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The Effect of Adding Dexamethasone and dexketoprofen to lidocaine in anesthesia and postoperative analgesia as a regional intravenous anesthesia technique

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Taylan AKKAYA

INTRODUCTION

Regional anesthesia is a widely used method because of more advantages compared to general anesthesia (1). Anesthesia is called Intravenous Regional Anesthesia (IVRA), which is created by giving a local anesthetic into the venous system of an extremity isolated from the systemic circulation by applying a tourniquet with a pressure above the systemic arterial pressure to the proximal part, eliminating the sensation of nerve conduction and pain (2). In patients undergoing upper extremity surgery; Intravenous regional anesthesia (IVRA) is a frequently preferred method due to its ease of administration, rapid onset of action and effective anesthesia, and short hospital stay (3).

Lidocaine and prilocaine are frequently preferred agents in IVRA. One of the major disadvantages of IVRA is that it has insufficient postoperative analgesic efficacy. Although it is tried to prevent unwanted systemic symptoms by decreasing the applied local anesthetic doses; these practices cause inadequate anesthesia (4). Many alternative drugs and methods are being studied in order to reduce unwanted systemic findings and extend the duration of anesthesia (5). For this purpose, after the detection of peripheral opioid receptors, morphine, fentanyl, tramadol, etc. Agents such as opioids, low-dose muscle relaxants, nonsteroidal anti-inflammatory drugs, clonidine to provide surgical muscle relaxation were added to local anesthetics, and alkalinization of local anesthetics was used in regional anesthesia to shorten the onset of local anesthetics and to prolong analgesia (6, 7). In this study, we planned to compare the sensory and motor block initation and end times, anesthesia quality, tourniquet tolerance, postoperative analgesia quality and side effects of adding dexketoprofen and dexamethasone to IVRA made with lidocaine.

MATERIALS and METHODS

The study was planned in 60 adult patients from ASA I-III group over the age of 18 who will undergo hand and wrist surgery with the approval of the hospital ethics committee and informed patient at the 1st Anesthesiology and Reanimation Clinic of the University of Health Sciences, Yıldırım Beyazıt Training and Research Hospital.

Cases contraindicated for IVRA application (presence of allergy to lidocaine, dexketoprofen and dexamethasone, thrombophlebitis and atherosclerotic vascular diseases, history of bronchial asthma, Raynoud's disease, arterio-venous fistula, scleroderma, sickle cell anemia, extensive burns to the

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operation site, laceration and infection, patients with myasthenia gravis, bleeding disorder, decompensated heart failure and digitalized patients, epilepsy, non-cooperative patients, sedentary and malnourished patients and those with liver dysfunction) and patients who did not accept the technique were excluded from the study.

All cases premedicated with 0.05 mg / kg i.m. midazolam (Dormicum, Roche) 30 minutes before the operation. Venous cannulation was performed with 22 gauge intravenous cannula on the dorsum of the hand, and infusion was started at a rate of 4-6 ml / kg / hour with 0.9% NaCl.

The demographic data of the patients who were taken to the operating table were recorded. Systolic arterial pressure (SAP), diastolic arterial pressure (DAP) and mean arterial pressure (MAP), heart rate (HR), peripheral oxygen saturation (SPO2) by electrocardiography (ECG) and pulse oximetry were monitored (Drager infinity alpha).

The arm, which was planned to be operated, was first kept above the heart level for 3 minutes and the venous blood of the arm was drained by the effect of gravity. Then, the anemia process was completed by wrapping the Esmarch bandage tightly from distal to proximal. The proximal cuff of the double-cuffed tourniquet (VBM Medizintechnik, GMBH, Germany) was inflated to a pressure of 100 mmHg or 300 mmHg above the systolic arterial blood pressure measured from the same arm. Occlusion pressure was confirmed by the disappearance of the radial pulse.

The patients were randomly divided into 3 groups and Lidocaine was given to the 1st group (Group I) with regional anesthesia technique, while Lidocaine + Dexamethasone to the 2nd group (Group II) and Lidocaine + Dexamethasone + Dexketoprofen to the 3rd group (Group III) were planned.

GROUP I (n = 19): 3 mg / kg of 2% Lidocaine was completed to 40 ml with saline.

GROUP II (n = 19): 3 mg / kg 2% Lidocaine + 8 mg Dexamethasone was completed to 40 ml with saline.

GROUP III (n = 18): 3 mg / kg 2% Lidocaine + 8 mg Dexamethasone + 50 mg Dexketoprofen was completed to 40 ml with saline.

The solution prepared for each group was injected in 90 seconds by the anesthesiologist immediately after the proximal tourniquet was inflated from the vein cannulation on the dorsum of the hand on the side where the operation was planned. The time to occurrence of the sensory block from the end of the injection was determined every 30 seconds by performing a pinprick test with the help of a 22 G short needle in 6 regions determined in the dermatomes of the median, radial and ulnar nerves. In these dermatomes, when the sensation of pain was not detected in the pinprick test performed by inserting a needle, the sensory block initiation time was recorded. The time to occurrence of motor block was recorded as the time from drug injection until the patients could not move their fingers. After the sensory block was formed in all dermatomes, the distal tourniquet was inflated to a pressure of 300 mmHg and the operation was initiated by opening the proximal tourniquet.

Visual Analogue Scale (VAS) values were recorded before and immediately after the tourniquet, at 5, 10, 15, 20 and 40 minutes after the injection of the prepared solution. Assessment of tourniquet pain with VAS, which is a pain assessment scale between 0 and 10; The evaluation of sedation status was performed with the Ramsey Sedation Scale, which was evaluated with a score between 1 and 5; The evaluation of the degree of motor block was done with the Bromage Scale, which was evaluated with a score between 0 and 3; Anesthesia quality was performed with a numerical scale scored between 1 and

4. Side effects such as bradycardia, hypotension, diplopia, dizziness, nausea, vomiting, cyanosis and nystagmus that may develop during the operation were recorded. When hypotension developed (mean arterial pressure decreased by 25% compared to preoperative values) iv 5¬10 mg ephedrine, when bradycardia developed iv 0.5 mg atropine and when SpO2 was 91%, it was planned to be treated by giving oxygen through a face mask. Fentanyl (Fentanyl Citrate-Abbott) at a dose of 1 pgr / kg was planned for those with a VAS value of 3 and above.

A 5-point scale (Ramsey Sedation Scale) was used for sedation.

1= alert, cooperative

2= prone to sleep

3= sleeping but responding to audible stimulus

4= fits but has response to tactile stimulus

5= sleeping but has no response to any stimulus.

Numerical Scale was used to evaluate the quality of anesthesia.

Perfect (4): patient comfortable, no analgesic requirement.

Good (3): minor analgesic need

Medium (2): needs additional analgesic.

Unsuccessful (1): general anesthesia was started.

The degree of motor block was evaluated using the Bromage Scale.

0 = no paralysis at all.

1= can only move her elbow and hand. He cannot raise his arm straight.

2= Cannot bend elbow, only move hand.

3= Can't move wrist and thumb.

The tourniquet was not lowered 20 minutes before the anesthetic agent injection and was not allowed to stay for more than 2 hours. After the tourniquet was opened, the time until the return of pain sensation with pinprick test in radial, median and ulnar nerve dermatomes was recorded as the return time of sensory block. The time until the patient could move his fingers was recorded as the motor block return time. VAS values, sedation status and side effects were recorded at 1, 10, 2, and 4 hours after the tourniquet was opened. The time between the opening of the tourniquet and the first analgesic administration was accepted as the time of analgesia and the time of first analgesic administration was recorded. The total amount of analgesic taken in the first 24 hours was recorded. If he needed 500 mg paracetamol tablet as analgesic, he was recommended to take a maximum of 4 tablets in 24 hours.

Statistical analysis

The analysis of the data was performed using the SPSS (Statistical Package for Social Science) for Windows 11.5 package program. Whether the distribution of continuous variables was close to normal was examined using the Shapiro Wilk test. Descriptive statistics were presented as mcan ± Standard deviation or median (minimum-maximum) for continuous variables, and as number of cases and (%)

for categorical variables.

Whether there is a statistically significant difference between the groups in terms of age and body weight. One-way analysis of variance, starting and ending times of motor and sensory block, VAS, amount of Fentanyl consumed, first post-op analgesic intake time, total analgesic consumption, tourniquet VAS, Sedation score and the significance of the difference in terms of anesthesia quality scores was investigated with the Kruskal Wallis test. If the Kruskal Wallis test statistic result was found to be significant, the non-parametric multiple comparison test was used to identify the groups that caused a significant difference. Categorical variables were analyzed using Pearson's Chi-Square or Fisher's Exact-Result Chi-Square test. Whether there was a statistically significant difference between the repeated measurements within the groups was investigated with the Bonferroni Corrected Wilcoxon Sign test.

For $p < 0.05$, the results were considered statistically significant. Bonferroni Correction was made to control the Type I error in all possible multiple comparisons.

RESULTS

In our study, demographic characteristics of 56 cases who underwent IVRA are shown in Table I, and no statistical difference was observed between the groups in terms of age, weight, gender, ASA classification ($p > 0.05$) (Table 1).

Sensorial and Engine Block Evaluation

Sensorial Block Start and End Time:

No statistically significant difference was found between the groups in terms of onset of sensory block ($p > 0.05$) (Table 2).

Engine Block Start and End Time:

Motor block onset time of Group III was statistically significantly shorter than Group I and Group II (Table 2) ($p < 0.05$). There was no statistically significant difference between Group I and Group II (Table 2) ($p > 0.05$).

VAS Values of Groups:

No statistically significant difference was found between the groups in terms of VAS values in the perioperative period ($p > 0.006$). The difference between post-op 1st minute, 2nd hour 1 5 and 4th hour VAS levels in Group I was found to be statistically significant ($p < 0.006$). The difference between the post-op 1st minute and 4th hour VAS levels of Group II was found to be statistically significant ($p < 0.006$). In the post-op period, VAS levels of Group I at all times were higher than those of Group II and Group III, and this difference was statistically significant ($p < 0.006$). The difference between Group II and Group III in terms of VAS levels at all times in the postoperative period was not statistically significant ($p > 0.006$)(Figure 1).

Analgesic Requirement During Perioperative and Postoperative Period:

In the perioperative period, 4 patients in Group I, 2 patients in Group II and 3 patients in Group III needed analgesic. It was observed that the difference between the groups in terms of the number of patients who needed analgesic and the total amount of analgesic consumed during this period was not statistically significant ($p > 0.05$).

Postoperative first analgesic intake time was recorded as 240.0 ± 60.8 minutes in Group I, 378.1 ± 125.3 minutes in Group II and 486.7 ± 147.6 minutes in Group III. This period is shorter in Group I compared

to Group II and Group III, and this difference was found to be

statistically significant (p <0.001). The difference between Group II and Group III is not statistically significant (p> 0.001) (Figure 2).

The analgesic requirement during the postoperative period was 19 patients in Group I, 16 patients in Group II and 9 patients in Group III. The number of patients who needed analgesic in the postoperative period was less in Group III than the other two groups, and this difference was statistically significant (p <0.001).

The total analgesic consumption in the postoperative period is 1.7 ± 0.41 g in Group I, 0.7 ± 0.48 g in Group II and 0.3 ± 0.39 g in Group III. Total analgesic consumption is less in Group III compared to Group I and Group II, and this difference was statistically significant (p <0.001) (Table 4). Total analgesic consumption of Group II is less than Group I and this difference was found to be statistically significant (p <0.001).

The number of tablets used in Group III was statistically significantly lower than Group I and Group II. The number of tablets used in Group II was found to be less than Group I, and this difference is statistically significant (p <0.001).

Tourniquet Pain:
Tourniquet VAS levels according to time which was observed between the groups has no statistically significant difference (p <0.0125).

Sedation Scores:
No statistically significant difference was found between sedation scores according to time and groups (p> 0.006).

Anesthesia Quality:
Per-op 20 minute anesthesia quality was found to be lower in Group I compared to Group II and Group III, and this difference was considered statistically significant (p <0.001). In Group I, the anesthesia quality at the per-op 5th minute was higher than the anesthesia quality at the 15th and 20th minutes, and this difference was statistically significant (p <0.002) (Table 3).

DISCUSSION

Because IVRA can be applied easily compared to other peripheral nerve blocks, it is reliable, it is possible to keep blood loss at a minimal level during surgery, its cost compared to general anesthesia, its low postoperative complications, its rapid recovery and its easy application to the upper extremity, It is a preferred method in surgery (1, 5). However, in the event of intraoperative leaks and early opening of the tourniquet, monitoring the systemic toxic effects of local anesthetics, tourniquet pain, failure to provide the post-operative analgesia requirement may be among the reasons that limit the use of this technique (5).

In recent years, alpha-2 agonists (clonidine, dexmedetomidine), opioids (morphine, meperidine, fentanyl, sufentanil, tramadol), muscle relaxants, NSAIDs are (ketorolac, tenoxicam), dexamethasone, magnesium sulphate, neostigmine, nitroglycerin were used to increase the quality of anethsia (8-11).

Acute inflammation caused by tissue damage plays an important role in the onset of surgical pain and could theoretically be useful in the management of acute surgical pain as a result of the potent anti-inflammatory effect of dexamethasone (12). NSAID-induced analgesia is due to peripheral suppression of the cyclooxygenase enzyme, possibly due to reduced activation of the arachidonic acid cascade with

additional mechanisms. The local accumulation of Pg E and I2 is the result of surgical trauma and directs the sensitivity of the nociceptors of the A and C fibers. Inhibition of prostaglandin synthesis at the injury center reduces sensitization and leads to a reduction in postoperative pain. Pg E is produced by cyclooxygenase and dexketoprofen provides inhibition of this enzyme (13). Dexketoprofen is an NSAID drug from the arylpropionic acid group, which is the racemic S (+) - enantiomer of ketoprofen. Dexketoprofen trometamol acts by inhibiting the sensitization of pain receptors triggered by locally released prostaglandins. On the other hand, it reduces the central sensitization effect by inhibiting Cyclooxygenase (COX) activity, thus blocking the transfer of painful stimuli to the upper nerve centers (14).

In our study, in the IVRA method applied for hand and wrist surgical interventions, anesthesia quality of 3 mg / kg 0.5% lidocaine and dexamethasone and dexketoprofen added to it, the formation and recovery times of sensory and motor block, tourniquet pain, the time of first analgesic administration and total analgesic consumption We compared the effects on the amount of postoperative analgesic consumption, intraoperative and postoperative sedation.

Hoffmann et al. (15) They added saline, bupivacaine, clonidine, sufentanil and tenoxicam to prilocaine in their IVRA study conducted on 75 patients. They found that the time to onset of sensory block in the group containing sufentanil was statistically significantly shorter than in the saline group. There was no statistically significant difference between the sensory block rotation times of the groups. In their study conducted on 56 volunteers, Kleinschmidt et al. (10). 56 found no difference in the time of onset of sensory block and reversal between the groups when they gave prilocaine to the first group, prilocaine and clonidine to the second group, and prilocaine to the third group while using the prilocaine tourniquet on IVRA.

A study of Memiş et al. (16) found that the onset time of the sensory block was significantly less in the group with dexmedetomidine in the study performed by adding dexmedetomidine to lidocaine. A study of Armstrong et al. (17) added fentanyl to prilocaine in their study by adding sodium bicarbonate to prilocaine and found no significant difference in the time of occurrence and recovery of sensory blockade (17).

In the IVRA study conducted by Bigat et al. (9), on 75 patients, 3 mg / kg lidocaine in the first group, 3 mg / kg lidocaine and 8 mg dexamethasone in the second group, and 3 mg / kg lidocaine and systemic 8 mg dexamethasone gave intravenously. The recovery time of the sensory block after tourniquet was removed was longer in the dexamethasone group than the others. A study of Jankovic et al.(13) added ketorolac along with ketorolac and dexamethasone to lidocaine in their study of 45 patients and found the groups to be similar in terms of sensory block onset time and sensory block recovery time after the tourniquet was released. In our study, the onset of sensory block was an average of 3 (2-4) minutes in Group I, 3 (2-5) minutes in Group II and 2.5 (2-5) minutes in Group III. The sensory block recovery time was 9 (6-11) minutes in Group I, 10 (7-11) minutes in Group II, and 9 (6-11) minutes in Group III. In our study, no difference was observed between the groups in terms of the onset of sensory block and its return.

In studies investigating the effects of adjuvant agents in IVRA, it was found that the addition of magnesium sulfate, nitroglycerine, cisatracurium or tramadol to lidocaine shortened the onset of motor block and significantly prolonged the motor block recovery time (9, 11, 18¬20).

In the study in which dexamethasone and ketorolac added to lidocaine, no difference was found

between the onset and end times of motor block (13). In the study in which they mixed dexamethasone with IVRA solution or applied systemically, the motor block onset time was found to be similar between the groups, while the motor block return time was found to be significantly higher in the group with dexamethasone (12). In our study, the motor block onset time was 7 (5-8) minutes in Group I, 7 (5-10) minutes in Group II, and 6 (5-8) minutes in Group III. Block onset time in group III was statistically significantly shorter than the other two groups. We think that the shorter duration in group III may be related to dexketoprofen. We could not find an IVRA study conducted with dexketoprofen in the literatüre. However, A study of Şen et al. (21), in which they added another NSAID, lornoxicam, to lidocaine, the motor block onset time was found to be shorter and the return time to be longer.

One of the disadvantages of IVRA application is tourniquet pain that can occur 30-60 minutes after the toumiquet is inflated. A study of Esmaoğlu et al. (19) found that VAS values at 0, 15, 30 and 60 minutes were significantly lower in the group to which dexmedetomidine was added to lidocaine. The study of Şen et al. (21) study was found that the pain of tourniquet was decreased in the study by adding lornoxicam to lidocaine.

The study of Bigat et al. (12) study was found that tourniquet pain control was better in the group in which dexamethasone was added to lidocaine. The study of Jankovic et al. (13) study in which dexamethasone and ketorolac were added to lidocaine, the results were similar. In our study, in which we planned to administer 1 pg / kg fentanyl to patients with tourniquet pain in the intraoperative period, fentanyl was administered only to one patient in Group III. Other than that, no patient required analgesic due to tourniquet pain. This may be because the operation times in our study were relatively short. Studies with long tourniquet durations can be planned to determine the intraoperative analgesic effect of dexamethasone and dexketoprofen more reliably.

A study of Reuben et al. (22) study in which ketorolac added to lidocaine, intraoperative VAS values were found to be significantly lower in the ketorolac group. The study of Jankovic et al. (13) study in which ketorolac and dexamethasone added to lidocaine, intraoperative VAS levels were found to be lower at all times. In our study, no statistically significant difference was found between the groups in terms of VAS levels in the intraoperative period. In the postoperative period, Group I VAS levels were higher than the other two groups at all times, and the difference was statistically significant. At all times, there was no difference between Group II and Group III in terms of VAS. (Table 3)

In our study, fentanyl requirement in the intraoperative period was 4 patients in Group I, 2 patients in Group II and 3 patients in Group III. There was no difference between the groups in terms of average fentanyl consumption.

As a result of these results, the quality of anesthesia and analgesia in the intraoperative period was evaluated as sufficient. The study of Bigat et al. (12) study has also been shown in the studies that dexamethasone was added to provide better postoperative analgesia. The study of Jankovic et al. (13) study was found that better postoperative analgesia was provided with tenoxicam and dexamethasone. In our study, we think that the low VAS values in Group II and Group III in the postoperative period are caused by dexamethasone and dexketoprofen added to lidocaine.

Although IVRA is an easy-to-apply, reliable and low-cost anesthesia technique, one of its major disadvantages is the rapid disappearance of analgesia following the tourniquet opening and the need for postoperative analgesic use. The effects of adjuvant drugs used in the studies on analgesia were also investigated. The study of Reuben et al. (22) study of IVRA, it was seen that the use of ketorolac both

facilitated the control of tourniquet pain and decreased postoperative pain.

The study of Şen et al. (23) study by adding nitroglycerine to lidocaine, the first analgesic requirement was found to be 225 ± 74 minutes, and it was found that analgesic activity continued longer than the control group. In addition, in this study, it was found that the pain score was lower for the first 4 hours postoperatively compared to the control group.

A study of Turan et al. (11) study of lidokaine magnesium sulfate, The study of Şen et al. (21) study of lornoxicam, The study of Esmaoğlu et al. (20) study was shown that the first analgesic requirement time was long and postoperative VAS values were signifıcantly lower in the first hour in the groups in which the adjuvant agent was added.

Likewise, The study of Bigat et al.(12) of lidocaine dexamethasone, A study of Öztürk et al. (24) of lidocaine tenoxicam, A study of Tuncer et al. (25) was found that the duration of postoperative analgesia was prolonged and the pain intensity was less in the studies of prilocaine with meperidine.

A study of Memiş et al (16) in IVRA, where dexmedetomidine was added to 3 mg / kg lidocaine, the first analgesia requirement time was longer than the control group and VAS values were lower in the first hour after the tourniquet was opened.

The study of Esmaoğlu et al. (19) performed by adding dexmedetomidine to lidocaine, it was found that the quality of anesthesia increased and the analgesic requirement decreased.

In the study of Turan et al. (8), while the first analgesic requirement time was found longer in the neostigmine group compared to the control group, no statistical difference was found in terms of VAS values.

In the study of McCartney et al., (26) No significant difference was found between the neostigmine group and the control group in terms of the time of first analgesic requirement and VAS values.

In our study, the postoperative analgesic requirement was 19 (100%) in Group I, 16 (84%) in Group II and 9 (50%) in Group III. The difference between Group I and Group II was not statistically significant, but the difference of Group III with other groups was found to be statistically significant. The first analgesic intake was 240 ± 60.8 minutes in Group I, 378 ± 125.3 minutes in Group II and 486 ± 147.6 minutes in Group III. Total analgesic consumption was also found to be 1.7 ± 0.41 g in Group I, 0.7 ± 0.48 g in Group II and 0.3 ± 0.39 g in Group III. In our study, no side effects related to the drugs used were observed in any patient.

In conclusion, adding dexamethasone and dexketoprofen to lidocaine prolongs the time of first analgesic intake and decreases the total amount of analgesic use in the postoperative period. However, further studies may be needed to investigate the local action mechanism of dexketoprofen.

CONCLUSION

In our study, we observed that 8 mg dexamethasone and 50 mg dexketoprofen added to lidocaine in IVRA prolonged the postoperative first analgesic intake time and analgesia time without any side effects and reduced the total analgesic consumption amount. In conclusion, by adding dexamethasone and dexketoprofen to lidocaine, better quality anesthesia, postoperative analgesia can be provided and postoperative analgesic consumption can be reduced.

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Table 1. Demographic variables

Variables	**Group I (n=19)**	**Group II (n=19)**	**Group II (n=18)**	***p***
Age (years)	49,9 ± 14,0	49,0 ± 8,5	45,7 ± 12,5	0,526
Gender				0,948
Man (n)	8 (%42,1)	9 (%47,4)	8 (%44,4)	
Woman (n)	11 (%57,9)	10 (%52,6)	10 (%55,6)	
Weight (kg)	71,7 **± 13,9**	75,5 **± 13,4**	71,5 **± 15,6**	0,623
ASA				0,613
ASA I (n)	8 (%42,1)	9 (%47,4)	10 (%55,6)	
ASA II (n)	10 (%52,6)	10 (%52,6)	8 (%44,4)	
ASA III (n)	1 (%5,3)	0 (%0)	0 (%0)	

Table 2 Distribution of sensory and motor block ınitiation and end times by groups

Variables	**Group I (n=19)**	**Group II (n=19)**	**Group II (n=18)**	***p***
SB Initiation Time (min.)	3 (2-4)	3 (2-5)	2,5 (2-5	0,400
SB Initiation Time (min.)	9 (6-11)	10 (7-11)	9 (6-11)	0,385
MB End Time (min.)	7 (5-8)[a]	7 (5-10)[b]	6 (5-8)[a,b]	0,002
MB End Time (min.)	10 (7-13)	10 (9-13)	10 (7-13)	0,424

SB: Sensorial Block, MB: Motor Block

a The difference between Group I and Group III is statistically significant (p=0.006)
b The difference between Group II and Group III is statistically significant (p<0.006)

Table 3. Anesthesia quality scores by time and groups

Follow up Time	Group I	Group Iı	Group III	p^a
Per-op 5 min.	4,0	4,0	3,9	0,348
Per-op 10 min.	3,9	3,8	3,8	0,847
Per-op 15 min.	3,4	3,8	3,8	0,014
Per-op 20 min.	3,3	3,8	3,8	<0,001

a Results for p <0.0125 were considered statistically significant according to the Bonferroni Correction.

b The difference between Per-op 5 min and Per-op 15 min is statistically significant (p <0.002).

c Per-op 5.dk ile Per-op 20.dk arasındaki fark istatistiksel olarak anlamlı (p<0,001).

d Grup I ile Grup II arasındaki fark istatistiksel olarak anlamlı (p<0,001).

e Grup I ile Grup III arasındaki fark istatistiksel olarak anlamlı (p<0,001).

DÜSTAD
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Sağlıklı Genç Gönüllülerde Dış Kulak Morfometrisinin Foto Analizi ile Boy, Cinsiyet ve Vücut Kitle indeksi Arasındaki Korelasyonun İncelenmesi

Gülay AÇAR[1]

Özet: İnsanlarda yüzün belirleyici özellikleri arasında yer alan dış kulak ve yapısı yaş ve cinsiyet tayininde kullanılabilir. Bu çalışmanın amacı, gelecekteki çalışmalara yön verecek standart değerleri elde etmek, bu ölçümlerin cinsiyet ve boy tahminindeki önemini tespit etmek ve sağlıklı genç erişkinlerde dış kulak morfolojisindeki farklılıkların vücut kitle indeksi (VKİ) üzerine nasıl bir etkisinin olduğunu araştırmaktır. Bu çalışmaya 22-25 yaş arası Meram Tıp Fakültesi öğrencisi olan 110 erkek, 136 kadın dahil edildi. Dijital fotoğraf analizi (Image J yazılımı) yöntemi kullanılarak 246 üniversite öğrencisinin çekilen fotoğrafları üzerinde dış kulak morfometrisine yönelik lineer ölçümler yapıldı. Onam formunu dolduran tüm katılımcıların vücut boy, kilo ve VKİ ölçüldü. Elde edilen verilerin yaş, cinsiyet ve lateralizasyona göre istatistiki analizi yapıldı. Ayrıca, ölçüm parametreleri ve VKİ arasındaki korelasyon tespit edildi. Dış kulak morfometrik ölçümleri, kulak memesi uzunluğu ve genişliği dışında, erkeklerde kadınlardan daha büyük ve istatistiksel olarak anlamlı bulundu ($p < 0,05$). Sol ve sağ kulak tüm ölçümleri, kulak memesi uzunluğu ve kulak kepçesi genişliği hariç her iki cinsiyet arasında istatistiksel olarak anlamlı farklılık gösterdi ($p < 0,05$). Kulak uzunluğu ve kulak kepçesinin en yüksek noktasından intertrajik çentiğin altına kadar olan mesafe (Sa-Inint mesafesi) sol tarafta daha yüksek değerlere sahipken, diğer ölçüm değerleri sağ tarafta daha büyüktü. Öğrencilerin Sa-Inint mesafesi, kulak memesi uzunluğu ve genişliği değerleri ile boy uzunluğu arasında kuvvetli pozitif korelasyon ($r = 0.269$, $p=0.000$; $r = 0.298$, $p=0.000$; $r = 0.172$, $p=0.007$) gözlenirken VKİ değerleri ile anlamlı pozitif korelasyon göstermediği tespit edildi. Lineer regresyon analizinde de kulak uzunluğu, genişliği ve Sa-Inint mesafesi değerlerinin boy tahmininde kullanılabileceği, fakat VKİ tahmininde kullanılmasının anlamsız olduğu görülmüştür. Bu çalışmada dış kulak morfometrisinin boy ve cinsiyet tahmininde ek bir araç olarak kullanılabileceği görülmüştür. Elde edilen morfometrik veriler adli antropoloji alanında ve plastik-rekonstrüktif cerrahide tedaviye yönelik yaklaşımların belirlenmesinde yardımcı olabilir.

Anahtar Kelimeler: Boy tahmini, Dış kulak morfomctrisi, Dijital fotoğraf analizi, Korelasyon, Vücut kitle indeksi.

Digitalized Analysis of the External Ear Morphometry and Correlation With Stature, Gender and Body Mass Index in Young Adults

Abstract: External ears in humans are the defining feature of the face and its structure shows the signs of age and sex. The aim of this study was to provide normative values which guide future studies, to estimate sex and stature by using these measurements and to investigate how the differences in external ear morphology have an effect on body mass index (BMI) in healthy young adults. This study was carried out in 110 healthy male and 136 healthy female medical students of age group 22-25 of Meram Faculty of Medicine. Informed consent of the students was obtained. The linear distances with reference to ear morphometry of 246 university students were measured using a photographic technic from the Image J program. Body height, weight and mass index of all subjects were measured. Changes in these parameters with age, gender and laterality were analyzed. The correlations between these measurements and BMI were analyzed. All measurements of the auricles were larger in males than the corresponding ones in females and all the differences except earlobe length and width were statistically significant ($p<0,05$). All measurements of the left and right auricles were statistically significantly different in both sexes except earlobe length and auricle width ($p<0,05$). Auricle length and the distance from the highest point of the auricle to the bottom of the intertragic notch (Sa-Inint distance) had higher values at the left side, whereas other measurement values were larger at the right side. The values of Sa-Inint distance, ear length and width showed positive correlation significantly with the height of students ($r= 0.269$, $p=0.000$; $r= 0.298$, $p=0.000$; $r= 0.172$, $p=0.007$), whereas BMI did not show positive correlation significantly with them. According to the results of the linear regression analysis, it was seen that the values of ear length, width and Sa-Inint distance could be used in height estimation, but it was meaningless to use it in BMI estimation. This study revealed that ear morphometry can be used as an

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additional tool in the estimation of height and sex from linear ear dimensions. The obtained morphometric data can be helpful in determining the treatment approaches in plastic-reconstructive surgery and forensic anthropology.

Key Words: Estimation of stature, External ear morphometry, D igitalized photographic analysis, Correlation, Body mass index

GİRİŞ

Kraniofasiyal antropometri; insanda baş ve yüzü oluşturan yapıların şekil ve duruş özelliklerinin incelenmesi ve boyutlarına ilişkin standart değerlerin elde edilmesini kapsamaktadır. Literatür incelendiğinde, yüzdeki oluşumların gerek boyut gerekse şekil açısından, etnik köken, yaş ve cinsiyete göre farklılık gösterdiği görülmektedir. Özellikle adli antropolojide kimlik tespiti yapılırken yüzdeki biyometrik özelliklerden yararlanılır. Kalıtımsal olarak belirlenen ve sabit bir renk dağılımına sahip olan kulak kepçesi (auricula)'nın şekli ve görünümü yüz ifadeleri ile değişmediğinden kraniyofasiyal antropometride sıklıkla kullanılan bir parametredir. Auricula biyometrisi, kulağın şekil ve boyutlarının diğer kişisel anatomik özellikler ile karşılaştırılması yöntemidir (Farkas, 2007; Nabiyev, 2009; Sforza, 2009).

Auricula üzerinde helix, antihelix, tragus, antitragus, auricular lobule, incisura intertragica gibi 50'nin üzerinde anatomik landmark mevcuttur. Kulak ölçümlerinde direkt ya da indirekt antropomclrik ölçüm metotları kullanılmaktadır. Direkt antropometrik metotta basit antropometrik ölçüm aletleri (kumpas, mezura gibi) kullanılırken, indirekt antropometrik ölçümlerde; radyolojik görüntüler, üç boyutlu lazer tarama ve fotoğraflar kullanılır. Belirli mesafeler, eğimler ve açılar dikkate alınarak çekilen kulak fotoğraflarında auricula üzerinde yer alan belirli referans noktalan arasında çeşitli ölçümler yapılır. Fotoğrafların aynı boyutlarda, aynı pozisyon ve açıdan çekilmiş olması gereklidir (Abaza, 2013; Arıncı, 2006; Nabiyev, 2009; Siddapur, 2017).

Puberteye kadar yetişkindeki boyutuna ulaşan auricula'mn boyutları yaşlandıkça artış göstermesine rağmen bu ölçüm değerleri arasındaki oran değişmez. Yapılan araştırmalarda erkeklerde auricula'mn morfometrik ölçümleri kadınlardan daha uzun ve daha geniş bulunmuştur. Auricula morfometrisi biyometrik araştırmalarda, adli tıp çalışmalannda yer alan yaş, cinsiyet ve kimlik tespitinde, genetik danışmanlığı alanında morfolojik bozukluk ile karakterize sendromların tanısında ve plastik-rekonstrüktif cerrahide tedaviye yönelik yaklaşımların belirlenmesinde kullanılan önemli parametrelerden biridir (Alexander, 2011; Dinkar, 2012; Nabiyev, 2009).

Son yıllarda literatürde yer alan çalışmalarda auricula morfometrisi ile boy uzunluğu arasında pozitif bir korelasyon olduğu ve boy tahmini için yapılan lineer denklem modelinde auricula boyutlarının kullanılabileceği bildirilmiştir. Çalışmamızda literatürde yer alan çalışmalar baz alınarak sağlıklı gönüllülerin çekilen fotoğrafları üzerinde auricula'nın morfometrik boyutlarının dijital analiz yöntemiyle ölçülmesi ve elde edilen verilerin kişiye özel boy, cinsiyet ve vücut kütle indeksi (VKİ) değerleri ile olan korelasyonunun incelenmesi amaçlandı.

Araştırmanın Yöntemi

Katılımcılar

Çalışma, yaşlan 22-25 arasında değişen toplam 246 sağlıklı gönüllü (110 erkek, 136 kadın) üzerinde yapıldı. Araştırma için Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan onay alındı (Karar No: 2020/2826). Çalışmaya herhangi bir kulak anomalisi olmayan, kulak kepçesinde travma veya cerrahi operasyon geçirmemiş Tıp Fakültesi 5 ve 6. sımf öğrencileri dahil edilmiştir. Gönüllülere çalışmanın amacından bahsedildi ve ölçümler hakkında bilgi verilerek bilgilendirilmiş onam formu imzalatıldı.

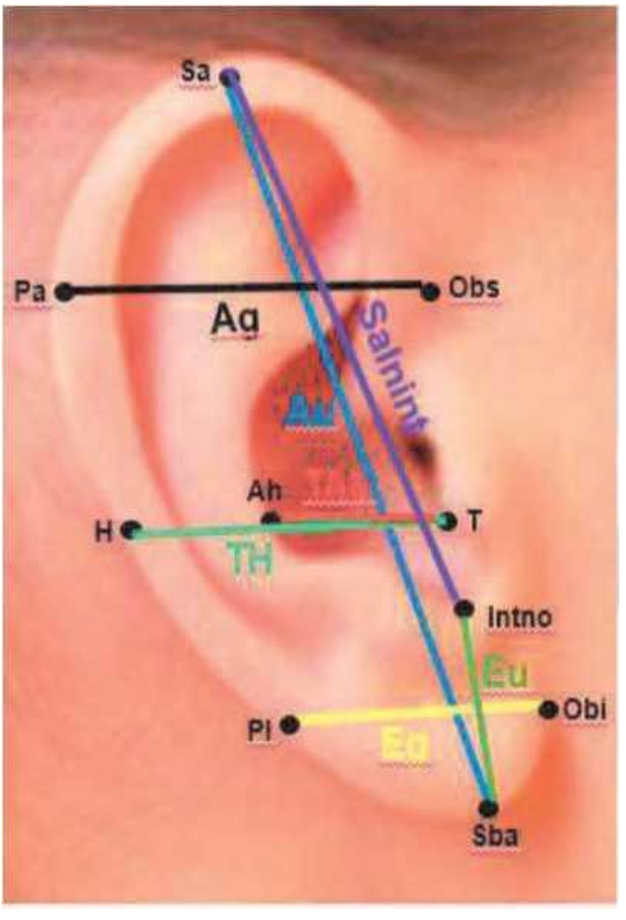
Verilerin Toplanması

Gönüllülerin kilo ve boy ölçümlerinin alınabilmesi için 1 adet boy ölçerli dijital baskül kullanıldı ve elde edilen değerlerden VKİ [VKİ=Vücut ağırlığı (kg)/Boy uzunluğunun karesi (m^2)] hesaplandı. VKİ değerlerine göre gönüllüler 5 gruba ayrıldı: VKİİ; <20 olanlar zayıf grup, VKİ2; 20,01-25 arası, normal grup, VKİ3; 25,01-30 arası, fazla kilolu grup, VKİ4; 30,01-35 arası, obez grup, VKİ5; >35 olanlar ise morbid obez grup olarak kaydedildi. Laboratuvarda gönüllülerin sağ ve sol kulak fotoğrafları 1 adet fotoğraf makinesi (Nikon D5100) kullanılarak 1 metre mesafeden çekildi. Çekilen kulak fotoğraflarında kulak kepçesi üzerinde işaretlenmiş referans noktaları (literatürde belirtilen noktalar) arasında ImageJ 1.50i programı kullanılarak morfometrik ölçümler yapıldı.

Ölçümlerde kullanılan antropometrik noktalar; Otobasion superius (Kulağın yanağa yapıştığı yerin üst noktası: Obs), Otobasion inferius (Kulağın yanağa yapıştığı yerin alt noktası: Obi), Superaurale (Kulağın en üst noktası: Sa), Subaurale (Kulağın en alt noktası: Sba), Postaurale (Kulağın en arka noktası: Pa), Tragus (T), Incisura intertragica (Tragus vantitragus arasındaki çentiğin en alt noktası: Inint), Heliks (H), Antiheliks (Ah), Postearlobe (Kulak memesinin en arka noktası:Pl) olarak belirlendi. Bu referans noktalan arasında; kulak uzunluğu (Sa-Sba). kulak genişliği (Pa-Obs), kulak memesi uzunluğu (Eu=Inint- Sba), kulak memesi genişliği (Eg=Pl- Obi), Tragus ile IIelix arası mesafe (T-H), Tragus ile Antihelix arası mesafe (T-Ah), Superaurale ile Incisura intertragica arası mesafe (Sa- Inint) (Şekil 1).

Veri Analizi

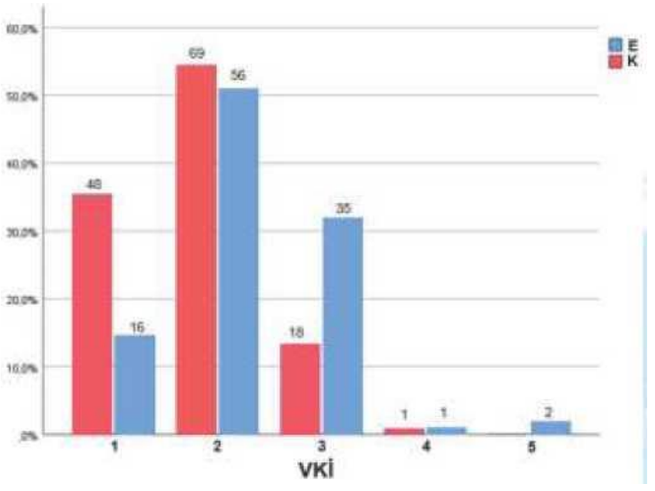
İstatistik! analizlerde SPSS 25.00 (Statistical Package for Social Sciences) programı kullanıldı. Lineer ölçümlerin her bir grup için ortalama ve standart sapma değerleri ayrı ayrı hesaplandı. VKİ gruplan arasındaki farklılık için ANOVA testi uygulandı. Sağ sol kulak ölçümleri arasındaki farklılıktan tespit etmek için Paired T testi, cinsiyetler arasındaki istatistiki analiz için Unpaired T test kullanıldı. Kulak ölçüm değerleri ile boy ve VKİ arasındaki ilişkiyi incelemek için Pearson korelasyon ve lineer regresyon analizi yapıldı. p<0,05 istatistiki olarak anlamlı kabul edildi



Şekil 1. Kulak kepçesi üzerinde işaretlenmiş referans noktaları ve yapılan lineer morfometrik ölçümler

BULGULAR

VKİ değerlerine göre 5 gruba ayrılan gönüllülerin cinsiyete göre dağılımında 4 ve 5. grup istatistiki analize dahil edilmedi (Grafik 1).



Grafik 1. Vücut kitle indeksi gruplarının cinsiyete göre dağılımı

Normal dağılım gösteren kulak boyutları ile ilgili ortalama antropometrik ölçüm değerleri, kulak memesi uzunluğu ve genişliği dışında, erkek gönüllülerde kadınlara göre istatistiksel olarak anlamlı derecede yüksek bulundu (p<0,001) (Tablo 1).

Tablo 1. Morfometrik ölçüm değerlerinin cinsiyete göre dağılımı

Morfometrik ölçümler	**Kız**	**Erkek**	**Total**
	MeantSD	**MeantSD**	**MeantSD**
Boy (m)	1,65 ±0,06**	1,78 ±0,0$*	1,71 ±0,06
Kilo (kg)	58,35 ±9,28**	75,16± 13,03*	65,87 ± 10,48
VKI (kg/m²)	21,46 ±3,13**	23,71 ±3,71*	22,46 ± 3,58
Au (cm)	6,12 ±0,77*	6,63± 0,89**	6,30 ± 0,86
Ag (cm)	3,33 ±0,43*	3,48± 0,49**	3,43 ± 0,47
TH (cm)	2,92 ± 0,4(J*	3,00= 0,44**	3,04 ±0,43
TAh (cm)	1,88 ±0,29**	2,02± 0,42**	2,01 ±0,37
Eu (cm)	1,41 ±0,27*	1,48 ±0,30*	1,44 ±0,28
Eg (cm)	1,59 ±0,43	1,57 ±0,41	1,58± 0,42
SaInint (cm)	4,74 ±0,62**	5,16 ±0,93*	4,91±0,80

**, p<0,001 - *, p<0,05

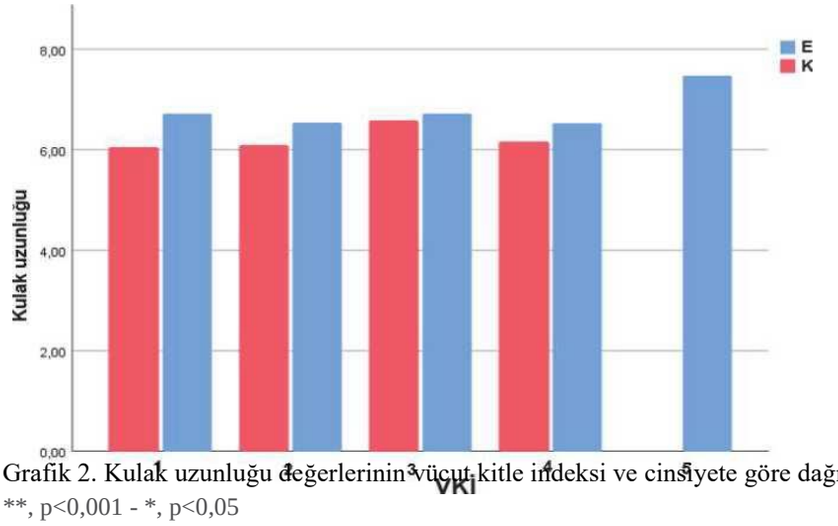
Sa- Inint mesafesi ve kulak uzunluğu sol tarafta; kulak ve kulak memesi genişlikleri, T- H ile T-Ah mesafeleri sağ tarafta diğer tarafa göre istatistiksel olarak anlamlı derecede yüksek bulundu (p<0,001) (Tablo 2).

Tablo 2. Morfometrik ölçüm değerlerinin lateralizasyona göre dağılımı

Morfometrik ölçümler	Sağ Mean ± SD	Sol Mean ± SD	Total Mean ± SD
Au (cm)	6,24 ± 0,85**	6,34 ± 0,86**	6,30 ± 0,86
Ag (cm)	3,45 ± 0,47 **	3,3 ± 0,46**	3,40 ± 0,47
TH (cm)	3,10 ± 0,43**	2,9 ± 0,42**	3,00 ± 0,43
TAh (cm)	2,07 ± 0,36**	1,94 ± 0,35**	2,01 ± 0,36
Eu (cm)	1,44 ± 0,28	1,44 ± 0,28	1,40 ± 0,28
Eg (cm)	1,78 ± 0,43**	1,58 ± 0,41**	1,6 ± 0,42
SaInint (cm)	4,89 ± 0,79*	4,92 ± 0,80*	4,9 ± 0,80

**P<0,001- *p<0,05

Grafik 2'de görüldüğü gibi kulak uzunluğu değerlerinin vücut kitle indeksi ve cinsiyete göre dağılımı istatistiki açıdan anlamlı bulunmadı.



Grafik 2. Kulak uzunluğu değerlerinin vücut kitle indeksi ve cinsiyete göre dağılımı
**, p<0,001 - *, p<0,05

Pearson korelasyon analizinde kulak uzunluğu ve Sa- Inint mesafesi değerleri ile boy değerleri arasında kuvvetli pozitif korelasyon bulundu. Kulak genişliği, T -H ve T-Ah mesafe değerleri ile boy değerleri arasında orta derecede pozitif korelasyon tespit edildi (Tablo 3).

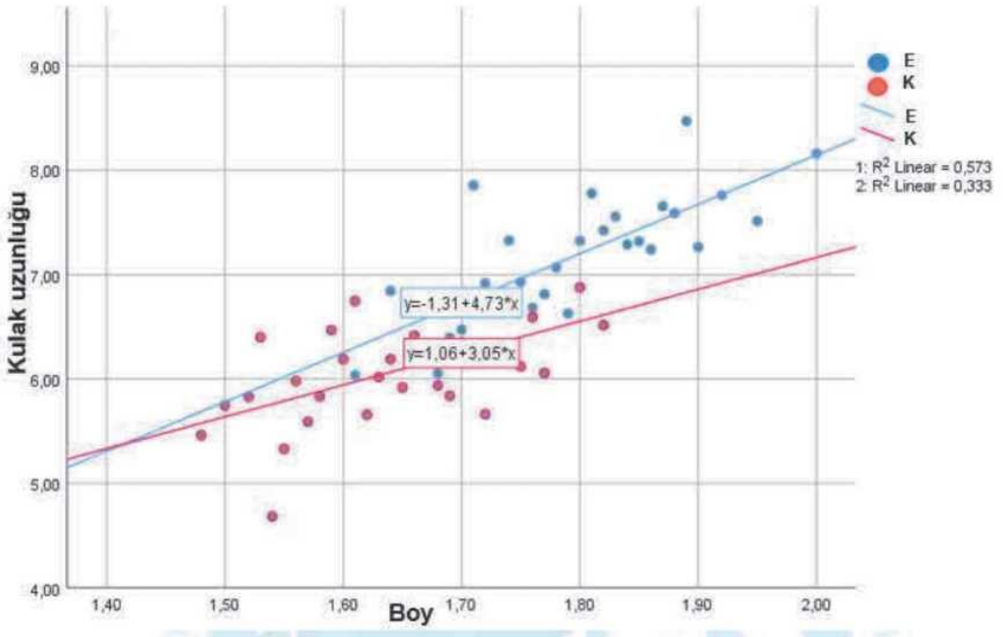
Tablo 3. Kulağın morfometrik ölçüm değerleri ile boy, kilo ve VKİ arasındaki korelasyon

		Boy	Kilo	VKİ	Au	Ag	TH	TAh	Eu	Eg	SaInint
Boy (m)	r	1									
	p										
Kilo (kg)	r	,662**	1								
	p	,000									
VKİ (kg/m2)	r	,204*	,864**	1							
	p	,001	,000								
Au (cm)	r	,298*	,141*	,117	1						
	p	,000	,025	,091							
Ag (cm)	r	,172*	,13f	,103	,771**	1					
	p	,007	,031	,101	,000						
TH (cm)	r	,126*	,107	,058	,705**	,803**	1				
	p	,048	,094	,368	,000	,000					

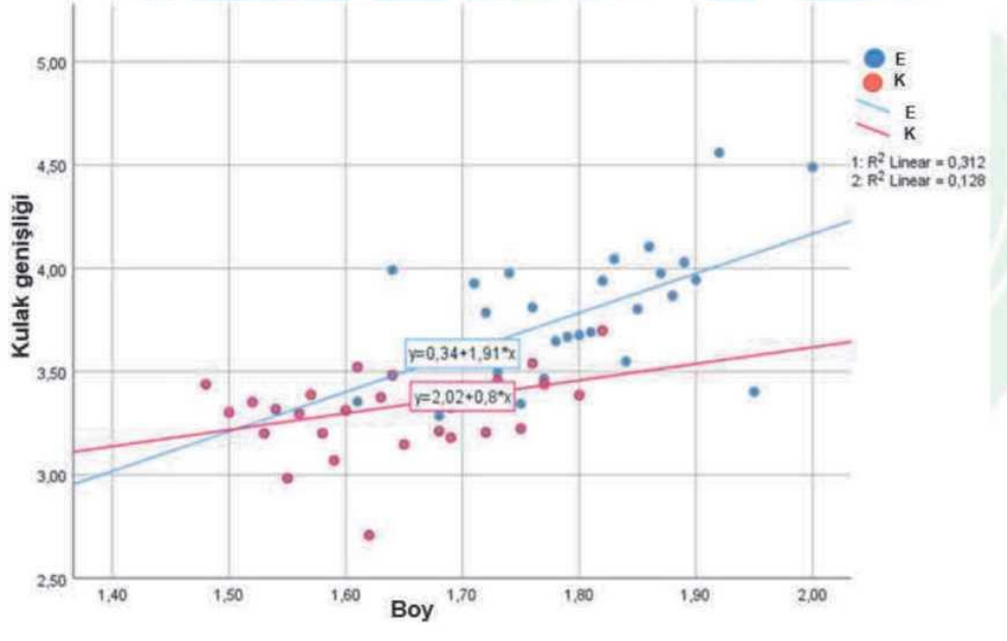
TAh (cm)	r	,144*	,101	,033	,610**	,701**	,837**				
	p	,024	,116	,606	,000	,000	,000	1			
Eu (cm)	r	,105	,264**	,174**	,603**	,422**	,405**	,336**			
	p	,101	,000	,006	,000	,000	,000	,000	1		
Eg (cm)	r	,004	,065	,076	,407**	,444**	,495**	,422**	,598**		
	p	,952	,309	,237	,000	,000	,000	,000	,000	1	
SaInint (cm)	r	,269**	,108	,118	,767**	,686**	,647**	,759**	,376**	,35^*	
	p	,000	,093	,066	,000	,000	,000	,000	,000	,000	1

**, p<0,001 - *, p<0,05

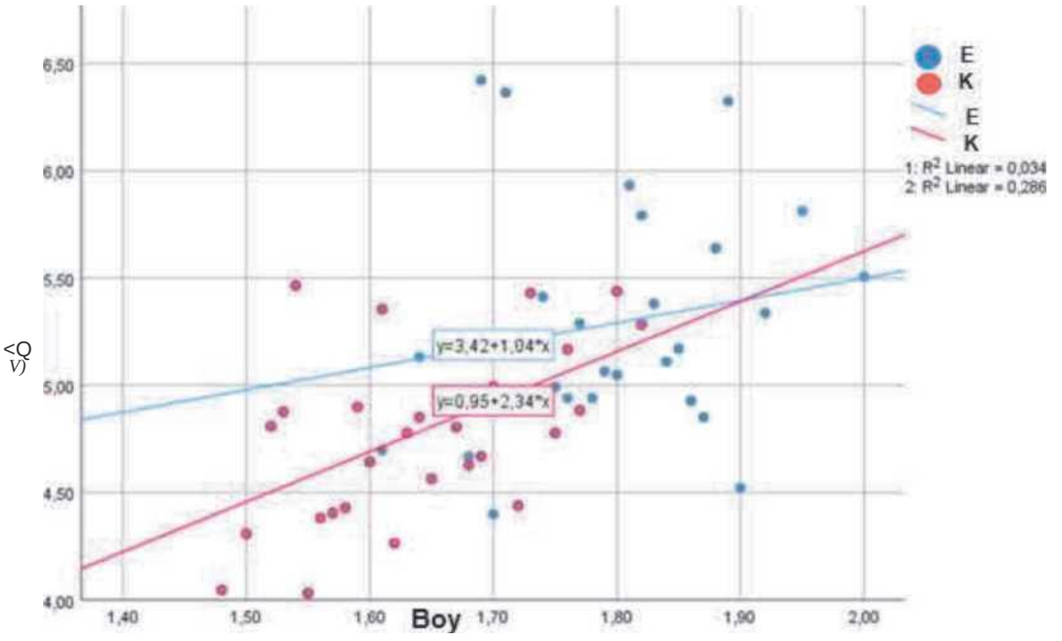
Boy uzunluğu değerleri kullanılarak yapılan lineer regresyon analizi Grafik 3, 4 ve 5'te gösterilmiştir. Buna göre elde edilen modelde boy ile kulak uzunluğu, genişliği ve Sa- Inint mesafesi arasında en yüksek r korelasyon katsayısı değerleri elde edildi. Özellikle erkeklerde kulak uzunluğu ve genişliği değerlerinde boy ile birlikte artış (anlamlı pozitif korelasyon) görülürken, Sa- Inint mesafesi değerinde özellikle kızlarda boy ile birlikte artış görüldü (Grafik 3, 4 ve 5).



Grafik 3. Boy ile kulak uzunluğu değerleri arasındaki korelasyon analizi

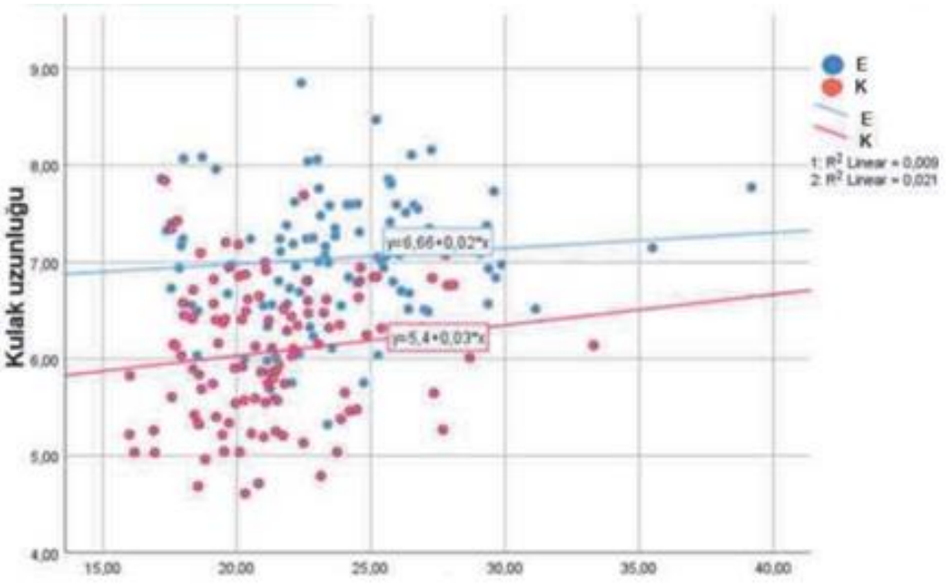


Grafik 4. Boy ile kulak genişliği değerleri arasındaki korelasyon analizi



Grafik 5. Boy ile Salnint (superaurale ve incisura intertragica arasındaki mesafe) değerleri arasındaki korelasyon analizi

VKİ değerleri kullanılarak yapılan regresyon analizi Grafik 6'de gösterilmiştir. Buna göre elde edilen modelde ise boy ile kulak uzunluğu, genişliği ve Sa- Inint mesafesi arasında çok düşük r korelasyon katsayısı değerleri elde edildi. Yani kulak uzunluğu, genişliği ve Sa- Inint mesafesi değerlerinin hem erkek hem de kızlarda VKİ ile anlamlı bir ilişkisi tespit edilmemiştir.



Grafik 6. Vücut kitle indeksi ile kulak uzunluğu değerleri arasındaki korelasyon analizi

Lineer regresyon analizi sonuçlarına göre kulak uzunluğu, genişliği ve Sa- Inint mesafesi değerlerinin boy uzunluğu tahmininde kullanılabileceği, fakat VKİ tahmininde kullanılmasının anlamsız olduğu görülmüştür.

TARTIŞMA

Dış kulağın anatomik yapısı, normal sınırları ve bunlarla ilgili standart ölçüler birçok çalışmada ele alınmış ve birbirleriyle olan ilişkileri incelenmiştir. Özellikle adli tıp alanındaki çalışmalarda profil bilgileriyle (antropometrik kanonlar yardımıyla kulak bölgesinin ortaya çıkarılması) güçlendirilmiş kulak biyometrisine göre kimlik tespiti üzerinde durulmaktadır. Kulak boyutlarına ilişkin verilerin

burun, dudak, alın gibi diğer antropometrik yüz bileşenlerinden elde edilen değerler ile birlikte kullanılması yaş, cinsiyet ve kimlik tespiti işlemlerini hızlandırmakta ve başarı şansını da arttırmaktadır. Kulak antropometrisine ilişkin veriler adli tıp, kraniyofasiyal cerrahi, otorinolaringoloji ve genetik danışmanlığı alanlarında oldukça önemli bir yer tutmaktadır (Nabiyev, 2009; Sağır, 2018; Tathsumak, 2015). Son yıllarda yapılan az sayıdaki çalışmada, kulak boyutları ile bireyin yaşı, cinsiyeti ve boy uzunluğu arasında nasıl bir korelasyon olduğu incelenmiştir. Bizim çalışmamızda ek olarak kilo ve VKİ dahil edilmiş ve kulak biyometrisine ilişkin elde ettiğimiz verilerin cinsiyet, boy ve VKİ ile nasıl bir korelasyon gösterdiği araştırılmıştır. Çalışmamızda elde ettiğimiz verilerin literatürde yapılan ve aynı yaş grubunu içeren çalışma sonuçlan ile uyumlu olduğu görülmüştür (Abdelaleem, 2016; Asadujjaman, 2019; Tathsumak, 2015; Taura, 2016).

Sağır ve arkadaşlan hem direkt ölçüm hem de yüz fotoğraflan üzerinde belirledikleri referans noktaları arasında indirekt ölçüm yöntemiyle 20 antropometrik (lineer ve açısal) mesafe içeren bir geometrik morfometri çalışması yürütmüşlerdir. Çalışmada 20 yaş üzeri 100 kadın ve 100 erkek olmak üzere toplam 200 genç erişkin bireyin ön, sağ ve sol profilden fotoğrafları çekilmiştir. Yüz üzerinde belirlenen 23 anatomik nokta arasında yapılan morfometrik analizlerde burun yüksekliği, üst yüz yüksekliği, morfolojik yüz yüksekliği, kulak yüksekliği ve genişliği ölçülerinde güvenilir sonuçlar elde etmişlerdir (Sağır, 2018).

Çalışmamızda elde edilen kulak morfometrik ölçüm sonuçları, Tathsumak ve arkadaşlanın verileriyle tamamen uyumludur. Kulak ölçüm verilerinin dominant el (sağlak ya da solak) ile olan korelasyonunun incelendiği bu çalışmada istatistiki olarak anlamlı bir sonuç bulunmadığı rapor edilmiştir (Tatlısumak, 2015).

Çalışmamıza katılan erkeklerde, kulak memesi uzunluğu ve genişliği dışındaki diğer veriler, kızlardan anlamlı derecede yüksek olarak bulunmuştur. Ayrıca, tüm kulak boyutu ölçüm değerleri literatürde Hindistanlı aynı yaş grubundaki bireyler üzerinde yapılan iki çalışmada elde edilen sonuçlara göre daha büyük bulunmuştur (Deepak, 2019; Natekar, 2020). Asadujjaman ve arkadaşları 313 (18-75 yaş arası 163 kadın, 150 erkek) gönüllü üzerinde kulak kepçesi morfometrisi ile yaş arasındaki ilişkiyi incelemiştir (Asadujjaman, 2019). Natekar ve arkadaşları 18-25 yaş arası 200 (100 kadın, 100 erkek) tıp fakültesi öğrencisinin fotoğraf görüntülerinde kulak kepçesi boyutlarım ölçerek cinsiyet tayini ile olan ilişkisini incelemişlerdir (Natekar, 2020). Bizim çalışmamızda elde ettiğimiz kulak morfometrik ölçüm verilerini diğer çalışma sonuçlan ile kıyasladığımızda; Kafkas ve Italyan bireylerin kulak ölçüm değerlerinin daha büyük olduğu, Hindistanlılarda daha küçük olduğu ve Bangladeş, Mısır ve Nijerya'da yapılmış çalışma sonuçlan ile benzerlik gösterdiği gözlenmiştir (Abdelaleem, 2018; Asadujjaman, 2019; Deepak, 2019; Laxman, 2019; Natekar, 2020; Ritz-Timme, 2011; Taura, 2016).

Abdelaleem ve arkadaşları 18-25 yaş arası 200 (120 erkek, 80 kadın) Mısırlı üniversite öğencisinin çekilmiş fotoğafları üzerinde kulak kepçesi morfometrisini analiz eden bir çalışma yapmışlardır. Elde edilen kulak uzunluğu ve genişliği ölçüm değerlerinin boy ile pozitif korelasyon gösterdiğini ve boy tahmininde (kızlarda 1=0,930, p<0,001; erkeklerde r=0,898, p<0,001) kullanılabileceğini rapor etmişlerdir (Abdelaleem, 2018). Taura ve arkadaşlan 219 Nijeryalı üniversite öğrencisi üzerinde dış kulak morfometrik parametrelerinin dijital analizini yaparak boy tahmini ile ilişkisini incelemişler ve ölçüm değerlerinin boy ile pozitif korelasyon gösterdiğini ve boy tahmininde (kızlarda r=0,082, p<0,001; erkeklerde r=0,086, p<0,001) kullanılabileceğini bildirmişlerdir (Taura, 2016). Laxman 300 (180 erkek, 120 kadın) Hindistanlı üniversite öğrencisi üzerinde yaptığı çalışmada ölçüm değerlerinin boy ile pozitif korelasyon gösterdiğini ve boy tahmininde (kızlarda r=0,728, p<0,001; erkeklerde r=0,815, p<0,001) kullanılabileceğini bildirmiştir (Laxman, 2019). Abdelaleem, Taura ve Laxman'mn çalışmalarına benzer olarak bizim çalışmamızda da elde edilen kulak morfometrik ölçüm verilerinin boy ile pozitif korelasyon gösterdiği ve boy tahmininde (kızlarda 1=0,333, p<0,001; erkeklerde r=0,573, p<0,001) kullanılabileceği görülmüştür. Ayrıca, çalışmamızda elde edilen ölçüm değerlerinin VKİ ile

olan korelasyonu incelenmiş ve bu verilerin VKİ tahmininde kullanılmasının istatistiki olarak anlamlı olmadığı analiz edilmiştir (kızlarda r=0,021, p<0,728; erkeklerde r=0,009, p<0,974). Literatürde kulak morfometrisi ile VKİ arasındaki korelasyonu inceleyen bir çalışma bulunamadığı için karşılaştırma yapılamamıştır.

SONUÇ ve ÖNERİLER

Çalışmamızda elde ettiğimiz kulak morfometrisine ait verilerimizin (kulak memesi uzunluğu ve genişliği hariç) erkeklerde kızlardan anlamlı derecede yüksek olduğu görülmektedir. Ayrıca, bu ölçüm değerlerinin sağ ve sol kulak arasında da farklılık gösterdiği tespit edilmiştir. Farklı uluslara ait verilerle karşılaştırma yapılması ölçümlerin ırklar arasında farklılıklar gösterebileceğini ve toplumumuza ait standart kulak boyutu verilerinin belirlenmesi gerektiğini göstermektedir. Lineer korelasyon analizi sonucu; kulak uzunluğu ve genişliği ölçüm değerlerinin boy uzunluğu ile birlikte artış göstermesine rağmen VKİ ile anlamlı bir korelasyon göstermediği gözlendi. Çalışmamızda elde ettiğimiz verilerin daha sonra yapılacak çalışmalara yön vereceğini ve veri tabanı oluşturacağım düşünmekteyiz. Ek olarak, bu ölçüm değerleri genetik danışmanlığı alanında morfolojik bozukluk ile karakterize sendromlann tanısında ve plastik-rekonstrüktif cerrahide tedaviye yönelik yaklaşımların belirlenmesinde yardımcı olabilir.

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DÜSTAD
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Muhtemel Medial Kompartman Osteoartrit Ön Tanısı ile Ortoröntgenografî Çekilen Hastalarda, Femur/Tibia Oranı ve Alt Ekstremite Mekanik Aks Deviasyonu Arasındaki İlişkinin İncelenmesi

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Özet: Literatürde kuru kemikler ve radyografik görüntüler üzerinde yapılan ölçümlerde alt ekstremite kemiklerinden femur (F) ve tibia (T) arasında bir oranın olduğu ve ırklar arasında farklılık gösterdiği ortaya konmuştur. Alt ekstremitelere ait deformite tespitinde; Alt ekstremite mekanik aksı ve mekanik aks deviasyonu (MAD) gibi ölçümler yapılmaktadır. Çalışmamızda F ve T uzunluk oranı ile MAD ölçülerek, elde edilen verilerin birbirleri arasındaki ilişki ile yaş ve cinsiyete göre değişiminin analiz edilmesi amaçlandı. Bu çalışmada Giresun Üniversitesi Prof. Dr. A. İlhan Özdemir Eğitim ve Araştırma Hastanesi Ortopedi ve Travmatoloji Polikliniğinde Medial Kompartman Osteoartrit ön tanısı ile ortoröntgenografî çekilen 40 ile 79 yaş arasında, 92 kadın ve 43 erkek hastaya ait görüntüler retrospektif olarak incelendi. Pacs dijital ölçüm programı ile 135 hastaya ait görüntüler üzerinde F, T ve MAD uzunlukları ölçüldü. Elde edilen ölçüm sonuçlarının yaş ve cinsiyete göre istatistiki analizi yapıldı. Hastaların yaş ortalaması 54.50 ± 8.82, kadınlarda sol ve sağ F/T oram 1.27 ± 0.07, erkeklerde sol F/T oranı 1.25 ± 0.07 cm ve sağ F/T oranı 1.24 ± 0.08 cm olarak bulundu. MAD en düşük 0 mm, en yüksek 9.64 mm, F/T oram en düşük 1.00, en yüksek 1.41 olarak ölçüldü. Yaş ve cinsiyetler ile F/T oranı ve MAD arasında anlamlı bir ilişki tespit edilmedi ($p<0.05$). F/T oram ve MAD ile de anlamlı bir ilişki tespit edilmedi ($p<0.05$). Çalışmamızda elde ettiğimiz F/T oranı benzer çalışmalarda bulunan oranlarla uyumludur. Diz osteoartrit görülme oranının yaşlanma ile arttığı bildirildiği halde, MAD'in yaş ile ilişkisi tespit edilmemiştir. Bu da alt ekstremite deformite tespitinde MAD ölçümüne ek ileri ölçümlerinde yapılması gerektiğini göstermektedir.
Anahtar Kelime: Ortoröntgenografi, F/T oranı, mekanik aks deviasyonu, varyasyon.

Investigation of the Relationship Between Femur/Tibia Rate and Lower Extremity Mechanical Axis Deviation in Patients Undergoing Orthoroentgenography with Presumptive Diagnosis of Medial Compartment Osteoarthritis

Abstract: In the literatüre, in the measurements made on dry bones and radiographic images, it has been shown that there is a ratio between the femur (F) and the tibia (T) of the lower extremity bones and it is among the races. In detecting deformity of the lower extremities; Measurements such as lower extremity mechanical axis and mechanical axis deviation (MAD) are performed. In our study, it was aimed to analyze the relationship between F and T length ratio and MAD and the relationship between each other and the change according to gender and

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gender. In this study, Images of 92 female and 43 male patients between the ages of 40 and 79 who underwent orthoroentgenography with a pre-diagnosis of Medial Compartment Osteoarthritis in the Orthopedics and Traumatology Policlinic of Giresun University Prof. Dr. A. İlhan Özdemir Training and Research Hospital were retrospectively analyzed. F, T and MAD lengths were measured on images of 135 patients with the Pacs digital measurement program. Statistical analysis of the obtained measurement results according to age and gender was made. The mean age of the patients was 54.50 ± 8.82, left and right F / T ratio 1.27 ± 0.07 in women, left F / T ratio 1.25 ± 0.07 cm and right F / T ratio 1.24 ± 0.08 cm. MAD was measured as the lowest 0 mm, the highest 9.64 mm, the F / T ratio as the lowest 1.00, the highest 1.41. There was no significant relationship between age and sex, and between F / T ratio and MAD ($p < 0.05$). There was also no significant relationship with F / T ratio and MAD ($p < 0.05$). The F / T ratio we obtained in our study is consistent with the rates found in similar studies. Although it has been reported that the incidence of knee osteoarthritis. Increases with aging, the relation of MAD with age has not been determined. This shows that further measurements should be made in addition to the MAD measurement in detecting lower extremity deformity.

Key Words: Orthoroentgenography, F / T ratio, mechanical axis deviation, variation.

GİRİŞ

Antropometri; İnsan vücudunun bileşimini, orantılarını ve tipini ortaya koymak için kişinin ağırlığını, vücut ölçülerini, gücünü ve hareket sınırlarını belirli noktalar esas alarak yapılan ölçme yöntemidir. İnsanların yaşadığı sosyoekomonik koşulların değişiklik göstermesi ve genetik faktörler vücut ölçü ve oranlarının da farklı olasına neden olmaktadır. İnsanların gelişim dönemlerinde vücudun tüm bölümlerinin gelişimi her dönemde aynı değildir. Pubertadan önce, alt extremite büyümesi diğer vücut bölümlerine göre daha hızlıdır. Kızlarda ergenlik dönemi, erkeklere oranla daha önce başlamasından dolayı antropometrik veriler cinsiyete göre de değişmektedir. Dolayısı ile antropometrik veriler ırka, yaşa ve cinsiyete göre farklılık göstermektedir (Yıldız, 1989; Yücel ve ark., 2017).

İnsan vücudunda alt ve üst ekstremite kemikleri arasında uzunluk ve hacim açısından matematiksel bir oran vardır. Literatürde kuru kemikler üzerinde ve radyografi üzerinde yapılan ölçümler ile alt ekstremite kemiklerinden femur (F) ve tibia (T) arasında bir oranın olduğu ve ırklar arasında farklılık gösterdiği ortaya konmuştur (Pietak ve ark., 2013). Alt ekstremite uzunluk farkları için uzatma ve kısaltma cerrahileri ile deformite operasyonlarında, F ve T arasındaki bu oran sıklıkla kullanılmaktadır (Ilizarov ve ark., 1992; Paley, 1990). Cerrah yaptığı operasyon sonrasında, F ve T'nin uzunluğunu ve oranını değişeceğinden hasta memnuniyeti ve cerrahi sonrası gelişebilen komplikasyonların azaltılması için F ve T'nin belirli oran içerisinde hesaplanması önemlidir (Weinberg ve ark., 2017).

Diz osteoartriti (gonartroz), orta ve ileri yaşta görülen ağrı, hareket kısıtlığı ve günlük aktiviteleri olumuz etkileyen önemli romatizmal hastalıktır. Bu hastalıkta radyolojik bulgularının düzeyi ile hastalarda görülen fonksiyonel kısıtlılık aynı oranda artmaktadır. Fonksiyonel olarak şikâyetlere etki eden faktörlerin ortaya konması ve uygun cerrahi tedavilerde somut veriler elde etmek için diz eklemine ait mekanik özelliklerin bilinmesi gerekmektedir (Evcik ve ark., 2006). Alt ekstremitelere ait deformitelerin tespitinde, alt ekstremite mekanik aksı ve mekanik aks deviasyonu (MAD) gibi ölçümler yapılmaktadır. Alt ekstremite mekanik eksenini, F başının orta noktası ile tibia- talus eklem yüzünün orta noktasını birleştiren vektörel çizgi oluşturur. Vücut ağırlığı bu eksen doğrultusunda yere aktarılmaktadır. Mekanin eksenin genu eklemi orta noktası ile arasındaki mesafe MAD'yi gösterir. Mekanik aks fizyolojik olarak diz ekleminin merkezinden veya ortalama 15 mm

medialinden ya da lateralinden geçebilir. MAD'nin bu sınırlar dışında medial yönde artış göstermesi varus, lateral yönde artış göstermesi valgus deformitesini gösterir. Varus durumunda eklem medialinde, valgus'da ise elkem lateralinde yük artışı oluşmaktadır (Evcik ve ark., 2006; Schröter ve ark., 2019). Bu ölçümlerin yapılabilmesi için F başı, diz eklemi ve ayak bilek ekleminin kolaylıkla ayırt edilebildiği ortoröntgenografi (bacak uzunluk grafisi)'den yararlanılır (Aytekin ve ark., 2020).

Uzun kemikler arasındaki oranların ırklar arasında farklılık göstermesi her toplum için özel çalışmaların yapılmasının gerekliliğini ortaya koymaktadır. Bizde bacak uzunluk grafileri üzerinde ölçümler yaparak, F ve T uzunluk oranı belirleyerek vücut ölçü standartlarının oluşturulmasında literatüre katkı sağlamayı ve alt ekstremite mekanik aks deviasyonu ile ilişkisini ortaya koymayı planladık.

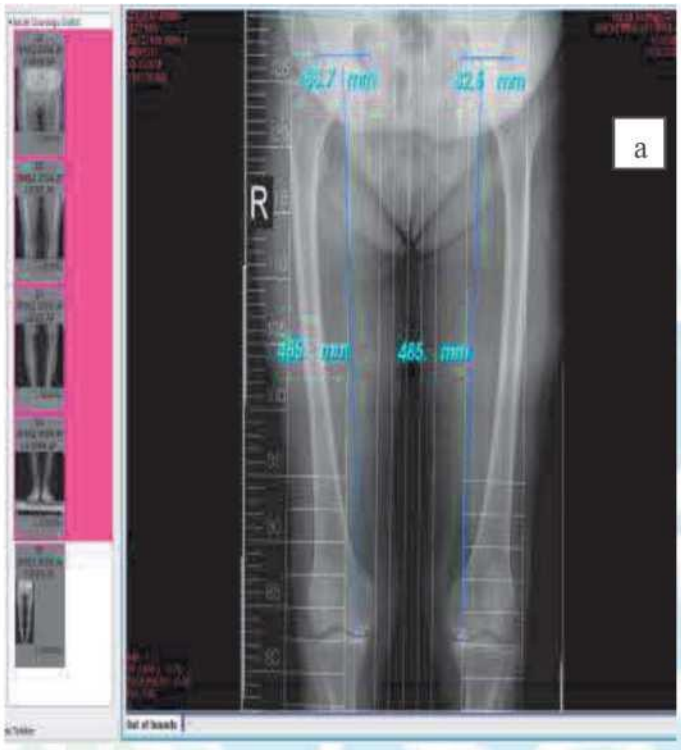
YÖNTEM

2017 Ocak- 2020 Eylül yılları arasında Giresun Üniversitesi Prof. Dr. A. İlhan ÖZDEMİR Eğitim ve Araştırma Hastanesi, Ortopedi ve Travmatoloji Polikliniğinde bacak ortoröntgenografi (uzunluk grafisi) çekilmiş 40 yaş üstü hastaların kayıtları listelendi. Dışlama kriteri olarak; 40 yaş altı, F ve/veya T kırığı olanlar, cücelik bulunan hastalar, bilinen romatizmal hastalığı olanlar, alt ekstremite deformitesi ve cerrahi geçmişi olanlar hastalar olarak belirlendi ve 135 hasta çalışmaya dahil edildi. Ortoröntgenografi ölçümleri için Pacs Dijital Ölçüm Programı kullanıldı.

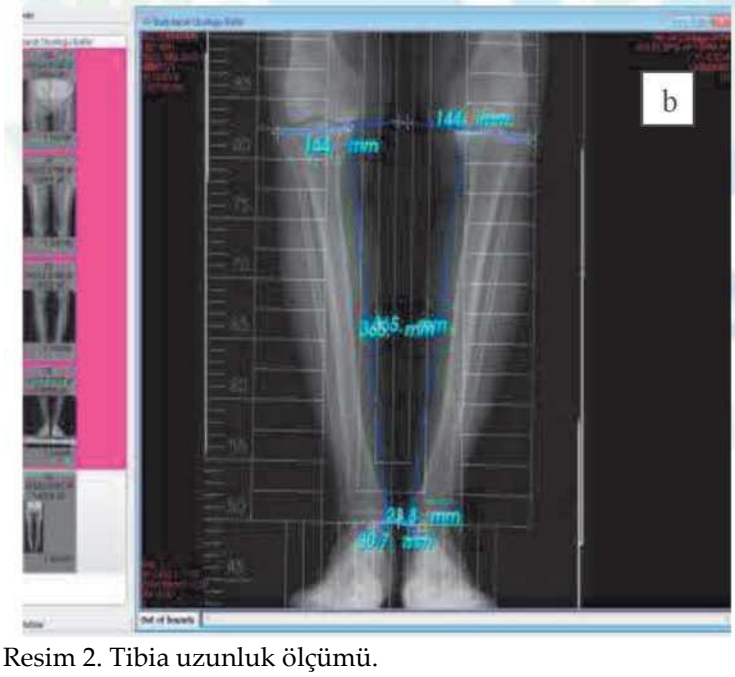
Femur uzunluk ölçümü:
Proksimalde caput femoris'in en uç noktası ile distalde condylus medialis'in altta en uç noktasından teğet geçen birer doğru çizildi ve bu iki doğru arasındaki mesafe ölçüldü.

Tibia uzunluk ölçümü.
Tibia proksimal eklem yüzeylerinden geçen teğet ile distalde malleolus medialis'in en alt noktasından geçen teğet arasındaki mesafe, kemiğin uzun eksenine paralel olarak ölçüldü.

Mekanik Aks Deviasyonu ölçümü:
Caput femoris'in orta noktası ile tibia-talus arasındaki eklem yüzünün orta noktasını bileştiren vertikal çizgi çekilerek mekanik aks bulundu. Daha sonra articulatio genu orta noktası bulunarak, bu noktadan mekanik aks'a dik çıkartılarak bu dikmenin uzunluğu ölçüldü (Resim 1-2-3).



Resim 1. Femur uzunluk ölçümü.



Resim 2. Tibia uzunluk ölçümü.

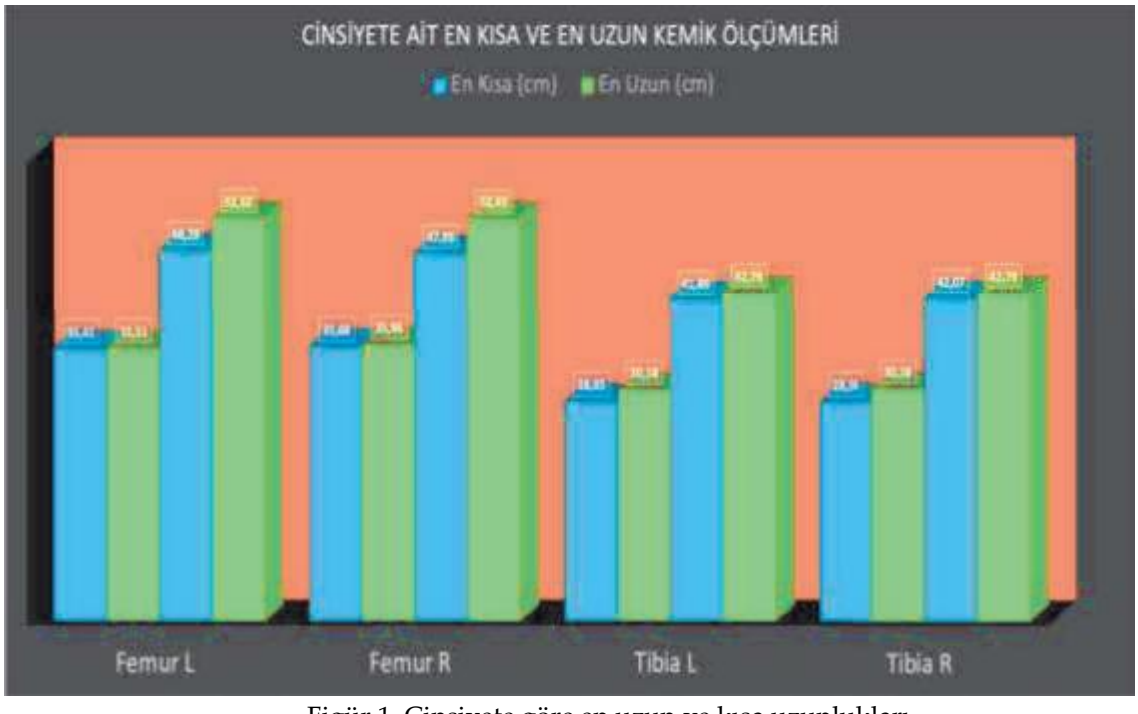
Resim 3. MAD ölçümü

Çalışmada elde edilen verilerin analizleri, SPSS 22 for Windows programı kullanılarak yapıldı. Kategorik değişkenler için sayı, yüzde, ortalama ve standart sapma; kategorik değişkenlerin karşılaştırılmasında Ki-kare testi kullanıldı. Sayısal değişkenler için parametrik testler uygulandı, istatistiksel anlamlılık düzeyi $p<0.05$ olarak alındı.

BULGULAR

Hastaların yaş ortalaması 54.50 ± 8.82, erkeklerin yaş ortalaması 54.90±8.05, kadınların yaş ortalaması 53.65 ± 10.35 olarak bulundu. Kadınlarda sol F uzunluğu 41.58±2.33 cm (en uzun 48.29 cm, en kısa 35.41 cm), sağ F uzunluğu 41.57±2.31 cm (en uzun 47.93 cm, en kısa 35.68 cm), sol T uzunluğu 33.06±2.50 cm (en uzun 41.89 cm, en kısa 28.65 cm), sağ T uzunluğu 33.06±2.49 cm (en uzun 42.07 cm, en kısa 28.56 cm), sol MAD 1.75±1.44 mm, sağ MAD 1.88±1.46 mm olarak ölçüldü.

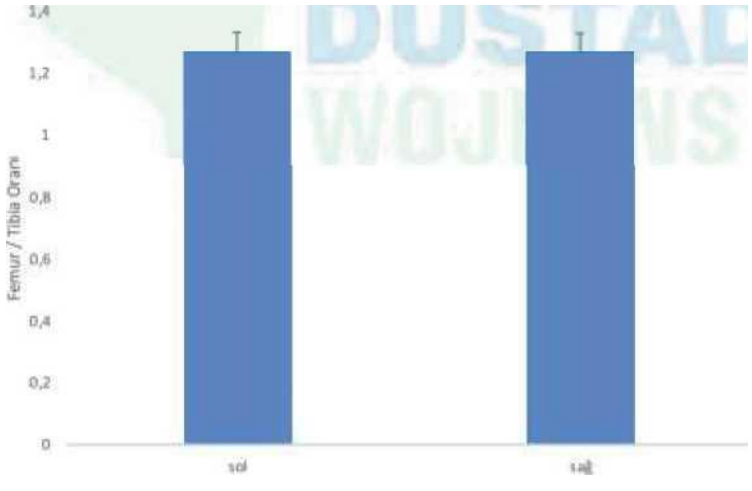
Erkeklerde sol F uzunluğu 45.39±3.39 cm (en uzun 52.52 cm, en kısa 35.51 cm), sağ F uzunluğu 45.38±3.34 cm (en uzun 52.43 cm, en kısa 35.96 cm), sol T uzunluğu 36.06±2.71 cm (en uzun 41.89 cm, en kısa 30.18 cm), sağ T uzunluğu 36.02±2.69 cm (en uzun 42.79 cm, en kısa 30.18 cm), sol MAD 2.10±1.16 mm, sağ MAD 1.79±1.04 mm olarak ölçüldü.



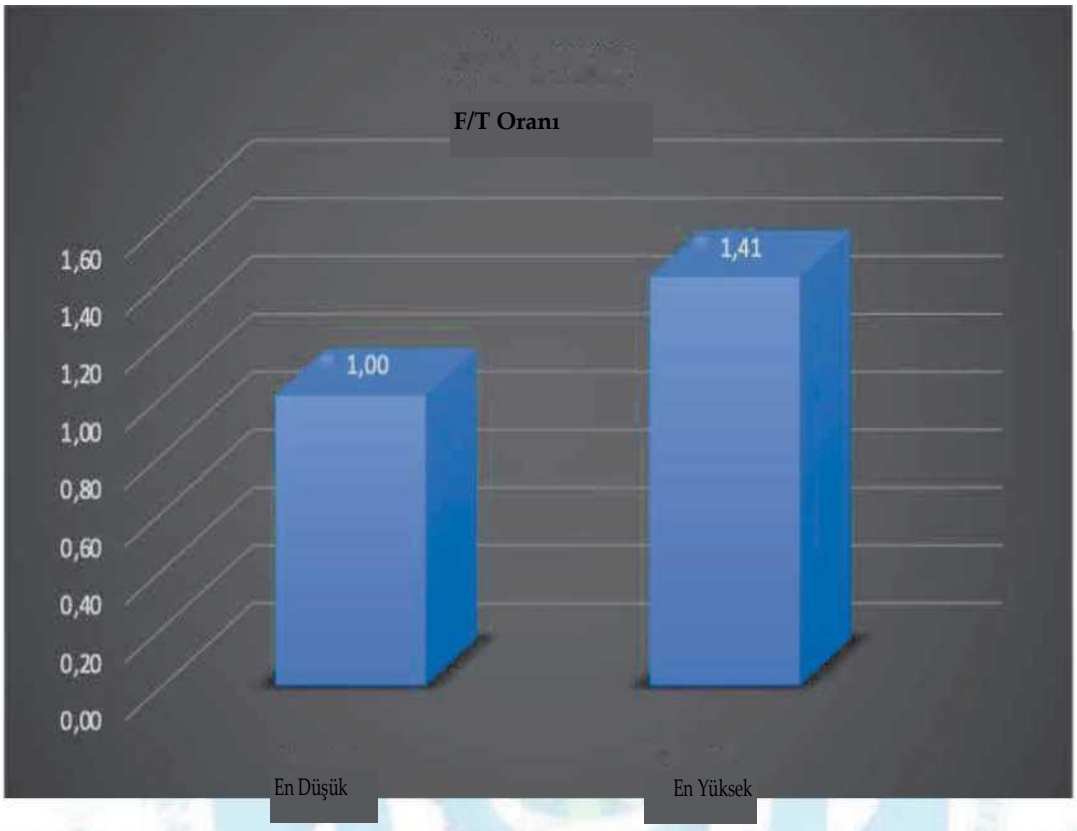
Figür 1. Cinsiyete göre en uzun ve kısa uzunlukları

Hastaların F/T oranı sol 1.26± 0.07, sağ 1.26±0.07, kadınlarda sol F/T oram 1.27±0.07, sağ F/T oranı 1.27±0.07, erkeklerde sol F/T oranı 1.25±0.07, sağ F/T oranı 1.24±0.08 olarak ölçüldü.

F/T Oranı ve SD



Figür 2. F/T oranı ve SD



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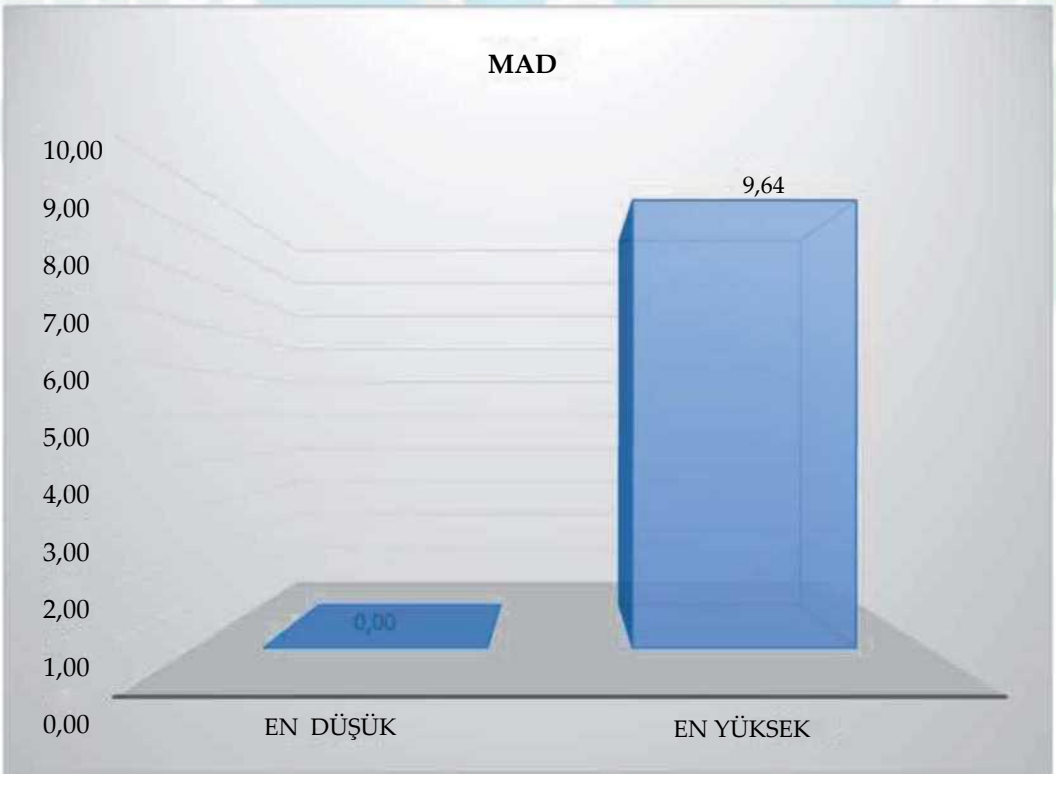
Figür 3. En düşük ve en yüksek F/T oranı.



Figür 4. En düşük ve en yüksek MAD.

Yaş ve cinsiyet ile F/T oranı ve MAD arasında anlamlı bir ilişki tespit edilmedi. F/T oranı ve MAD ile de anlamlı bir ilişki tespit edilmedi.

TARTIŞMA

Bacaklar arasındaki uzunluk farkları ve cücelik fonksiyonel açıdan hastalarda ciddi sorun oluşturmaktadır. Bu sorunlara bağlı uzatma ve kısaltma cerrahilerinde F ve T'nin uzunluklarının ayarlanması önemli rol oynamaktadır. Yapılan cerrahi işlem sonrası F ve T'nin uzunlukları değişeceğinden aralarındaki oranda değişmiş olur.

Birçok çalışmada F ve T arasındaki uzunluk oranı bildirilmiştir. Strecker ve ark. 355 hastanın Bilgisayarlı Tomografi (BT) görüntüleri üzerinde yaptıkları çalışmada F/T oranını 1.26 olarak bildirmişlerdir (Strecker ve ark., 1997). Pietak ve ark. 46 hastaya ait ipsilateral BT görüntüleri üzerinde yaptıkları ölçümde F/T oranını 1.21 olarak bildirmişlerdir (Pietak ve ark., 2013). Weinberg ve Liu 1152 kadavra üzerinde F/T oranını 0.80 olarak bildirmişlerdir (Weinberg ve Liu, 2017). Batıbay ve ark. 50.7 yaş ortalamasına sahip 104 kadın ve 67 erkek olmak üzere toplam 171 hastanın ortoröntgenografi görüntüleri üzerinde yapılan ölçümlerde F/T oranını 1.17 olarak bildirmiştir (Batıbay ve ark., 2019). Bizim F/T oranımız 1.26 olup, benzer çalışmalarda bulunan oranlarla uyumludur. Yapılan çalışmalarda bulunan F/T oranı yakın olmakla beraber, farklı sonuçların elde edilmesi ırklar arasındaki antropometrik verilerin çeşitlilik gösterdiğini ortaya koymaktadır.

Yaşın ilerlemesi ile meydana gelen dejenerasyon neticesinde diz osteoartriti görülme oranının arttığı bildirilmiştir (Batıbay ve ark., 2019). Weinberg ve arkadaşlarının 625 kadavra üstünde yaptıkları çalışmada F/T oranı ve diz dejenerasyonu arasındaki ilişkiyi araştırmışlar ve F/T oram ile diz eklem dejenerasyonu arasında negatif korelasyon tespit etmişlerdir (Weinberg ve Liu, 2017). Batıbey ve arkadaşlarının 171 hastaya ait ortoröntgenografi görüntüleri üzerinde yapmış olduğu çalışmada F/T oram ile gonatroz arasında ilişki tespit edilmemiş (Batıbay ve ark., 2019). Çalışmamızda ise MAD normal sınırlar arasında tespit edilmiş olduğundan, F/T oranı, yaş ve cinsiyet ile gonartroz arasında ilişki tespit edilmedi.

SONUÇ

Çalışmamızda; 135 hastaya ait ortoröntgenografi ölçümlerinde F/T oram 1.26±0.07 olarak bulundu. Hastaların MAD ölçülerinin normal sınırlar aralığında olduğu görüldü (MAD<15mm) . Yaş ve cinsiyetler ile F/T oranı arasında anlamlı bir ilişki tespit edilmedi ($p<0.05$). Yaş ve cinsiyetler ile MAD arasında anlamlı bir ilişki tespit edilmedi ($p<0.05$). F/T oram ve MAD ile de anlamlı bir ilişki tespit edilmedi ($p<0.05$). Çalışmamızda elde ettiğimiz F/T oram benzer çalışmalarda bulunan oranlarla uyumludur.

Diz osteoartrit görülme oranının yaşlanma ile arttığı bildirildiği halde, MAD'in yaş ile ilişkisi tespit edilmemiştir. Bu da alt ekstremite deformite tespitinde MAD ölçümüne ek ileri ölçümler yapılması gerektiğini göstermektedir.

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Yetişkin Yaş Grubunda Özofagus Yabancı Cisimleri Kurban Bayramı Döneminde Artıyor mu?

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Özet: Yetişkinlerde görülen özofagial YC'ler genellikle iyi çiğnenmemiş ve büyük gıda lokmalarıdır. Yabancı cisim (YC) yutulması daha çok çocukluk çağında görülür. Klinik pratiğimizde Müslümanların kutladıkları kurban bayramı sırasında özofagus YC vakalarında artış gözlemledik. Bu çalışma; yetişkin yaş grubunda özofagus YC vakalarının kurban bayramı döneminde artış gösterip-göstermediğini araştırmak ve YC vakalarının klinik özelliklerinin literatür eşliğinde tartışılmasını amaçlamaktadır. Çalışma Konya Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniğinde retrospektif olarak gerçekleştirildi.Eylül 2014 ve Eylül 2019 tarihleri arasında endoskopik ve radyolojik olarak özofagus YC tanısı almış 18 yaşından büyük hastalar değerlendirmeye alındı.
On altı hasta çalışmaya dahil edildi. Kurban bayramı döneminde özofagus YC görülme sıklığı %10, kurban bayramı dönemi dışında ise özofagus YC görülme oranı %0,51 olarak tespit edildi (p:0,001) . Kurban bayramı döneminde sadece 1 hastada direkt grafi ile tam konulabilmiştir. Bu nedenle hastalara BT çekilmiştir. Kurban bayramı grubunda tüm vakalar fleksible endoskop ile tedavi edilmiştir. Diğer dönemlerde ki vakalardan 2' si cerrahi olarak tedavi edilmiştir. Sonuç olarak özofagial YC görülme sıklığı kurban bayramı döneminde artmaktadır. Bu dönemde görülen YC vakaları genellikle özofagial gıda tıkacı şeklinde ortaya çıkmaktadır. Bu dönemde tanıda direk grafı yetersiz kalabilmektedir. Fleksible endoskopi tedavi birincil seçim olmalıdır.

Anahtar Kelimeler: Özofagus, yabancı cisim, endoskopi

Does Foreign Body Esophagus Increasein During Hajj Associated Annual Animal Sacrificefeasts?

AbstractEsophageal YCs seen in adults are generally not chewed well and are large food bites. Foreign body (YC) ingestion is mostly seen in childhood. In our clinical practice, we observed an increase in esophageal YC cases during the feast of sacrifice celebrated by Muslims. This work; The aim of this study is to investigate whether esophageal HC cases increase in the adult age group during the Sacrifice Feast period and to discuss the clinical features of the SC cases in the light of the literature. Patients older than 18 years who were diagnosed with esophageal YC were included in the evaluation. Sixteen patients were included in the study. The incidence of esophageal HF was 10% during the Eid al-Adha period and 0.51% for the esophagus YC outside the eid al-adha period (p: 0.001). During the Eid al-Adha period, diagnosis could be made in only 1 patient by direct radiography. For this reason, patients had CT scans. All cases in the sacrifice group were treated with a flexible endoscope. 2 of the cases in other periods were treated surgically. Conclusion: As a result, the incidence of esophageal HR is increasing during the eid al-sac period. HF cases seen in this period usually occur as esophageal food plug. Direct radiography may be insufficient for diagnosis during this period. Flexible endoscopy treatment should be the primary choice.

Keywords Esophagus, foreign body, endoscopy.

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GİRİŞ

Yabancı cisim (YC) yutulması daha çok çocukluk çağında görülür (1). Çocuklarda da en sık 6 ay- 3 yaş aralığında karşımıza çıkar. Çocuklar genellikle metal para, küçük oyuncaklar, piller ve küçük oyuncak parçalarım yutarlar (2-4) .Yetişkinlerde görülen özofagial YC'ler ise genellikle iyi çiğnenmemiş ve büyük gıda lokmalarıdır. Bu durum total diş protezli yaşlılarda daha sık görülmektedir. Yetişkin yaş grubunda mental retardasyonu olanlarda, psikotik hastalığı olanlarda, mahkumlarda özofagus ve üst gastrointestinal sistem YC daha sık görülmektedir (5,6).

Özofagus YC bağh perforasyon, ülserasyon, fistülizasyon ve obstrüksiyon gibi komplikasyonlar ortaya çıkabilir. Ayrıca özofagus YC bağh hava yolu komplikasyonları (aspirasyon ve asfiksi) da görülebilir. Bu nedenle özofagus YC ile karşılaşıldığında; YC ya çıkarılmalı ya da mideye itilmelidir (7). Endoskopinin başarılı olamadığı veya ek komplikasyonların olduğu durumlarda cerrahi tedavi bir seçenektir (8).

Özofagusta YC tanısı yetişkin ve büyük çocuklarda kolaydır. Anamnez çoğu zaman yeterli olur. Ancak psikotik hastalar ve küçük çocuklarda tamda zorluklar yaşanabileceği akılda tutulmalıdır (7). Klinik pratiğimizde Müslümanların kutladıkları kurban bayramı sırasında özofagus YC vakalarında artış gözlemledik. Bu çalışma; yetişkin yaş grubunda özofagus YC vakalarının kurban bayramı döneminde artış gösterip-göstermediğini araştırmak ve YC vakalarının klinik özelliklerinin literatür eşliğinde tartışılmasını amaçlamaktadır.

YÖNTEM

Bu çalışma Konya Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniğinde retrospektif olarak gerçekleştirildi. Hastanemiz ''Tıpta Uzmanlık Eğitim Kurulu" (TUEK)' ndan hasta verilerinin kullanılması için izin (TUEK karar no:) alınmıştır. Çalışmamızda Eylül 2014 ve Eylül 2019 tarihleri arasında özofagus YC tanısı olan hastalar değerlendirmeye alındı. Bu hastalardan endoskopik ve/veya radyolojik olarak özofagus YC tanısı alan ve 18 yaşından büyük hastalar çalışmaya dahil edildi. Çalışmanın gerçekleştirildiği 5 yıllık sürede Kurban Bayramı (4 gün) ve bayramı takip eden 10 günlük periyod (toplam 14 gün) " Kurban Bayramı Dönemi" ve bu 14 gün dışında kalan dönem ise " diğer zaman dönemi" olarak belirlendi. Her iki dönemde görülen özofagus YC vakaları kaydedilerek bu dönemlerde ki özofagus YC görülme sıklığı (100 gün başına düşen vaka sayısı olarak) belirlendi. Daha sonra bu görülme sıklıkları arasında istatiksel analiz yapıldı. Çalışmaya dahil edilen hastaların demografik özellikleri, YC tipleri, YC tanı metodu kayıt edildi. Hastalarda mental retardasyon, psikotik hastalık varlığı ve mahkum olup- olmama durumu tespit edildi. Hastaların tedavi şekilleri kayıt altına alındı.Gruplar arasında ;yaş, cinsiyet, YC tipi, mental retardasyon varlığı, psikotik hastalık varlığı, mahkum olup olmama ve cerrahi tedavi ihtiyacı; istatiksel olarak anlamlı fark olup olmadığı araştırıldı.

İstatiksel analiz; Uygulanacak istatistiksel yöntemlere karar vermek için öncelikle ShapiroWilk normallik testi uygulanmış ve gruplardan herhangi birinde dahi normallik varsayımı sağlanmıyorsa parametrik olmayan test yöntemleri seçilmiştir. Bu kapsamda ölçümle elde edilen değişkenlerin bağımsız iki grupta karşılaştırılması amacıyla Mann- Whitney U testi, kategorik değişkenler bakımından ilişki ya da gruplar arası farklılıkların incelenmesinde pearsonchi-square ve Fisher'in exact testi uygulanmıştır. Çalışmaya dair grup karşılaştırmaları sonuçları ve diğer demografik özellikler ise, nitel değişkenlerde oran, nicel değişkenlerde ise ortamla ve ortanca ile sunulmuştur. Çalışmanın istatistiksel analizinin gerçekleştirilmesinde IBM SPSS V22.0 (Statistical packageforSocialSciences, SPSS Inc., Chicago, IL, United States) programı kullanılmış ve istatistiksel anlamlılık sımn $p<0,05$ kabul edilmiştir.

BULGULAR

Eylül 2014 ve eylül 2019 tarihleri arasındaki 4 yıl süresince yapılan tarama neticesinde 16 özofagus YC tanısı alan hasta tespit edildi. Bu onaltı hastanın 7' si kurban bayramı döneminde diğer 9 hasta ise kurban bayramı dönemi dışında kalan günlerde tespit edildi. Kurban bayramı döneminde özofagus YC

görülme oranı %10 ; diğer günlerde ise bu oran %0,51 olarak olarak tespit edilmiştir. Özofagus YC görülme sıklığı Kurban bayramı döneminde istatiksel olarak anlamlı ($p<0,005$) düzeyde yüksek bulunmuştur. Kurban bayramı döneminde başvuran hastalar ve kurban bayramı zamanı dışında başvuran hasta gruplarının yaş, cinsiyet ve yabancı cismin tipi (organik gıda artığı veya inorganik) dağılımları arasında istatiksel olarak anlamlı fark bulunmamıştır ($p>0,005$). Grupların YC sıklığı, yaş, cinsiyet ve YC tiplerinin dağlımı tablo. 1' de detaylı olarak görülmektedir. Çalışmaya dahil edilen hastalardan mental retardasyon, mahkumiyet hali ve psikotik hastalık tanısı olup olmadığı da değerlendirildi ve gruplar arasında fark görülmedi ($p>0,05$). Tablo 2' de detaylı olarak görülmektedir.

Hastaların tamamının anamnezinde YC veya gıda yutulması sonrası başlayan yutamama, boğazda ve/veya retrostemal takılma hissi ve ağrı yanında oral gıda alamama şikayeti mevcuttu. Özofagus YC tanısı için direkt grafi ve bilgisayarlı tomografi (BT) kullanılmıştı. Hiçbir hastaya tanısal amaçlı endoskopi yapılmadı. Kurban bayramı grubunda yer alan 7 hastadan 6' sında tam BT ve sadece 1 hastada ise direk grafi ile tanı konuldu. Diğer zamanlarda görülen 9 özofagus YC olgusundan 5' ine direk grafi ve 4' üne ise BT ile tam konulduğu tespit edildi. Çalışmamızda ele alman 16 hastanın tamamına direkt grafi çekilmiş ve 6 hastada YC direk grafide görülmüştür. Çalışmamızda direk grafide YC görülme oranı toplamda %37,5 olarak tespit edildi. Direk grafide YC görülemeyen olgulara BT çekilmiş ve tamamında YC BT de görülmüştür. Hastaların tanı metodları ve YC' in özofagustaki lokalizasyonlan tablo.3' de özetlenmiştir.

Çalışmada irdelenen hastalardan 15 ' ine teröpotik amaçlı fleksible endoskopi yapıldı. Bir hasta endoskopi hazırlığı sırasında şikayetlerinin aniden gerilemesi ve radyoloji kontrolünde yabancı cismin mideye geçmesi üzerine endoskopi yapılmadı. Bu endoskopilerden 13' ü başarı ile sonuçlanırken 2 hastada endoskopik olarak YC çıkanlamadığı veya mideye itilemediği için cerrahi tedavi uygulandı. Cerrahi tedavi uygulanan hastaların her ikisi de kurban bayramı dönemi dışında başvuran ve inorganik sivri cisimler yutan hastalardı. Hastaların tedavi şekilleri tablo.4' te özetlenmiştir.

TARTIŞMA

Özofagus YC' leri genellikle çocukluk döneminde görülürler. Ancak tüm yaş gruplarında karşımıza çıkmaktadır. Bu çalışmamızda sadece erişkin yaş grubu irdelenmiştir. Ülkemizde 512 hastalık bir özofagus YC serisinde erişkin hasta oram %34,2 olarak bulunmuştur. Aynı çalışmada erişkinlerde tespit edilen YC' lerin yaklaşık %88' lik bir kısmım et parçalan ve kemikli et oluşturmaktaydı (9). Özofagus YC vakalarının irdelendiği bir meta analizde ise YC tipinin erişkinlerde en sık olarak sivri uçlu nesneler (%3 8,1) olduğu vurgulanmaktadır (10). Beşyüz on iki hastalık bir olgu serisinde kurban bayramı döneminde özofagusta et ve kemikli ete bağlı YC vakalarının arttığı bildirilmesine karşın bu durum istatiksel olarak vurgulanmamış ve gözlemsel bir veri olarak sunulmuştur (9). Çalışmamızda irdelenen 16 özofagus YC vakasından 7'si kurban bayramı döneminde başvurmuştu. Çalışmamızda irdelenen 5 yıllık süreçte Kurban bayramı dönemlerinde özofagus YC görülme oranı %10 olarak bulunurken diğer zaman zarfında bu oran %0,51 olarak tespit edilmiştir. Bu yükseklik istatiksel olarak da anlamlı bulunmuştur. Bu artışın nedeninin; kurban bayramı döneminde toplumda et tüketiminin, insanların et yeme iştahının artması ve etlerin tam pişirilmeden yenmesi olduğu kanısındayız. Yetişkin yaş grubunda özofagus YC genellikle yaşlı popülasyonda ortaya çıkar. Çalışmamızda kurban bayramı döneminde başvuran hastalar diğer gruba göre daha yaşlı görünmelerine rağmen grupların ortalama yaşları arasında istatiksel fark bulunamamıştır.

Yetişkin yaş grubunda; mental retardasyon, psikotik hastalıklar ve mahkumiyeti olan hastalarda özofagus YC daha sık görülmektedir (5,6) . Çalışmamızda değerlendirilen 16 hasta içerisinde bu 3 duruma 4 vakada rastladık. Bunlardan birisi kurban bayramı dönemindeyken diğer 3'ü ise diğer zaman grubunda tespit edildi. Grupların bu 3 faktör açısından değerlendirmesinde istatiksel fark bulunmamasına karşın kurban bayramı grubunda bu risk faktörlerine daha az rastlandığı görülmektedir. Bu durum kurban bayramı döneminde daha çok et yeme miktarının artmasına bağlı YC sıklığının arttığı görüşümüzün lehine olduğu kanısındayız.

Son yıllarda literatüre giren ve gıda kaynaklı özofagial YC terimini kapsayan özofagial gıda tıkacı (esophageal food impaction) terimi kullanılmaktadır. Üçyüz sekiz hastalık bir seride,özofagus gıda tıkaçlarının %65'i erkeklerde görülürken medyan yaş 62 olarak bildirilmiş ve gıda tıkaçlarının % 68 'inin et olduğu vurgulanmıştır (11). Bizim çalışmamızda da kurban bayramı grubunda medyan yaş 65 ve hastaların %57' si erkek olarak bulundu. Bu oranlar literatürle uyumludur. Aynı çalışmada özofagus gıda tıkacı sıklığı yılda 100.000 ' de 25 olarak bildirilmiştir (11) .

Özofagusta YC olgularında ortaya çıkan semptomlar YC şekline ve tipine, YC lokalizasyonuna ve YC bağlı komplikasyon olup olmamasına bağlı olarak değişkenlik gösterir. Ancak klasik ve en sık olarak görülen semptomlar disfaji ve odinofajidir (12). Yaklaşık 13.000 hastalık bir meta-analizde disfaji %48, odinofaji %43,4 ve retrostemal ağrı %78 sıklıkta tespit edilmiştir (10). Çalışmamızda da tüm hastalarda retrostemal ağrı, disfaji ve odinofaji yakınması mevcuttu.

Çalışmamızda yer alan YC yutma şikayeti ve klasik semptomlarla başvuran tüm hastalara ilk tanı yöntemi olarak direk grafi çekildi. Çalışmamızda direk grafi ile özofagial YC saptanma oram %37,5 olarak bulundu. Ülkemizde 512 hastalık bir özofagus YC serisinde erişkin yaş grubunda direk grafi ile özofagus YC tespit edilme oranı %45 olarak bulunmuştur (9).

YC özofagusu geçtikten sonra ancak %10-20' de non-operatif tedavi ve %1 'den daha az oranda da cerrahi tedavi gerekir. Özofagus anatomik darlıkları nedeni ile YC' lerin üst gastrointestinal sistemde YC' lerin en sık görüldüğü yerdir. Aynca özofagus YC ise ciddi komplikasyonlara yol açabileceği için acil müdahale edilmesi gereken bir klinik tablodur (13). Çelik S ve ark çalışmasında Özofagus YC'leri çocuk yaş grubunda en sık servikal özofagusta görülürken yetişkinlerde en sık torasik özofagusta görülmüştür (9). Bizim çalışmamızda da her iki grupta da YC en sık torasik özofagusta görülmüştür.

Özofagus YC tedavisi ile ilgili olarak kesin bir tedavi metodu yoktur. Özofagus YC tedavisinde kullanılan yöntemler; 1) Gözlem, 2) Foley kateter ile yabancı cismin çıkartılması, 3) Rijit veya fleksibl özofagoskopi, 4) Magill forseps ile yabancı cismin çıkartılması, 5) Yabancı cismin mideye itilmesi, 6) İntravenöz glukagon verilmesi, 7) Cerrahi tedavi olarak sayılabilir (1,12,14).

Endoskopi günümüzde özofagus YC için en sık kullanılanı metoddur (15). Özofagial gıda tıkaçları için de endoskopi en güvenli ve etkin yoldur (11). Çalışmamızda da özofagial YC vakalarının 15'ine fleksible endoskopi yapılmış ve 13 vakada endoskopi başarılı olmuştur. Özellikle kurban bayramı dönemi grubunda tüm vakalar endoskop ile tedavi edilmiştir.

Sonuç olarak özofagial YC görülme sıklığı kurban bayramı döneminde artmaktadır. Bu dönemde görülen YC vakaları genellikle özofagial gıda tıkacı şeklinde ortaya çıkmaktadır. Bu dönemde tanıda direk grafi yetersiz kalabilmektedir. Fleksible endoskopi tedavi birincil seçim olmalıdır.

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Effects of Age and Gender on Post Dural Puncture Headache

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Abstract: Post dural puncture headache is one of the most disturbing problems for patients in the post-operative process. When planning spinal anesthesia, age, and gender characteristics are of great importance in taking precautions against possible headaches. Our study retrospectively evaluated the proportions of age and gender characteristics in patients with headache symptoms after spinal anesthesia. We evaluated 43 patients who applied to our clinic with post-spinal headache between January 2016 and December 2018 and whose diagnosis was confirmed after examination and diagnostic. Considering the headache rates after spinal anesthesia, female patients were more (24 or 55.8%). The male population's average age in the groups was older (38.37 ± 11.10 vs. 31.96 ± 6.96 yr, mean ± SD; P = 0.026) has emerged. In our study, more post-dural puncture headache was found in young and female patients. In the light of these data, we think that our colleagues will be more likely to recognize patients who have the potential to develop headaches in patients undergoing spinal anesthesia.

Keywords: Dural Puncture, Age, Gender

Özet: Spinal anestezi sonrası baş ağrısı, hastalan post operatif süreçte en çok rahatsız eden problemlerden biridir. Hastaların spinal anestezi planlaması yaparken yaş ve cinsiyet özellikleri, oluşabilecek baş ağnsına karşı önlem almada büyük önem arz eder. Biz de çalışmamızda retrospektif olarak spinal anestezi sonrası bağ ağrısı semptomları olan hastalarda yaş ve cinsiyet özelliklerinin oranlanın değerlendirdikOcak 2016 ile Aralık 2018 arasında kliniğimize spinal sonrası baş ağnsı ile başvurmuş ve muayene ve tetkik sonrası tanısı kesinleşmiş 43 hastayı değerlendirdik. Spinal anestezi sonrası baş ağnsı oranlarına bakıldığında bayan hastaların daha fazla olduğu (24 or 55.8%) ve gruplar içinde de erkek popülasyonun yaş ortalamasının daha yaşlı olduğu (38.37±11.10 vs. 31.96± 6.96 yr, mean ±SD; P = 0.026) ortaya çıkmıştır. Çalışmamızda genç ve bayan hastalarda daha fazla oranda spinal sonrası baş ağnsı saptanmıştır. Bu veriler ışığında meslektaşlarımızın spinal anestezi uygulanacak hastalarda baş ağrısı oluşabilme potansiyeli olan hastalan daha rahat tanıma olasılıklan olacaktır diye düşünmekteyiz.

Anahtar Kelimeler: Dural Ponksiyon Sonrası Baş Ağrısı, Yaş, Cinsiyet

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INTRODUCTION

Gender and age in the development of post dural puncture headache (PDPH) is believed to be an independent risk factor. There is an incidence of PDPD, which was higher in young patients as a factor of age. (1) Some data in the anesthesiology literature indicate that there is no significant difference in the incidence of PDPH in terms of gender in some studies. (24) However, other random data suggest that women may have a higher incidence of PDPH than males (7.4% females, 3.4% males). (5) There may be several reasons why females have a higher incidence. It is accepted that women have a higher incidence of headaches, such as tension-type and migraine. (6, 7) There may also be differences in pain sensation processing, nociceptive information in women greater sensitivity to experimentally induced pain and mechanically, it aroused more pain. (8-10)

Finally, some data have also suggested that sex hormones may affect the incidence of some instances. (7, 11) Due to some studies' inconsistencies, we aimed to determine the effect of age and gender on PDPH in our study.

MATERIALS and METHODS

The archives of Konya Training and Research Hospital's database was searched from January 2016 to December 2018. The database was searched for all patients containing post- dural puncture headache, which yielded 43 patients. Our study is a retrospective case study that was performed according to the Declaration of Helsinki, approved by the ethics committee of Karatay University, Scientific Research Board (Ethics committee decision number:41901325-050.99). PDPH was defined as a headache occurring after a lumbar puncture that was postural. Inclusion criteria included randomized patients that evaluated only adult patients, and where the incidence of PDPH data was available for both genders. And, the other inclusion criteria included patients that were older than 18 ages. Exclusion criteria included patients whose definition of PDPH was unclear *(i.e.,* did not indicate a postural component of the headache). Only one gender was studied (e.g., parturients), the separate incidence of PDPH for the younger than 18 ages were not available. Our study also excluded patients performing the incidence of PDPH after a continuous spinal catheter.

Data *(e.g.,* number and mean age of males and female patients and ages) were collected, and results were recorded. The overall incidence of PDPH (weighted for patient observations) after lumbar puncture between male and female patients were compared. Also, age groups were compared as three patients (18-39 ages, 40-64 ages, and older than 65 ages). The level of significance for all tests was set at a level of 0.05. Demographic data were compared with chi-square (needle size and shape) and *t-tests* (age). A fixed-effects model was used. All statistical analyses *(i.e.,* determination of the pooled estimate, test for heterogeneity) were performed with SPSS 22.0 (SPSS Inc., Chicago, IL). After the data compilation was complete, we performed further analyses to assess the validity of our conclusions.

RESULTS

Our search resulted in 43 patients. There were 19 male and 24 female patients in the data. A total of 12 patients were rejected for the following reasons: 8 did not include an adequate definition of PDPH (i.e., did not indicate a postural component of the headache), 4 were pediatric patients. Table 1 shows the characteristics of the patients who were PDPH. There were more female (24 or 55.8%) than male (19 or 44.2%) patients. Overall, male patients were significantly older (38.37±11.10 vs. 31.96± 6.96 yr, mean±SD; $P = 0.026$) than female patients.

There were three different age groups: 18-39, 40-64, older, 65 ages. The patients included a definition of PDPH were significantly younger as the 18-39 ages group (32 or 74.4%), The 40-64 ages group were less (10 or 23.3%), and the last group as the older than 65 ages had the least rate (1 or 2.3%).

Figure 1 shows the pooled estimate of all included patients as a histogram chart. The odds ratio of a male patient developing a PDPH *versus* a female patient was 0.65 (95% confidence interval, 0.8H0.44), i.e., female patients have higher odds of developing PDPH compared with male patients.

DISCUSSION

The extent of gender and age as an independent risk factor for the development of PDPH is not clear. (1, 2) We performed a study to determine the effect of age and gender on the incidence of PDPH. Female patients had significantly higher odds of developing PDPH than male patients. This finding occurred even though male patients overall were substantially older. Although it is not apparent why young and female patients would have a higher incidence of PDPH, there may be several physiologic, anatomical, or psychosocial possibilities to explain the higher reported incidence of PDPH in young and female patients.

A direct relationship was found between age and incidence of PDPH. Patients under the age of 40 experienced a significantly higher rate of PDPH Ghaleb et al. had found that the incidence of PDPH was higher in the patients aged between 18 and30 years. (3) Pelvic et al. (4) enrolled 776 patients between the ages of 20 and45, and a 25 G spinal needle was used. It was found that PDPH occurred more frequently in younger generations. Chan et al. (5) found the incidence of PDPH to be 13.9% using a 25 G Quincke needle study that enrolled 101 patients with a mean age of 33.6 years; they emphasized in this study that PDPH is seen more frequently in younger patients. Contrarily, Schmittner et al. (6) reported that PDPH was seen in a patient group with a mean age of 42.3, whereas PDPH was not seen in another group of patients with a mean age 46.8. They determined that no significant differences were found in terms of PDPH incidence in different age groups. Further, in another study in which 361 patients had elective C/S surgery, the correlation between age and PDPH was researched, and no significant differences were found. (7)

In our study, we have found that the patients included a definition of PDPH were significantly younger in the 18-39 ages group (32 or 74.4%),

Female patients seem to process nociceptive information differently than male patients. Although this topic is complex, it appears that female patients generally exhibit greater sensitivity to experimental noxious stimuli than males. (8-10) Females also have the higher temporal summation of mechanically evoked pain, indicating that females may demonstrate a greater degree of central sensitization than males. (11) Gender differences in cerebral activation patterns in response to noxious stimuli are also noted, with females having greater activation of the contralateral prefrontal cortex, an activation pattern associated with increased pain perception. (12, 13) In addition to gender differences in nociceptive thresholds and processing, psychosocial factors may contribute to some of the differences seen in experimentally induced pain. (14) Postoperatively, females report a higher incidence of headache and pain despite possibly having a more significant analgesic response to opioids thanmen. (15-17)

Therefore, both biologic and psychosocial factors may contribute to the differences in pain perception, which may in part explain the increased incidence of reported PDPH in female patients in our study. There are other reasons why females might hypothetically report a higher incidence of PDPH.

Vasodilation of the cerebral vessels occurs typically in patients with PDPH as a homeostatic mechanism to compensate for cerebrospinal fluid loss and may theoretically contribute to the severity of PDPH. (18-20) Gender differences in the cerebral vasodilatory response are present, with premenopausal females exhibiting significantly greater vasodilatory response to acetazolamide than males or postmenopausal females. (21, 22) In addition, the incidence of PDPH seems to increase in females relative to male patients after the onset of puberty. (23) Estrogen has been shown to mediate cerebral artery tone and may dilate cerebral pial vessels. (24) Finally, younger (aged 30-40yr), presumably premenopausal women have a significantly higher cerebrovascular reactivity than older women (aged 50-60 yr) and men. (24)

Our study had some limitations. For our study, we could not obtain the spinal needle size and type applied to possible patients because this was not recorded in the relevant data. It would be more meaningful for us to evaluate patients with this information that we will receive intra-operatively. In addition, if we included headaches for which we made the differential diagnosis, we would have the opportunity to compare those with and without PDPH in our study.

In summary, as a result of our systematic examination, it was found that PDPH was higher in the young age group and the female gender. Our analysis does not allow us to determine the rationale behind these findings. Still, we believe that our study in young and female patients may guide our colleagues in the post-operative follow-up.

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Can Changes in Platelet Count, Mean Platelet Volume, and Platelet Distribution Width Be Used to Determine the Post Dural Puncture Headache?

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Abstract: Diagnosing factor for the development of post-dural puncture headache. This article examined a total of 41 patients (19 males, 22 females). The rate of developing a post-dural puncture headache was significantly higher for all patients with platelet distribution width ($p<0.01$). Although the other parameters had no significant values, platelet distribution width had significant differences for post-dural puncture headache..

Keywords: Post dural puncture headache, platelet count, mean platelet volume, platelet distribution width.

Özet: Pıhtılaşma parametrelerinin iltihaplı hastalıkların bir göstergesi olduğu bilinmektedir. Bu parametrelerin dural ponksiyon sonrası baş ağrısının gelişmesinde tanı koyucu bir faktör olabileceğini bulmayı amaçladık. Bu makalede toplam 41 hasta (19 erkek, 22 kadın) incelenmiştir. Trombosit dağılım genişliği yüksek olan tüm hastalarda dural ponksiyon sonrası baş ağrısı gelişme oranı anlamlı olarak daha yüksekti ($p <0.01$). Diğer parametreler anlamlı değere sahip olmasa da trombosit dağılım genişliği, dural ponksiyon sonrası baş ağrısı için önemli farklılıklar gösterdi.

Anahtar Kelimeler: Spinal baş ağrısı, trombosit sayısı, ortalama trombosit hacmi, trombosit dağılım genişliği.

INTRODUCTION

Neuroaxial blocking has numerous advantages over general anesthesia. Being safe, low required dose of drugs, lower cost for patients, no risk of pulmonary aspirations, no age limits are some benefits of neuroaxial blocking. However, some complications have been reported for spinal anesthesia. Post-dural puncture headache (PDPH) is the most frequent complication of these procedures, which is attributed mostly to the excessive leak of cerebrospinal fluid (CSF) from the puncture point leading to intracranial hypotension, associated with a resultant cerebral vasodilatation. (1-3) The incidence of PDPH was reported to be 1-30% (4, 5), with 0%-14.5% incidence rate when small needles are used. (6) In the post-operative period, PDPH remains a bad experience that patients who undergo spinal will never forget throughout their lives. (7) In this sense, it stands before us as an obstacle for patients to return to normal life, especially in the post-operative period (8).

We aimed to find that the practical and cheap parameter may diagnose PDPH by using the coagulation parameters which were platelet count, platelet distribution width (PDW) and mean platelet volüme (MPV).

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METHODS

Our study is a retrospective case study that was performed according to the principles of the Declaration of Helsinki, approved by the ethics committee of Karatay University, Scientific Research Board (Ethics committee decision number: 41901325-050.99). Forty-one patients with a confirmed diagnosed of PDPH were evaluated in this study. These patients were selected to apply to Konya Training and Research Hospital between January 2016 and December 2018.

All of the patients received standart treatment in the our clinic. The inclusion criteria of the study were a diagnonsis of PDPH. Patients were also included that they had to have the hemogram assays were regularly examined; and the standard drug using the current treatment guidelines had been fallowed (9).

The exclusion criteria included the presence of diseases, such as cardiovascular disease, thromboembolic disease that required medication that would affect the bleeding clotting panel, and a lack of assays performed at the specified intervals.

The following data were recorded from the patient by computer registration database: platelet count, platelet distribution width (PDW) and mean platelet volüme (MPV) for PDPH. When the PDPH diagnosis was made, it was scanned and recorded on days. We only assessed the patients who had a normal preoperative values about Plt, PDW and MPV.

Statistical analysis

All statistical analyses were performed using SPSS version 22.0 (SPSS Inc., Chicago, IL, USA). One sample t-test was used for inter-group comparisons and Pearson and Spearman correlation tests were used to assess" the correlation between numerical and categorical parameters. A value of $p<0.05$ was considered statistically significant.

RESULTS

Demographic and clinical features

Forty-one patients who diognosed positive for PDPH. Of these patients, 19 were male and 22 were female. The average age of the patients was 34.68±11.15 for male and 35.18±8.30 for female. All of the patients were treated by the drugs which recommended in the guidelines. (9).

Platelet Index Findings

There was a significant difference in the groups in the PDW values for PDPH patients ($p<0.01$), (Figure 1). There was no significant difference for each measurement in all patients in terms of platelet count and MPV values (Table 1). There was a istatistically differences in the platelet count and MPV values, but all of the mean values for the platelet count and MPV were within normal values.

DISCUSSION

In this study, which we conducted in the hope that we could find a new parameter for the diagnosis of PDPH, which remained a bad experience that will not be forgotten throughout their lives in patients with spinal surgery in the post-operative period, we especially recorded an increase in the PDW parameter above normal values. The most effective factor in coagulation, thromboplastin counting, distribution, and width can also be caused by these effects, which led us to conduct this study. There has always been a need for a simple and inexpensive test based on a possible disease rate relationship (10).

As hospitals around the world continue to accept patients with PDPH, the unknown pathogenesis

behind the mechanism is continuining. (11) Many studies, especially intra- operative, have been conducted on the effects of spinal anesthesia before. (12) While there are studies focusing on cognitive functions after general anesthesia in the elderly in terms of the post-operative period, (13) one of the most important causes of discomfort in the post- operative period in patients is PDPH. (8) However, studies regarding the post-operative process and diagnosis of PDPH are limited.

Trombus formation mechanisms are variable. Generally, evidence of viruses suggests that the inflammation of immune and non-immune cells can lead to an imbalance of procoagulant and anticoagulant conditions during infection. The risk of hematopathology is standard, as it plays an essential role in endothelial homeostasis regulation, and its structure is impaired in viral infections. In addition, the Von Willebrand factor, toll-like receptor activation, and tissue factor pathway activation caused by viral infection may play a role in the following clotting cascade leading to the formation of cross-linked fibrin clots (14). The breakdown of these clots according to the physiological response to the excessive activation of the clotting cascade is responsible for procoagulant D-dimer increases. With the antigen effect, platelets are activated, coordination WBC is ensured for pathogen clearance and clot formation occurs. Immune cells, platelets, and endothelial cells, therefore, all play a role in the clothing mechanism related to viral infections (15). So we conclude that coagulation parameters can determine the inflamation situations like PDPH.

In our study, the effects of the coagulation mechanism on platelet parameters in terms of platelet count, MPV, and PDW values were examined. Although there are numerical changes in all these parameters, a statistically significant difference was only found in relation to the PDW values ($p=0.01$).

In another study (16), the relationship between MPV, PDW, other acute phase reactants and radiological pulmonary tuberculosis was investigated. One hundred patients with pulmonary tuberculasis (Group 1), 50 patients with community-acquired pneumonia (Group 2), and 28 healthy control individuals (Group 3) were included in this analytical study. When the results were evaluated, WBC, erythrocyte sedimentation rate, CRP, PLT, and PCT values are both in Group 1 and Group 2 compared to Group 3, PDW values are in Group 1. This difference was found to be significantly higher than Group 3. This study shows that reactively higher PDW in pulmonary tuberculosis often develops. Similarly, in our study, the most numerical changes in intensive care patients were seen in the first measurement of the PDW values. Moreover, meaningfulness was found with a repeated measure ANOVA test. In addition to a significant difference as indicated by ROC analysis. The ROC analysis was our purpose to evaluate as a diagnostic tool. Still, a considerable area could be determined on the diagonal curve for PDW values(AUC= 0.407), although the AUC value was relatively low.

When the limitations related to our study were evaluated,we deduced that the number of patients included in the study could have been higher. The reason for the limited number of patients was the evaluation of two-years evaluation period, as well as the condition that the PDPH patients were diagnosed, as well as requiring the standard application of medication per the current treatment guidelines was another reason for the low number of patients included in our study.

CONCLUSIONS

Although all the platelet indexes did not have a specific value for early recognition of the severity of PDPH, the PDW values did have a higher value. This study found that the PDW parameters can be used as a new reference in future studies for the diagnosis of PDPH.

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Tables

Table 1. Distribution of demographic variables and coagulation parameters in Post-dural puncture headache patients (PDPH).

PDPH Patients	
Age (years)	34.95 ± 9.60
Gender (n*)	19 m**/22f***
Plt (10^3/mm^3) measurements	245.02 ±62.03
MPV (μm^3) measurements	10.48 ±0.80
PDW (%) measurements	12.62 ±1.89

*n: number of the patients, **m: male, ***f: female

Figures

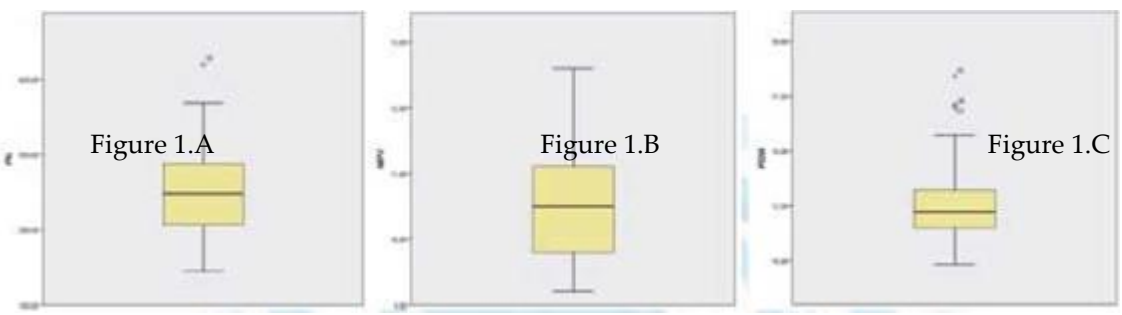

Figure 1.A. Distribution of platelet count, boxplot graphic, Figure **1.A.** Distribution of Mean platelet volüme, boxplot graphic, Figure 1.C. Distribution of platelet distribution width, boxplot graphic.

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Evaluation of Acute Pancreatitis Etiology and Prognosis: Our Results of Ten Years-Retrospective Study

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Abstract: Our objective was to evaluate the etiology and clinical results of acute pancreatitis patients treated in our clinic. Material and Method 395 AP patients were included in the study. AP patients were grouped as MAP, MSP and SAP according to the revised Atlanta classification. Etiology, demographic data hospital and intensive care unit hospitalization were recorded for all patients. Body mass index (BMI), amylase, lipase, hematocrit, C-reactive protein (CRP), procalcitonin, liver function tests and arterial blood gas analyses were made during diagnosis. Systemic Inflammatory Response Findings (SIRS) were evaluated in respiratory, cardiovascular and nephrological terms according to modified Marshall scoring (MMS) system. Necrosis degree was detected based on CT Severity Index (CTSI). Pancreatitis severity was clinically determined based on Imrie score. There were 395 patients in total. 55.6 of the patients were male (n:220) and 44.4% (n:175) were female. The average age was 54.2 (18-84). Biliary pancreatitis was observed most commonly among AP causes. Hypertriglyceridemia was the second most common cause. Its mortality rate among all patients was 4.05%. As a result, gallstones constitute the most common etiological factor in AP. Increasing of nutrition habits with fatty foods increase hypertriglyceridemic AP.

Keywords: Acute pancreatitis, gall stone, hypertriglyceridemia, etiology.

Özet: Kliniğimizde tedavi edilen akut pankreatitli hastaların etyoloji ve klinik sonuçları açısından değerlendirmeyi amaçladık. Çalışmada 395 AP'li hasta mevcuttu. AP'li hastalar revize Atlanta sınıflamasına göre MAP, MSP ve SAP olarak gruplandı. Tüm hastaların etyolojisi, demografik verileri, hastanede ve yoğun bakımda yatış süresileri kaydedildi. Vücut kitle indeksi(BMI), tanı anındaki amilaz, lipaz, hematokrit, C- reaktif protein(CRP), prokalsitonin, karaciğer fonksiyon testleri, arteryel kan gazı analizleri yapıldı. Sistemik İnflamatuar Cevap Bulguları(SIRS), modifiye Marshall skorlama(MMS) sistemine göre solunumsal, kardiyovasküler ve nefrolojik açıdan organ yetmezlikleri değerlendirildi. CT severity Index'e (CTSI) göre nekroz derecesi tespit edildi. Klinik olarak İmrie skoruna göre pankreatit şiddeti belirlendi. Toplamda 395 hasta vardı. Hastaların % 55,6'sı (n:220) erkek, %44,4'ü (n:175) kadındı. Ortalama yaş 54,2 (18-84) idi. AP'nin nedenleri arasında en fazla biliyer pankreatit görüldü. 2. Sıklıkta hipertrigliseridemi görüldü. Tüm hastalar içerisinde %4,05'lik mortalite oram vardı. Sonuç olarak AP' de en sık etyolojik faktör safra taşlandır. Yağlı gıdalarla beslenme alışkanlıklarının artması hipertrigliseridemik AP'yi artırmaktadır..

Anahtar Kelimeler: Akut pankreatit, safra taşı, hipertrigliseridemi, etyoloji.

OBJECTIVE

Acute pancreatitis (AP) is an inflammatory disease of pancreas. AP can be seen in a wide clinical perspective ranging between pathologically mild edematous changes and severe necrotizing pancreatitis. It is separated into three groups as mild, moderate and severe Most of the patients have a mild course. Although it had a mild course in most of the patients, they can also be seen as a severe and complicated disease accompanied by necrosis with a ratio of 10-20%. Its mortality and morbidity is high despite the latest technological developments (1,2).

Long intensive care treatments may be necessary in patients in severe condition since AP causes failures in multiple systems. This situation causes severe costs for the countries. Risk factors should be

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determined and the scoring should be made for efficient treatments in the early period of the disease and the clinical management should be applied effectively (3-5).

While AP occurs generally due to biliary tract stone, alcoholic pancreatitis is also commonly seen in western societies. Idiopathic AP also occurs due to ERCP complication, pancreas cancer, hyperlipidemia and hypercalcemia and trauma (3, 6, 7). Risk factors, disease etiology, early diagnosis and treatment affect prognosis. Based on the results of the patients treated in our clinic, our objective was to evaluate AP which has an important place among acute stomach causes in our country.

MATERIAL and METHOD

Patients treated due to acute pancreatitis diagnosis in Necmettin Erbakan University Meram Faculty of Medicine General Surgery Clinic between 2010 and 2020 were retrospectively evaluated in this study. Consent of the ethics board was taken. 395 AP patients were included in the study. AP patients were grouped as Mild AP (MAP), moderately severe AP (MAP) and severe AP (SAP) based on revised Atlanta classification (8). NP patients were separated into three groups based on necrosis ratios in CTSI.

Patients detected to have high serum amylase and lipase together with the characteristic pain of AP, were diagnosed with acute pancreatitis diagnosis according to revised Atlanta criteria and have pancreatitis finding in intravenous contrasted abdominal tomography were included. In the first evaluation, the patients who had pancreatic or peripancreatic inflammation findings but no local complication and organ failure were classified as interstitial edematous pancreatitis (IEP) patients and patients who have necrosis findings in pancreatic or peripancreatic zones but lacked contrast involvement were classified as NP patients (8). Patients with chronic pancreatitis were not included in the study. Based on revised Atlanta criteria, the patients detected not to have local complication and organ failure were classified as patients with mild AP (MAP), NP patients who didn't have organ failure or those who had temporary organ failure but recovered in 48 hours were classified as moderately severe AP (MSP) and the organ failures continuing after 48 hours were regarded as permanent and these patients were classified as severe AP (SAP) patients (9).

Etiology, demographic data hospital and intensive care unit hospitalization were recorded for all patients. Body mass index (BMI), amylase, lipase, hematocrit, C-reactive protein (CRP), procalcitonin, liver function tests and arterial blood gas analyses were made during diagnosis. Systemic Inflammatory Response Findings (SIRS) were evaluated in respiratory, cardiovascular and nephrological terms according to modified Marshall scoring (MMS) system. Necrosis degree was determined based on CT Severity Index (CTSI) (23). Pancreatitis severity was clinically determined based on Imrie score. Modified Marshall Score ≥2 was accepted as organ failure (10).WBC, body temperature, pulse and respiratory rate parameters were evaluated for SIRS and values ≥ 3 were accepted as SIRS (11).

All data were statistically analyzed. Descriptive statistics was performed using Jamovi software program.

RESULTS

There were 395 patients in total. 55.6% (n:220) of the patients were male and 44.4% (n:175) were female. Mean age of the patients was 54.2 (18-84).

Biliary pancreatitis was observed most commonly among AP causes. 255 of the patients (63.2%) had biliary tract stone related AP. Among other patients, 6.3% (n:25) had alcoholic pancreatitis, 10.1% (n:40) had hypertriglyceridemia, 15.7% (n:62) had idiopathic, 2.4% (n: 9) post-ERCP and 1% (n:4) had hypercalcemia related AP(Table 1).

Etiology	n	%
gall stone	255	63,2
hypertriglyceridemia	40	10,1
alcohol use	25	6,3
post-ERCP	9	2,4
hypercalcemia	4	1
idiopatik	62	15,7

Table 1. Acute pancreatitis etiology

Most AP patients had MAP and MSAP. 10% (n:40) had SAP.

Hypertension and diabetes mellitus were the most common comorbid diseases in AP patients. 18.9% of the patients had DM and Hypertension. Intra-abdominal free fluid was the most common complication with the rate of 13.9%r in AP patients (n:55). %12.2% (n:48) had pancreatic necrosis, 8.1% (n:32) had pancreatic pseudocyst and 5.1% (n: 20) had peritonitis.

6.8% (n: 27) of the patients had systemic inflammatory response syndrome (SIRS) and 4.1% (n:16) had multiple organ dysfunction syndrome (MODS).

16.5% (n:65) were treated in intensive care unit. Median intensive care unit hospitalization duration was nine days. 4.05% of the patients (n: 16) died. All of these patients had SAP. 12 patients had necrotizing pancreatitis. The average age of these patients was >65. Among the patients who died, 10 were male and 6 were female. MODS, septic shock and acute respiratory failure were the most common death causes in these patients. In the etiology of the SAP patients who died, six patients had gall stone, five patients had hypertriglyceridemia, two patients had hyperglycemia and one patient died after ERCP. No etiology was found in two patients.

DISCUSSION

AP constitutes a significant place among the emergencies causing stomach ache. Its global yearly prevalence is 40-50 per 100.000 individuals (12, 13). AP related mortality rate is between 5-30% in literature. Mortality continues despite improving intensive care conditions and treatment chances (13).

The most important step in AP treatment is its regulation based on etiology. Routine intravenous fluid treatment, dietary regulation, analgesic treatment, treatment of inflammatory mediator inhibitors and antibiotics constitutes the main constituents of the treatment (14). Older age clinically affects the disease course negatively. Age border changes between 55 and 75 in most studies. As far as we know, age over 75 highly increases mortality rate (15). Although a higher rate of AP formation was reported in males in literature, most reports emphasized no difference in terms of gender 12, 16). Mortality rate in elder patients in our study was found similar to previous studies in terms of age and gender.

BMI>30 also presents a significant risk factor for AP. In a meta-analysis study, SAP rate was 1.8-4.6%, systemic complications were 1.4-3.8%, local complications were 2.4-6.6% and the mortality rate was 1-4.8%. Early and late term organ failures constitute a significant mortality marker and lengthen hospitalization duration. A mortality rate of 42% was reported in the organ failures and necrosis formation within the first 72 hours. These studies emphasized

organ failure as the most important factor determining mortality and morbidity (17). Organ failures significantly influenced the disease progress in our study, too. MODS and death rate were observed high in necrosis cases.

Gall stone is the most commonly known cause of AP. In addition, alcohol and hypertriglyceridemia are among the most common etiological factors after gall stone (18, 19). The significant role of hypertriglyceridemia in AP etiology was observed in AP etiology in recent years. A study emphasized that it is more common than alcoholic AP (14). Considerable hypertriglyceridemia was also reported in SAP patients (14, 15). As the reference hospital in our region, the most common AP cause was again gall stone in our study. Hypertriglyceridemia was the second most common. Our findings for SAP patients in hyperglyceridemia etiology were also in line with literature.

Idiopathic AP has a prevalence of 16.7-23% in literatüre. The rate was 15.7% in our study (14). We acquired this rate with minimal decrease according to literature. Using methods such as USG, MRCP and ERCP, we think that we may have better clarified some conditions which are hard to diagnose. Similar studies (14) also provided same results with our study.

In recent years, some researchers claimed that AP could be more complicated in some coexisting problems such as high-fat diet, unhealthy life style, smoking, metabolic syndrome and type2 DM (20). Thus it was suggested to consider that patients with multiple risk factors might also have etiological causes (14).

Mortality rate in AP was stated as 1.2-1.5% in many studies. But mortality rate was stated to increase up to 35% in the patients with permanent organ failure (17, 21). Necrosis formation is the local complication of the disease in AP and it exacerbates AP. Parallel to this, studies in literature reported that the presence of necrosis negatively affects prognosis and increases morbidity and mortality rate. While mortality was stated as 23% in any necrosis ratio, it was stated as 0% in conditions without necrosis in some studies. There was a strong relationship between mortality and morbidity in necrosis rates over 30%. But presence of necrosis always brings organ failure along as AP-related inflammatory response may change individually (22-24). Our mortality rate was found as 4.05% among all pancreatitis in our study. This rate was higher than literature. Most of the patients with mortality had organ failure and necrosis. Our higher rate of following the local complications of AP as surgery clinic explains why this rate is higher than all AP rates.

In line with literature, NP patients without organ failure were also present in our study. In parallel, 12 patients (24%) in NP group died due to multi organ failure.

CONCLUSION

As a result, AP is a disease which mostly has a mild course. Gallstones constitute the most common etiological factor in AP. Increasing of nutrition habits with fatty foods increase hypertriglyceridemic AP. Hypertriglyceridemic etiology may be observed in SAP.

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Our Pancreaticoduodenectomy experiences: Analysis of Single Center Results for Five Years

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Abstract: The objective of our study was to evaluate the correlations between the data of pancreaticoduodenectomy (PD) cases in our clinic in the last five years and also the parameters affecting preoperative and postoperative survey. This study includes the cases which underwent pancreaticoduodenectomy due to different causes in Necmettin Erbakan University Meram Faculty of Medicine General Surgery Clinic between 2014 and 2019. The study evaluated the ages, genders, preoperative albumin, Ca 19.9 and total bilirubin values, histopathological grade, lymphovascular invasion and tumor size based on the pathological preparation acquired during the operation. Ca 19.9, lymphovascular invasion, tumor size and histological grade were evaluated as prognostic factors negatively affecting survival. Preoperatively measured Ca 19.9 is important in prognostic terms. CA 19.9 can be used for the selection of the patient who will undergo pancreaticoduodenectomy and information can be acquired on their survivals.

Keywords: Periampullary region tumor, pancreaticoduodenectomy, whipple operation, pancreas cancer.

Özet: Çalışmamızın amacı son 5 yıl içinde kliniğimizde yapılan pankreatikoduodenektomi(PD) vakalarının verilerini çıkararak bunlar arasındaki korelasyonu, preoperatif ve postoperatif surveye etki eden parametreleri değerlendirmekti. Bu çalışmada Necmettin Erbakan Üniversitesi Meram Tıp Fakültesi Genel Cerrahi Kliniği'nde 2014 ve 2019 yılları içerisinde çeşitli nedenlerle yapılmış olan pankreatikoduodenektomi vakalarını içermektedir. Çalışmada hastaların yaşı, cinsiyeti, preoperatif albumin, Ca 19.9 ve total bilirubin değerleri, ameliyatta elde edilen patolojik preparatta histolojik grade, lenfovasküler invazyon ve tümör boyutu değerlendirildi. Ca 19.9, lenfovasküler invazyon, tümör boyutu ve histolojik grade sağ kalımı olumsuz etkileyen prognostik faktörler olarak değerlendirildi. preoperatif ölçülen Ca 19.9 prognostik açıdan önemlidir. Pankreatikoduodenektomi yapılacak olan hastaların seçiminde CA 19.9 kullanılabilir ve sağ kalımları hakkında bilgi edinilebilir.

Anahtar kelimeler: Periampuller bölge tümörü, pankreatikoduodenektomi, whipple operasyonu, pankreas kanseri.

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INTRODUCTION

Periampullary region tumors are classified as pancreas head cancer, distal choledochal cancers, duodenum cancers and ampulla of vater cancers. The only curative surgical treatment option is pancreaticoduodenectomy in these cancers (1,3). Pancreaticoduodenectomy (whipple operation) is a technique generally applied in periampullary region tumors. It has high mortality and morbidity. Five year survival is less than 10% (1, 2, 11). Although the surgical mortality was reported between 40-60% in the studies of 1960s, it was reported as 3% in recent studies. Morbidity rates are around 40% (3,9). Thus, patient selection is important for the operation. Parallel to literature, the objective of our study was to evaluate preoperative parameters on patient selection, having information on survival in operated patients and share our clinic experience with literature.

MATERIAL and METHOD

163 cases who underwent pancreaticoduodenectomy due to different causes in Konya Necmettin Erbakan University Meram Faculty of Medicine General Surgery Clinic between 2014 and 2019 were retrospectively examined. Ages, genders, preoperative Ca 19.9, albumin and total bilirubin values, histological grade, lymphovascular invasion and tumor size based on the material acquired during the operation were examined. These values were calculated using IBM SPSS statistics 20 and the prognostic values were presented.

RESULTS

163 PD patients were included in the study. General information of the patients was shown in Table 1.

Gender	Male: 107 (65%)	Female: 56(35%)
Age	<65: 75(46%)	>65: 88(54%)
Ca 19.9	<100: 82(50%)	>100: 81(50%)
Albumin	<3.5: 69(42%)	>3.5: 94(58%)
Total bilirubin	<5: 116(71%)	>5: 47(29%)
Histological Grade	Grade 1: 63(45%)	Grade 2 and 3 :75(55%)
Lymphovascular invasion	Yes: 79(57%)	No: 59(43%)
Tumor size	<2: 60(38%)	>2: 96(62%)

Table 1: Patient characteristics

160 of the patients which underwent PD were prediagnosed with periampullary region tumor while the others had PD due to extra hepatic cholangiocellular carcinoma, duodenum invading colon cancer and choledochal cyst (Table 2).

Pancreas head tumor	82(49%)
AmpullaVateri tumor	52(32%)
Choledochal tumor	18(11%)
Duodenum tumor	8(5%)
Extrahepatic chol angi ocellularca	1(1%)
Duodenum invasing colon ca	1(1%)
Choledochal cyst	1(1%)

Table 2: Preoperative diagnoses

Considering the pathology results of these 160 cases, 143 were evaluated as malign, 9 as premalign and 8 as benign (Table 3). Pancreas head carcinomas constituted the most common lesion.

Adenocarcinoma	122(75%)
Mucinosis adenocarcinoma	11 (6%)
Neuroendocrine tm	5(3%)
Mixed adenoneuro endocrine tm	3(1%)
NonHodgkin lymphoma infiltration	1(1%)
Malign Epithelial tm	1(1%)
Mucinosis cystic neoplasia	2(1%)
IPMN	1(1%)
Adenomateous polypoid severe dysplasia	1(1%)
Squameous metaplasia	1(1%)
GIST	1(1%)
Neuroendocrine Hyperplasia	1(1%)
Serous cystic adenoma	1(1%)
Solid pseudopapillary neoplasia	1(1%)
Autoimmune IG G4 related pancreatitis	1(1%)
Cyst hydatid	1(1%)
Chronic pancreatitis	2(1%)
No pathology	4(%2)

Table 3: Postoperative pathology results

General five-year survival was calculated as 25%, three year survival as 42% and one year survival as 63% in the patients included in the study. Eight patients died in the first month (5%).

Four of our patients died in the first 10 days due to sepsis, pulmonary emboli, mesentery ischemia and acute liver failure.

The average age was 64.7 in our study. Average tumor dimension was measured as 28.6 mm.

CA 19.9 levels were observed to increase directly proportional to the increasing tumor size and lymphovascular invasion was also higher in these patients. Albumin level was observed to be low in patients with high bilirubin level. Histological grade was higher in patients diagnosed at elder ages.

Considering age distribution, three-year survival was the same in patients under and over d65 years of age (p=0.78).

Based on the evaluation of the patients with malignity, preoperative Ca 19.9 value over 100 U / mL has a significantly negative effect on survival. While 3-year survival rate was 14.3% in patients with C 19.9 levels over 100 U /mL, it was 51.6% in those with C 19.9 levels below 100 U /mL. (p=0.01).

Total bilirubin value was below 5 mg/dl in 116 patients included in the study. While 3 year survival rate was 42% in individuals with total bilirubin value below 5 mg/dl, it was 33% in those with total bilirubin value over 5 mg/dl. This value was regarded to be insignificant in statistical analysis. Three-year survival was the same (37%) when only the patients with detected malignity were evaluated.

Three-year survey is 35% in patients with preoperative albumin level below 3.5 and 46% in those with a level over 3.5. These value wasn't statistically significant. (p=0.41).

3-year survival was observed to be lower in patients with positive lymphovascular invasion considering the presented values based on postoperative pathology results (24.1%). Three- year survival rate was

57.9% in patients lacking lymphovascular invasion. This value was regarded to be statistically significant. (p=0.01).

Tumor differentiations were separated into two groups as well-differentiated and moderately or poorly differentiated. While the three-year survival is 50% in well-differentiated patients, it is 20.3% in moderately or poorly differentiated patients. These values were statistically significant. (p=0.03).

Three-year survival was 55% for the patients with tumor size under 2 cm and 27% for those over 2 cm. This value was regarded to be statistically significant (p=0.03).

Preoperatively checked Ca 19.9 level and lymphovascular invasion, tumor size and histological grade acquired from postoperative pathology results were observed to have a statistically significant effect on survival based on study data.

No significant effect of patient age and preoperative albumin and bilirubin values was observed on survival.

DISCUSSION

When compared to literature, same three-year survival was observed in our hospital (42%). No difference was observed in survival when extra-pancreatic and pancreatic periampullary region tumors were compared. Three-year survival was 42% in extra-pancreatic periampullary region tumors and 9% in pancreatic ones in literature (7). In another study, 5 year survival in pancreas head cancers was lower than extra-pancreatic periampullary region tumors (9). Tumor location was stated to have no effect on survival in a current study (11).

A study by El Nakeeb et al showed that survival decreased with advanced age and it was considered that evaluation with larger patient populations would be better (8). Another study showed no effect of age distribution on survival (11). Considering age distribution, survival was the same in patients under and over 65 years of age in line with literature (7).

3-year survival was 14% with values below 100 U /mL in our study when Ca 19.9 levels were evaluated. This value is 22% in literature and p value was 0.01 in both studies which was statistically significant (7,8). Examining two separate studies, survival was negatively affected in cases with Ca 19.9 level over 35U / mL (9, 11). A study on P-CRP value showed that P-CRP wasn't correlated with Ca 19.9 but both parameters had a negative effect on survival (11). Another study presenting a significant positive correlation between S100A4 expression and preoperative serum Ca19.9 level, survival was again low in patients with high Ca 19.9 level (12).

While total bilirubin increase had a negative effect on survival in literature when total bilirubin level was evaluated, no significant effect of bilirubin levels was observed on survival in our study (7).

Albumin level didn't have a significant effect on survival in our study. Three-year survey is 35% in patients with preoperative albumin level below 3.5 and 46% in those with a level over 3.5. This rate is statistically insignificant. But 3-year survival is stated to be very low in patients with low albumin level in literature (7).

Negative effect on survival was reported in many studies on lymphovascular invasion (7,8,9,10). In line with literature, three-year survival of the patients with lymphovascular reinvasion was below 25%.

Deteriorated histological grade as in lymphovascular invasion also negatively affects patient survival, in line with literature (7).

While average tumor size was calculated as 28 mm in our study, it was 21 mm in literature (7,8). In line with literature, our study showed that the increase in tumor dimensions decreased survival (7,8).

CONCLUSION

Preoperatively evaluated Ca 19.9 level was significant as a prognostic factor in our study. Again, postoperative tumor size and lymphovascular invasion and histology grade are also parameters accepted to be significant in patient survival evaluation. Different views on all these parameters were reported in different studies in literature. This evaluation can provide more correct information in studies and meta-analysis studies including a larger group. Different studies provided findings on the fact that age, tumor location, albumin and total bilirubin also have effect on survival but the effect of these factors on survival was insignificant in our study (7).

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The Clinical Significance of d-Dimer/Troponin T Ratio in Patientswith Pulmonary Thromboembolism

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Abstract: d-Dimer and hsTT are biochemical markers used for pulmonary thromboembolism (PTE). There are very few studies on the clinical significance of the ratio between these two parameters. Our aim is finding new parameter d-Dimer/hsTT ratio for PTE. So this new ratio can be important to distinguish from other thromboembolic events. The study included patients who were admitted to the EmergencyDepartment of Ankara Numune Training and Research Hospital and underwent CT pulmonary angiogram (CTPA) with pre-diagnosis of PTE between 2014-2017. The computed tomography reports of the patients were also evaluated. The detected pathologies and pulmonary thromboembolism presence were recorded. The ratio of d-dimer and hsTT values of the patients were calculated and mortality were recorded. While there was a statistically significant difference between the two groups in terms of d-Dimer and hsTT ($p = 0.001$ and $p < 0.001$, respectively), there was no differencein terms of d-Dimer/hsTT ($p = 0.199$). Compared with the literature, we have found that different cardiac troponins are examined for d-Dimer/Troponin ratio and that there is no standard. However, most of the studies have emphasized the significance of cardiac enzyme results in terms of poor prognosis.

Key words: d-Dimer, troponin, pulmonary thromboembolism.

Pulmoner Tromboemboli Hastalarında d-Dimer/Troponin T Oranının Klinik Önemi

Özet: d-Dimer ve hsTT, pulmoner tromboembolizm (PTE) için kullanılan biyokimyasal belirteçlerdir. Bu iki parameter arasındaki oranın klinik önemi üzerine çok az çalışma vardır. Amacımız, PTE için yeni parametre d-Dimer / hsTT oranı bulmaktır. Dolayısıyla bu yeni oran, diğer tromboembolik olaylardan PTE'yi ayırt etmek için önemli olabilir. Çalışmaya 2014-2017 yılları arasında Ankara Numune Eğitim ve araştırma Hastanesi Acil Servisi'ne başvuran ve PTE ön tanısıyla BT pulmoner anjiyografi (BTPA) çekilen hastalar dahil edildi. Hastaların bilgisayarlı tomografi raporları değerlendirildi. Saptanan patolojiler ve pulmoner tromboembolizm varlığı kaydedildi. Hastaların d-Dimer ve hsTT değerlerinin oranı hesaplandı ve mortalite durumu kaydedildi. İki grup arasında d-Dimer ve hsTT açısından istatistiksel olarak anlamlı fark varken (sırasıyla $p=0.001$ ve $p<0.001$), d-Dimer / hsTT oranı açısından fark yoktu ($p=0.199$). Litertür ile karşılaştırıldığında, farklı kardiyak troponinlerin d-Dimer / Troponin oranı için incelendiğini ve bir standart olmadığını bulduk. Bununla birlikte, çalışmaların çoğu kötü prognoz açısından kardiyak enzim sonuçlarının önemini vurgulamıştır.
Anahtar Kelimeler: d-Dimer, troponin, pulmoner tromboemboli

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INTRODUCTION

Pulmonary thromboembolism (PTE) is a clinical condition usually caused by thrombi of thedeep calf veins that occlude the pulmonary artery or its branches. The diagnosis is challenging due to its various clinical presentations (1). Venous thromboembolism (VTE), clinically presenting as deep venous thrombosis (DVT) or PTE, is the third most common acute cardiovascular disease following myocardial infarction and stroke (2). The 30-day mortality rates exceed 15% with a sudden cardiac death rate of 11%. Right ventricular dysfunction is also seen in approximately 27-56% of the patients (3).

While the low plasma level of d-Dimer has a high predictive value in excluding PTE, it is widely accepted that high d-Dimer level has a low predictive value in diagnosing PTE (4). PTE is excluded if the d-dimer level is below 1000 ng/mL in the absence of any clinical condition (according to Wells score) or below 500 ng/mL in the presence of one or more clinical conditions. Moreover, elevated cardiac Troponin values (≥14 pg/mL) igh sensitivity Troponin T (hsTT)in patients aged <75 years and ≥45 pg/mL in patients aged ≥75 years) have been reported to indicate poor prognosis in PTE, especially in normotensive patients (2).

It is a known fact that early diagnosis and treatment are important in PTE, thus the mortalityis reduced. d-Dimer and hsTT are biochemical markers used for this purpose. There are veryfew studies on the clinical significance of the ratio between these two parameters. Kim et al.
(5) published an article on this topic in the Korean Journal of Internal Medicine in 2019. Thecorrelation between d-Dimer/Troponin I (TnI) ratio was investigated in patients withpulmonary thromboembolism and non-ST-elevation myocardial infarction (NSTEMI). In conclusion, it was found to be higher and more significant in PTE than in NSTEMI. The aim of our study was to demonstrate the clinical significance of d-Dimer/hsTT ratio betweenthe patient groups with and without pulmonary embolism and to evaluate the prognosis witha new perspective.

MATERIAL AND METHODS

Study design and participants

The study was conducted retrospectively after obtaining the ethics committee (decision of the Ankara Numune Training and Research Hospital Clinical Research Ethics Committee, dated 13/09/2017 and numbered E-17-1474) approval. The study included patients who were admitted to the Emergency Department of Ankara Numune Training and Research Hospital and underwent CT pulmonary angiogram (CTPA) with pre-diagnosis of PTE between 2014-2017. The records of these patients were scanned through the information processing systemof our hospital. The records of 453 patients were reviewed retrospectively. 270 patients wereexcluded from the study due to missing data, pregnancy and being under 18 years of age. Epidemiological data of 183 patients were used in the study (Figure 1). 183 patients were divided into 2 groups as those with or without pulmonary thromembolism. Of these patients,those under 18 years of age, pregnant women, had no troponin value or could not be measured numerically (expressed by <) and who had tomography without checking d-Dimerlevel were excluded from the study.

Data collection

Of the data of the patients, age, gender, hsTT, d-dimer and CTPA results were recorded. Patients who were thought to have acute pulmonary embolism and who underwent CTPA for diagnosis were included in the study. The hsTT and d-Dimer values of the patients wererecorded through the system. In addition, computed tomography images were examined. Diseases detected in radiology reports were

recorded. Among these patients, those under theage of 18, pregnant, and those without hsTT and d-Dimer values were excluded from the study. The ratio of d-dimer and hsTT values of the patients were calculated. In addition, other thromboembolic and pulmonary pathologies detected other than pulmonary embolism were also recorded. Finally, the 30-day mortality status of the patients was examined from the hospital records. The data were recorded by 2 specialist doctors. A third specialist checked this data. The computed tomography reports of the patients were also evaluated. The detected pathologies and pulmonary thromboembolism presence were recorded.

Sample collection

It was determined that the hsTT values of the patients were measured using the electrochemiluminescence immunological test (ECLIA) with the sandwich principle in a Cobas device (Roche Diagnostics, Mannheim, Germany). The reference values were as follows: Limit of Blank (LoB) = 3 ng/L (pg/mL), Limit of Detection (LoD) = 5ng/L (pg/mL)and Limit of Quantitation (LoQ) = 13 ng/L (pg/mL). It was determined that d-dimer was measured with immuno-turbodimetric STA - Liatest D - Di PLUS method (Diagnostica Stago S.A.S. Seine, France). The reference value for d-dimer was <0.5 microg/ml. The computed tomography device was a Toshiba Aquilion 64-slice CT (Toshiba Medical SystemCorporation, Shimoishigami, Otawara-Shi, Japan). The CT scans were performed in accordance with the PTE protocol.

Statistical analysis

The Kolmogorov-Smirnov test was used to determine whether the data of the patients included in the study are normally distributed. The age, d-Dimer, hsTT, and d-Dimer/hsTT data were non-normally distributed. Therefore, the Mann-Whitney U test was used for comparisons between groups. The Chi-square test was used to compare categorical variables.Non-normally distributed data were expressed as median (interquartile range) - (median (IQR)). A p-value of <0.05 was considered statistically significant

RESULTS

The data of the patient group with PTE on CTPA and the control group without PTE are summarized in Table 1. There was no significant difference between the patient and controlgroups in terms of age and gender (p = 0.135 and p = 0.717, respectively). The two groups were similar in terms of age and gender. While there was a statistically significant differencebetween the two groups in terms of d-Dimer and hsTT (p = 0.001 and p <0.001, respectively), there was no difference in terms of d-Dimer/hsTT (p=0.199).

The results of the comparison of the presence of PTE with mortality are shown in Table 2. Accordingly, there was a statistically significant difference between the PTE and non-PTE groups in terms of mortality (p = 0.005). However, the mortality rate was 4.5% in the non- PTE group. We think that this mortality is associated with non-embolic diseases.

The distribution of patients with and without PTE according to d-dimer positive and negativestatus was adapted in Table 3. Negative d-dimer level shows positive results towards normallung ventilation.

In terms of comorbid diseases other than PTE, of the patients, 18.5% had pneumonia, 11.1% had malignancy, 3.7% had pneumonia and effusion. Moreover, of the patients, 4 had muralthrombus, 2 had acute coronary syndrome, 1 had mesenteric ischemia, 1 had pneumothorax,1 had acute respiratory distress syndrome (ARDS), 1 had acute pulmonary edema, 1 had aortic dissection and 1 had peripheral artery disease.

DISCUSSION

In PTE, the right ventricle is affected when more than 50% of the vascular bed is obstructedby thrombus. Right ventricular dysfunction occurs with increased pulmonary artery pressure. Increased need for oxygen may lead to microinfarctions in the heart, elevating cardiac enzymes. This is expected to extend up to 6-12 hours and return to normal at 40 hours (1).

Considering that, the ratio of hsTT to d-dimer was evaluated. When the d-dimer and hsTT values of the patients with PTE and without PTE were examined, the difference between thetwo groups was significant ($p = 0.001$, $p < 0.001$, respectively). However, the d-Dimer/hsTTratio was not significant ($p = 0.199$). In the study of Kim et al. (5), the d-Dimer/TnI ratio was found to be significantly higher in patients with PTE than in patients with NSTEMI. The cut-off value was 1.12 mg/L for d-Dimer (AUC 0.860, sensitivity 81.1%, specificity 70.2%), 0.72 ng/mL for TnI (AUC 0.875, sensitivity 80.6%, specificity 78.9%), and the d-Dimer/TnI ratio was 1.82 (AUC 0.951, sensitivity 93.3%, specificity 86.6%). d-Dimer/TnI ratio was found to show better sensitivity and specificity than d-Dimer or TnI in the differential diagnosis between PTE and NSTEMI. The most important difference between the two studies was that the study by Kim et al. was conducted between patients with PTE and NSTEMI. Our study was conducted between PTE and other non-PTE causes. We thinkthat the difference between the two studies is due to that. Because only 2 patients had acutecoronary syndrome in our study. Another difference between the studies was in terms of troponin parameters studied. Kim et al. examined Troponin I level, while we measured hsTT. These two important differences can be summarized as follows: the troponin level below theequation would naturally be higher in the NSTEMI group than in patients with PTE. The study of Kim helps us in selecting patients to schedule coronary angiography (CAG) with the cut-off level that they established for d-Dimer/TnI, which is simple and inexpensive, andperhaps prevents unnecessary CAG procedures. In order to compare this ratio more effectively, it is actually necessary to make a comparison with conditions that do not increasecardiac enzymes as much as NSTEMI. Since our study was conducted retrospectively, the number of PTE patients was small due to patients with incomplete data. We think that furtherstudies to be conducted on a larger number of patients diagnosed with PTE by excluding NSTEMI will provide statistically more valuable data.

High levels of d-dimer, a degradation product of fibrin, have been reported to be a risk indicator for future VTE in the healthy population, as well as predictive of poor cardiac prognosis (6-7). In the study by Hajsadeghi et al. on d-dimer/fibrinogen ratio in intensive care patients, the d-Dimer/fibrinogen (DDFR) ratio was found to be significantly higher in patients with PTE ($p=0.003$) (DDFR in PTE positive patients $=9.13 \pm 7.16$) (8). In addition d-dimer levels were significantly higher compared to the non-PTE group ($\mu g/ml=4.65 \pm 3.46$). In our study, d-dimer levels were significantly higher in the PTE group than in the non-PTE group ($p = 0.001$). PTE was detected only in 1 patient with negative d-Dimer level. This aspect of our study was in line with the literature (9-11).

Cardiac troponin is a highly sensitive and specific biochemical marker of myocardial injury. High levels of troponin may be observed in patients with acute PTE, especially in those with massive PTE. Since it reflects right ventricular dysfunction, it has prognostic significance (12). In our study, hsTT values were significantly higher in the PTE group ($p < 0.001$). When the studies in the literature were reviewed in the light of these results, d-Dimer and cardiac troponin values were significant and valuable in the diagnosis in terms of thrombus load (14), complications (15,16) and imaging findings (17,18). In the meta-analysis of Hamedani et al. (13) including 45 studies, it was reported that biomarkers studied after heavy exercise

were significant in recognizing pulmonary embolism and cardiac injury, and it was demonstrated that these biomarkers even mimic pulmonary embolism and cardiac injury after heavy exercise. Martinez et al. (14) measured higher levels of d-Dimer and troponin in central pulmonary embolism. Vuilleumier et al. (15) found a 3.5-fold increase in complications in the last 3 months of elevated troponin I (death, VTE, acute dyspnea, pulmonary infarction, heart failure, and myalgia), while Kline et al. (16) found it significantin predicting right ventricular hypokinesis. Klok et al. (17) found low troponin T levels to be better to determine low complication rates than those with high right and left ventricularratios on CT and high d-Dimer levels. Jeebun et al. (18) found a high correlation between right and left ventricular ratios on tomography and elevated d-Dimer and troponin I values in pulmonary embolism.

Unless untreated, the mortality rate of PTE may rise up to 30-34%, while it can be reduced to 2-8% with early diagnosis and appropriate treatment (2,19). In our study, we found that 6(22.2%) of the 27 patients with PTE died. This was similar to the mortality rate found in thestudy by Jose et al. (20). In the non-PTE group, the mortality rate was 4.5%. There was a significant difference between the two groups in terms of mortality ($p = 0.005$). We think that the mortality in the non-PTE group is associated with comorbid diseases of the patients.

CONCLUSION

The retrospective nature of our study and the small number of patients with PTE were significant limitations. Compared with the literature, we have found that different cardiac troponins are examined for d-Dimer/Troponin ratio and that there is no standard. However, most of the studies have emphasized the significance of cardiac enzyme results in terms of poor prognosis. This suggests that cardiac troponin parameters should be evaluated with a standard cut-off, such as the INR level. In other words, a specific cut off value can be determined between each cardiac enzyme studied and the d-Dimer ratio. This may help obtain more significant data on predicting prognosis in prospective analysis studies to be conducted on larger patient groups. We are of the opinion that there is a need for multicenter, prospective studies on the use of d-Dimer/troponin ratio in PTE, which is simple, calculableand cost-effective.

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TABLES

Table 1. Age, gender, d-dimer, troponin T and d-dimer / troponin T data of patient andcontrol groups

Parameter	No PTE	There is PTE	P value
Age	70 (25)	74 (21)	0,135
Gender (Male) (n)	75	14	0,717
Gender (Female) (n)	81	13	
D-dimer (mg/L)	1,48 (2,04)	2,33 (2,25)	0,001
Troponin T (ng/mL)	0,021 (0,041)	0,055 (0,175)	<0,001
D-dimer/Troponin T	58,66 (139,49)	41,54 (93,58)	0,199

* Data are given as median (interquartile range) for numerical variables and number forgender

Table 2. Comparison of patient and control groups by mortality status

Pulmonary embolism	No mortality	There is mortality	P value
No	149 (%95,5)	7 (%4,5)	0,005
There is	21 (%77,8)	6 (%22,2)	

Table 3. Comparison of patient and control groups by d-dimer positivity and negativity (d-dimer positivity-negativity was adapted by age (9).

D-dimer	No PTE yok	There is PTE	P value
Negative	38 (%24,4)	1 (%3,7)	0,016
Positive	118 (%75,6)	26 (%96,3)	
Total	156 (%100)	27 (%100)	

Figure 1. Flow chart of patients who underwent CTPA with suspected PTE