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Conference Paper
Entrala E, Mascaro C. New structural findings in Cryptosporidium parvum oocysts. Eighth International Congress of Parasitology (ICOPA VIII); October, 10-14; Izmir-Turkey: 1994. p. 1250-75
Thesis
Erakıncı G. Donörlerde parazitlere karşı oluşan antikorların aranması. İzmir: Ege Üniversitesi Sağlık Bilimleri Enstitüsü. 1997.
Article in Electronic Format
Morse SS. Factors in the emergence of infectious diseases. Emerg Infect Dis (serial online) l995 Jan-Mar (cited 1996 June 5): 1(1): (24 screens). Available from: URL: http:/ www.cdc.gov/ncidodlElD/cid.htm.

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a) Original research: Prospective, retrospective and all kinds of experimental studies

Structure

English title, author names and institutions.
Abstract (average 200-400 word)
Introduction
Methods
Results
Discussion and conclusion
References (most 30)
Whole text should not exceed 4500 words except for resources and English summary.

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Introduction
Methods
Results
Discussion and conclusion
References (most 20)
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Case report
Discussion and conclusion
References (most 20)
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Introduction
The compilation text also including appropriate sub-headings,
Conclusion
References (most 35)
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Conclusion
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Structure
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Topics related to the subject.
Conclusion
References (3-5 inter)

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Structure

300 words of text and original images about the subject

References (3-5 inter)

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Structure
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i) Questions and Answers: Are the texts written in form of questions and answers about scientific educative –instructive medical issues.

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CONTENTS

EDITORIAL

About the third issue...

We are in happiness as we achieve to perform our goal including publications from all areas of health sciences which are in our journal plans significantly. In the first two issue, we had publications in the field of heaths Also, in our third issue we tried to create an internationally respected journal with a similar editorial policy.

In this issue, two are original articles; two of them are about a case report and a review. The articles' branches are Parasitology, Genetics, Orthopedic and Traumatology. While the first original article was reviewing Cryptosporidium sp. in Erzurum's Potable Water, the second was about determining genetics and medical genetics knowledge of students, physicians and academics. In addition, the case reports are about diagnosed osteopoikilosis after knee pain and correction of hallux valgus deformity with distal suture anchor. The moreover review presented parasitic diseases of urinary tract.

In our journal publications process, I extend my thanks to our authors, article assessment referees, our editorial board members and our technical team for their support.

PhD. Asst. Prof. Ülkü KARAMAN

Director in Charge

See you soon…

Middle Black Sea Journal of Health Science December 2016; 2(3): 1-6

RESEARCH ARTICLE

Investigation of Cryptosporidium sp. Oocysts in Erzurum's Potable Water on Different Months

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Abstract

Objective: Cryptosporidium sp. is a protozoan which is highly resistant to external environmental conditions and chlorination and can lead to severe diarrhea in immunosuppressed persons. Oocysts of this parasite, is excreted by human and animal feces, lead to contamination of potable (drinking) water supplies in environments with poor sanitation. Our aim is to investigate the presence of oocysts in some potable water samples taken from different points of Erzurum city center and around on different months.

Methods: Totally 120 water samples were collected from 40 random different points of Erzurum city center and around on April, May and July. Of the 120 samples, 45 were from city water system and 75 from fountain and wells water. Water samples collected within 5 liter tanks were filtered by using membrane filter. From each sample preparation were done by using modified acid fast staining method and then examined under microscope.

Results: *Cryptosporidium* sp. oocysts were detected on 18 (15.0%) of total 120 water samples. 6 (13.3%) of these positive samples were from city water system and the other 12 (16.0%) were from fountains and wells. According to the seasonal distribution of positive samples 9 (22.5%) have been taken on April, 7 (17.5%) on May and 2 (5.0%) on July.

Conclusion: Results of this study have shown that source of water supplies in our region are notably contaminated with *Cryptosporidium* sp. oocysts, and the rate of contamination is higher on April and May when compared with July.

Key words: Cryptosporidium sp, water, modified acid fast

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DOI: ……..

This study was presented at the 18th National Parasitology Meeting held on 29 September-5 October 2013, Karahayıt, Denizli

Introduction

Cryptosporidium sp. is an intracellular protozoa which can lead to diarrhea in both human and animals by ingestion of contaminated food and water (Fayer, 2004). It has a typical coxcidian (merogony, gametogony, chizogony) life cycle. The parasite is very common in the world, and currently 26 species are reported. But among them only the six have a special importance in human cryptosporidiosis cases (Griffiths et al., 1998; Clark, 1999; Chalmers et al., 2013). They are *C. hominis*, *C. parvum*, *C. meleagridis*, *C. cuniculus*, *C. felis* and *C. canis* (Chalmers et al., 2013). Oocysts of this parasite excreted by human and animal feces leads to contamination of drinking water sources in bad sanitized environments. On the other hand being resistant to disinfectants and heat changes of the oocysts make the wastewater

treatment processes difficult. Although, boiling of water for about one minute or treating it with iodine for about 20 minutes or filtering are effective methods for inactivity of oocysts, none of them are practical to apply in city system of water (Redlinger et al., 2002). Additionally chlorinating and ozone-treating of the water can't provide sufficient prevention. As a result of this fact, waterborne epidemics may arise due to the drinking of water contaminated with oocyst (Ekinci, 2012). The epidemic of Milwaukee, in which about 400.000 people are affected in 1993 in USA, is one of the best examples that the agent may lead to the outbreaks (Mac Kenzie et al., 1994; Eisenberg et al., 2005).

The infection dose of the parasite is low, and it is reported that taking 10 to 30 oocysts can lead to infection (DuPont et al., 1995; Okhuysen et al., 1999). Since the disease can be seen in animals, infected animals may act as a reservoir. Therefore some occupation employers, such as veterinarians and livestock rangers are at risk for this disease. The places such as school, dormitory, water parks, day light care centers are risky places for epidemics. Clinical table varies depending on the age and immune status of the host. It is asymptomatic in immunocompetent individuals (Egyed et al., 2003). In a number of vertebral organisms including human being, in particular immunosuppressive individuals, it leads cholera-like enteritis continuing with extreme dehydration in which water loss may reach up to 20 ml by the destruction of microvillus lining of gastrointestinal epithelium. This life threating clinical picture is commonly seen in developing countries especially in children at the age of under-five (Inceboz et al., 2002; Dirim et al., 2003). Disease can be diagnosed by detecting the cryptosporidium in feces and tissue biopsy using IFAT, DFA, ELISA, PCR methods (Eren, 2011).

This study was planned to investigate the drinking water supplied from different sources in Erzurum city center and its surroundings for the presence of Cryptosporidium sp. oocysts, and if detected, to determine the seasonal distribution of the parasite.

Methods

Selecting the sampling points: People, living in Erzurum city center and in its surrounding, obtain their drinking water mainly from two different sources. One of these sources is Çat dam belonging to metropolitan municipality. The water produced from this natural source is distributed to the city water system The second source is ground water which comes from unknown origin. People, living in villages and in city use this water by means of wells and fountains.

In this study, 15 points at which the water is supplied from dam by city water system, and 25 points at which water is supplied from wells and fountains were selected by simple randomized method. Water samples were taken from each selected points. Sampling from the same city water system and fountain and wells was repeated three times on April, May and July.

Collection of water samples and laboratory analyses: The process of all samplings was carried out by using 5 lt sterilized plastic containers. Water samples taken from the sources are filtered using vacuum-pumped filtration device with a 0.45 µm cellulose acetate membrane filter (Sortorius AG, Germany). Then, the particles remaining on membrane were washed with 20 ml of the same sample by centrifuging for 15 minutes at 3500 rpm. Supernatant was discharged and the sediments were taken into 1.5 ml Eppendorf tube. Two preparations from each sample were done by putting 100 µl samples onto clean slide, then let them to dry. Dried preparations were kept in pure methanol for three minutes, and fixed. Modified acid fast staining method was applied. Stained slides were then examined under microscope at x40, x100 magnification. Due to easy application, being able to show the fine structure of the oocysts in detail, and the fact that red oocysts can be seen easily on blue ground, this method was used in the diagnosis of cryptosporidium (Ok et al., 1997; Cicek et al., 2011).

Statistical analysis: SPSS 17 packet program was used for statistical analysis. Categorical variables in the study were expressed as percentage (%) and numeric values (n)

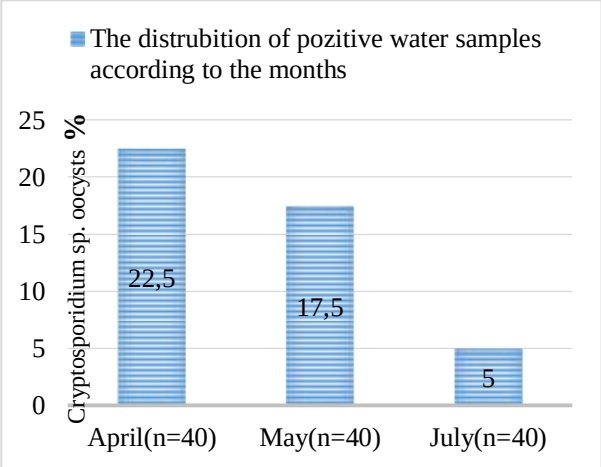
Results

Cryptosporidium sp. oocysts were detected in 18 of 120 water samples examined (15.0%). When the distribution is considered according to the sources in which the oocysts are available, oocysts is detected in 6 of 45 city water systems (13.3%) and 12 of 75 fountains (16.0%) (table 1).

Table 1. The distributions of *Cryptosporidium* sp. oocysts observed in water samples according to months and sources

Water sources	City water system			Fountain and wells		
Months	Sample (n)	Positive (n)	%	Sample (n)	Positive (n)	%
April	15	3	20	25	6	24
May	15	2	13.3	25	5	20
July	15	1	6.7	25	1	4
Total	45	6	13.3	75	12	16

While *Cryptosporidium* sp. oocysts was observed in total 9 drinking water samples in April (22.5%), this was 7 in May (17.5%) and 2 in July (5.0%) (Graphic 1)



Graphic 1. The distribution of *Cryptosporidium* sp. oocysts in drinking waters according to the months

When we evaluated the positive results according to the months and the sources of the samples, it is seen that oocysts were detected in 6 of 25 samples from fountain and wells (24.0%) and 3 of 15 from city water system (20.0%) in April. We also found out that there was oocysts in 2 of 15 (13.3%) samples taken from city water system and in 5 of 25 (20.0%) samples taken from fountains and wells in May. Also in 1 of 15 (6.7%) samples taken from city water systems and in 1 of 25 (4.0%) samples taken from fountain and wells in July oocysts were detected (Table 1). *Cryptosporidium* sp. oocysts were detected in exactly different sources in April, May and July. During microscopic examinations, we also observed *Cyclospora* sp. oocysts in some of the samples as well as *Cryptosporidium* sp. (2 in April, 2 in May and 2 in July) (Figure1- 3).

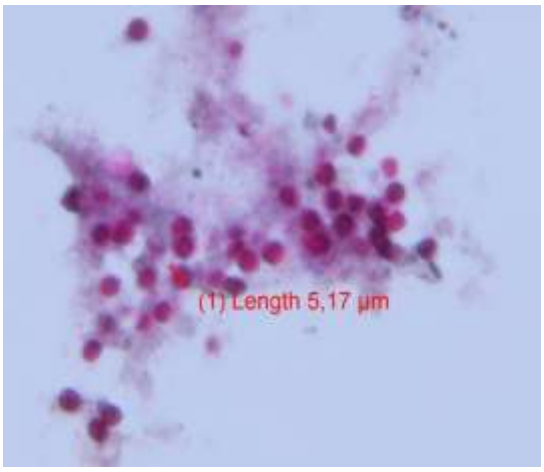


Figure 1. *Cryptosporidium sp*. oocysts (100X)

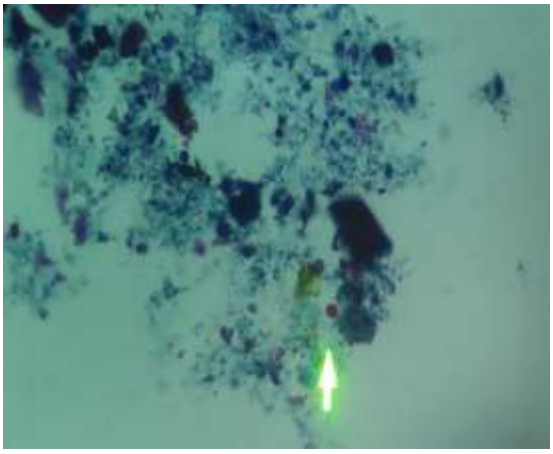


Figure 2. *Cryptosporidium* sp. oocysts (40X)

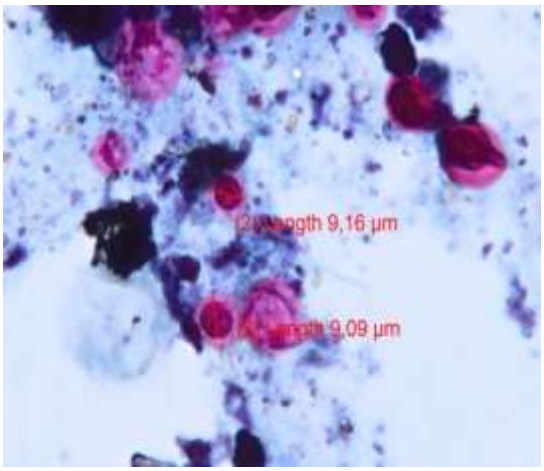


Figure 3. *Cyclospora sp*. oocysts (100X)

Discussion

Cryptosporidium sp. is considered to be one of the three pathogens which is the most common and causing gastroenteritis, especially in developing countries. Among the many species *C. parvum* and *C. hominis* are more prevalent than the others (Current et al., 1991; Wilson, 2004). This protozoon may transmit to the humans by different ways but waterborne transmission is the most important one. As the time passes, the numbers of cases in both immunocompromised and immunocompetent persons increased and this make the disease more important (Juranek, 2000; Fayer et al., 2000; Ozcel et al., 2007).

In some countries such as USA and Australia, Cryptosporidium takes place at the upper ranks among the waterborne epidemics, however, in Europe, frequency and importance of infection is highly variable. It is reported that even in only one epidemic in USA, while over thousands of people are affected, this number may be the most 27-575 in Europe (Mac Kenzie et al., 1994; Smith, 1998; Eisenberg et al., 2005). In Turkey one waterborne epidemic of Cryptosporidium sp. and *Cyclospora* sp. which was experienced in a village of Izmir was reported by Aksoy et al. (2007).

In a study carried out in Germany, Cryptosporidium sp. has been detected in 90% of sand-filtered portable waters, and in 78 % surface waters (Karanis et al., 1996). Also, in a multicenter study carried out in Europa, *Cryptosporidium* sp. has been detected in one third of drinking waters (Ward et al., 2002). In the studies carried out in Mediterranean Region particularly in Greece, Spain and İtaly, high rate of Cryptosporidium sp. oocysts was detected in lakes, rivers and wastewater treatment pools (Conio et al., 1999; Karanis et al., 2002). LeChevallier et al. (1991) reported that they detected Giardia cysts and *Cryptosporidium* sp. oocysts at the rate of 17% and 27% in filtered waters, 81% and 87% in non-filtered waters in wastewater treatment centers at 14 states of USA. Almeida et al. (2010) reported that they met Giardia cysts in 8.4% of 167 drinking waters coming from 44 sources and *Cryptosporidium* sp. oocysts in 10.2% of drinking water in Portugal. In another study carried out by Galván et al. (2014) in Spain, they reported that *Cryptosporidium* sp. oocysts were most often encountered in winter and spring season.

The study by Koksal et al. (2002) in which *Giardia* sp. and *Cryptosporidium* sp. oocysts were searched in 40 untreated water samples obtained from different dams in İstanbul was known to be the first study in Turkey. But the authors reported that they couldn't find any parasite. In Mersin, Ceber et al. (2005) investigated *Cryptosporidium* sp. oocysts in total 100 water samples including drinking water, wastewater, sea water and potable water. In the result of study, they reported to have found Cryptosporidium sp. oocysts in 11.4% of 44 drinking water, in 21.0% of 19 wastewater, in 50.0% of 2 well water and in 2.9% of 35 sea water samples. In Van, Cicek et al. (2011) observed that there was Cryptosporidium sp. oocysts in 1.1% of total 440 water samples.

In our study, we observed *Cryptosporidium* sp. oocysts in 16.0% of 75 samples from fountains and wells, and in 13.3% of 45 samples from city water system. When we evaluated the results according to the months, we found out that in 22.5% of 40 water samples taken in April, 17.5% of 40 samples taken in May, and 5.0% of 40 samples taken in July were contaminated with oocysts. These results that *Cryptoporidium* sp. oocysts are more prevalent in spring than in summer are accordance with the study results by Galvan et al. (2014) in Spain.

In conclusion, we can say that city water system and fountain and wells water used as drinking water in our region is contaminated with *Cryptosporidium* sp. oocysts. One another conclusion of our study is that more *Cryptosporidium* sp. oocysts is seen in April and May than in July. The reason of this situation may be due to the more fecal contamination occurred in these months resulting from melting of snow mass and more rainfall in these months. In order to obtain healthy drinking water, contamination of water sources with human and animal fecal wastes should be prevented. Because the *Cryptosporidium* sp. oocysts are resistant to chlorine and other disinfectant, using of filtered water or water which is boiled or heated at least one at 72 °C will be protective for people especially small children and immunosuppressive patients.

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RESEARCH ARTICLE

Determining Genetics and Medical Genetics Knowledge of Students, Physicians and Academics in A Medical Faculty Model

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Abstract

Objective: Medical Genetics is one of the latest and hot topics in medicine both as a specialty and as the most recent developments after the human genome project. The aim of this study is to determine the basic knowledge about genetics and medical genetics through the faculty of medicine that had no medical genetics department before.

Methods: We assessed the knowledge of medical genetics through a questionnaire that was applied to 549 undergraduate students whom 300 of them were at preclinical and 249 were clinical studies, 149 resident physicians and 86 academic staff in Cukurova University, Adana, Turkey.

Results: According to our data, the scores of basic knowledge of genetics ranged from 40% to 100% with an average of 74%. This significant difference was related to the age and the education level. However, the scores on the knowledge of medical genetics (as a clinical department) were significantly higher in the academic stuff (54% positivity) than the resident physicians (39% positivity) and medical students. More interestingly, the lowest rate (9% positivity) was in the students group of 4th, 5th and 6th year of medical studies at clinics, while it was 17% of positivity in the first 3 years of medical education.

Conclusion: As a conclusion, while the great importance of medical genetics is well-accepted in all medical literature, there was still a big gap between medical education and the implementation of medical genetics.

Key words: Medical genetic, education, medical students

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Introduction

Medical genetics is one of the most recent developed departments in medical faculties. Over the last decade, after the human genome project data released, there was a transformation in all fields of medicine by an explosion of genetic testing, genetic diseases and genomic data (Zhao and Grant, 2011).

The establishment of medical genetics as a primary specialty and not a subspecialty of another fields in medical training in Europe began most recently, while there were still discrepancies between countries. Genetics is usually thought together with biology as an obligatory lesson during the first year of medical education. Unfortunately, these lessons were thought by non-medical geneticists or by geneticists that has no clinical attitudes. However, there were huge clinical responsibilities of medical genetics that should be given through the medical education. So, the

genetic literacy via the medical education affect the attitudes and understanding of basic genetics/genomics and medical genetics as a clinical specialty.

Medical geneticist has clinical responsibilities of providing patient care in clinical genetics policlinics that include dysmorphology, rare diseases clinics/genomics, prenatal diagnosis clinics, diagnosis laboratory and treatment of rare diseases (Acgme, 2016). Medical geneticists also participate in undergraduate and graduate level courses in human and medical genetics, cytogenetics, biochemical genetics and molecular genetics laboratories.

In this study, the main aim is to focus on the assessment of medical genetics knowledge level in a medical faculty throughout all its components starting from undergraduate students to academic stuff and also to find out the importance of medical genetics training thought by appropriate department; Department of Medical Genetics

Methods

In our study, we measured the participants' genetic and medical genetics knowledge. All the participants enrolled in the study were required to complete two tests; one for screening the baseline knowledge of genetics and the second for the knowledge about Department of Medical Genetics as a primary clinical specialty.

Participants for this study were all from the Cukurova University Faculty of Medicine and this study was performed before the integration of medical genetics training program to the undergraduate and graduate education. During the study, there was also no on-going medical genetics clinics at the faculty hospital.

There were three groups for the comparison; (1) undergraduate students (n=549) that was also divided into two groups, one from the first three year (preclinical education) (n=300) and other from clinical period (n=249); (2) resident physicians (n=149) and; (3) academic stuff (n=86) at the Balcali Hospital and Clinics of Cukurova University Faculty of Medicine.

We used the well-validated, previously reported 16-item survey to measure the knowledge about basic genetics (Jallinoja and Aro, 1999). Genetics literacy knowledge survey was scored according categorization; 0-40 as inadequate, 41-70 as marginal, or 71-100 as adequate.

To ascertain participants' knowledge about the medical genetics, we have asked 2 survey questions:

1) a- Before this survey, had you ever heard of Department of Medical Genetics?

b- If Yes, where did you know about the Department of Medical Genetics?

2) Have you ever considered to refer any patient to the Department of Medical Genetics?

The answers were classified according to positive perceived knowledge of the Department of Medical Genetics.

Results

Our study demonstrates the characterization of a medical faculty including students, resident physicians and academic stuff about the genetics and medical genetics knowledge. We used the descriptive statistics to summarize each study group and the association with knowledge scores.

Overall, 784 participants were enrolled in our study. The 70% of participants (n=549) were undergraduate students, 19% were resident physicians (n=149) and 11% were academic stuff (n=86). Undergraduates group were divided into two groups according to the medical education system as 55% of preclinical (n=300) and 45% of clinical period (n=249). The characterization of participants in this study was showed in table 1.

Table 1: The characterization and number of participants in this study.

Characterization of Participants	Number (%)
Undergraduate students	70 (549/784)
Preclinical	55 (300/549)
Clinical	45 (249/549)
Resident physicians	19 (149/784)
Academic stuff	11 (86/784)

Genetics Knowledge

According to our findings, the scores of genetic knowledge were ranging from 40% to 100% (mean score=74%). Overall differences in genetic knowledge were observed among the education levels (p=0.0001) with the highest score in academic stuff and lowest in preclinical undergraduate students. However, no differences were noted between these groups on questions pertaining to the inheritance-related questions (mean score 90.6%). But, when we compared to the scores of questions on genes, chromosomes, and cells, there was a statistically significant difference between academic stuff and other groups (p=0.0001). None of the participants had under the score of 40 in this study. Only the preclinical period students had a marginal knowledge of genetics (mean=62%).

Medical Genetics Knowledge

Only the 22.6% of the participants (n=177) indicated that that they had heard about the Department of Medical Genetics before our survey. The significantly lowest proportion was 9% (n=22) in the group of clinical period students (n=249), followed by the 17% (n=51) in the group of preclinical period students (n=300) (table 2).

The highest rate was in the academic stuff group (n=86) as 54% (n=46). Most interestingly, the majority of this group (96.8%) at least once in their career they referred a patient to the medical geneticist (table 2).

The interesting finding is in resident physicians group (n=149) with 39% high positivity (n=58) with only 5% very low rate of referring any patient (table 2).

Table 2: The value of medical genetics knowledge among participants in this study

Participants	Medical Genetics Knowledge (%)
Preclinical Students	17 (n=51)
Clinical Students	9 (n=22)
Resident physicians	39 (n=149)
Academic stuff	54 (n=46)

Discussion

Medical genetics or clinical genetics in some countries has been recognized as an EU (European Union) – wide primary medical specialty since March 3rd, 2011 by the Commission adopted Regulation (EU) No:213/2011 amending Annexes II and V to Directive 2005/36/EC of the European Parliament and of the Council on the recognition of professional qualifications. Since then, education of medical genetics towards successful implementation in the medical training becomes more important. There were studies that underlie the importance of genomic knowledge and its effect in public debates on genomic issues including genetic concepts of prenatal diagnosis; newborn screening and genetics research (Catz et al 2005; McInerney 2002; Lea et al 2011; Levitt et al 2005). Although given recent and prevalent scientists attention to medical genetics and their role in scientific explanation, the studies about medical genetics has still been understudied.

Thus, in our study we studied the status of a well-known university with a medical faculty without an established Department of Medical Genetics throughout the knowledge level in genetics and medical genetics.

In summary, in this article we demonstrated the genetic knowledge to the association of medical genetics department and an actual comprehension of all over a medical faculty from students to academic stuff.

The scientists have already theorized and pratices debated about the medical genetics of natural development for decades and medical genetics is quite common for all of scientists to refer to the other medical branches in all the world (Brown 2016; Matthews 2016).

There are new studies about provide a useful evolutionary lesson about the impact of selection on spatial patterns of medical genetic variation, when the environment affects which individuals can colonize new sites, and on adaptive genetic variation, when environmental heterogeneity creates divergence at specific loci underlying local adaptation. After these studies the new branches were development about medical genetics like immunogenetics, epigenetics (Sork et al., 2016; Davies et al., 2016). In addition the results of studies suggest that associations identified between genetic and other medical branches like dermatology, oncology and microbiology (Eroglu et al., 2014; Li X et al., 2016; Suh et al., 2016).

Overall, while there was a high knowledge of genetics, the medical genetics knowledge differs from that. Most of our data indicates that the higher knowledge levels related to the higher education. However, there was a negative correlation in terms of medical genetics knowledge; 17% positivity in preclinical and 9% positivity in clinical students. Interestingly, the 85% of preclinical students with positive knowledge obtained their knowledge during the very first few months of the medical school via the internet searches about postgraduate specialties but not by courses during the education.

Providing clinically meaningful education and training in genomics is central to enabling every health employee to develop the appropriate knowledge and skills in genomics in order to provide optimum care to individuals and families now, and to facilitate the integration of new information and technology as it becomes available across mainstream healthcare services (Tonkin et al., 2011). Our study by its concept, points out the importance of re-defining the medical education by the novel concepts in medicine such as medical/clinical genetics, and the imbalance of knowledge between medical education and scientific concepts.

Informed Consent: Written informed consent was obtained from students who participated in this study.
Ethics Committee Approval: The approval was obtained from the local Ethical committee
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REVIEW

Parasitic Diseases of Urinary Tract

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Abstract

Urinary tract infections are among frequent health problems, but parasitic infections are taken no notice. Of urinary system diseases, parasitic diseases such as schistosomiasis (bilharziasis) and trichomoniasis effect lots of people and often give rise to renal and lower urinary tract diseases. Echinocoocosis and filariasis rarely effect urinary system. Schistosomiasis gives rise to the disease by finding its way into bladder veins in human who is final host. It leads to unintended consequences such as permanent urogenital problems, renal failure and malignancy because of its chronicity and tissue damage in the part of body it locates. Symptomatic involvement in urogenital system is more common in females compared to males. Trichomoniasis is the most frequent parasitic disease in the world which occurs because of *Trichomonas vaginalis* trophozoites' involvement in urogenital system sexually. This disease underlies vaginitis which is frequent in females, but it gives rise to urethritis and prostatitis in male. Echinococcosis is known as an endemic zoonotic parasitic disease which infects to humans from animals and grows up in humans evolved in agriculture and stock rising and it may involve in kidney sporadically. Filariasis involves lymphatic system. Obstruction give rise to elephantiasis which may involve in stratum and legs. In this review was presented general information about morphological, biological characteristics of urinary system parasites, diseases they give rise to, clinical symptoms and their prevalence in Turkey. Therefore, helpful information for diagnosis and treatment in humans has been presented by reviewing information in literature about *S. haematobium, E. granulosus, T. vaginalis, W. bancrofti*, urogenital myiasis and scabies which are among urogenital system parasites.

Key words: Urogenital parasites, human, Turkey..

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Introduction

Parasitic diseases as schistosomiasis (bilharziasis), trichomoniasis, echinococcosis, and filariasis (*Wuchereria buncrofti*) affect lots of people, and they cause urinary tract diseases. Echinococcosis and filariasis affect the urinary tract disease less than other parasites (Unat et al., 1995; Özcel, 2007; Yazar et al., 2016). In this review, the general information about the biological, morphological features, and clinical symptomps of significant helminths, protozoons, and arthtoparasides which locate in urinary system, and the prevalance of diseases in Turkey were reported. We aimed to present the recent information of literature in this topic.

Schistosomiasis (Bilharziasis)

Schistosomiasis is an endemic disease in tropical, and subtropical areas. The urinary schistosomiasis caused by *Schistosoma haematobium* (Bilharz,1852) is common in 75 countries in South America, Africa, and The Middle East region. More than 200 million people are infected, and it is estimated that more than 800 million people are under the risk of infection (WHO Information, 2010). It was reported that Bulinis, the intermediate host worm, was seen in our country in Nusaybin and Suruç region (Özcel, 2007b). The frequency of this parasite is unknown in Turkey. Most of the reported cases have originated abroad (Alver et al., 2004; Yazar, 2008; Özvatan, 2011).

Morphology

Females are generally longer and slimmer than males, and they exist in ducts called as 'canalis gynecophrus' which are located in the ventral part of the male body. Female Schistosoma leave their males while just laying eggs, go into the capillary veins and and then turn back to ducts of the males after releasing their eggs. Males are 10-15x0.7-1 mm, and females are 15-20x0.25 mm in size. There are oral suckers surrounding the oral cavity and the ventral sucker just under it in the front part of the body. In the digestive system, oral cavity, pharynx, oesephagus and intestinal canal are available respectively. Two intestinal canals end at the posterior part of the body by combining with each other. The eggs of Schistosoma species which are classified in trematodes don't have valves, miracidium (larva) exist in Schistosoma eggs as in many other trematod classes. The sizes of the eggs vary according to the species of Schistosoma and there is an apophysis spinal in various parts of the egg. *Schistosoma haematobium* eggs are oval and 100–160 x 40–60 µm in size. They have a spina on one of its margins (Yazar, et. al., 2016; Özcel, 2007b).

Biology

Adult male and female parasites live together in big veins. The males stay in the big veins after copulation and females leave the males nearly every day and mainly go into the veins surrounding the urogenital system (urinary bladder veins) by proceeding into small veins and lay their eggs there. These eggs attach to the blood vessels via blood flow velocity and spinas on their walls and reach into the urinary bladder space by penetrating into the vein wall. These eggs which are passed with urine need fresh water or saline water with a density of less than 0.7% to be alive. Miracidium leaves the egg in fresh water, and moves by the help of cillias and penetrate into the fresh water snail Bulinis. Then it loses the cillias and sporocyst phase is progressed and female sporocysts take its place without redi phase. Double–tailed cercarias evolve out of sporocysts and these are called furcucariaes. Furcucariaes scatter to snail's tissues and body cavity by destroying the sporocyst. In certain circumstances, they move in the fresh water very fast by leaving the snail (Altıntaş, 2002; Yazar et. al., 2016). There is no metacercaria phase, which is an infective form in other areas, for them. The furcocercariae is the infective form of *S. haematobium.* The infection of the last host occurs due to furcocercariaes' burrowing the skin or contamines by the freshwater. The furcocercariae that goes into the organism from the skin, travels to the mezenterium vein via the lymphatic vessels, then lung and systemic circulation, and finally comes to bladder vein. The furcocercariae that penetrated into the oral epithelia travels to lung via blood stream and then migrates to the bladder from the left heart. The prepatent period is six weeks. Schistosoma is a treametode, which has a long lifetime, and they can be alive during the host life if a treatment is not given (Altıntaş, 2002; Ross et. al., 2002; Özcel, 2007b; Avcıoğlu, 2007).

Clinical Symptoms, Diagnosis and Treatment

The erythema, papule and itchiness (Swimmer'sitch) can be seen on the host skin because of the host reaction (Altıntaş, 2002; Şahin et. al., 2009). The classic signs of urinary schistosomiasis are associated with accumulating the eggs in the kidney and the kidney damage. Adult females lay eggs at bladder veins, then migrate to the urinary bladder submucosa and granulomas occur because of cell infiltration and inflammation (Hams et. al., 2013). The accumulation of eggs under mucosa causes mucosal hyperemia and hematuria. The eggs which penetrate into the mucosa and migrate into the urinary bladder are excreted through bleeding the urine. The inflammation causes different levels of cystitis in urinary bladder mucosa. The little erythema and ulcerative lesions on bladder mucosa can be seen under cystoscopic evaluation. Ulcerative lesions induce scar tissue, the bladder wall becomes thicker and loses its elasticity. The

eggs create pseudo tubercules on the bladder mucosa and then nodules and polipoid masses develop (Gryseels, 2012). Schistosomiasis is also known as a predisposing factor for adenocarcinoma of the bladder. It is one of the most important reasons of urinary bladder carcinoma especially in Africa and The Middle East, although the cancer pathogenesis, and molecular mechanisms are still not known well (Koonrungsesomboon, 2015).

It is more common in females than males (Remoue et. al., 2002; Özcel, 2007b; Avcıoğlu, 2007). While vesicula seminalis, prostate, urethra, vas deferences and rarely testes and ureters are affceted in males, ovary, fallopian tubes, uterus, and vagina are involved for females (Özcel, 2007). In addition tiredness, exhaustion, sweating, headache and subfebrile fever (Katayama fever) are seen in local symptoms (Avcıoğlu, 2007).

The parasite is diagnosed by the detection of Schistosoma eggs in the urine through stool and biopsy materials. The most appropriate method to detect the eggs in the urine is by examining the last part of the urine which passed in the afternoon after being centrifuged. It is recommended that the eggs examined for at least five different days microscopically if the urine sample is negative taken from clinically suspicious conditions. Additionally, antigen and antibody detection tests can be used alternatively in suspicious conditions (Özcel, 2007b; Şahin et. al., 2009).

The control of the disease is based on large-scale treatment of risky population, access to safe water, improved sanitation and hygiene education. The disease should be kept in mind if the visitors from the endemic countries have symtoms of infection (Inobaya et. al., 2014).

The most effective treatment modality is using Praziquantel (single dose, orally, 40 miligrams per kilogram) (Altıntaş, 2002).

Cystic Echinococcosis

Cystic echinococcosis (CE) is a helminthzoonotic disease and common in the world especially our country. The prevalence of disease in our country varies according to the region, it is mostly common in Eastern, South-East, and Central Anatolia (Unat et. al., 1995). The prevalence of disease is 50-400/100.000, and the incidence is 3,4/100.000 in Turkey (Doğru, 2008). The reported case with CE in Turkey is mainly located in the liver and lungs (Altıntaş et. al., 2004). Renal cyst hydatid commonly occurs with systemic diseases and the isolated form is very rare (Vargas-Serrano et. al., 1997; Zmerli et. al., 2001; Bozdağ et. al., 2012; Merdin et. al., 2014).

Morphology

The adult form of *Echinococcus granulosus (E. granulosus)* is 2-11 .mm in height and 0.6 mm in width. The body of the parasite is formed of 3 or 4 cingulars. It is composed of scolex, neck, immature, mature, and gravid cingulars. The scolex is typically small, and has four brawny suckers, rostellum, and 28-50 distichous coronoids. The body (strobila) is generally composed of 3 cingulars, but rarely 4- cingular striae are encountered. The last cingular, proglottid is gravid and it is nearly half of the body. The uterus extends across the cingular and there may be 200-800 eggs in it. The eggs are round and slightly oval, 28-36 µm in size, thick-walled, dark brown, radial lineal and contain 6-coronoid embryo (the oncosphere) . The eggs of *E. granulosus* can not be differentiated under light microscope from the other species of Echinococcus and Taenia (Altıntaş et. al., 2004; Özbilgin &Kilimcioğlu, 2007).

The cause of the disease is the larva form of E. granulosus called as hydatid cyst. The cysts are usually filled with clear fluid called rock water, which is secreted from germinal layer. The fluid is alcali (base) with 7.2-7.4 Ph, 1007-1015 density, and also it has antigenic features (Özbilgin &Kilimcioğlu, 2007).

Biology

The adult form is located in the small intestine of dogs or other canidae as a definitive host, the larva form is located in internal organs of sheep, cow, pig or human as intermediate host. The eggs of parasite excreted by the definitive host constitute disease by ingestion and rarely inhalation by intermediate hosts. The oncosphere that releases from the eggs in the small intestine penetrates into the intestine wall and enters into the portal system. Oncosphere invades the liver previously and develops with fluid-filled cysts. Oncospheres rarely pass over the sinusoids and enter to systemic circulation, and can migrate to all internal organs (Altıntaş et. al., 2004; Eckert &Deplazes, 2004).

Clinical Symptoms, Diagnosis and Treatment

Isolated renal disease is rare, and reported as 2-4% of all cases (Adayener et. al., 2008). The other involved organs in the genitourinary system are urinary bladder, prostate, testes, and seminal

vesicules. Renal cystic echinococcosis is usually a single and cortical located lesion. The disease can be asymptomatic for several years, and some symptoms occur when the cyst enlarges. The most common symptoms are palpable mass, hematuria, pain, and hydaturia which occur with the connection of cyst and collector system (Göğüş et. al., 2003). Hydaturia is specific to disease (Angulo et. al., 1997; Göğüş et. al., 2003).

The renal cystic echinococcosis is diagnosed with radiologic methods, direct diagnostic microbiologic tests, serologic and molecular tests. Ultrasonography, computed tomography, and manyetic resonans are used for radiologic imaging. Imaging technics are useful to see the calcification of cyst wall. The suspicious cases can be checked by using serologic tests as indirect hemagglutination test, indirect fluorescent antibody test, and Enyzme-linked immunosorbent assay (Pawlowski et. al., 2001; Filippou et. al., 2007; Yılmaz&Babür, 2007).

The renal cystic echinococcosis can be treated with different methods as medical, surgical, and PAIR (puncture, aspiration, injection, respiration) (McManus et. al., 2003; Köksal et. al., 2004). Surgery is the first line treatment modality, and complete resection of the cyst is recommended. There are several different surgical approaches as cystectomy, pericystectomy, partial cystectomy, partial and simple nephrectomy as well. The most serious complication during the surgery is fatal anaphylaxis due to a rupture of the cyst and dissemination of the infection. Benzimidazol family such as Albendazol, Mabendazol, and Praziquantel are the options for the medical treatment. The purpose of Albendazol and Mabendazol treatment, which is done before and after surgery, is sterilisation of the cyst, preventing the anaphlaxy and the recurrence (Pawlowski et. al., 2001; Filippou et. al., 2007). The recommended treatment period is 3-6 months. The most common adverse effect of medical treatment is dysfunction of the liver (Köksal et. al., 2004).

Trichomoniasis

The flagellated parasite *Trichomonas vaginalis (T. vaginalis)* is the aetiologic agent of trichomoniasis, which was firstly described by Donne in 1836. It is a sexually transmitted infection, and a common parasite in the world (Safi et. al., 2000; Özcel &Zeyrek, 2007). It affects the urogenital system and it is fed by cells, bacteries, and sperm cells via fagositing (Unat et. al., 1995).

T. vaginalis is mostly common in patients of ages between 20-40. It is reported that *T. vaginalis* is detected between 4% and 73% of women with vaginal discharge in our country (Suay et. al., 1995; Tamer et. al., 2008; Değerli et. al., 2011), and it is reported by 2,8% among men with urethritis (Çulha et. al., 2008), while founded that between 0,8% and 12% among men with nongonococcal urethritis (Özbilgin et. al., 1992; Ay et. al., 1999).

Morphology

Trichomonas vaginalis has only one form as a trophozoite. The trophozoite is oval and pear shaped, 10-25 x 5-15 µm in size. It has a nucleus, four anterior flagella, and a flagella called ‘’wavy membrane’’ dangling down along the membrane of a parasite. *T. vaginalis* is a protozoon which turns around its own axis continually. It feeds by phagocytosing cell, bacteria and sperm in its location (Unat et. al., 1995; Özcel &Zeyrek, 2007).

Biology

It is a monoxenous parasite, and human is the single host for it. The throphozoite is in infective form since there isn’t a cyst form of it. The trophozoite form is not very resistant to external factors; it can be alive for 1 hour in water, and 24 hours in urine. Trichomonas is sexually transmitted from infected female or male, but rarely contaminated from soiled towels, baths, swimming pools, toilet paper, and toilet seats (Unat et. al., 1995; Yazar et. al., 2016).

Clinical Symptoms, Diagnosis and Treatment

The mean incubation period is 6-10 days. The symptomps of disease vary according to organ and gender. Vaginal discharge occurs during the acute period of the disease. Frothy, greenish, malodorous vaginal discharge is characteristic of the disease. Disuria and pollacuria are common with erythema, tanning, and itchness of the vulva and vagina. The chronic disease can be commonly present with semptomatic vaginal discharge or can be asymptomatic. The symptoms have decreased over time, and disease becomes in latency (Kuman &Altıntaş, 1996).

Most infected men are asymptomatic, and it is hard to detect the disease. Male patients are generally presented with urethritis, prostatitis, and rarely epididymitis and cystitis. Occasionally, white and fuzzy urethral discharge can be seen (Kuman &Altıntaş, 1996; Skerk et. al., 2002).

The disease is diagnosed with immediate

microscopic evaluation of the vaginal, and urehtral discharge, prostatic secretion, and urine sediment. Another method of diagnosis is via overnight culture. The suspicious cases can be checked by using serologic and molecular tests. More than one method can be combined to diagnose (Özcel &Zeyrek, 2007).

Infection is treated with oral or local use of metranidazole (250 miligrams per kilogram, three times a day, a week period). The drug is contraindicated in the first 3 months of pregnancy. Secnidazole has taken the place of metronidazole because of its adverse effects and long treatment period of this drug. Secnidazole has better results than other nitroimidazole family (2 grams, single dose, orally). Tinidazole can be useful in case of resistant disease. Partners have to be treated all together (Kuman&Altıntaş, 1996; Özcel &Zeyrek, 2007).

Filariasis

Filariasis is a parasitic infection in tropical and subtropical areas with high morbidity but low mortality (Chandy et. al., 2011). There are 7 species of filariasis parasites which cause disease in humans, but typically *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timori* are known as factors for filiariasis (Melrose, 2002; Palumbo, 2008). The intermediate host is mosquitos as Aedes, Anopheles and Culex species. The disease is transmitted to humans through the bite of an infected mosquito. The disease has a long latency period, and sometimes, it can also be asymptomatic. This situation generally damages the lymphatic system and kidneys (Kuman, 2007).

Wuchereria bancrofti

Almost 1 billion people are under the risk of lymphedema disease known as *Wuchereria bancrofti (W. bancrofti)*. It is estimated that roughly 120 million people are infected with W. bancrofti in developing countries. Lymphedema is common in Uganda, Tanzania, Kenya, Rwanda, Burundi, Sudan and Ethiopia. Filariasis cases are very rare in our country, because of this reason there is no information about its frequency in Turkey. It is detected sporadically in Alanya, Elazığ, Çubuk and Samsun region in Turkey (Unat et. al., 1995; Kuman, 2007).

Morphology

The adult forms are cylinder-shaped. They don't have lips, and oral cavity is not developed, and it is fistular going on with oesephagus. The male is 30-40 mm x 0,1 mm in size, and it has 15 pairs of postnatal papillas. The female is 50-100 mm x 0,25 mm in size, and transparent, but eggs in the uterus can be seen. Females are viviparous, and their larvas are named as microfilariaes which are 300x8 micron in size. After the infection, microfilariaes can be seen in blood within 6-8 months (Unat et. al., 1995; Kuman, 2007).

Biology

Human beings serve as the definitive host and mosquitoes as their intermediate hosts. The major vectors of *W. bancrofti* are mosquitoes of the genus Culex (in urban and semi-urban areas), Anopheles (in rural areas of Africa and elsewhere) and Aedes (in islands of the Pacific). In Turkey, the most common vector is Culex fatigans. Larvae known as microfilariaes may live for a few years until they are transferred by an insect vector (Culicidae; mosquitos) which is an intermediate host in the blood. When microfilariaes are transferred together with blood by a suitable vector, L1 larvae develops in the digestive tract of the vector. L1 larvae migrate to thoracic muscles of vector mosquito from midgut wall. It molts here twice in 3 weeks and L3 larvae develop within 3 weeks after metamorphosis (infective filariform). Infective L3 larvae come to the proboscis of the vector and it goes into the circulator system of the host while sucking blood. A larva molts twice in humans and it becomes adult with metamorphosis while migrating to certain infected regions. Microfilariaes are detected in the blood after almost 6 months (Unat et. al., 1995; Kuman, 2007; Yazar et. al., 2016).

Clinical Symptoms, Diagnosis and Treatment

Recurrent lymphadenitis, lymphangitis, and fever can be seen in mild disease, and these cause swelling especially in the legs and feet. Inflammation in epididymis, testes, scrotum, and spermatic cord is not very rare, and also hydrocele is common. In severe disease, obstruction of major lymphatic vessels may cause to chyluria and elephantiasis (Melrose, 2002; Kuman, 2007; Chandy et. al., 2011).

The final diagnosis for filariasis is established from a blood sample which is taken during the night by microscopic examination if microfiliariaes

are seen in blood samples (Melrose, 2002). Urine and hydrocele fluid may also be seen as factors. The lower parts of the legs, edema and painful swelling began in the reproductive organs and feet should be considered of filarial acute attack. Finger-causing fossa while pressing over swelling is the diagnostic sign of the disease. Over time, skin thickens and changes colour. It resembles an elephant's skin. Apart from swelling, cough and mild temperature are some indications of the disease. In elephantiasis cases, the diagnosis is established clinically because microfilaria can not be detected in blood (Simonsen et. al., 2002; Mendoza et. al., 2009).

The first choice for treatment is diethylcarbamazine (DEC), despite having some toxic side effects. DEC should be given orally three times a day in dose of 2 mg per kg during 12 days. This medicine does not make an end of adult larvae but effective on microfilariaes. The most important advantage of Ivermectin which was investigated recently is using a single dose a day. The effectiveness of both medicines on adult parasites is not enough. Long term DEC treatment is useful to prevent the spread of new adult parasites. Physiotherapy is run together with surgical treatment. The legs should be jacked for detumescence in legs and compression socks should be put on to prevent the obstruction of lymphatic liquide (Stolk et. al., 2005).

Urogenital Myasis

Urogenital myiasis is an infestasion of humans and vertebrates, which is a member of the diptera family known as flies larva, and also lives on live cells or dead tissue. Pathophysiology of infestasion varies on humans, with the location of larva and the species of it. Urogenital myasis usually limits itself, but rarely patients are presented with urinary tract obstruction, and genital lesions. Urogenital myasis cases were rarely reported in our country with the species of *Eristalis tenax* (Mumcuoğlu et. al., 2005), *Lucilia sericata* (Dinçer et. al., 1995), and *Psychoda albipennis* (Taylan-Özkan et. al., 2004; Güven et. al., 2008).

The symptoms of the infestation are commonly itchiness, dysuria, pollacuria, infravesical obstruction, anuria and hematuria. These symptoms occur with habitation and development of larva's into the lower urinary system (Zumpt, 1965; Dinçer, 1997; Güven et. al., 2008).

Scabies

Scabies called as *Sarcoptes scabiei* are the other infestasions located on genital organs (Yazar et. al., 2016).

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CASE REPORT

Insidentally Diagnosed Osteopoikilosis After Knee Pain

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Abstract
Osteopoikilosis is a rare, benign, autosomal dominant disorder characterised by sclerotic bone lesions most commonly involving the hands, feet, pelvis, and ends of long bones. Lesions are typically found incidentally on imaging studies done for unrelated complaints. It may resemble bone tumor, metabolic disease, mastocytosis and tuberous sclerosis. Early recognition is essential to prevent unnecessary emotional distress and invasive testing. Herein we report a case presenting with knee pain whose radio¬logic investigation revealed typical osteopoikilotic lesions.

Key words: Osteopoikilosis, bone dysplasia, radiography, diagnosis.

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Introduction

Osteopoikilosis is also named as “spotted bone disease” an asymptomatic osteosclerotic dysplasia initially described by Albers-Schönberg in 1915 (Resnick et al., 1988). It is a rare, benign, autosomal dominant disorder characterised by sclerotic bone lesions most commonly involving the hands, feet, pelvis, and ends of long bones (Woyciechowsky et al., 2012; Paraskevas et al., 2009). Skalp, vertebrae, costa and mandibular involvement were less commonly reported (Resnick and Niwayama, 1995). Prevalence has been estimated to be 1/50,000, male and female are equally affected, and it may occur at any age (Woyciechowsky et al., 2012). Lesions are typically found incidentally on imaging studies done for unrelated complaints (Carpintero et al., 2004). It may resemble bone tumor, metabolic disease, mastocytosis and tuberous sclerosis (Resnick et al., 1988). Therefore, patients with the diagnosis of mass history should be evaluated with physical examination, labolatuary and radiology together (Dabak et al., 2012). The symmetric distribution, lack of bone destruction, and location differentiates osteopoikilosis from other

pathologies (Tuncel and Caner, 2012). Early recognition is essential to prevent unnecessary emotional distress and invasive testing (Carpintero et al., 2004). No routine follow-up or studies are necessary

Case Report

A 20-year-old female came to our hospital with right knee pain for about two months after a minor trauma. On physical examination her right knee medial joint space was painful with palpation accompanied by mild suprapatellar swelling and no other joints were affected. All joints had a full passive range of motion and other pyhsical examination was normal. He was in good health and had no history of illness or drug use. On X-ray the affected knee showed that there were circumscribed sclerotic areas near the ends of the tibia and femur (Figure 1). To explore possible intraarticular pathologies we considered to look Magnetic Resonans Imaging (MRI) of the affected knee. MRI showed no intraarticular signs but in T1 sequences there were multiple, well-defined, millimeter-sized sclerotic areas near the ends of the tibia and femur (osteopoikilosis) as shown on X-ray (Figure 2). Then bone scan done to explore the other parts of the body and showed multiple ovoid, radiodense bony lesions in the pelvis and proximal femurs, consistent with the diagnosis of osteopoikilosis. The patient used ibuprofen for 10 days and full resolution was achieved with 10 days rest.

Figure 1: On X-ray the affected knee showed that there were circumscribed sclerotic areas near the ends of the tibia and femur

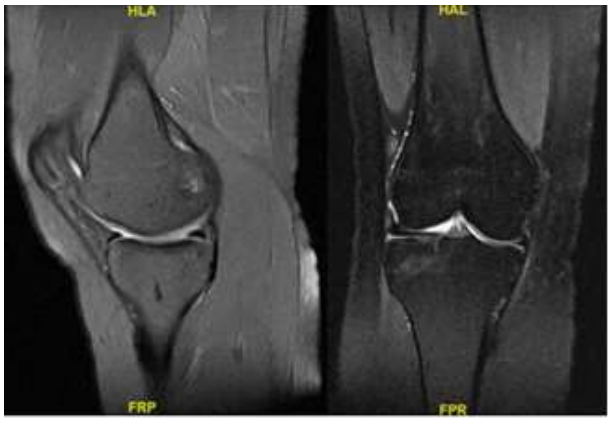

Figure 2: MRI showed no intraarticular signs but in T1 sequences there were multiple, well-defined, millimeter-sized sclerotic areas near the ends of the tibia and femur (osteopoikilosis).

Discussion

Osteopoikilosis is a rare, benign, autosomal dominant disorder characterised by sclerotic bone lesions most commonly involving the hands, feet, pelvis and ends of long bones (Woyciechowsky et al., 2012; Paraskevas et al., 2009). Lesions are typically found incidentally on imaging studies done for unrelated complaints (Carpintero et al., 2004). In some patients with osteopoikilosis joint pain and effusions were reported but so far a clear relationship between osteopoikilosis and joint symptoms has not shown (Resnick et al., 1988). In this report the patient had medial knee pain with palpation accompanied by mild suprapatellar swelling but we thought this pain was not associated with osteopoikilozis. She had moderate pain for two months, bu she had no similar pain earlier.

Osteopoikilosis is an important disorder to be kept in mind during differential diagnosis with osteoblastic metastases, tuberous sclerosis, mastocytosis, osteopathy, melorheostosis. It can be distinguished by metaphyseal and epiphyseal involvement, symmetrical distribution and uniform size of the lesions (Appenzeller et al., 2007). In this report imaging of the affected knee showed that there were circumscribed sclerotic areas near the ends of the tibia and femur and also bone scan showed multiple ovoid, radiodense bony lesions in the pelvis and proximal femurs, consistent with the diagnosis of osteopoikilosis.

In conclusion, patients with osteopoikilosis remain asymptomatic and diagnosed incidentally on X-ray. The symmetric distribution, lack of bone destruction, and location differentiates

osteopoikilosis from other pathologies. The physicians must advise the patients with osteopoikilosis that the disease has benign course, and similar pathologies can be found with their family members, In these cases to prevent unnecessary and invasive testing and emotional distress, early recognition is essential. No routine follow-up or studies are necessary but it is important to keep it in mind at differential diagnosis..

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CASE REPORT

Correction of Hallux Valgus Deformity with Distal Suture Anchor; Surgical Technique

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Abstract
Hallux valgus, which is a frequently encountered foot problem, is a disease causing pain to the patient with difficulties in walking and wearing shoes and cosmetic problems. There are many different conservative and surgical treatments which are applied according to the degree of deformity. The treatment method of correction of the deformity with a distal suture anchor without the need for osteotomy, which has not been previously described in literature, is presented in this paper when applied to cases of moderate hallux valgus as it was considered as an alternative treatment method because of complications occurring in osteotomy

Key words: Hallux Valgus, Treatment Outcome, Surgery.

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Introduction

Hallux valgus (HV) deformity was first identified by Carl Huster in 1871 (Dogan et al., 2007). HV, which is characterized by external angulation of the big toe, is actually a complex deformity including various pathologies (Karlı et al., 1991). Factors such as the type of foot, the foot structure, genetic, systemic and neuromuscular diseases may play a role separately or in combination in the etiology (Pehlivan, 2002). Many different conservative and surgical treatments have been described for this complex deformity which is seen at varying degrees. Although surgical treatment includes operations on the soft tissue and bone, complications in the osteotomy area and associated with the implant used can create problems in bone operations.

The technique of deformity correction with a distal suture anchor without the need for osteotomy is presented in literature for the first time in this paper as applied to cases determined with moderate level symptomatic HV.

Case Report

Patients and Surgical Technique

The study included 7 feet of 6 patients who were treated surgically for a diagnosis of hallux valgus after presenting at our clinic with complaints of foot pain and mis-shapen foot. Informed consent was obtained from all the patients. Age, gender, affected side, degree of HV, pre-operative and postoperative hallux valgus angle (HVA) and intermetatarsal angle (IMA), follow-up period and complications were examined in all patients.

Surgical technique: With the application of a tourniquet, an incision of approximately 5cm was made on the medial surface of the foot in the area including the 1st metatarsal and the proximal of the proximal phalanx, the capsule was opened longitudinally and the buniectomy procedure was applied. Then the adductor hallucis tenotomy was made with a 45˚ oblique incision of approximately 5cm on the dorsal side in the first web space. By stripping the periosteum in the area where the K-wires were to pass from the 2nd metatarsal medial and lateral surfaces, the first row was passed. In the area over the buniectomy, a 5mm anchor suture was placed obliquely so as not to press on the opposite cortex at approximately 2.5 cm proximal from the joint. After opening 2 holes approximately 1cm proximal and distal to the placed suture anchor, the threads of the suture anchor (2-2) were passed through these holes with 1.5mm K-wire (Figure 1). In the same way, the threads of the suture anchor were passed through holes opened in the 2nd metatarsal, thus protecting the nerve and vascular bundle. The first and second metatarsals were drawn together with a clamp, the deformity was corrected and the threads were tightly sutured on the 2nd metatarsal lateral surface (Figure 2). Preoperative and postoperative radiograph is shown in Figure 3.

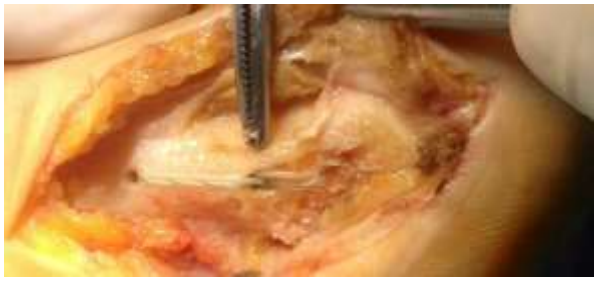

Figure 1. Intra-operative view of the obliquely placed distal suture anchor and the threads which have passed through.

Figure 2. Intra-operative view of the fixation after the deformity correction in the lateral of the threads passed from the 2nd metatarsal

Figure 3. Preoperative and postoperative radiographs

Results

The patients were 5 females and 1 male with a mean age of 46 years (range, 26-50 years). The affected foot was right side in 3 cases, left side in 2 and bilateral in 1. All the cases were moderate HV. Angulation measurements were determined as preoperative HVA 27.8±8.3, postoperative HVA 17.0±5.0, and amount of HVA correction 10.8±4.4, preoperative IMA 13.1±1.8, postoperative IMA 9.1±0.8, and amount of IMA correction 4.0±1.5. No

recurrence and no complications were observed throughout the follow-up of mean 10 months (range, 3-12 months). The characteristics of the cases are shown in Table 1.

Table 1. Characteristics of the cases

	Age (yrs)	Gender	Side	Preop HVA	Postop HVA	HVA correction	Preop IMA	Postop IMA	IMA correction	Follow-up (mths)
	26	F	Right	40	22	18	14	10	4	3
	50	M	Left	25	20	5	12	10	2	10
	49	F	Right	21	13	8	12	8	4	10
	47	F	Right	34	21	13	16	10	6	10
	46	F	Right	20	10	10	12	9	3	10
	46	F	Left	20	12	8	11	8	3	10
	46	F	Left	35	21	14	15	9	6	12

Discussion

When making decisions about HV treatment, the aim should be to achieve normal anatomy with an appropriate technique, taking into account the difference shown by each deformity (Oztuna et al., 2003). While mild deformities can be treated with soft tissue operations alone or with distal osteotomies, in deformities with a higher 1st-2nd metatarsal angle, it is recommended that proximal metatarsal osteotomy is applied first (Trnka, 2005). In osteotomies made with many different techniques and fixation materials, non-union, malunion, delayed union, avascular necrosis and implant-related problems may develop. In addition, although high success rates have been reported from all these techniques, there are technical difficulties in application (Honkamp and Rongstad., 2004; Erkan et al., 2007). When all these problems are taken into consideration, deformity correction without the need for an osteotomy provides a great advantage.

When literature is examined, it can be seen that many osteotomy techniques and results have been reported. Different procedures have been presented using absorbable screws, endobutton and absorbable proximal suture anchor (Haddon and Gunzy, 2008; Haddon et al., 2011; Holme 2011). In procedures made with absorbable implants, there is the advantage that no second surgical intervention is required to remove the implant. However, it has been reported in literature that stress fractures have occurred from the pressure in the lateral of the 2nd metatarsal of the metal button of the absorbable proximal suture anchor and the endobutton. In this respect, a great advantage of the new technique presented here is that the distal suture anchor does not contain a metal button and as suturing is applied to the lateral of the 2nd metatarsal, there is less pressure on the bone.

Limitations of the current study can be said to be that the number of cases was low, only cases of moderate HV were included, there was a risk of recurrence because of suturing, values below the normal upper values of the HVA and IMA angles could not be taken and there was no long-term follow up.

A moderate degree of HV deformity can be corrected without making a bone osteotomy with this method which has not been previously described in literature. Using our novel technique, the above-mentioned complications are not encountered. In conclusion, deformity correction with distal suture anchor can be considered a reliable alternative method in the treatment of moderate level HV.

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