as well. We did not have a case with the complication of pruritus. Our results are similar to the literature results. In addition, our dose of intrathecal fentanyl is convenient with literature.

Study limitations

There are certain limitations in our study. The low number of cases is the first limiting factor. Due to the fact that our study was conducted in limited time, the fact that we could not examine the maternal and neonatal effects of CSE analgesia is the second limiting factor.

Conclusion

As a result, both the ASA (American Society of Anesthesiology) and the ACOG (American College of Obstetrics and Gynecology) have the opinion that being in pain of a person under the control of a doctor is not acceptable. For this reason, labour analgesia options such as CSE analgesia, epidural analgesia should be offered to each mother for labor. CSE analgesia may be a good alternative to epidural analgesia because of its advantages such as the rapid analgesia, shortening the first stage of labour and increasing the comfort of the mother at the episiotomy suturing. We believe that our study will shed light on long-termed, painless childbirth studies with large populations to be conducted in the future.

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RESEARCH ARTICLE

Does Side Dominance Affect the Clinical and Functional Outcomes Following Arthroscopic Rotator Cuff Repair?

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Abstract

Objectives: The aims of this study were to evaluate the mid-term functional outcomes following arthroscopic rotator cuff repair (aRCR) and to define the effect of hand dominance on functional outcomes and re-tear rate.

Methods: Between 2009 and 2015, 160 patients with aRCR (100 females and 60 males) with a minimum 3-year follow-up duration were included in the study. Patients were divided into two main groups according to hand dominance of operated side: Dominant (Group 1) and nondominant (Group 2). Pre- and postoperative functional outcome scores and clinical status of patients were evaluated using the Visual Analog Scale (VAS), American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES), University at California at Los Angeles Shouder Rating Scale (UCLA) and Constant-Murley score (CMS). Functional scores, and revision rate of patients were compared in terms of hand dominance, patient characteristics and operative features.

Results: The mean follow-up period was 45.5 ± 8.3 months (Range, 36 to 84 months). Mean age at the time of surgery was 59.0 ± 8.3 years in the dominant group and 58.3 ± 9.2 years in the nondominant group (p=0.689). Good to excellent postoperative functional outcomes were obtained regarding VAS, ASES, UCLA and CMS and scores in both groups compared with the baseline (p=0.000). Although dominant group had higher postoperative functional scores compared to nondominant group, improvement in functional scores were similar between groups (p<0.05). Retear was noted in 16 patients (7 patients, 7.2% in dominant group and 9 patients, 14.2% in nondominant group, p=0.145). Side dominancy was not associated with retear development (p=0.145). However, tear size was found to be associated with re-tear development (p=0.025).

Conclusions: This study suggests that side dominancy has no significant impact on improvement in clinical scores and re-tear development after aRCR in mid-term.

Key words: Rotator cuff, operation side, dominance, outcomes, functional, clinical

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Introduction

Rotator cuff tears are among the most common pathologies of the shoulder with increasing incidence by age and require surgical intervention in the failure of conservative treatment (Marx et al. 2009). Arthroscopic rotator cuff repair (aRCR) has become widespread today with the development of arthroscopic techniques and equipments. Re-tear is the most common complication after aRCR with reported re-tear rates ranging from 5% to 94% (Ajrawat et al. 2019; Galatz et al. 2004; I.-B. Kim and Kim 2016; Lafosse et al. 2008; Le et al. 2014; Wang et al. 2010). There are many studies evaluating the risk factors that may affect outcomes after aRCR and re-tear rate in different patient groups (Y.-K. Kim et al. 2018; Park et al. 2015; Saccomanno et al. 2016; Shim et al. 2018). Side dominance is one of the factors that seems to play a role in the etiology of rotator cuff tears (Sayampanathan and Andrew 2017). Although side dominance is known to increase the risk up to 2 times in etiology, studies evaluating the effect of side dominance on clinical outcomes after aRCR are limited (Kelly et al. 2017; Oh et al. 2009, 2010; Woollard et al. 2017). Its effect on mid-term post-aRCR recovery and revision rate is not well known. In this study we aimed to investigate whether side dominance affected clinical and functional scores and retear rate after aRCR mid-term. The hypothesize was that dominant limb injuries tended to have higher revision rate and functional scores compared to non-dominant limb in the med-term.

Methods

Patients

The study protocol of this retrospective case-control study was approved by Erciyes University Faculty of Medicine clinical investigations research ethics board (Date: 24.07.2015, number: 2015/330). Between 2009 and 2015, a single surgeon (AG) with at least 5-year experience in arthroscopic shoulder surgery performed 275 RCRs. Of these, we retrospectively reviewed 160 consecutive RCRs with a minimum 3-year follow-up. Patients were divided into two main groups according to hand dominancy: Dominant group (97 patients, 62 males and 35 females) and nondominant group (63 patients, 38 males and 25 females). Nonsurgical treatment options were applied to all patients including; Nonsteroidal anti-inflammatory drugs (NSAIDs), subacromial or glenohumeral steroid injections and physical therapy. Patients without response to non-surgical treatment and who attended regular follow-up for at least 3 years with unilateral partial or total rotator cuff tear repair were included in this study. Patients; who have not attended regular follow-up for at least 3 years (72 patients), patients who had undergone previous surgery for the affected shoulder (subacromial pathologies – 18 patients; trauma – 2 patients; glenohumeral pathologies – 11 patients) and the patients who had not attended postoperative rehabilitation program regularly (12 patients) were excluded.

Surgical method

All surgical procedures were performed under interscalene block and general anesthesia combination. Patients were positioned in the beach-chair position. A diagnostic arthroscopy was performed prior to the repair process. Biceps tendon was tenotomized if the tendon was degenerated or inflamed. Then, the arthroscope was placed into the subacromial space, and bursectomy was performed to elucidate the tear pattern. A single or double row repair technique was used according to tear size and configuration. Repairs were performed using Smith & Nephew (London, UK) TWINFIX® suture anchor with ULTRABRAID® suture or FOOTPRINT PK® suture anchor. Subacromial decompression and release of anterior aspect of the coracoacromial ligament were performed following rotator cuff repair.

Postoperative rehabilitation

An immobilizer was used postoperatively for 6 weeks. Pendulum exercises were started immediately postoperatively. Twice a day, 10-min pendulum exercises with active elbow, wrist, and hand exercises were allowed for the first 6 weeks. Passive range of motion was allowed for 6-8 weeks, active-assisted range of motion between 8 and 10 weeks, and active range of motion between 10 and 12 weeks. Strengthening program was started at the 12th week.

Postoperative assessment

Patient characteristics and demographic data were recorded. Operative reports were evaluated, and pre- and postoperative clinical and functional examinations were performed. As the primary outcome measures, pre- and post-operative functional outcomes were measured using the Visual Analog Scale (VAS; ranging from 0 to 10; 0 = no pain to 10 = worst pain ever), American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES) (King et al. 1999) , University at California

at Los Angeles Shouder Rating Scale (UCLA) (Placzek et al. 2004) and Constant-Murley score (CMS) (Constant and Murley 1987). Also Minimal Clinically Important Difference (MCID) of VAS, UCLA, ASES and CMS values were evaluated for both groups as previously reported (Cvetanovich et al. 2019; Tashjian et al. 2020; Xu et al. 2020). Postoperative rotator cuff re-tear was evaluated by physical examination (persistent pain, loss of strength, pseudoparalysis) correlating with MRI (assessing the structural integrity of the repaired rotator cuff) (Flurin et al. 2005). An informed consent was obtained from all participating patients.

Data and Statistical Analysis

IBM SPSS Statistics version 22.0 (IBM Inc. Chicago, IL, USA) was used for statistical analysis. Descriptive data were presented as median (range), frequency and mean ± standard deviation (SD). Distribution of the variables was tested by using the Shapiro–Wilk test. Nonparametric tests were used since the data were not normally distributed. The Mann–Whitney U test or Kruskal–Wallis test was used for intergroup comparisons of independent quantitative data, depending on the number of groups compared, and Wilcoxon test was used in the evaluation of dependent continuous variables (last follow-up vs. baseline). The chi-square test and Fischer exact test were used in the evaluation categorical data. A sample size of 56 participants per group was calculated as necessary to detect a significant difference in measurements, with a statistical power of 0.80. The type 1 error rate associated with the null hypothesis test was 0.05.

The level of statistical significance was set at p-value <0.05.

Results

The mean follow-up duration was 45.5 ± 8.3 months (range, 36 to 84 months). The mean age of patients was 58.8 ± 8.6 years (range, 36 to 77). There were 98 tears at the right side and 62 tears at the left side. Of the 160 patients, 97 (60.6%) had injuries on the dominant side, whereas 63 (39.4%) had injuries on the non-dominant side. There was no statistically significant difference between two groups regarding to preoperative patient and tear characteristics ($p>0.05$) (Table 1). Also, in our patient group, we found no significant difference between two groups regarding to pre- and intraoperative characteristics ($p>0.05$) (Table 2). Good to excellent outcomes with significant improvements in functional outcome scores were obtained at the last follow -up. Pre- and postoperative VAS, ASES, UCLA and CMS scores were improved significantly compared to the baseline ($p<0.000$ for all). Although dominant group had higher postoperative functional outcome scores compared to nondominant group; there was no statistically significant difference between two groups in terms of clinical and functional scores ($p>0.05$) (Table 3). A total of 16 patients (7 patients in dominant group and 9 patients in nondominant group) had re-tear and they underwent revision surgery during follow-up period. The mean re-tear time was 9.6 ± 5.9 months (range, 3 to 24 months). No parameters of patient demographics and operative features including leg dominance was found to be associated with re-tear except tear size (Table 4). In re-tear group; 2 patients (12.5%) were revised with reverse shoulder arthroplasty. Two patients (12,5%) were treated with latissimus dorsi tendon transfer and the others (12 patients, 75%) were treated with revision arthroscopic rotator cuff repair. No patients developed superficial or deep infection. No major complication was observed perioperatively or at the postoperative follow-up period.

Table 1. Patient and tear characteristics according to the study group. º

		Total (n=160)		Dominant (n=97)		Nondominant (n=63)		*p* value
Age		58.8 ± 8.6		59.1 ± 8.3		58.3 ± 9.2		0.575
Follow-up period (Month)		45,5 ± 8,3		45.3 ± 8.4		45.7 ± 8.2		0.689
BMI		26.3 ± 2.8		26.3 ± 2.7		26.3 ± 3.0		0.942
Sex	Female	100	62.5%	62	63.9%	38	60.3%	0.646
	Male	60	37.5%	35	36.1%	25	39.7%	
Tear type	Total	116	72.5%	71	73.2%	45	71.4%	0.807
	Partial	44	27.5%	26	26.8%	18	28.6%	
Tear pattern	Crescent	126	78.8%	75	77.3%	51	81.0%	
	U type	22	13.8%	14	14.4%	8	12.7%	0.573
	L type	12	7.4%	8	8.2%	4	6.3%	
Torn tendon	SS	120	75.0%	68	70.1%	52	82.5%	
	SS+IS	36	22.5%	28	28.9%	8	12.7%	0.113
	SS+IS+SSC	4	2.5%	1	1.0%	3	4.8%	
Side	Right	98	61.3 %	59	60.8%	39	61.9%	0.891
	Left	62	38.8 %	38	39.2%	24	38.1%	
Acromion type	1	44	27.5 %	27	27.8%	17	27.0%	0.866
	2	82	52.5 %	51	52.6%	33	52.4%	
	3	32	20.0%	19	19.6%	13	20.6%	
Smoking Habit	(-)	132	82.5 %	80	82.5%	52	82.5%	0.992
	(+)	28	17.5 %	17	17.5%	11	17.5%	
Comorbidity	(-)	86	53.8 %	52	53.6%	34	54.0%	0.964
	(+)	74	46.2 %	45	46.4%	29	46.0%	
Diabetes	(-)	134	83.8 %	79	81.4%	55	87.3%	0.326
	(+)	26	16.2 %	18	18.6%	8	12.7%	
Hypercholesterol emia	(-)	129	80.6 %	75	77.3%	54	85.7%	0.189
	(+)	31	19.4 %	22	22.7%	9	14.3%	
Thyroid disease	(-)	155	96.9 %	94	96.9%	61	96.8%	0.977
	(+)	5	3.1 %	3	3.1%	2	3.2%	

ºData are reported as mean ± SD or n (%). BMI, Body mass index.

Table 2. Pre- and intraoperative characteristics of patients according to the study group. º

		Total (n=160)		Dominant (n=97)		Nondeminant (n=63)		*p* value
Number of anchors used		2,3 ± 0.7 / 2.0 (1-5)		2,3 ± 0.6 / 2.0 (1-4)		2,3 ± 0.8 / 2.0 (1-5)		0.862
***Time to surgery** (months)*		8.9 ± 8.5 / 6.0 (0-48)		8.9 ± 9.4 / 6.0 (1-48)		7.2 ± 6.7 / 6.0 (1-36)		0.161
***Tear size** (mm)*		25.8 ± 10.9 / 20 (10-55)		26.0 ± 10.4 /25 (10-55)		25.4 ± 11.6/ 20 (10-55)		0.466
***Operative time** (minutes)*		82.2 ± 17.4 / 75 (60-120)		80.6 ± 17.0 / 75 (60-120)		84.6 ± 17.9 / 75 (65-120)		0.071
Repair type	Single row	90	56.3 %	56	57.7%	34	54%	0.639
	Double row	70	43.7 %	41	42.3 %	29	46%	
Biceps tenotomy	(-)	112	70.0 %	67	69.1%	45	71.6%	0.751
	(+)	48	30.0 %	30	30.9%	18	28.4%	
Acromioplasty	(-)	25	15.6 %	16	16.5%	9	14.3%	0.707
	(+)	135	84.4 %	81	83.5 %	54	85.7%	

º Data are reported as mean ± SD / median (min-max) or n (%).

Table 3. Comparative clinical outcome scores of all patients and Dominance (+) and Dominance (-) groups. [e]

	Total (n=160)		***p***	**Dominant (n=97)**		**Nondominant (n=63)**		***p***
Time to failure (months)	9.6 ± 5.9	8.0(3-24)		7.5 ± 5.7	6.0(3-20)	11.3 ± 5.9	8.0 (6-24)	0.071
Re-tear (n/%)	16 (10)			7 (43.8)		9 (56.3)		0.145
VAS score								
Preop	5.1 ± 2.6	4.0(2-10)	***0.00***	4.8 ± 2.6	4.0(2-10)	5.6 ± 2.6	5.0(2- 10)	***0.051***
Postop				2.4 ± 1.8	2.0(1-9)	3.0 ± 1.9	2.0(1- 9)	***0.004***
Pre-post difference	2.7 ± 1.9	2.0(1-9)		-2.3 ± 2.2	-2.0((-8)-4)	-2.5 ± 2.3	-2.0((-8)- 2)	0.797
Pre-post difference *p*				***0.000***		***0.000***		
ASES score								
Preop	41.8 ± 17.3	45.0(10-72)	***0.00***	43.8 ± 17.3	50.0(10-72)	38.7 ± 17.1	43.0(10-66)	***0.043***
Postop	85.0 ± 17.1	90.0(23-100)		87.7 ± 15.2	90.0(23-100)	80.9 ± 19.2	90.0(27-100)	***0.005***
Pre-post difference				43.8 ± 15.9	44.0(8-80)	42.1 ± 19.5	42.0(5-85)	0.677
Pre-post difference *p*				***0.000***		***0.000***		
UCLA score								
Preop	17.2 ± 4.4	18.0(6-26)	***0.00***	17.8 ± 4.4	19.0(6-26)	16.3 ± 4.3	17.0(6-25)	***0.033***
Postop	31.2 ± 4.4	32.0(14-35)		31.7 ± 4.2	33.0(14-35)	30.4 ± 4.6	32.0(16-35)	***0.023***
Pre-post difference				13.8 ± 4.4	14.0((-2)-24)	14.1 ± 5.1	14.0(2-24)	0.869
Pre-post difference *p*				***0.000***		***0.000***		
CM score								
Preop	42.4 ± 12.3	44.0(11-70)	***0.00***	43.6 ± 12.1	45.0(11-70)	40.6 ± 12.6	42.0(13-68)	0.122
Postop	81.4 ± 14.9	85.0(32-100)		83.0 ± 14.6	87.0(36-100)	78.8 ± 15.2	82.0(32-100)	***0.042***
Pre-post difference				39.3 ± 13.0	40.0((-5)-72)	38.2 ± 16.3	39.0((-4)-72)	0.697
Pre-post difference *p*				***0.000***		***0.000***		

[e] Data are reported as mean ± SD / median(min-max) or n (%).VAS: Visual Analog Scale; ASES*:* American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form; UCLA: University at California at Los Angeles Shouder Rating Scale; CM: Constant-Murley. Bolded *p* indicates a statistically significant difference between groups ($p < 0.05$).

Table 4: Patient demographics and operative features according to the retear status. [e]

		Total (n=160)	Retear (-) (n=144)	Retear (+) (n=16)	*p*
Age (year)		58.8 ± 8.6	58.9 ± 8.6	58.1 ± 8.8	0.728
BMI (kg/m^2)		26.3 ± 80	26.3 ± 2.8	26.6 ± 3.1	0.655
Sex (n/%)	Female	100 (62.5)	91 (63.2)	9 (56.3)	
	Male	60 (27.5)	53 (36.8)	7 (43.8)	0.586
Side dominancy	(+)	97 (60.6)	90 (62.5)	7 (43.8)	
(n/%)	(-)	63 (39.4)	54 (37.5)	9 (56.2)	0.145
Affected side (n/%)	Right	98 (61.3)	89 (61.8)	9 (56.3)	
	Left	62 (38.8)	55 (38.2)	7 (43.7)	0.665
Dominant side(n/%)	Right	84 (60.9)	74 (51.4)	6 (37.5)	
	Left	76 (39.1)	70 (48.6)	10 (62.5)	0.398
Smoking habits	Nonsmokers	132 (82.5)	117 (81.2)	15 (93.8)	
(n/%)	Smokers	28 (17.5)	27 (18.8)	1 (6.3)	0.212
Comorbidity	(+)	74 (46.2)	64 (44.4)	10 (62.5)	
	(-)	86 (53.8)	80 (55.6)	6 (37.5)	0.169
Tear type	Total	116 (72.5)	103 (71.5)	13 (81.3)	
	Partial	44 (27.5)	41 (28.5)	3 (18.7)	0.409
Repair type	Single row	90 (56.3)	82 (56.9)	8 (50.0)	
	Double row	70 (43.7)	62 (43.1)	8 (50.0)	0.595
Biceps tenotomy	(+)	112 (70)	99 (68.8)	13 (81.3)	
	(-)	48 (30)	45 (31.3)	3 (18.8)	0.301
Acromioplasty	(+)	135 (84.4)	120 (83.3)	15 (93.8)	
	(-)	25 (15.6)	24 (16.7)	1 (6.3)	0.276
Time injury to surgery (months)		6 (1-48)	6 (1-48)	6 (1-24)	0.615
Operative time (minutes**)**		75 (60-120)	75 (60-120)	82.5 (65-120)	0.134
Number of anchors used		2 (1-5)	2 (1-5)	2 (1-5)	0.892
Tear size (mm**)**		20 (10-55)	20 (10-55)	25 (15-50)	**0.025**

[e] Data are reported as mean ± SD or median (min-max) or n (%). Bolded ***p*** indicates a statistically significant difference between groups ($p < 0.05$). BMI, Body mass index.

Discussion

The most important finding of this current study was that side dominancy was found not to affect improvement in clinical scores and re-tear development after aRCR in mid-term. Besides, aRCR is an effective method with low re-tear rate and high clinical scores regardless of side dominacy, repair method (single or double row) and patient characteristics in mid-term. However larger tear size was found to negatively affect re-tear development.

In our study, postoperative VAS, ASES, UCLA and CMS scores were significantly improved compared to the baseline in both groups. In Dominant group, 87.4 % of VAS, 85.6 % of UCLA, 89.1% of ASES and 87% of CMS MCID values were achieved respectively whereas 85.2 % of VAS; 84.0 % of UCLA, 87.7% of ASES and 85.6% of CMS MCID values achieved in nondominant group. However, we found no difference between clinical improvement values of two groups according to the MCID scores. In the other words, although there were significant score differences between the dominant and nondominant shoulders, that difference was not clinically significant.

There are many studies evaluating the risk factors that may affect outcomes after aRCR or re-tear in different patient groups (Berglund et al. 2018; Charousset et al. 2006; Chung et al. 2016; Gasbarro et al. 2016; Y.-K. Kim et al. 2018; Park et al. 2015; Saccomanno et al. 2016; Sahni and Narang 2016; Savoie et al. 2016; Shim et al. 2018; Tashjian et al. 2010). Some patient and tear characteristics such as larger tear size, older age, higher interval from tear to surgery, diabetes, obesity were reported to be associated with poorer outcomes after aRCR (Berglund et al. 2018; Park et al. 2015; Saccomanno et al. 2016; Sahni and Narang 2016; Tashjian et al. 2010). However, studies evaluating the effect of side dominance on clinical outcomes after aRCR are limited (Oh et al. 2009, 2010) (Kelly et al. 2017;

Woollard et al. 2017). Recently Kelly et al. (Kelly et al. 2017) evaluated the possible effect of hand dominance on functional outcome following single row rotator cuff repair and found no difference between dominant and non-dominant side surgery. Also, they reported higher overall outcome score in the dominant surgery group with at least 3 years follow up. In line with this study Woollard et al. (Woollard et al. 2017) revealed that surgery on the dominant arm resulted in greater improvement in patient-reported disability thereby increasing the odds of a successful surgery. However, some other studies examining whether or not rotator cuff repair on the dominant arm predicts clinical outcome reported no effect of hand dominance on impairment-based outcome scores (Oh et al. 2009, 2010). In concordance with Kelly et al. (2017) and Woollard et al. (2017) we found that side dominancy had a significant impact on postoperative functional and clinical scores in the mid-term. However, there was no statistically significant difference between two groups in terms of improvement in clinical and functional scores.

Re-tear is the most common complication after RCR with reported re-tear rates ranging from 5% to 94% (Ajrawat et al. 2019; Galatz et al. 2004; I.-B. Kim and Kim 2016; Lafosse et al. 2008; Le et al. 2014; Wang et al. 2010). Overall re-tear rate was 10% (16 patients) in our study population, that rate, which is slightly lower than the rates reported in the literature can be attributed to the relatively shorter follow-up period. This study suggest that side dominancy has no significant impact on re-tear after aRCR in the mid-term.

Larger tear size, older age, higher time interval from tear to surgery, diabetes, obesity were reported to be associated with poorer outcomes after aRCR (Berglund et al. 2018; Park et al. 2015; Saccomanno et al. 2016; Sahni and Narang 2016; Tashjian et al. 2010)(I.-B. Kim and Kim 2016). In our study, we found no effect of patient and tear characteristics such as age, BMI, sex, tear type, tear pattern, torn tendon, tear side, acromion type, smoking habits and comorbidities on re-tear development. However larger tear size was found to negatively affected re-tear development as many studies in the literature (Park et al. 2015; Saccomanno et al. 2016) (Gasbarro et al. 2016). In the literature there are conflicting results about the outcomes of single- or double-row rotator cuff aRCR (Hurley, Maye, and Mullett 2019; Y.-K. Kim et al. 2018; Sugaya et al. 2007). We found no differences with either single- or double-row rotator cuff repairs in terms of re-tear rate.

The strength of this study was that all the procedures were performed in a single center by a single surgeon with at least 5-year experience on arthroscopic shoulder surgery. Besides, we evaluated a large variety of factors; patients' characteristics and demographic data, pre- and postoperative scores and intraoperative factors in terms of side dominancy. There are several limitations of this current study. First, this study was retrospective in nature but we used the prospectively collected data of patients without loss of follow-up to reach more accurate results. Second, although at least 3-year follow-up may be sufficient to evaluate the re-tear rate, long-term functional outcomes and re-tear rate may differ and more accurate results may be obtained with longer follow-up. Third, patients daily work has not been evaluated, this may affect homogeneity, clinical outcomes and re-tear rate. Further randomized prospective studies with more homogeneous patient groups are needed to evaluate the effects of side dominancy on aRCR.

Conclusion

This study suggests that side dominancy has no significant impact on improvement in clinical scores and re-tear development after aRCR in mid-term. Besides, aRCR is an effective method with high clinical scores and low re-tear rate regardless of side dominacy, surgical features and patient characteristics in mid-term. However larger tear size was found to negatively affect re-tear development.

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RESEARCH ARTICLE

Comparison of The Effects of Remifentanil and Fentanyl Combined with Desflurane on Intraoperative Hemodynamic Parameters and Postoperative Recovery Period in Anesthesia for Day Case Surgery

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Abstract

Objective: We aimed to compare the effects of two different opioids, fentanyl and remifentanil with short-acting inhalation agent, desflurane on intraoperative hemodynamics and recovery quality in the postoperative period in anesthesia for day case surgery.

Methods: A prospective randomized case control study was carried out at Anesthesia and Reanimation Clinics of The Istanbul Education and Research Hospital with the approval of the local ethics committee between 2001-2002. The study population (n=100) who has arthroscopic knee surgery was composed of patients between the ages of 18-65 classified as ASAI-II. The cases were randomized and divided into two groups. After giving fentanyl to patients in the first group and remifentanil infusion to patients in the second group, induction has administered by propofol and mivacurium was given as a muscle relaxant in both groups. After endotracheal intubation, systemic blood pressure, heart rate and peripheral oxygen saturation (SpO2) values were recorded every five minutes. When the surgery was completed, eye opening, following commands, saying her name, saying her birthday, sitting without help and getting the correct answer to the DSS test was recorded for both groups. Visual Pain Scale (VAS) and Modified Aldrete Score were evaluated and recorded at 0, 15, 30, and 60 minutes. Patients were observed and recorded in terms of side effects such as increased secretion, bradycardia, nausea, vomiting, dizziness, headache, and tremors in both groups.

Results: In terms of demographic features there was no statistically significant difference between the two groups. Generally, systemic blood pressures were significantly higher in the fentanyl group. Heart rate was significantly higher in fentanyl group during intubation and intraoperative periods. There was no statistically significant difference between groups in terms of Sp02. Time until spontaneous breathing, extubating, eye opening, following commands, saying the name, DSST and unassisted sitting were significantly longer in the fentanyl group. The mean values of VAS scores at the 15th and 30th minutes were significantly higher in the remifentanil group. Similarly, the mean Aldrete recovery scale scores at 15th and 30th minutes were significantly higher in the remifentanil group. When postoperative pathological findings were evaluated, the frequency of bradycardia was significantly higher in the remifentanil group, there was no difference in terms of other side effects.

Conclusion According to the our study results; we concluded that it is a better alternative to use remifentanil together with desflurane which is preferred short-acting inhalation agent in ambulatory anesthesia; in terms of hemodynamic stability during the intubation, peroperative and extubation periods and rapid postoperative recovery.

Key words: Remifentanil, Fentanyl, Day Case Surgery, Recovery, VAS, Aldrete

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Introduction

Ambulatory anesthesia includes admission of the patient to the hospital, surgery, recovery period and delivery to the home. The frequency of ambulatory anesthesia has increased from 10% to 55% since the 1980s, and at least 17% has been applied under polyclinic conditions (American Hospital Association,2014). Day case surgery procedures are increasingly preferred in eligible patients due to lower costs, reducing length of hospital stay and shortening of waiting patient lists (Lapetina EM and Armstrong, 2002, Vila H et all. 2003, Coldiron B et all. 2004, Clayman MA et all. 2006). In addition to that, the increase of the role of anesthesiologists during the perioperative process, beginning to use of many short-acting anesthetic drugs, and increased use of minimal invasive surgical techniques are the other reasons. The presence of fast and short-acting anesthetic, analgesic and muscle relaxant agents allows many surgical interventions to be performed daily, thanks to this recovery will be easier and faster (Lapetina EM and Armstrong, 2002; Coldiron B et all. 2004; Shapiro et al,2014; Hüppe et al,2018; Barbier et al, 2019;). Propofol, which is one of the most preferred intravenous agents in ambulatory anesthesia induction, is one of the most suitable choices since it provides very fast recovery due to its short elimination half-life and early redistribution (Doze et al,1998). Since it isn't preferred to antagonize muscle relaxants, today the most popular agent in this respect is mivacurium, whose half-life is quite short, like 10-20 minutes (Cook et al,1989; Viby-Mogensen et all, 1995). Desflurane, one of the inhalation agents that frequently used in maintenance; by reason of its rapid induction and recovery and ensuring cardiovascular stability, it has become more often and widely used than other agents (White et al,2009). Remifentanyl and fentanyl which have rapid onset of action are widespread used as a narcotic agent, titratable, metabolised by non-specific esterases. Like other opioids, they can cause dose-dependent analgesia, respiratory depression, and muscle stiffness (Glass,1995; Mulas et al,1998). Recent years, many researches have been conducted to find the most appropriate combination among agents that have rapid onset of action, short recovery time and few side effects, provides amnesia and analgesia (Doris and Frances, 1999; Peacock,1999; Mulas et al,1998; Joo, 2000; Gelb AW et all, 2018). In our study, we used propofol as a hypnotic agent, mivacurium as a muscle relaxant, and desflurane in maintenance for ambulatory anesthesia of patients who have arthroscopic knee surgery. By comparing the effects of two different opioids, fentanyl and remifentanil with short-acting inhalation agent, desflurane on intraoperative hemodynamics and recovery quality in the postoperative period, we aimed to reveal whether they have superiority to each other.

Methods

A prospective randomized study planned as a thesis was carried out at Istanbul Education and Research Hospital with the approval of the local ethics committee between 2001-2002. 100 patients between the ages of 18-65, classified as American Society of Anesthesiologists Classification (ASA)I-II, who has arthroscopic knee surgery were included in the study. The patients were informed about the procedures to be performed before the operation; their approvals were obtained. Vascular access was obtained from the forearm veins with 22 Gauge (G) intravenous (iv) cannula. Crystalloid infusion with the dose of 2 ml / kg / hour was started. Before induction, for the digit symbol substitution (DSS) test, we were informed that we would give a verbal warning such as a sentence or word, and that we would want it to repeat after the operation. No medication was used for premedication. Then DSS test was conducted to all patients. The cases were randomized and divided into two groups. After giving 1 microgram / kilogram (µg / kg) fentanyl to patients in the first group, we preoxygenated patients with a mask for 3 minutes. In the second group of patients, subsequent to remifentanil 1µg / kg bolus, 0.25 µg / kg / min infusion was started. Induction has administered by 2 milligrams / kilogram (mg / kg) propofol in both groups. As a muscle relaxant, mivacurium was given in two steps, as priming dose before propofol, 0.15 mg / kg and then 0.10 mg / kg. After ventilating with a mask for 2.5 minutes, endotracheal intubation was performed. After endotracheal intubation, maintenance was supplied with 50% Nitroprotoxide (N2O) + 50% oxygen and

4% desflurane and mechanical ventilation was initiated. Systemic blood pressure (systolic, diastolic, mean), heart rate and peripheral oxygen saturation (SpO2) values were recorded every five minutes. An additional dose of 0.5 µg / kg fentanyl was administered to the patients in group 1, whose operation lasted more than 30 minutes. Remifentanil infusion rate was reduced to 0.05 µg / kg / min after the 30th minute in patients in group 2. When the surgery was completed, remifentanil infusion was terminated and desflurane was reduced to 2%. Desflurane inhalation was stopped after skin suturization. Then N20 was ceased and switched to 100% oxygen. Duration of anesthesia was defined as the time from the moment of induction until the desflurane was ceased; the duration of the surgery was defined as from the moment of skin incision to removal of the trocars. The time from cessation of desflurane to extubation, eye opening, following commands, saying her name, saying her birthday, sitting without help and getting the correct answer to the DSS test were recorded for both groups. Visual Pain Scale (VAS) and Modified Aldrete Score were evaluated and recorded at 0, 15, 30, and 60 minutes (Aldrete,1995; Katz and Melzack,1999). Patients were observed and recorded in terms of side effects such as increased secretion, bradycardia, nausea, vomiting, dizziness, headache, and tremors in both groups.

Statistical Analyses

SPSS 10.0 software (IBM, SPSS 10.0; Chicago, Illinois, USA) was used in the analysis. The mean, standard deviation, median minimum, median maximum, frequency and ratio values were used as descriptive statistics of the data. The distribution of variables was checked with the Kolmogorov–Smirnov test. The t-test and the Mann–Whitney U-test were used in the analysis of quantitative data for independent samples. The demographic data and intraoperative variables such as duration of surgery, between the two groups were analyzed using the Student's t -test for continuous variables. Chi-squared test was used for categorical variables and the analysis of qualitative data. Hemodynamic parameters and scores at a particular point of time between two groups were compared, using unpaired t -test. p- value < 0.05 was regarded as statistically significant.

Results

Our study was planned as a randomized controlled study. In all, 100 patients between the ages of 18-65, classified as ASA I-II, had arthroscopic knee surgery in Istanbul Education Hospital between 2001-2002, were included in the study with the approval of the ethics committee. The mean age of the patients was 41.11. In terms of demographic features like age, average height and weight, gender, duration of anesthesia and surgery; there was no statistically significant difference between the two groups. (p> 0.05) (Table 1).

Tablo 1. Comparison of demographic characteristics of the study groups.

	REMIFENTANYL		FENTANYL		p value
	Mean	**SD**	**Mean**	**SD**	
Age[a]	41.72	11.86	40.50	12.99	.625
Weight[a]	75.98	11.71	74.68	10.84	.566
Length[a]	170.30	7.98	167.40	8.31	.078
Duration of anesthesia (min)[a]	34.18	6.10	35.24	7.90	.428
Duration of surgery (min)[a]	24.18	4.94	25.28	7.38	.347
	n	**%**	**n**	**%**	
Gender[b]					.147
Women	15	30	28	56	
Men	35	70	22	44	

[a] Student t-test and [b] Chi-square, * statiscally significant p<0.05

Tablo 2: Hemodynamic parameters during outpatient anesthesia

	REMIFENTANYL		FENTANYL		p value
	Mean	**SD**	**Mean**	**SD**	
SBP(mmHg)					
Preoperative	143.26	15.83	148.12	18.14	.157
Induction	116.26	14.45	119.08	15.09	.342
Intubation	136.24	17.96	**145.42**	**22.04**	**.025***
Intraoperative	111.62	11.15	**124.41**	**13.29**	**.000***
Pre-extubation	129.74	13.79	**139.84**	**17.42**	**.002***
Post-extubation	143.70	13.61	**151.42**	**18.60**	**.020***
Postoperative 15 minute	139.82	13.03	143.06	15.49	.260
Postoperative 30 minute	138.20	11.62	137.70	16.08	.859
Postoperative 60 minute	137.06	12.04	138.78	16.26	.549
DBP (mmHg)					
Preoperative	82.28	10.97	86.00	13.40	.132
Induction	65.70	10.50	69.58	12.62	.098
Intubation	78.90	12.71	**85.66**	**15.80**	**.020***
Intraoperative	63.30	9.00	**71.77**	**11.95**	**.000***
Pre-extubation	73.42	11.19	**79.44**	**15.61**	**.029***
Post-extubation	83.04	11.51	87.40	14.05	.093
Postoperative 15 minute	79.60	9.76	81.28	12.36	.453
Postoperative 30 minute	76.22	9.92	**80.48**	**11.35**	**.048***
Postoperative 60 minute	75.64	10.62	**80.46**	**12.09**	**.037***
MBP (mmHg)					
Preoperative	105.37	14.95	108.78	15.54	.268
Induction	86.16	12.33	87.68	12.54	.543
Intubation	99.58	14.23	**108.90**	**18.91**	**.006***
Intraoperative	82.46	12.02	**93.50**	**14.29**	**.000***
Pre-extubation	95.54	14.96	101.92	18.84	.065
Post-extubation	104.98	12.89	**113.30**	**17.48**	**.008***
Postoperative 15 minute	99.72	9.44	102.38	12.80	.240
Postoperative 30 minute	96.42	9.35	99.64	12.19	.142
Postoperative 60 minute	95.06	10.25	**99.58**	**12.29**	**.049***
HR/min					
Preoperative	84.62	12.34	89.20	12.11	.064
Induction	76.78	10.69	79.34	11.74	.257
Intubation	85.26	11.73	**90.84**	**11.88**	**.020***
Intraoperative	68.69	7.57	**73.29**	**7.81**	**.004***
Pre-extubation	79.80	9.82	82.40	9.46	.181
Post-extubation	92.08	10.03	93.00	10.76	.659
Postoperative 15 minute	85.06	7.05	86.78	10.69	.345
Postoperative 30 minute	82.54	6.14	84.54	8.79	.190
Postoperative 60 minute	80.94	5.99	82.90	9.98	.237
SP02 (%)					
Preoperative	97.40	1.17	96.14	4.20	.370
Induction	98.50	1.08	98.43	1.16	.880
Intubation	99.20	1.03	99.29	1.07	.846
Intraoperative	99.46	.74	99.42	.86	.913
Pre-extubation	99.50	.71	99.46	.88	.911
Post-extubation	98.00	.82	98.54	1.27	.256
Postoperative 15 minute	97.90	.57	97.92	1.26	.958
Postoperative 30 minute	97.89	.60	97.77	1.30	.800
Postoperative 60 minute	97.78	.67	97.92	1.19	.744

Student t-test, *statistically significant $p<0.05$, SBP: systolic blood pressure, DBP:diastolic blood pressure, MAP: mean arterial pressure, HR: heart rate per minute, SpO2: peripheral oxygen saturation

Systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP), Heart rate (HR), oxygen saturation (SPO2) values were recorded preoperatively, in the course of induction and intubation, every five minutes during the intraoperative period, before and after extubation, and also at the 15th, 30th and 60th minutes in the postoperative period. As presented in Table 2; during intubation, in the perioperative period, before and after extubation, mean SBP were significantly higher in the fentanyl group ($p < 0.05$, $p < 0.001$, $p < 0.01$). There was no significant difference between the two groups at 15, 30 and 60 minutes postoperatively ($p > 0.05$). Mean DBP were significantly higher in the fentanyl group in the course of intubation, during intraoperative period, before extubation, at 30 min and 60 min postoperatively ($p < 0.05$, $p < 0.001$, $p < 0.01$). There was no statistically significant difference between the two groups at preoperatively, at time of induction, post-extubation and postoperative 15th minutes ($p > 0.05$). Mean MAP was significantly higher in the fentanyl group during intubation, intraoperatively, post-extubation and postoperative 60th minutes. ($p < 0.05$, $p < 0.001$ and $p < 0.01$). There was no statistically significant difference preoperatively, at time of induction, pre-extubation, 15th and 30th minutes postoperatively ($p > 0.05$). When the two groups were compared in terms of mean heart rate, there was no statistically significant difference preoperatively, at induction, before and after extubation, postoperative 15, 30 and 60 minutes ($p > 0.05$). However, heart rate was significantly higher in fentanyl group during intubation and intraoperative periods ($p < 0.05$, $p < 0.001$, $p < 0.01$). There was no statistically significant difference between groups in terms of Sp02 ($p > 0.05$) (Table 2).

Tablo 3: Findings of postoperative recovery period

	REMIFENTANYL		FENTANYL		p value
	Mean	**SD**	**Mean**	**SD**	
Spontaneous breathing	3.57	.67	5.73	.77	.000*
Extubation	4.26	.59	7.29	1.03	.000*
Eye opening	4.37	.81	9.07	10.12	.001*
Complying with command	7.27	1.07	15.53	3.44	.000*
Answering questions	5.68	.95	10.74	2.45	.000*
DSST	6.17	.92	12.17	2.48	.000*
Unaiding sitting	12.25	1.47	24.12	5.44	.000*

Student t-test, *statistically significant $p<0.05$, DSST: digit symbol substitution test

Tablo 4: VAS score averages

	REMIFENTANYL		FENTANYL		p value
	Mean	**SD**	**Mean**	**SD**	
0. minute	4.10	2.31	3.68	2.07	.341
15. minute	**6.28**	**1.98**	5.08	1.98	.003*
30. minute	**7.14**	**1.48**	6.08	1.85	.002*
60. minute	6.28	1.51	6.48	1.79	.547

Student t-test, *statistically significant $p<0.05$, VAS: Visual analog scale

On the other hand, there was no statistically significant difference between the two groups in terms of mean values of systolic, diastolic, mean arterial pressure, and heart rate at time of induction, intubation, before and after extubation ($p > 0.05$). However, when both groups are analyzed separately; compared with values at induction, systolic, diastolic, mean arterial pressures and heart rate values were significantly increased during intubation and before extubation, except Sp02 ($p < 0.001$, $p < 0.05$). Sp02 values were significantly low ($p < 0.001$,$p < 0.05$). As presented in Table 3, time until spontaneous breathing, extubation, eye opening, following commands, saying the name, DSST and unassisted sitting were significantly longer in the fentanyl group ($p < 0.001$). The mean values of VAS scores at the 15th and 30th minutes were significantly higher in the remifentanil group ($p < 0.01$) (Table 4). Similarly, the mean Aldreate recovery scale scores at 15th and 30th minutes were significantly higher in the remifentanil group ($p < 0.01$) (Table 5). When postoperative pathological findings were evaluated, the frequency of bradycardia was significantly higher in the remifentanil group, there was no statistically significant difference between the two groups in terms of other side effects ($p < 0.01$, $p > 0.05$) (Table 6)

Tablo 5: ALDRETE recovery scale score averages

	REMIFENTANYL		FENTANYL		P value
	Mean	**SD**	**Mean**	**SD**	
0. minute	8.36	.78	8.16	.65	.166
15. minute	**9.68**	**.51**	8.88	.82	.000*
30. minute	**9.88**	**.33**	9.54	.73	.004*
60. minute	9.96	.20	9.86	.35	.082

Student t-test, *statistically significant p<0.05

Tablo 6: Pathological findings of postoperative recovery period

	REMIFENTANYL		FENTANYL		p value
	n	**%**	**n**	**%**	
Increased secretion	4	8.0	3	6.0	-
Laryngospasm	3	6.0	4	8.0	-
Nausea	1	2.0	7	14.0	0.059
Vomiting	0	-	0	-	-
Headache	3	6.0	6	12.0	0.487
Dizziness			3	6.0	0.242
Shake	1	**2.0**	1	**2.0**	-
Bradycardia	17	34.0	5	10.0	0.007*

Student t-testi, *statistically significant p<0.05,

Discussion

Nowadays, the common features of the agents used in modern anesthesia practice are that their duration of action is short and therefore the anesthetic depth can be easily controlled, and they ensure the shorter and safer postoperative recovery period. With the widespread use of these agents, outpatient surgery has preferred and performed more frequently as a popular technique. We compared the effects of remifentanil and fentanyl in outpatient anesthesia. We didn't find any difference in Sp02 values between these opioids at any stage of anesthesia. However, in the fentanyl group, values of systolic, diastolic and mean blood pressures were detected higher, especially during intubation, intraoperative period, pre- and post-extubation periods, compared to remifentanil. In support of our data, some authors found SBP, DBP and MAP higher values in fentanyl group during intubation, intraoperative and extubation periods (Albertin et al,2001; Twersky et al, 2001; Lang et al, 2019). In contrast, some other authors reported that they could not find any significant difference between SBP, DBP and MAP in preoperative, peroperative and postoperative periods between administration of remifentanil 0.5 mcg /kg bolus, 0.2 mcg/kg/min infusion and fentanyl 1 mcg/kg bolus and 2mcg/kg/hour infusion (Doyle et al,2001; Choi et al, 2016).It was thought that these results may be due to using different dosage and way of remifentanil and fentanyl.

When HR was evaluated in our study, it was found increased in the fentanyl group compared to the remifentanil group in the intubation and intraoperative period. Many authors were also found to similar results. In the remifentanil group, bradycardia was detected more frequently during intubation, preoperative and extubation period. When values were found below the 50 beat /min, intervened with atropine and these data were consistent with the literature (Cafiero et al,2000; Doyle et al,2001; Twersky et al, 2001; Choi et al, 2016).

When the findings of the postoperative recovery period are evaluated; in the fentanyl group, onset time of spontaneous breathing, extubation, eye opening, following commands, saying the name, DSST, and unaided sitting were found to be significantly longer. These values were found to be compatible with other remifentanil-fentanyl comparative studies (Mulas et al,1998; Doyle et al,2001, Dy et al, 2001; Grundmnann et al, 2001). Similarly, some authors compared combination desflurane-remifentanil to desflurane-fentanyl; in remifentanil group, they found that onset time of spontaneous breathing, extubation, eye opening, saying the name, and following the commands are significantly shorter. They also reported that they found DSST duration significantly shorter in the remifentanil group (Wilhelm et al,2001). But the others were found no difference between them (Choi et al, 2016). While the VAS scores that we used to evaluate postoperative pain were statistically significantly higher in the remifentanil group at 15th and 30th minutes, we didn't find any significant difference at the 60th minute. In their study with 16 patients from the remifentanil and fentanyl groups, some authors reported that 7 patients in the remifentanil group and

4 patients in the fentanyl group had analgesic requirements in the early post-operative period (Doyle et al,2001). But the others found no difference VAS scores between fentanyl and remifentanil group in their studies (Haytural, 2015). On the other hand; some other authors found higher VAS scores in the fentanyl group (Monsef et al, 2019).We didn't administer additional analgesics in our study, but when the VAS scores were evaluated, it was concluded that pain control was better achieved in patients treated with fentanyl in the early period.

The average of Aldrete score used for assessment of the cooperation of the patients in remifentanil group at the 15th and 30th minutes during the recovery period were found significantly higher . At 0 and 60 minutes, the score results were similar. When the pathological findings were evaluated, 4 patients in the remifentanil group had increased secretion, 3 patients had laryngospasm, 1 patient had nausea and 3 patients had headache. Increased secretion in 3 patients, laryngospasm in 4 patients, nausea in 7 patients, and headache in 6 patients were detected in the fentanyl group. However, there was no significant difference between the two groups in terms of these parameters. These findings were consistent with the literature. Similar findings are declared between the two groups in the many studies (Mulas et al,1998; Doyle et al,2001; Haytural, 2015, Monsef et al, 2019).

Conclusion

According to the results we obtained from our study; we concluded that it is a better alternative to use remifentanil together with desflurane which is preferred short-acting inhalation agent in ambulatory anesthesia; in terms of hemodynamic stability during the intubation, peroperative and extubation periods and rapid postoperative recovery.

Ethics Committee Approval: Ethics committee approval was received for this study from Clinical Research Ethics Committee of Istanbul Teaching and Research Hospital.
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RESEARCH ARTICLE

Comparative Evaluation of Three Nickel-Titanium Instrumentation Systems in Human Teeth Using Computed Tomography

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Abstract

Objectives: Root canal cleaning and shaping during root canal treatment have been one of the important stages in achieving success The objective of this study was to investigate area and volume changing occurring during shaping of the root canals with three different nickel titanium instrument systems (Race, Hero shaper, Protaper).

Method: In this study, 91 upper first molar teeth were used. Teeth divided randomly into 3 groups. Mesio buccal root of first upper molar teeth were shaped with Race, Hero shaper, and Protaper. The CT images were taken before and after shaping. The taken CT images were transferred to mimics software and 3D models were obtained. On these 3D models, area and volume changes were calculated. Data were subjected to one way Anova. Significance level was set at P= 0.05

Results: No significant difference was found between the volumes calculated on images in terms of the effectiveness of the instruments (P=0.47). No significant difference was found between the areas calculated on images in terms of the effectiveness of the instruments (P=0.71).

Conclusion: Within the limits of this study, all rotary instrument systems showed similar effects in terms of area and volume changes of the root canals at the end of the shaping process.

Key words: Hero shaper, Protaper, Race, Root Canal Area, Root Canal Volume,

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Introduction

Root canal cleaning and shaping during root canal treatment have been one of the important stages in achieving success (Haapasalo et al. 2005; Paqué et al. 2009). Various methods and instruments have been developed for biomechanical removal of the microorganisms, organic and inorganic tissue debris in the root canals and hermetic obturation of the canals.

Hero shaper was manufactured by Micro-mega (Besançon, France) company. It consists of 6 instruments with three different diameters. It has 4-6% taper and cutting angle, triple helix horizontal

section and a non-active tip providing tracking the canal. The curve of root canal is the key factor in the selection of consecutive instruments. Easy root canals curve was defined as the roots with a curve lower than 100, moderate root canals as those with a curve between 100-250 degrees and difficult root canals as the narrow canals with a curve higher than 250. Instruments and the techniques vary corresponding to degree of canal curve.

Protaper was manufactured by Dentsply maillefer (Ballaigues, Switzerland) company. Three types consist of total 6 instruments (SX, S1, S2, F1, F2, and F3). It has a convex triangle section, varying spiral angle and knife interval, and non-cutting guide tip. The system involves instruments with varying taper angles including auxiliary instrument (SX), shaping instruments (S1, S2) and finishing instruments (F1, F2, F3).

RACE (Reamer with Alternating Cutting Edges) is an instrument manufactured by FKG dentaire (La-chaux de fonds, Switzerland). It has a non-cutting tip design in order to provide easy tool control. Owing to its alternative grooves, working time has decreased without a need for a high torque. Since surface shaping is performed with electrochemical polishing, it has a good resistance against metal fatigue and bending. It has eight breakable memory disks showing metal fatigue. It consists of the instruments with different taper angles.

Studies have shown that instrument designs cause area and volume changes during shaping of the root canals (Ozgur Uyanik et al. 2006; Mahran and AboEl-Fotouh 2008; Ikram et al. 2009). The objective of this study was to investigate area and volume changing occurring during shaping of the root canals with three different nickel titanium instrument systems. The null hypothesis was that there would be no difference among three different nickel titanium instrument systems in terms of the changed area and volume of root canals.

Methods

This experimental study is taken from thesis "Comparative Evaluation of Three Nickel-Titanium Instrumentation Systems in Human Teeth Using Computed Tomography" done in 2010 at Atatürk University. This study was approved by the Ethics Committee of graduate school of health sciences of Atatürk University, Erzurum, Turkey, (2010).

In this study, 91 upper first molar teeth were extracted due to periodontal and prosthetic reasons. Sample size calculated based on previous studies. The teeth were kept in 10% formalin solution immediately after the extraction. The teeth were then kept in distilled water. At first, the teeth were kept in 5% NaOCl for 24 hours. Inclusion criteria were completion of root development, reaching of No 10 K file (Mani Inc., Tochigi-ken, Japan) to apical, and teeth with a curve > 250 according to Schneider 1971. Debris in the root surface was cleaned with a curette. After caries and fillings in the crown were cleaned, the occlusal surface of the tooth was smoothed to fix the reference point. Access cavities were prepared using diamond fissure bur (Mani Inc., Tochigi-ken, Japan). Distal and palatinal roots were then cut with a carbon saw and removed. Pulp debris in the root canal was then removed as much as possible utilizing a barbed broaches file. Working length was recorded as 0.5 mm shorter from the point where #10 K file was seen in the apical foramen. Preparation was not performed in the second canals. Root apex was covered with pink wax in order to prevent leakage of acrylic into root canals during embedding into acrylic blocks. The samples were embedded into the blocks prepared from orthodontic acryl as the crowns remaining outside.

Computed Tomography (CT) Imaging Before Preparation

Sample images were acquired using a computed tomography device (Aquillon; Toshiba Medical Systems, Tokyo, Japan) in Ataturk University Medical Faculty Research Hospital department of radiology. Images of the samples inserted to the tomography device were taken in DICOM format under the conditions of 16x0.5 mm collimation, 0.5 mm thickness 120 kV and 300 mAs. The recorded images and CT data were transferred to the Mimics software of Materialise (Leuven, Belgium) in order to calculate area and volumes of the root canals.

Preparation Process

Teeth with determined working length and root canal curves were randomly divided into three groups.

Group 1: Shaping of the root canals with RACE

Sequence of the instruments was determined according to manufacturer recommendations. Accordingly; #10/40 and #08/35 instruments were used until encountering a resistance in the coronal part of the root. #02/15 instrument was then used along the working length. Widening in the working length was completed with # 02/20 and # 02/25 instruments.

Each instrument was used with Xsmart Dentsply maillefer (Ballaigues, Switzerland) electrical motor at 600 revolutions per minute and 2 N torque. After the

use of each instrument, root canals were irrigated with 2 mL 5% NaOCl irrigation solution. During root canal shaping, 4 leaflets in files were ruptured due to the difficulty of the curved anatomy. The file was not used longer when the leaflets in the disk depleted.

Group 2: Shaping of the root canals with hero shaper.

In line with the instrument order recommended by the manufacturer in the teeth with difficult canals and a curve ≥25o, preparation was made by tracking the yellow line on the "Hero Shaper Box". The shaping was started with #06/20 instrument. Coronal part or middle 2/3 part of the root canal was shaped with #06/20 instrument via passive progression technique. Shaping was performed along the working length with #04/20, #04/25 and #04/30 instruments. Each instrument was used with Xsmart Dentsply maillefer (Ballaigues, Switzerland) electrical motor at 600 revolutions per minute and 2 N torque. After the use of each instrument, root canals were irrigated with 2 mL 5% NaOCl irrigation solution. Rotary files were changed after each 5 usage or when a deformation sign was observed.

Group 3: Shaping of the root canals with PROTAPER.

Working was started with the SX. S1 was used along the working length.

Shaping was completed along the working length using S2, F1, F2 and F3 instruments. Each instrument was used with Xsmart Dentsply maillefer (Ballaigues, Switzerland) electrical motor at 600 revolutions per minute and 2 N torque. After the use of each instrument, root canals were irrigated with 2 mL 5% NaOCl irrigation solution. Instruments were changed after each 5 usage or when a deformation sign was observed.

CT imaging After Preparation

Second images were taken under the same conditions in order to compare the models obtained before the preparation and those obtained after the preparation in terms of area and volume.

Area and Volume Calculations Before and After Preparation

Data obtained before and after preparation were transferred to the Mimics software. Appropriate voxels were similarly grouped in order to reconstruct 3D images based on the Hounsfield units (HU). For this purpose, a mask with defined HU values was created. Areas and volumes were calculated on the models obtained from the first and second images. These measurements and calculations were made for all teeth.

Statistical Analysis

The descriptive analyses for the groups were calculated. The normality of the variation of the data was verified by the shapiro-wilk test (P=0.05). Data were subjected to One Way Anova (P=0.05). The data were analyzed using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) for Windows, version 15 software.

Results

Area changes that occurred during root canal preparation are shown in Figure 1, and volume changes in Figure 2.

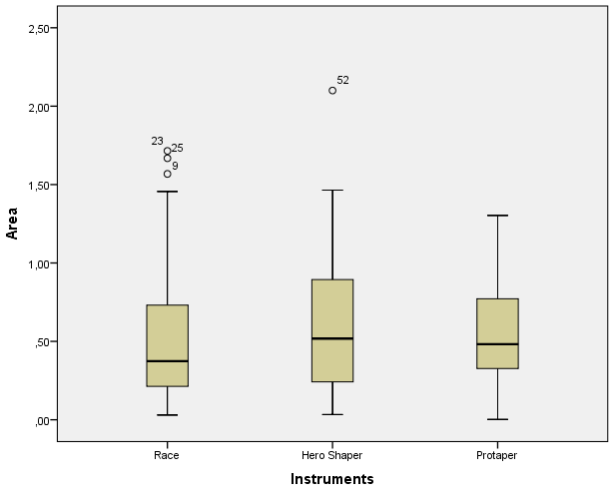

Figure 1. Mean values of changed area of groups (mm^2)

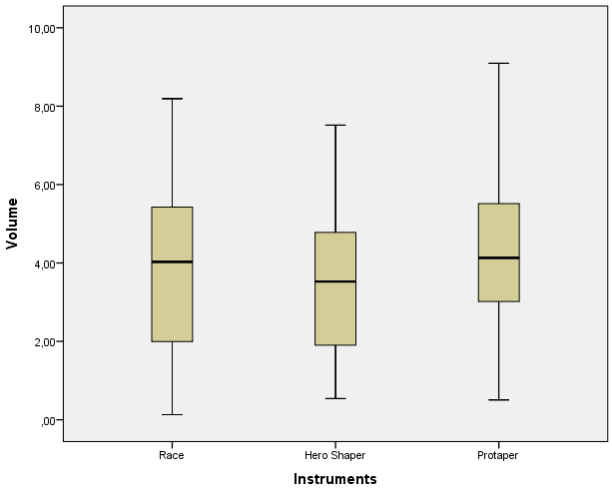

Figure 2. Mean values of changed volume of groups (mm^3)

The images obtained before and after the preparation and were compared in all samples. Total area and volume differences were calculated. According to the results, no significant difference was found between the volumes on images in terms of the effectiveness of the instruments (P>0.47) (Table 1).

According to the results, no significant difference was found between the areas on images in terms of the effectiveness of the instruments (P>0.71) (Table 1).

Table 1. Mean and standard deviation of changed area/volume of groups

	Area (mm^2)	Volume (mm^3)
Race	0,57± 0,51	3,80±2,07
Hero Shaper	0,61±0,46	3,69±1,81
Protaper	0,52±0,31	4,25±1,84
	P=0,71	P=0,47

Discussion

According to results of the present study, there was no statistically significant difference among three different nickel titanium instrument systems in terms of the changed area and volume of root canals. Thus, the null hypothesis was accepted.

Removal of microorganisms from the root canal system is necessary for a successful endodontic treatment. Today, this is executed by chemical cleaning and shaping of the root canal system (Haapasalo et al. 2005; Paqué et al. 2009). Baker et al. 1975 reported that using a large amount of irrigation solution during root canal shaping will be beneficial. Mechanical preparation and irrigation should be combined in order to provide effective irrigation solutions delivery through the entire root canal system (Paqué et al. 2009). Shupping et al (Shuping et al. 2000). found that Ni-Ti instruments give the best effect when combined with irrigation solution. Although preparing to the root canals with large-taper instruments and effectively removing debris with preserving apical foramen cause a better irrigation, it is controversial topic that to which size of the root canals should be prepared (Albrecht et al. 2004). Since the living microorganisms can penetrate to the dentinal tubules, maintaining their life during root canal treatment, clinical importance of the shaped surface concept gains a different meaning (Peters et al. 2002). Therefore, shaping completed with larger apical numbers in which microorganisms can be mechanically removed and disinfection can be optimally applied are recommended (Dalton et al. 1998). In a declaration by the European Endodontic Society, it is reported that the preparation should cover the entire periphery of the canal in order to confirm complete cleaning and shaping of a canal (Undergraduate curriculum guidelines for endodontology. European Society of Endodontology 1992).

Many methods have been used to evaluate endodontic instruments for a few decades. These methods include plastic models' method, serial sections method, histological sections method, scanning electron microscope method and radiologic methods (Southard et al. 1987; Mizrahi et al. 1975; Bramante et al. 1987). Although destructive methods are easy, understandable and inexpensive, disadvantages such as substance loss occurring along the root canal due to fragmentation of the samples, difficulty in preparation between the portions, and errors during data transfer have caused the development of nondestructive methods. Imaging with CT has eliminated these disadvantages and also provided the opportunity of examining the samples with all aspects. However due to section thickness is not enough detailed images cannot be obtained, from small areas such as the apical region of the teeth. Microcomputed tomography (MCT) has been developed for this purpose. Although MTC provides very fine details and can be used successfully even in very small areas, it has some disadvantages such as requiring technical skills, expensive and difficult to access (Gluskin et al. 2001). Considering all these factors, in this study we used computed tomography.

In their study with MTC, Ikram et al. 2009 calculated volume changes occurring in the tooth during cleaning of decays, preparing the access cavity, root canal preparation with Protaper, preparation required for insertion of fiber post, and preparation required for insertion of cast post in 12 extracted upper premolars. They reported that volume changes occurred during removal of the decay by 8.3%, preparing the access cavity by 4.4%, root canal preparation by 1%, fiber post preparation by 1.4%, and cast post preparation by 4.1%. In that study, the amount of removed dentin was calculated according to the tooth volume. The amount of dentin removed during root canal preparation was reported as 1%. MCT gives more precise outcomes because of taking thinner sections during imaging. In this study, the total volume rate changed in the two canals of the upper premolars was given. We found the amount of removed dentin during root canal preparation as 0.5%. The difference between the two results can be attributed to the type of the teeth used and MCT used for imaging.

In a study by Ozgur Uyanik et al. (2006) using CT, area and volume changes occurring during shaping of the mesial roots of the lower first molars were

compared among three different instruments. Fourteen horizontal sections taken from the teeth were transferred to the 3D Doctor software, 3D model of the teeth was obtained, and area and volume changes were calculated on the 3D model. It was found that Hero Shaper, Protaper and Race removed a volume of 2.08±0.45, 2.77±028 and 2.40±1.53 mm3, respectively. The authors demonstrated that Protaper removed a statistically significantly higher amount of dentin, while no significant difference was found between Race and Hero Shaper. No statistically significant difference found between the groups in terms of area change. In that study, calculations were made by obtaining a 3D model from 2D images of 1 mm thickness taken from the mesial roots of the lower molars. In our study, calculations were made by obtaining the model from 3D images of 0.5 mm thickness taken from the roots of the upper molars. Variation in selected teeth and section thicknesses might cause different numerical results between the studies. However, despite the differences in numerical values, the results are in parallel with our results in terms of the effectiveness of the instruments.

Mahran and AboEl-Fotouh 2008 took 14 horizontal sections from 45 mesio-buccal canals of the upper first molars using CT. They divided the teeth into three groups. They made preparation with Protaper in Group I, Hero Shaper in Group II and Gates glidden and Flex R hand file in Group III. The amount of removed dentin was calculated with Syngo CT software VB20. The authors stated that Protaper removed the statistically highest amount of dentin (1.6 mm3), while Group III removed the lowest amount (0.93 mm3). The difference of the study by Mahran and AboEl-Fotouh 2008 and by Ozgur Uyanik et al. (2006) was using of the upper molars instead of the lower molars. In these studies, 3D model was obtained from 2D images of 1 mm thickness. The results reported in that study different from the study by Ozgur Uyanik et al. (2006) might be attributed to the teeth used. The difference between our results and the results of these two studies might be resulted from obtaining the model from 3D images of 0.5 mm thickness. Although numerical values of the results were different, results of all three studies are consistent when effectiveness of the instruments was evaluated.

In their study, Loizides et al. (2007) compared the effectiveness of Hero group (endo flare, Hero Shaper, Hero apical) and Protaper on the mesial roots of the lower molars using MCT. They examined area changes in the sections taken at 2, 4, 6 and 8 mm from the apical. It was reported that Protaper changed more area than Hero group at 2 mm, while Hero group changed more areas than Protaper at the other three levels. The authors found significant differences between the groups. In that study, area changes at different levels were studied, and it was found that the Hero group changed areas at more levels than Protaper. Different results from our study might be caused by the methods used.

Conclusion

Within the limits of this study, rotary instrument systems used during shaping of the root canals showed similar effects in terms of area and volume changes in the root canals.

Acknowledgments: This paper is taken from my thesis "Comparative Evaluation of Three Nickel-Titanium Instrumentation Systems in Human Teeth Using Computed Tomography" done in 2010 at Atatürk University.

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RESEARCH ARTICLE

The Investigation of a Tertiary Hospital Emergency Service in terms of Quality Standards

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Abstract

Objective: Emergency services (ES) are the units where people first apply when they encounter an emergency and provide uninterrupted service 24 hours a day. The quality of these services is as important as the correct diagnosis and treatment of the patients in emergency services. Quality standards for emergency services (QSES) are the scales used for emergency services to provide quality service. In this study, the compliance status of a tertiary hospital emergency service with QSES was investigated.

Methods: Data of emergency service recorded by the quality unit of a tertiary hospital between 01 January 2018 and 31 December 2018 were retrospectively analyzed.

Results: It was found that a total of 90719 patients (27383 in 1st period, 28634 in the 2nd period, 7930 in the 3rd period, 28572 in the 4th period of 2018) applied to the emergency service in 2018. The patients were kept in the observation room for less than 6 hours, which is the target time for staying of patient. Less than 30 minutes when is the target time of the physician to reach the consultation could not be achieved. Less than 3% which is the target ratio of the patients re-applying to the emergency service within twenty-four hours with the same complaint was achieved. Less than 1% which is the target ratio of the patients sent from the emergency service to another center was achieved. Chi-square test test showed that there was a statistically significant difference between the periods in terms of all indicators (**p<0.001**).

Conclusion: The hospital's situation regarding QSES was examined and quality targets were mostly met. However, additional measures are required to further improve the quality of the service provided in the emergency service.

Key words: Emergency service, quality standards, healthcare

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Introduction

Information about healthcare services can be accessed easily and at any time. Therefore, activity results of healthcare service are reported more clearly and more reliably. In the light of the data obtained, it helps to make business policy and decisions of the organization (Erdem and Ozdagoglu, 2008; Kucuk et al., 2017).

Emergency services (ES) are the units where people first apply when they encounter an emergency and provide uninterrupted service 24 hours a day. Emergency services need to be well organized because it is not known when and how emergencies

will occur. The quality of these services is as important as the correct diagnosis and treatment of the patients. For this reason, Quality standards for emergency services (QSES) have been developed to provide quality services in emergency services (Altindis ve Unal, 2017; https://Kalite.Saglik.Gov.Tr/Tr,9081/Indikator-Applemlari.Html). By this way, hospital managers are able to easily identify defective sides of the emergency service of the hospital where they work and take the necessary measures quickly.

In this study, the compliance status of a tertiary hospital emergency service with QSES was investigated

Methods

Study Design

This study is a retrospective study and its universe consists of emergency service data recorded by the quality unit of a tertiary hospital between 01 January 2018 and 31 December 2018. The study started after the approval no: 2020/20 by Ethics Committee of Ordu University.

While analyzing the study data, the data collection stages were grouped as follows:

Because the quality unit of the hospital collected the data quarterly, the data were analyzed quarterly in four different periods: 1st period covering January-February-March, 2nd period covering April-May-June, 3rd period covering July-August-September and 4th period covering October-November-December.

In the study, the forms named as "The duration of hospitalization of the patients hospitalized in the emergency service", "The rates of patients reapplying to the emergency service within twenty-four hours with the same complaint", "The duration of consultant physician's access to the emergency service", "Patient referral rate of the emergency service" recorded by the quality units of the hospital within the framework of QSES were analyzed retrospectively. According to this;

1. Under the title of "The duration of hospitalization of the patients hospitalized in the emergency service", the total number of patients hospitalized in the observation room, total stay duration (as minutes) of the patients hospitalized in the observation room, the number of the patients hospitalized more than 12 hours among the patients in the observation room and the percentage of patients hospitalized for more than 12 hours among the patients in the observation room were analyzed. As stated in the source information reached, the formula "total of hospitalization durations of the patients hospitalized in the observation/ total number of hospitalizations made in the observation" as the calculation method of stay time in the observation. The duration of the emergency service observation is intended to be under six hours as the target value (QHST, 2020).

2. Under the title of "The rates of patients reapplying to the emergency service within twenty-four hours with the same complaint", the total number of the patients admitted to the emergency service and the number of patients reapplying to the emergency service within twenty-four hours were examined. In line with the source information, the formula "(the number of patients reapplying to the emergency service with the same complaint within 24 hours / the number of patients applying to the emergency service) x100" was used as the method of calculating the rates of patients applying to the emergency service again within twenty-four hours with the same complaint and 3% and below was planned as the target value (QHST, 2020).

3. Under the title of "The duration of consultant physician's access to the emergency service", total number of consultation requests in the emergency service, branches consulted and percentage rates of them, the time in minutes that the physicians coming to the consultation reach the patient, the number of consultations requested during working hours and the number of consultations requested outside working hours were analyzed. Considering the literature, the rate of total time to reach consultation / number of consultation requests to the emergency service in the relevant time period was calculated for the duration of consultant physician's access to the emergency service. The target in this ratio was aimed to be 30 minutes or less (QHST, 2020).

4. Under the title of "Patient referral rate of the emergency service", the total number of patients admitted to the emergency service, the total number of patients referred to another center, the percentage of the patients referred to another center, the percentage of the diagnosis of the patients referred and the referral rates of patients referred to another center were analyzed. In line with the literature source used, the formula "(the number of patients referred to another institution from the emergency service / the number of patients applying to the emergency service)x100 was used to calculate the referral rates in the relevant time interval and the target value was planned to be ≤ 1% (QHST, 2020).

Inclusion criteria

The emergency service forms filled by the quality unit of the hospital between 01 January 2018 and 31 December 2018 were included in the study.

Exclusion criteria

Incomplete forms were excluded from the study.

Data Analysis

Frequency analysis of variables was realized, and descriptive statistics were calculated. Whether the frequencies are homogeneously distributed according to the periods was checked by one-way Chi-square test. SPSS v 26 statistics program (IBM Corp., Armonk, NY) was used in calculations.

Results

A total of 90719 patients, 27383 in 1st period, 28634 in 2nd period, 7930 in the 3rd period, 28572 in the 4th period, were admitted to the emergency service in 2018.

The data obtained according to the sub-parameters of "The duration of hospitalization of the patients hospitalized in the emergency service" were as follows; it was detected that 23.35 % (n = 21189) of the patients admitted to the emergency service were taken under the observation. In addition, it was found that 1.89 (n = 1720) of the subjects remained in the emergency service for more than 12 hours. The duration of patient stay in the observation room was targeted to be under 6 hours and this target was achieved (Table 1). It was detected that 1.89% (n = 1720) of the patients who applied to the emergency service stayed in the emergency service for more than 12 hours (Table 1). Whether the frequencies of the parameters are homogenously distributed according to the periods were checked by one-way Chi-square test. Chi-square test showed a statistically significant difference between periods in terms of all parameters (p <0.001). While the highest number of patients hospitalized in the observation room was 40.1% (n = 8500) in 1st period, it was determined 1.8% (n = 383) in 4th period as the lowest.

The data obtained according to the sub-parameters of "The rates of patients reapplying to the emergency service within twenty-four hours with the same complaint" were as follows; it was determined that 11929 consultations were requested in the emergency service within a period of one year and this rate was 13.14% of the total number of patients. It was determined that 3363 (3.70%) of the consultations were requested during working hours while the remaining 1894 (2.08%) were requested outside the working hours. While the target time of the physician to reach the consultation was <30 minutes, this period was determined as> 30 minutes in our hospital, and it was observed that the target value was not achieved (Table 1). Whether the frequencies of the parameters are homogenously distributed according to the periods were checked by one-way Chi-square test. Chi-square test showed a statistically significant difference between periods in terms of all parameters (p <0.001). In the emergency service, the highest number of consultation requests was 35.2% (n = 4200) in 2nd period while the lowest number of consultations, 10.3% (n = 1228), was requested in 4th period.

The data obtained according to the sub-parameters of “The duration of consultant physician's access to the emergency service" were as follows; the number and rates of the patients re-admitted to the emergency service within twenty-four hours were 1.42% (n = 390), 1.36% (n = 391), 4.07% (n = 323) and 0.32% (n = 94), respectively. In total, it was observed that it was 1.32% (n = 1198). The target value was planned as 3 3% and the target value was achieved. Whether the frequencies of the parameters are homogenously distributed according to the periods were checked by one-way Chi-square test. Chi-square test showed a statistically significant difference between periods in terms of all parameters (p <0.001). It was detected that the number of patients re-admitted to the emergency service within 24 hours was 32.6% (n = 391) in 2nd period as the highest and 7.8% (n = 94) in 4th period as the lowest.

The data obtained according to the sub-parameters of "Patient referral rate of the emergency service" were as follows; a total of 90719 patients applied to the emergency service, of which 187 were transferred to another center for different reasons. The percentage of the patients referred from the emergency service was observed as 0.2% and the target value, ≤ 1%, has been achieved (Table 1). Whether the frequencies of the parameters are homogenously distributed according to the periods were checked by one-way Chi-square test. Chi-square test showed a statistically significant difference between periods in terms of all parameters (p <0.001). The total number of patients referred to another center was 58.8% (n = 110) in 4th period as the highest while the lowest number of patients referred was detected as 5.3% (n = 10) in 3rd period. The hospitalization of COPD patients is increasing in 4th period, which is the winter period. As the number of COPD patients with follow-up is high in Ordu and most of them receive inpatient treatment, the bed capacity is not

sufficient and for it was thought for this reason that the referral rate is increased.

Discussion

Data of the emergency service was analyzed retrospectively and the status of achieving the target values specified in QSES was investigated. In addition, consultation times in the emergency service, the time period of the consultation, the proportion of the patients staying in the observation room of emergency service, the patients staying for over 12 hours in the observation room, the patients re-applying to the emergency service within 24 hours, and the rate of referral in the emergency service were investigated. In the direction of the resource information reached, the studies carried out so far and quality standards forms of the emergency service have been examined together. In this study, four parameters thought to affect the emergency service workflow were evaluated together.

Of the patients who applied to ES and whose first assessment was made, the duration of the observation in the emergency service, the number of ones with an observation duration of more than 12 hours and the achievement status of the target value were analyzed in the study. 23.35% (n = 21189) of 90719 cases who applied to the emergency service were taken to the observation room in the emergency service. The durations of the patients' stay in the observation room of the emergency service were 2.4, 6.0, 5.8 and 0.07 hours according to the periods, respectively. While the highest number of patients hospitalized in the observation room was 40.1% (n = 8500) in 1st period, it was determined 1.8% (n = 383) in 4th period as the lowest. Also, it was detected that 1.89% (n = 1720) of the patients who applied to the emergency service stayed in the emergency service for more than 12 hours. Despite this, 98.11% of all patients were found to be below 6 hours which is the target time. It was reported in the studies conducted in different centers that the duration of the observation has changed. It was reported in a study conducted that a significant portion, 77%, of the patients were concluded in the first 8 hours in AS however the duration of the observation was extended up to 18 hours in the remaining patient group (Ross et al., 2003). In another study conducted in a tertiary university hospital, it was reported that the average duration of observation was 2 days (Dede, 2006). Kilicaslan et al. reported in their study that the average time of observation of the patients in the emergency service was 2 hours (Kilicaslan et al., 2005). In the study conducted by Oktay et al., they reported the average duration of observation as 3.3 hours (Oktay et al., 2003). According to the report of the American College of Emergency Medicine, it was reported that the average duration of stay in non-serious illnesses or injuries was 1-2 hours while the duration may increase depending on the diagnosis and clinical condition (www.acep.org). Many factors such as clinical diagnosis of the patients, the examination results of the patients, the knowledge and experience of the physician evaluating the patient, emergency bed status affect the duration of the patient's observation in the emergency service. According to the reports of Karatas et al., emergency services with more than 50000 patient applications per year must have at least 30 beds (Karatas and Ciplak, 2007). However, our hospital, which has over 90000 annual patient applications, has 14 beds in the emergency service. For this reason, it is thought that the patients are discharged, hospitalized or referred faster. Moreover, the fact that there is only one emergency medical specialist in each shift in our emergency service indicates that the diagnosis and treatment organizations of the patients are done quickly. Another reason for the short duration of the observation is that there are large health centers in neighborhood of our hospital, and we think that the patients who may take a long time to diagnose go to these centers.

The patients reapplying to the emergency service within 24 hours were examined in the study. It was determined that 1.32% (n = 1198) of 90719 cases who admitted to the emergency service applied to the emergency service again within 24 hours. The target value, <3%, has been achieved. Erenler et al. reported in their study that 163,951 patients applied to the emergency service annually and 0.73% (n = 1210) of these patients applied to the emergency service again within 24 hours (Erenler et al., 2014). Another study reported that 312255 people applied to the emergency center per year and 3.6% (n = 11420) of the subjects applied to the emergency service again in 24 hours (Incesu et al., 2016). Yorulmaz et al. reported that they examined 3-year data of their hospital emergency service, a total of 1083553 patients applied to the emergency service and 0.72% (n = 7775) of these subjects re-applied to the emergency service within 24 hours (Yorulmaz et al., 2017). This situation is thought to be related to the fact that the doctors working in the emergency service do not provide sufficient information while discharging the patients. It was concluded that the patients with knowledge did not make unnecessary applications to the emergency services because they learned in which case they should apply to the hospital.

In the study, the rate of requesting consultation in the emergency service was examined as the percentage. It was detected that the consultation was requested for 13.14% (n = 11929) [(11.67% in 1st period (n = 3198), 14.66% in 2nd period (n = 4200), 41.65% in 3rd period (n = 3303), 4.29% in 4th period (n = 1228)] of the applicants in 2018. It was found that consultation was requested for 5.78% (n = 5257) of these cases in total [3.7% (n = 3363) during working hours (between 08.00-17.00) and 2.08% (n = 1894) outside working hours (17.00-08.00)]. Consultation is an important practice in patient management in the emergency room (Ozyurt et al.,2018). In various studies conducted in tertiary hospitals in our country, it has been reported that the rates of requesting consultation in ESs were different. Ay et al. reported that they requested consultation for 29.12% of the subjects in their study including 3609 emergency service applications (Ay et al., 2010). Aydın et al. stated in their study involving 3000 patients that they requested consultations for 39.1% of the patients (Aydin et al., 2010) while it was reported in another study that 9294 patients were included in the study and 21.6% of them were requested for consultation (Domez et al., 2017). At least one emergency medical specialist doctor is employed in the emergency service of our hospital while practitioners and physicians with less experience were working in the emergency services in the past. We believe that this rate has decreased since they can terminate most of the complicated patients themselves thanks to the high level of experience and knowledge of emergency medicine specialists. In our study, the mean time to reach the patient (in minutes) of the consultant physician was detected as 30.4, 29.7, 27.5 and 547.3, respectively, and the target value, <30 minutes, could not be achieved mostly or could be achieved at the border. We believe that this situation depends on the consulted physicians simultaneously looking at the consultation outside the emergency service, providing the outpatient service and closing the consultation from the system late due to the workload even if the patient was evaluated at the desired time.

The number of patients referred to another center after applying to the hospital emergency service was examined in our study. It was observed that the rates of the subjects referred to the center other than the emergency service to the total subjects applied were 0.09% (n = 26), 0.14% (n = 41), 0.12% (n = 10) and 0.38% (n = 187), respectively, and the rate was 0.20% (n = 187) in total. The target value, < 1%, was achieved. The total number of patients referred to another center was 58.8% (n = 110) in 4th period as the highest while the lowest number of patients referred was detected as 5.3% (n = 10) in 3rd period. The hospitalization of COPD patients is increasing in 4th period, which is the winter period. As the number of COPD patients with follow-up is high in Ordu and most of them receive inpatient treatment, the bed capacity is not sufficient and for it was thought for this reason that the referral rate is increased. In the light of the source information available, no research was found in the literature regarding the patients referred from the emergency service. The study shows that the emergency service is successful in referrals. This situation is thought to be related to the fact that technical facilities of the emergency services are good and emergency medicine specialists can solve most patients' problems at their centers thanks to their knowledge, skills and experience.

Conclusion

The situation of the hospital emergency service was analyzed with respect to quality standards and it was determined that the quality targets were mostly achieved. However, I believe that the recommendations given below should be followed to further improve the quality of the service provided in the emergency service.

1. The number of emergency medical specialists should be increased in all centers.
2. We believe that work planning should be made so that there is at least one emergency medicine specialist at each shift in the centers with adequate emergency medicine specialists
3. Emergency medicine specialists should be assigned in the centers with high technical equipment and infrastructure.
4. More extensive studies evaluating QSES should be done and preventive measures should be taken for the deficiencies observed.

Ethics Committee Approval: The Ordu University Clinical Research Ethics Committee approved the protocol of this study (KAEK 2020-20).
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CASE REPORT

Chronic Kidney Disease and Multiple Myeloma Case in Clinical Nephrology

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Abstract

Multiple myeloma (MM) is a neoplastic plasma cell dyscrasia identify by anemia, recurrent infections, increased serum and / or monoclonal protein in urine, osteolytic bone lesions, hypercalcemia and renal failure. MM accounts for approximately 1% of all cancer cases and 10% of hematological malignancies MM related renal failure is an important prognostic factor leading to early mortality and ranges from 20-50% depending on the frequency of kidney disease in MM. In the present paper, we report that advanced age, concomitant chronic renal failure with unknown cause and anemia should always bring MM to mind; In these cases, serum and urine immunization electrophoresis should be requested even if serum protein electrophoresis is normal.

Key words: Light chain; The immunofixation; multiple myeloma

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Introduction

Multiple myeloma (MM) accounts for approximately 1% of all cancer cases and 10% of hematological malignancies (Rajkumar et al.,2014). Each year over 32,000 new cases are diagnosed in the United States, and almost 13,000 patients die of the disease (Siegel et al.,2020). The annual age-adjusted incidence in the United States has remained stable for decades at approximately 4 per 100,000 (Kyle et al.,2004). MM is more common in males (approximately 1.4 / 1), with an average age of 69 for males and 72 for females at the time of diagnosis (Barlogie et al., 2006). Multiple myeloma can be presented with three different clinical pictures: typical pattern, light chain myeloma and non-secretory myeloma. The classic findings leading to diagnosis are bone pain, hypercalcemia, sedimentation height, anemia, and lytic bone lesions (Kyle et al., 2003). Bone pain is generally felt in the

back and chest wall, less often in the extremities. In 80% of patients, lytic bone lesions, osteopenia, osteoporosis, or pathological fractures can be detected in skeletal surveys (Kyle et al., 2003). Unlike other malignancies that metastasize to bone, the osteolytic bone lesions in multiple myeloma exhibit no new bone formation (Roodman ,2009). Bone disease is the main cause of morbidity and can be best detected using low-dose whole body computed tomography (WB-CT), fluoro-deoxyglucose (FDG) positron emission tomography/computed tomographic scans (PET/CT), or magnetic resonance imaging (MRI) (Hillengass et al., 2019) Sedimentation has increased significantly and may be over 100 mm / h. (Alexandrakis et al., 2003) Anemia is generally normochromic normocytic and is seen at the time of diagnosis in 73% of patients and throughout the disease in 97% (Kyle et al., 2003). Renal involvement rate is 48% and it is more common in light chain myeloma (Winearls, 1995).

Renal involvement in MM was first described in 1845 by Henry Bence Jones detecting oxidized albumin in the urine of a myeloma patient, which would later be called Bence Jones protein (Jones, 1848). MM-related kidney failure (ESRD) is an important prognostic factor causing early mortality. The frequency of renal failure in MM varies between 20-50% depending on the definition (Alexanian et al., 1990; Eleutherakis-Papaiakovou et al., 2007). Renal failure despite being generally moderate (between stage 2 and stage 4), 10% of patients still require renal replacement therapy (Torra et al., 1995). MM damage is mainly caused by the effect of monoclonal light chains. Hypercalcemia although less frequently is another cause of kidney failure (Blade and Rosinol, 2005). Dehydration, hyperuricemia, nephrotoxic drugs, and use of contrast agents are other factors that are effective in the development of kidney failure and they cause kidney damage by increasing the effects of light chains rather than being the main cause of kidney failure (Alexanian et al., 1990; Kyle et al., 2003). It is known that with the improvement of kidney failure, negative effects on survival disappear. Therefore, it is important to identify the factors that affect the healing of kidney failure. Alongside supportive therapy such as appropriate fluid replacement, correction of hypercalcemia and avoiding nephrotoxic agents, chemotherapy for MM should be initiated quickly. With the treatment, the rate of recovery of kidney failure reaches 25-58% (Blade and Rosinol, 2005; Eleutherakis-Papaiakovou et al., 2007). In the present paper, we report that advanced age, concomitant chronic renal failure with unknown cause and anemia should always bring MM to mind; In these cases, serum and urine immunization electrophoresis should be requested even if serum protein electrophoresis is normal.

Case

An 82-year-old male patient has been followed up in the nephrology outpatient clinic for nine months due to chronic kidney damage (CKD). Five months prior, in addition to anemia, the patient with a marked sedimentation height was referred to the hematology outpatient clinic. CKD and hypertension have been present for 9 months in patient history. The medications patient was administrated were polystyrene sulfonate calcium salt, sodium bicarbonate, iron II, darbopoetin alpha. The patient did not consume alcohol or smoked.

In the physical examination of a middle aged male patient with no acute ailments, decreased skin turgor, dry tongue, pale skin was found and a fever of 37 °C, blood pressure of 140/80 mmHg, 96/min pulse and respiratory rate of 18 per minute is recorded. Respiratory sounds were normal in auscultation. Cardiac sounds were normal during the cardiac examination. Abdominal examination revealed no distention, tenderness, and organomegaly. Intestinal sounds were normal. There was no costovertebral angle sensitivity. No edema was detected in both lower extremities. No lymphadenopathy was detected in the cervical, axillary and inguinal regions. No feature present in neurological examination. Other system examinations were normal.

In Hemogram WBC 11430 uL, Hb 10.5 gr / dl, Hct 33.2 %, MCV 91.7 fl, RBC 3.62 10 ^ 6 / uL, Neu 6410 uL, Monocyte 620 uL, Lymphocyte 3560 uL, PLT 193.000 UL.

Routine biochemistry Glucose 86 mg /dL urea 49.2 mg / dl, creatinine 1.58 mg / dl, sodium 140 mEq /L, potassium 6.13 mEq / L, calcium 9.6 mg / dl, chlorine 104 mEq / L, phosphorus 3.4 mg / dl, uric acid 5.5 mg / dl, AST 21 U/L, ALT 13 U/L, Total protein 8.4 g / dl, albumin 4.1 g / dl, CK 107 U / L, sedimentation 105 mm / h, CRP was 1.3 mg / L, LDH 189 UL. Iron 100.8 ug / dL, TDBK 230.8 ug / dL, ferritin 860.7 ng / mL, folate 2.85 ng / mL, vitamin B12 357.7 pg / mL, reticulocyte count 1.17 ng / mL, Parathormone 70.91 ng / mL, 25-OH D 16.81 ng was / mL. PT was 16.9 sec, aPTT 40.7 ng / mL, INR 1.22 ng / mL.

Complete urine examination and sediment Density 1013, pH 5, leukocyte negative, erythrocyte negative, protein +1, glucose negative, nitrite negative, urobilinogen negative, ketone negative.

Venous blood gas pH 7.28, HCO3 18.6, PCO2 39.8, PO2 32.3

In advanced examination and examination of hematology outpatient clinic Serum beta-2 microglobulin is found as 6.51 mg / L.

Immunization electrophoresis-serum quantitative monoclonal protein was IgA 908 mg / dL, IgG 1724 mg / dL, IgM 56.5 mg / dL, Kappa light chain was 4.16 g / L, Lambda light chain was 3.31 g / L. Hemoglobin electrophoresis was; HbA 97.4%, HbA2 2.57% HbF 0%. ARB (-) in sputum, Sputum culture: no reproduction.

Discussion

Multiple myeloma is malignant proliferation of advanced plasma cells; seen in elderly, often presenting with renal failure and hypercalcemia. As with many types of malignancies, the benefit of early diagnosis is indisputable, and further evaluations are often required aside a presence of high clinical suspicion. Clinical and laboratory findings in light chain myeloma often resemble typical MM.

The revised International Myeloma Working Group criteria for the diagnosis of multiple myeloma requires the presence of one or more myeloma defining events (MDE) in addition to evidence of either 10% or more clonal plasma cells on bone marrow examination or a biopsy-proven plasmacytoma. MDE consists of established CRAB (hypercalcemia, renal failure, anemia, or lytic bone lesions) features as well as 3 specific biomarkers: clonal bone marrow plasma cells ≥60%, serum free light chain (FLC) ratio ≥100 (provided involved FLC level is ≥100 mg/L), and more than one focal lesion on MRI. (Rajkumar, 2020)

Serum protein electrophoresis alone is insufficient in MM. In the presence of a typical pattern MM, M protein can be detected by serum protein electrophoresis at a rate of 82%, which increases to 97% if serum and urine immunofaction electrophoresis is added (Kyle et al., 2003).

In 20% of all MM cases, only light chain is present in serum and urine, and in this table, also called light chain myeloma, one third of patients are presented with renal failure. In light chain myeloma, serum or urine kappa and lambda type light chains can be detected by serum and urine immunofaction electrophoresis.

Conclusion

Advanced age concomitant chronic renal failure with unknown cause and anemia should always bring MM to mind; In these cases, serum and urine immunization electrophoresis should be requested even if serum protein electrophoresis is normal.

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REVIEW

Evaluation of the World Breastfeeding Trend Initiative Reports of the Countries Affiliated to the Turkish Cooperation and Coordination Agency

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Abstract

Breastfeeding has many benefits for the physical and psychological development of the baby and its positive effects continue for life. Breastfeeding correctly and properly whenever the baby wants, except in compulsory situations feeding only with breast milk during the first six months and breastfeeding is recommended in addition to supplementary food for at least two years of age. In most parts of the world, programs to encourage breastfeeding are implemented. In this study, the rates of countries that sent reports to World Breastfeeding Trend Initiavite (WBTI) from countries that are members of the Turkish Cooperation and Coordination Agency (TCCA) Presidency on breastfeeding and bottle use. It was observed that the rates were below the standards in the specified reports. Increasing breastfeeding rates, reduce baby bottle use and thus, it is thought that educational programs should be focused on in order to raise healthier generations.

Key words: Breastfeeding, Turkish Cooperation and Coordination Agency, World Breastfeeding Trend Initiative

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Introduction

Breast milk is very important in the first 2 years of a baby's life because it has the ideal content to meet the needs of the baby. An examination of the data on the importance of childhood nutrition reveals that about 1.5 million children die due to acute nutritional deficiency per year (Lancet, 2000). Although breastfeeding precisely prevents infant mortality, the rate of breastfeeding in Japan for the first 6 months is 3%; this rate is 47.2% in USA and in our country 41% (Liu, 2013; Centers for Disease Control and Prevention. Breastfeeding report card United States, 2012; Turkey Demographic and Health Survey, 2018). Assembly, it has been declared as one of the six global targets to increase the rate of exclusive breastfeeding in the first six months up to at least 50% by year 2025 (World Health Organization, 2014).

Breastfeeding is a unique feeding method for the healthy growth and development of the baby (Akyuz, 2007). It is very important to feed the baby only with breast milk for the first six months after birth and to continue breastfeeding with appropriate supplementary foods, until at least two years of age (World Health Organization, 2020). Breast milk contains most of the vitamins at the desired level, except vitamin D and K. Besides being abundantly rich in nutrient content, breast milk plays an important role in the development of the baby and augmenting immunity, due to the growth factors and immunological factors it contained. Breast milk is easy to digest and protects the baby from gastrointestinal problems; it also provides protection against the development of type 2 diabetes mellitus and obesity. Being rich in essential fatty acids, it supports brain and nerve tissue development. Breastfeeding also protects the mother against diseases such as breast cancer, ovarian cancer, and osteoporosis. In addition, it strengthens the emotional bond between the mother and the baby (Samur, 2008). Mothers should be educated and encouraged for breastfeeding, because breast milk is very important for the health of the baby and the mother. A successful breastfeeding during the first 6 months depends on several factors including the mother's thoughts about breastfeeding, the health condition of the baby and the mother, the feeding of the baby in the first days after birth, the nutrition of the mother during the lactation period, and prenatal and postnatal interventions of midwives and nurses to provide lactation. The long-term success of breastfeeding depends on factors including the time of starting breastfeeding, the frequency of breastfeeding, the time to switch to supplementary food, and the mother's working conditions (Hoyer, 1998; Schmied, 1999; Chierici, 1999; Raister, 2000; Akyuz, 2007).

Breastfeeding in Turkey

WHO and UNICEF recommend breast-feeding babies exclusively for the first six months and continuing breast-feeding with adequate complementary food for up to two years of age (Gartner, 2005). The same recommendation is accepted by Ministry of Health, in our country. Training of breastfeeding, beginning especially after the 32th week of pregnancy, has been proven to increase the duration of breastfeeding, in many studies (Betrini, 2003).

Breastfeeding has been supported by “Monitoring the Growth Program”, since 1987, and by the implementation of “Breast Milk Promotion and Baby-Friendly Health Institutions Program”, since 1991,with the cooperation of UNICEF (Bolat, 2011).Ten steps of successful breastfeeding have been introduced to all health institutions by the Ministry of Health. A health institution that carries out these steps is entitled as a baby-friendly health institution. Correct practices required for nutrition during infancy and early childhood include starting breastfeeding within the first hour of life, breastfeeding for the first six months of life, exclusively, continuing breastfeeding for two years or more, and introducing safe, convenient and adequate supplementary foods at 6 months of age (Turkey Demographic and Health Survey, 2018). Breastfeeding in the first hour after the delivery is very important for the establishment of the bond between the mother and the baby and providing the baby with colostrum, which is very beneficial and protective for the baby. According to Turkey Demographic and Health Survey (TDHS) 2018 report, the rate of starting breastfeeding within the first hour was 71%, the rate of feeding with only breast milk for the first 6 months was 41%, and median duration of breastfeeding was 16.7 months. Although bottle feeding is not recommended in the first 2 years of age, the frequency of use is high in our country. According to the data of TDHS 2018 report, the rate of feeding with a bottle was 53% in the first 2 years (Turkey Demographic and Health Survey, 2018).

Turkish Cooperation and Coordination Agency

Turkish Cooperation and Coordination Agency (TCCA) was established within the Ministry of Culture and Tourism of the Republic of Turkey, in 1992, in order to implement and coordinate the aid, projects and collaboration efforts to our consanguine living in newly established countries in Central Asia. TCCA has been an instrument to implement our foreign policy in many regions and countries. While the initial aim of the institution was to help Turkic Republics to produce their own social structure, to develop their identity, cultural and political rights, to improve their technical infrastructure, it continued to provide help in several fields including education, health, restoration, agricultural development, finance, tourism, industry, etc. (Turkish Cooperation and Coordination Agency, 2020).

World Breastfeeding Trend Initiavite

The Breastfeeding Promotion Network of India (BPNI) has been serving as a breastfeeding incentive network of India for 28 years. Its main purpose is to help all countries around the world to produce

policies on baby nutrition. BPNI is also the global secretary of the World Breastfeeding Trend Initiative (WBTI) program. WBTI was first established, in 2004, as an assessment and comparison tool of the policies and programs of the World Health Organization for the implementation of the global strategy for nutrition of infants and children, on the basis of countries. WBTI does this through a 15-step strategy including,

1. National Policy,
2. Management and Financing,
3. Baby-Friendly Hospital İnitiative / Ten Steps to Successful Breastfeeding,
4. Implementing Baby Food Codex,
5. Maintaining Delivery,
6. Health and Nutrition Care Systems,
7. Guidance Services for Breastfeeding Mothers and Pregnant Women,
8. HIV and İnfant Nutrition,
9. Nutrition of Babies and Young Children İn Emergency Conditions,
10. Monitoring and Evaluation,
11. İnitiating Breastfeeding Within the First Hour of Delivery,
12. Exclusive Breastfeeding for The First Six Months,
13. Median Breastfeeding Time,
14. Bottle Feeding,
15. Complementary Feeding-İntroduction Of Solid, Semi-Solid or Soft Foods.

Countries agreeing to participate in this program write their reports according to this 15-step strategy and send these reports to WBTI for evaluation (World Breastfeeding Trends Initiative, 2020). WBTI reviews the reports, records the weaknesses and strengths of the countries in a separate report and keeps these reports (World Breastfeeding Trends Initiative, 2020). Turkey WBTI report of the Ministry of Health was presented in 2015 with the support of universities and non-governmental organizations (World Breastfeeding Trends Initiative, 2020). Turkey has taken 80 points out of 100 by the report evaluated WBTI (World Breastfeeding Trends Initiative, 2020).

The aim of this article is to review the reports gathered from WBTI about the TIKA member countries who provided information to them and provide information regarding the amount of breastfeeding in these countries. The countries who did not provide information to WBTI have been excluded from the review.

Republic of South Africa submitted its' report to WBTI, in 2010. According to this report, breastfeeding rate was 12% for the first 3 months, and the rate of exclusive breastfeeding for the first 4-6 months was 1.5%. It was reported that 46% of the babies started bottle feeding, in the first 10 weeks (World Breastfeeding Trends Initiative, 2020). When we examined the reports submitted to WBTI, by Mozambique, Kenya, and Afghanistan, in 2012, the rate of starting breastfeeding in the first 1 hour in was 63% Mozambique, rate of exclusive breastfeeding for the first 6 months was 37%, and the median duration of breastfeeding was 18 months. Starting bottle feeding rate was 30% for the first 6 months, whereas it was observed that the baby-friendly hospital application was not available in the country. In the report submitted by Kenya, the rate of breastfeeding in the first 1 hour was 58%, the rate of exclusive breastfeeding in the first 6 months was 31.9%, and the median duration of breastfeeding was 20 months. According to the report submitted by Afghanistan, the rate of exclusive breastfeeding for the first 6 months was 54%, the median breastfeeding period was 23 months, and the rate of bottle usage was 28%. Breastfeeding rates were found to be lower in girls. Although, baby-friendly hospital practice was available in the country, sustainability problems were present, due to cultural and traditional obstacles (World Breastfeeding Trends Initiative, 2020). Ethiopia submitted its' report to WBTI, in 2013. The report revealed that 56% of the deliveries took place at home, the rate of exclusive breastfeeding in the first 6 months was only 31.9%, and the median breastfeeding period was 20 months. Although 10 steps of successful breastfeeding have been applied as a part of baby-friendly hospital initiative, we observed that the rate of baby-friendly hospitals was only 7% (World Breastfeeding Trends Initiative, 2020). According to the reports submitted in 2015, the rate of starting breastfeeding in the first 1 hour was 49%, in Nigeria; the rate of exclusive breastfeeding in the first 6 months was 50%; and the median duration of breastfeeding was 18.2 months. In the report from Tanzania, the rate of starting breastfeeding in the first 1 hour was 49%, the rate of exclusive breastfeeding in the first 6 months was 50%, the median duration of breastfeeding was 20 months, and the rate of bottle feeding before the end of first 6 months was 5%. In the report from Uganda, the rate of starting breastfeeding in the first 1 hour was 52.5%, the rate of exclusive breastfeeding in the first 6 months was 63.2%, and the median breastfeeding period was 18 months. In the report from Gambia, the rate of exclusive breastfeeding in

the first 6 months was 48%, the rate of exclusive breastfeeding in the first 6 months was 20 months, and the rate of bottle feeding before the end of first 6 months was 7%. In addition to the fact that there was no baby-friendly hospital initiation in Gambia, neither there were available updated materials, to help mothers who have problems with breastfeeding. In the report from Bosnia and Herzegovina; the rate of exclusive breastfeeding in the first 6 months was 18.5%; and the rate of baby-friendly hospitals was 73%. The baby-friendly hospital program started in 2009 and the baby nutrition policy was adopted in 2012. According to the 2015 report of Mexico, the rate of starting breastfeeding in the first 1 hour was 38%, the rate of exclusive breastfeeding in the first 6 months was 14%, and the rate of exclusive breastfeeding in the first 6 months was 14%, and the median breastfeeding period was 10 months (World Breastfeeding Trends Initiative, 2020). According to the report submitted by Colombia, in 2017, the rate of starting breastfeeding in the first 1 hour was 57%, the rate of exclusive breastfeeding in the first 6 months was 43%, the median breastfeeding period was 15 months, and the rate of bottle feeding before the end of first 6 months was 55% (World Breastfeeding Trends Initiative, 2020).

Conclusion

In conclusion, it is seen that the breastfeeding rates are far from the 2025 targets of the World Health Assembly, in TCCA countries. Especially, the use of bottle feeding is still very common and the rates of exclusive breastfeeding in the first 6 months are far from the desired targets. The first steps of raising healthier generations are to increase the rates of breastfeeding, the amount of breast milk, and immunization. The aim of this review is to underline the importance of exclusive use of breast milk for the first 6 months and continuing breastfeeding until 2 years of age with appropriate supplementary foods

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APRIL – 2020 REFEREES INDEX

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