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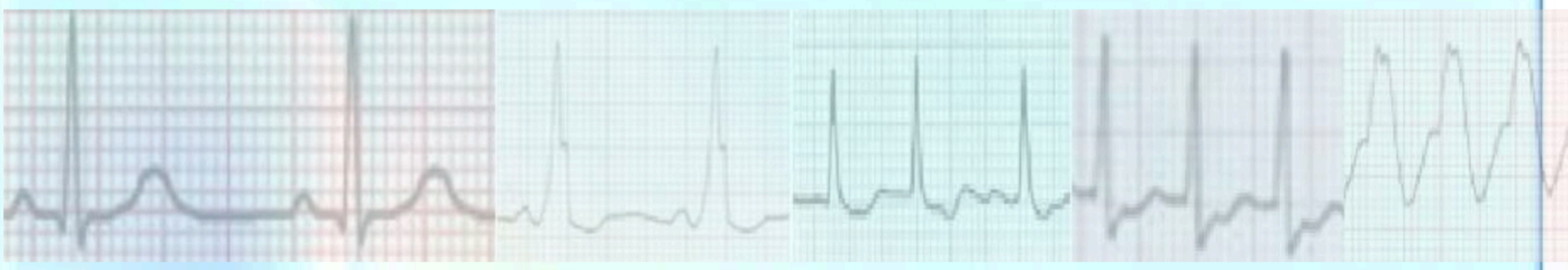

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Overview

The International Journal of Current Medical and Biological Sciences is an international, peer-reviewed, open-access electronic and conventional published journal in the English language. The journal accepts clinical and experimental studies, editorial articles, technical and educational reviews, clinical case reports, original images, letters to the editor, and congress abstracts that contribute to general medicine and academic studies.

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IJCMBS was established in 2021as open access and peer-reviewed journal that accepts articles in English. IJCMBS is published 3 times a year. Articles submitted should not have been previously published or be currently under consideration for publication any place else and should report original unpublished research results. The journal does not expect any fees for publication. All articles are available on the website of the journal with membership.

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ALL ARTICLES

Title page,

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It should be arranged as subtitles.

Authors' Open Researcher and Contributor ID **(ORCID ID)** information must be uploaded to the system during article submission.

The article part (except for the abstract, references, table, figure and subtitles) of the research reviews should not exceed **3500 words**, the abstract part should not exceed **250 words,** the references should **not exceed 40**,

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A plain and understandable writing language should be used in the text, scientific writing style should be adopted and unnecessary repetitions should be avoided. Writing; It should be written with 1.5 line spacing, Times New Roman 12 points. Pages should be numbered in the lower right corner. Manuscripts should be uploaded to the system in 2 files.

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The title of the article should not exceed 100 characters (letters) in research articles and 80 characters in case reports. The title should be written in both English and Turkish. The names and surnames of the authors who contributed to the study should be written clearly.

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A) Abstract

Title of the Article; It should be short, easy to understand and describe the content of the article. Turkish (Abstract) and English (Abstract) abstracts should have Turkish and English titles at the beginning. It should not exceed **250** words in research reviews and **150** words in case reports.

Abstracts, Bacground, Materials and Methods, Results, Conclusion, Keywords in Turkish research articles; In English research papers, it should consist of Background, Materials and Methods, Results, Conclusions, Key words sections.

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Keywords; At the end of the Turkish Abstract and English Abstract section, under the heading Keywords and Keywords, there should be a maximum of five keywords that capture the main titles of the scientific article and are written in accordance with the Index Medicus Medical Subject Headings (MeSH). Care should be taken to select the keywords from the Science Terms of Turkey (www.bilimterimleri.com).

Abbreviations in the text should be explained in parentheses where they are first used. Abbreviations should not be used in abstracts.

B) Article

It consists of Introduction, Material and method, Results, Discussion and Conclusion sections.

Introduction: Information that will explain the subject and the purpose of the study is given.

Material and method: The place, time, and planning of the study, as well as the elements and methods used,

should be reported. Data collection, characteristics of patients and individuals, characteristics of the experimental study, and statistical methods should be explained in detail.

Results: The obtained data should be given together with the statistical results.

Discussion: The results of the study should be evaluated by comparing with the literature data.

All spellings must comply with Turkish spelling rules and must be in accordance with punctuation marks. Abbreviations should be avoided as much as possible. References, figures, tables and pictures should be numbered in the order they appear in the text.

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If the journal is used as a source: year, volume, issue, start and end pages are given.

If a book is used as a source: only year, start and end pages are given. The surnames and initials of the authors should be written in the references. If the number of authors is **3** or less in the references, all author names are written. If the name of the author is more than **3,** instead of the names of the following authors, "et al." is written in English sources and "et al." in Turkish sources. Journal names should be abbreviated according to Index Medicus. The way of writing the reference should be like the examples below. References should be arranged in the language of the article and as seen in the examples below.

Sources from journals: Tascanov MB, Tanriverdi Z, Gungoren F, et al. Comparisons of microbiota-generated metabolites in patients with young and elderly acute coronary syndrome. Anatol J Cardiol. 2020;24(3):175-82.

Books; 1. Wagner G. S. Marriott's Practical electrocardiography, Tenth ed. Lippincott Williams Publisher, 2000: 124-129

Web article: Abood S. Quality improvement initiative in nursing homes: The ANA acts in an advisory role. Am J Nurs [serial on the Internet] 2002 [cited 12 Aug 2002]. Available from: www.nursingworld.org/AJN/2002/june/wawatch.htm

Website; Cancer-pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources [updated 16 May 2002; cited 9 July 2002]. Available from: www.cancer-pain.org

Thesis; Gezer R: Morphological Characteristics and Individual Differences of Rugae Palatines. Master Thesis, Şanlıurfa: Harran University Institute of Health Sciences, 2016.

D) Explanations

Financial resources, contributing institutions, organizations and individuals, if any, should be specified in this section.

E) Tables

Tables should be written on a separate page with 1.5 line spacing, each table should have a number and an explanatory name. If there are abbreviations in the table, their expansions should be written in alphabetical order under the table. Table numbering (Table 1. , Table 2., ...) should be given consecutive numbers and Roman numerals should not be used. Tables should be uploaded in the article on a separate page.

F) Figures and Pictures

Figures and pictures must be named and numbered. Numbering (Figure 1., Figure 2., …) should be given consecutive numbers and Roman numerals should not be used. Images should be clear and have a minimum resolution of 300 dots per inch (dpi). Images should be uploaded within the article on a separate page. If abbreviations are used under the figure and picture, the explanation of the abbreviations should be stated under the subtitle in alphabetical order. The magnification and technique of microscopic images should be explained. The editorial board can make any changes it deems necessary without changing the essence of the article.

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It is a must to prepare the manuscripts in accordance with research and publication ethics. The authors should state that they accept ethical principles in all human clinical research and that they conduct the research in accordance with these principles. Regarding these, in the Materials and Methods section: they obtained approval for each prospective and retrospective study from the ethics committee of the institution where the clinical research was conducted, and they obtained informed consent from the people who participated in the study or their guardians; In experimental studies on animals, they have to state that they protect animal rights and that they have received approval from the relevant experimental animal ethics committee. Regarding the results of experimental studies on humans or experimental animals, it is obligatory to submit an ethics committee approval document during the application to the journal. In the presence of the author(s), commercial link or institution providing financial support for the study; used commercial product, drug, company, etc. should inform the Editor on the presentation page. The absence of such a situation should also be stated on a separate page.

In studies that require ethics committee approval, the Ethics Committee Approval Document should be uploaded to the system during the article submission process, and the information about the permission (board name, date and issue number) should be stated in the material and method section, as well as in the explanations section after the discussion section of the article. Studies that require the approval of the Ethics Committee are as follows.

All kinds of research conducted with qualitative or quantitative approaches that require data collection from the participants by using survey, interview, focus group work, observation, experiment and interview techniques.

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Retrospective studies in accordance with the law on the protection of personal data, (If requested, the permission document obtained from the institution where the study was carried out should also be uploaded to the system when the archive is scanned.)

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Authors should write the topics that are requested to be corrected in the referee report as an answer in the answer section reserved for them. In addition, they should make the necessary changes in the article and resubmit them online by specifying (painting) them in the article

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Original Article

Review

Case Report

International Journal of Current Medical and Biological Sciences Volume 1, Issue 2:21-7:2021
Original Article

Approach to Cadavers Used in Anatomy Education: Dead Body Privacy and Medical Ethics

Anatomi Eğitiminde Kullanılan Kadavralara Yaklaşım: Ölü Beden Mahremiyeti ve Tıp Etiği

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Abstract

Background: The human cadavers have been the most valuable educational tool for medical students to learn the anatomical structures belonging to human body and to study on by touching and dissecting the real tissues and organs. It also important that the medical students to take a sensitive approach on cadavers and respect their privacy. The aim of the study was to evaluate and compare the opinions of the students attending the Faculty of Medicine of Bursa Uludag University and the anatomists of Turkish Universities in terms of medical ethics and raise the awareness of the confidentialities of the dead bodies.

Materials and Methods: A questionnaire, consisting of 23 questions were prepared using reliable and private online forms and shared with the students and academicians. SPSS 22.0 software package was used for the statistical analyses.

Results: The questionnaire were answered by 89 anatomists in Turkey and 553 students who have been attending Bursa Uludag University Faculty of Medicine. Statistically significance was observed in six different topics among 15 questions about approaching cadavers and dead body privacy between groups.

Conclusion: Cadavers, as the most valuable educational tools in anatomy education, are a part of a subject that must be meticulously focused on privacy and moral values. As it is seen from the answers privacy of dead bodies is one of the most important issues in relation to the human anatomy education.

Keywords: Anatomy, Cadaver, Medical students, Medical ethics

ÖZ

Amaç: İnsan kadavraları, tıp öğrencilerinin insan vücuduna ait anatomik yapıları öğrenmeleri, gerçek doku ve organlara dokunarak ve inceleyerek üzerinde çalışabilmeleri için en değerli eğitim aracı olmuştur. Tıp öğrencilerinin kadavra konusunda duyarlı olmaları ve mahremiyete saygı göstermeleri önemlidir. Araştırmanın amacı, Bursa Uludağ Üniversitesi Tıp Fakültesi'ne devam eden öğrenciler ile Türkiye'deki üniversitelerdeki anatomistlerin görüşlerini tıp etiği açısından değerlendirip karşılaştırmak ve cenazenin mahremiyeti konusunda farkındalık yaratmaktır.

Gereç ve Yöntem: Güvenilir ve özel çevrimiçi formlar kullanılarak 23 sorudan oluşan bir anket hazırlanarak öğrenciler ve akademisyenler ile paylaşılmıştır. İstatistiksel analizler için SPSS 22.0 paket programı kullanılmıştır.

Bulgular: Bursa Uludağ Üniversitesi Tıp Fakültesi'ne devam eden 553 öğrenci ile Türkiye'deki 89 anatomist anket formlarını yanıtladı. Kadavraya yaklaşım ve ölü beden mahremiyeti ile ilgili 15 sorudan altı farklı soruda gruplar arasında istatistiksel olarak anlamlılık gözlendi.

Sonuç: Anatomi eğitiminde en değerli eğitim aracı olan kadavralar, mahremiyet ve ahlaki değerler üzerinde titizlikle durulması gereken bir konunun parçasıdır. Cevaplardan da anlaşılacağı gibi, insan anatomisi eğitimi ile ilgili en önemli konulardan biri de ölü bedenlerin mahremiyetidir.

Anahtar kelimeler: Anatomi, Kadavra, Tıp öğrencileri, Tıp etiği

Introduction

Among the medical disciplines, anatomical sciences have been one of the cornerstones of the medical education and the oldest branches of basic medical sciences. By studying and / or observing the details of the human body, the students can be able to learn the relationships between the anatomical structures and their basic functions (1-3).

It has been believed that the cadaver dissections contributed the anatomy knowledge three dimensionally, and additionally it also advanced the essential surgical skills and attitudes in the name of professionalism in terms of patient-physician relationships, ethics and moral values (4-6).

Providing the cadavers for dissection studies and medical education has been appeared to be most important difficulty or problem in the anatomical sciences since the beginning. To solve this problem, the dead bodies of criminals were used for a long time. Due to that, after the social reactions related to using the corpses of criminals, unclaimed peoples' bodies after death were began to be used as an alternative way. This solution has also brought new ethical debates with it on the point of whether the poor and unclaimed people in the society have been informally abused in the name of science. Since half of 20th century, donated bodies by volunteers have become a most accurate and legal source of obtaining cadaver as a solution to the ethical debates (7).

Anatomy education has been more effective in practice way but the lack of access to cadaver has been leaded the different methods in education like social media in order to reach more people. Using social media in anatomy education has brought a debate on dead body privacy, ethical, moral and legal aspects about sharing the human remains with the public (8).

Cadaver dissection or studying on a dissected cadaver has been essential at anatomy learning for medical students. As we know, the limitations of obtaining the cadavers, increasing numbers of students and fewer materials lead the students to take pictures of cadavers at laboratories to study later and has leaded to share with other students. Using the social media networks has brought some ethical debates when the cadaver images were shared and stored in virtual places. It can be considered that those situations might cause a decrease of the body donating for scientific or educational purposes. The aim of this study was to evaluate the thoughts of the medical students of the Bursa Uludag University and academicians in anatomy departments of different universities in Turkey and to increase awareness about dead body privacy with the collaboration of Anatomy and Medical Ethics departments.

Material and Method

Questionnaire form:

Two different groups that included in the study were the students attending the Faculty of Medicine of Bursa Uludag University and faculty members and assistants of anatomy departments in different medical faculties of Turkish Universities. Two separate questionnaire forms prepared to contain a set of three questions for demographic information (Part A), four questions about using cadaver at anatomy learning and medical ethics education (Part B) and fifteen questions to get the thoughts about approaching to cadaver used at anatomy education and dead body privacy (Part C) were prepared. The questions of the part C were formed as compatible to 5-point Likert Scale.

Data Collection 1: *Faculty members and assistants of anatomy departments*

The first questionnaire form approved by Uludag University Medical Faculty Clinical Research Ethics Committee Decision dated on 04.07.2017 and numbered 2017-10/33 prior to the study. The form has been made accessible on internet with the link address https://goo.gl/forms/5iXMa0zvByw7DYoz1 and the address was shared only by voluntary participants.

Data Collection 2: *Students of Faculty of Medicine of Uludag University*

The second questionnaire form approved by Uludag University Medical Faculty Clinical Research Ethics Committee Decision (04.07.2017-2017-10/34), was used for grades 1 to 6 students of Faculty of Medicine of Uludag University. The form has been made accessible on internet with the link address "https://goo.gl/forms/dPbqVgoQDWpD9vDr1", the address was shared only by voluntary participants.

SPSS 22.0 (Statistical Package for the Social Sciences) was performed for statistical analysis.

The frequency analyses were used for the answers given and Student's t–test were performed for comparing the answers of two groups.

Results

A: Demographic Information:

1. Faculty members and assistants of Anatomy departments

The questionnaire was answered by 89 anatomy academicians (42 males (47.2%), 47 females (52.8%) from 29 different universities in Turkey. Distribution of academic title was given in figure 1 and age distribution in figure 2.

2. Students of Faculty of Medicine of Bursa Uludag University

The questionnaire form was answered by 553 students (272 males (49.2%), 281 females (50.8%). Distribution of grates was given in figure 3 and age distribution in figure 4.

B: Using the cadavers at anatomy learning and medical ethics education:

The answers of questions about using the cadavers at anatomy learning and questions related to their medical ethics education were given in table1.

Table 1. The answers about using the cadavers at anatomy education and the answers related to their medical ethics education

Questions	Faculty members and assistants (n=89)		Students (n=553)	
	Yes	No	Yes	No
1. Did you dissect cadaver at your anatomy education?	85.4%	14.6%	83.4%	16.6%
2. Did you use dissected cadaver at your anatomy practice classes?	92.1%	7.9%	96.7%	3.3%
3. Do you use cadaver at anatomy education at your school?	96.6%	3.4%	98.7%	1.3%
4. Did you study medical ethics during your education?	68.5%	31.5%	96%	4%

C: Thoughts about approaching to a cadaver used in anatomy education and dead body privacy:

The great majority of respondents of both faculty members and assistants of anatomical sciences (89.9%) and students (78.8%) strongly agreed that the human body must be valued and respected during life and after death because of human is a valuable asset. On the point of sharing photographs or videos taken with cadavers in social media, both anatomy academicians/assistants and students stated that they are strongly disagree about that subject (83.1% and 70.2%, respectively) (Table 2, Table 3). When the scores of the answers given by anatomy academicians/assistants and students compared (Table 4), it was observed that there was strongly statistically significant difference between two groups on the issues of "The cadaver should be in a more respected position because of the training anatomy education contribution" ($p< 0.001$), "The point of view towards the cadaver is as sensitive and important as approaching the patient" ($p< 0.001$), "I warn the people who share cadaver images in social media" ($p< 0.001$), "Cadaver dissections should not be performed except in the anatomy laboratories or surgical sciences in hospitals" ($p=0.001$), "Sharing the photos / videos including cadaver images" ($p=0.002$), "The acquisition of the sense of ethics and privacy related to the cadaver is important in terms of medical ethics and patient privacy" ($p=0.001$).

Table 2. Thoughts of the academicians/assistants about approaching to cadaver used at anatomy education and dead body privacy

Questions	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Human is a valuable asset. For this reason, the human body must be valued and respected during life and after death.	1.1%	1.1%	0%	7.9%	89.9%
2. Even if a cadaver is a lifeless body. it is necessary to respect his privacy.	1.1%	2.2%	3.4%	11.2%	82%
3. The cadaver should be in a more respected position because it contributes to anatomy education.	1.1%	1.1%	2.2%	12.4%	83.1%
4. The point of view towards the cadaver is as sensitive and important as approaching the patient.	1.1%	2.2%	2.2%	2.5%	71.9%
5. On the right of privacy, covering the face of the cadaver during the dissection is a human delicacy that should not be neglected.	4.5%	9%	21.3%	31.5%	33.7%
6. Memories taken from cadavers can be shared in social media (Facebook, Instagram, Twitter, snapchat, etc.).	83.1%	9%	5.6%	1.1%	1.1%
7. Cadaver dissections can be performed outside of anatomy rooms or surgical units in hospitals (congress centre, hotel, etc.).	59.6%	20.2%	7.9%	7.9%	4.5%
8. It makes me uncomfortable to see the photo or video of my acquaintance, who has donated his body, in social media.	0%	3.4%	6.7%	19.1%	70.8%
9. I warn the people who share cadaver images in social media.	1.1%	1.1%	7.9%	29.2%	60.7%
10. Cadaver dissections should not be performed except in the anatomy laboratories or surgical sciences in hospitals.	2.2%	5.6%	5.6%	23.6%	62.9%
11. Sharing the photos / videos including cadaver images on social media is not ethical.	0%	1.1%	5.6%	15.7%	77.5%
12. I would prefer to dissect the donated body	2.2%	6.7%	29.2%	34.8%	27%
13. I would prefer to dissect the body belonging unclaimed	9%	25.8%	50.6%	12.4%	2.2%
14. The acquisition of the sense of ethics and privacy related to the cadaver is important in terms of medical ethics and patient privacy.	0%	0%	3.4%	24.7%	71.9%
15. Sharing cadaver photos / videos on social media negatively affects cadaver donation.	2.2%	2.2%	7.9%	29.2%	58.4%

Additionally, statistically significant difference was observed on the topics of "Human is a valuable asset. For this reason, the human body must be valued and respected during life and after death" (p=0.027), "Even if a cadaver is a lifeless body, it is necessary to respect his privacy" (p=0.028), "Memories taken from cadavers can be shared in social media" (p=0.047), "Cadaver dissections can be performed outside of anatomy rooms or surgical units in hospitals (congress centre, hotel, etc.)" (p=0.023) (Table4).

Table3. Thoughts of the students about approaching to cadaver used at anatomy education and dead body privacy.

Questions	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1. Human is a valuable asset. For this reason, the human body must be valued and respected during life and after death.	2%	1.3%	1.6%	16.3%	78.8%
2. Even if a cadaver is a lifeless body, it is necessary to respect his privacy.	2.4%	2.9%	4.3%	21.9%	68.5%
3. The cadaver should be in a more respected position because of the training anatomy education contribution.	2%	2.7%	2.5%	34.0%	56.8%
4. The point of view towards the cadaver is as sensitive and important as approaching the patient.	1.8%	8.3%	4.1%	34.5%	41.2%
5. On the right of privacy, covering the face of the cadaver during the dissection is a human delicacy that should not be neglected.	5.2%	13%	26%	26.8%	28.9%
6. Memories taken from cadavers can be shared in social media (Facebook, Instagram, Twitter, snapchat, etc.).	70.2%	20.3%	5.4%	2.7%	1.4%
7. Cadaver dissections can be performed outside of anatomy rooms or surgical units in hospitals (congress centre, hotel, etc.).	35.6%	35.8%	16.1%	9.9%	2.5%
8. It makes me uncomfortable to see the photo or video of my acquaintance, who has donated his body, in social media.	2.4%	3.6%	6.0%	26%	62%
9. I warn the people who share cadaver images in social media.	2%	4.7%	20.3%	44.3%	28.8%
10. Cadaver dissections should not be performed except in the anatomy laboratories or surgical sciences in hospitals.	2.2%	6.9%	15.7%	38.7%	36.1%
11. Sharing the photos / videos including cadaver images on social media is not ethical.	1.8%	2.2%	5.8%	29.3%	60.9%
12. I would prefer to dissect the donated body	1.1%	4.5%	25.1%	40.9%	28.4%
13. I would prefer to dissect the body belonging unclaimed	12.3%	28.9%	47.4%	9.2%	2%
14. The acquisition of the sense of ethics and privacy related to the cadaver is important in terms of medical ethics and patient privacy.	0.9%	0.9%	4.5%	37.3%	56.4%
15. Sharing cadaver photos / videos on social media negatively affects cadaver donation.	1.4%	3.4%	8.9%	34.5%	51.7%

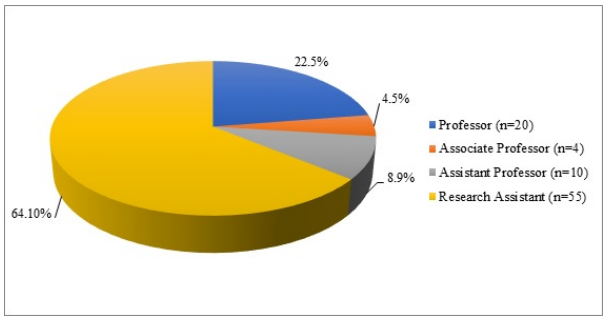

Figure 1. Distribution of academic titles

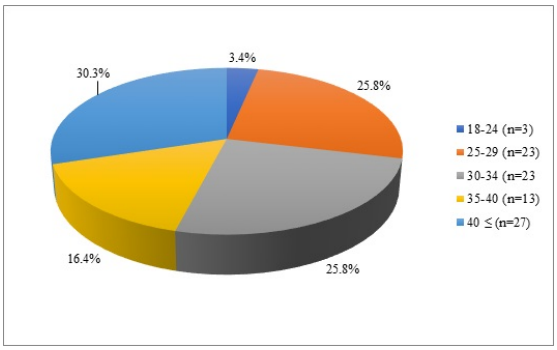

Figure 2. Age distribution of assistants and members of different faculties

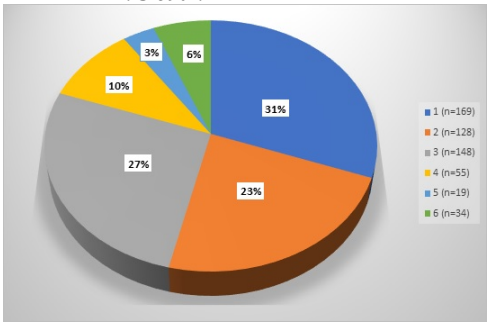

Figure 3. Distribution of grades

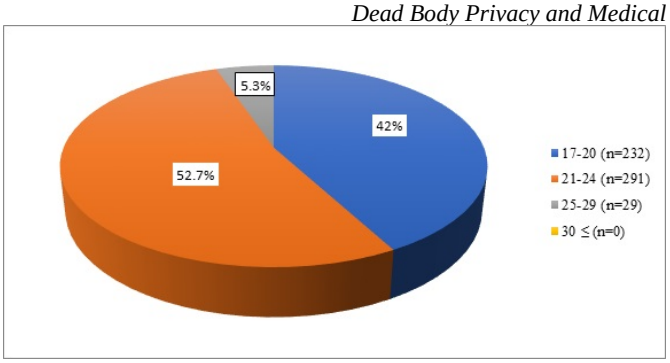

Figure 4. Age distribution of the students

Table4. Comparison of the answers given by anatomy academicians and students

Questions	Anatomy Academicians (n=89)	Students (n=553)	p
	Mean ± S.D.	Mean ± S.D.	
1. Human is a valuable asset. For this reason, the human body must be valued and respected during life and after death.	4.84 ± 0.58	4.68 ± 0.75	0.027
2. Even if a cadaver is a lifeless body, it is necessary to respect his privacy.	4.70 ± 0.74	4.51 ± 0.89	0.028
3. The cadaver should be in a more respected position because it contributes to anatomy education.	4.75 ± 0.66	4.41 ± 0.85	<0.001
4. The point of view towards the cadaver is as sensitive and important as approaching the patient.	4.61 ± 0.74	4.05 ± 1.02	<0.001
5. On the right of privacy, covering the face of the cadaver during the dissection is a human delicacy that should not be neglected.	3.81 ± 1.13	3.61 ± 1.18	0.132
6. Memories taken from cadavers can be shared in social media (Facebook, Instagram, Twitter, snapchat, etc.).	1.28 ± 0.72	1.45 ± 0.83	0.047
7. Cadaver dissections can be performed outside of anatomy rooms or surgical units in hospitals (congress centre, hotel, etc.).	1.77 ± 1.16	2.07 ± 1.06	0.023
8. It makes me uncomfortable to see the photo or video of my acquaintance, who has donated his body, in social media.	4.57 ± 0.76	4.41 ± 0.92	0.088
9. I warn the people who share cadaver images in social media.	4.47 ± 0.78	3.93 ± 0.92	<0.001
10. Cadaver dissections should not be performed except in the anatomy laboratories or surgical sciences in hospitals.	4.39 ± 0.98	4.01 ± 0.99	0.001
11. Sharing the photos / videos including cadaver images on social media is not ethical.	4.69 ± 0.62	4.45 ± 0.84	0.002
12. I would prefer to dissect the donated body	3.77 ± 0.99	3.91 ± 0.89	0.235
13. I would prefer to dissect the body belonging unclaimed	2.73 ± 0.87	2.59 ± 0.89	0.174
14. The acquisition of the sense of ethics and privacy related to the cadaver is important in terms of medical ethics and patient privacy.	4.68 ± 0.53	4.47 ± 0.71	0.001
15. Sharing cadaver photos / videos on social media negatively affects cadaver donation.	4.39 ± 0.89	4.31 ± 0.68	0.455

Table 5. Similar questions of current study, Erbay et. al. (2015) and Ögenler et al. (2014)

Questions	Ogenler et al. (2014)	Erbay et al. (2015)	Current Study	
			Academicians/ Assistants	Students
Human is a valuable asset. For this reason, the human body must be valued and respected during life and after death.	9.87 ± 0.56	4.27 ± 1.04	4.84 ± 0.58	4.68 ± 0.75
The cadaver should be in a more respected position because of the training anatomy education contribution	8.06 ± 2.97	3.60 ± 1.12	4.75 ± 0.66	4.41 ± 0.85
On the right of privacy, covering the face of the cadaver during the dissection is a human delicacy that should not be neglected.	6.01 ± 3.30	3.27 ± 1.19	3.81 ± 1.13	3.61 ±1.18

Discussion

Cadaver demonstrations in anatomy classes is one of the most important elements that distinguish anatomy courses from other courses or lessons; however, some inappropriate approaches, behaviours or jokes can be occasionally observed in those classes as undesirable conditions and a misstep for the medical education especially in terms of medical humanities. While the objectifying a dead body is important for understanding the anatomy courses, this instance is not an element or argument that will prevent us to respecting it. On the contrary, studying on a cadaver requires sensitivity and modesty (9). The dissection of the body or studying on dissected cadaver must have been carried out with a profound respect because of the right of the privacy involves the after death, too (10). In this respect, anatomists are given the responsibility to integrate medical ethics into traditional anatomy courses. The dissection has been essential and ideal technique not only for learning the anatomy three-dimensionally but also a step towards the humanistic approach. The main ethical concern of dissection of the body or studying on the dissected cadavers has been lying in the respect to human life besides to thinking of death and human mortality. These values that the students obtain during the anatomy classes will be a factor complementing their clinical training phase (11-13). Approaching to cadavers with exclusive respect and dignity during the training process can also enhance the body donations and public awareness (13).

It must be considered that some ethical dilemmas can be resolved through debates between different branches of science as well as among medical professionals, ethicists, lawyers, politicians and the public. The anatomists have also taken an important part in this interdisciplinary group on the issue of respecting the dead body and protecting the human privacy (14). If ethics and professionalism were essential to be a "good doctor", the curriculum should be inward with the relevant and profound topics (15). In the study of Kara et al. 2012, the students stated that they regard the anatomists as examples at anatomy classes on the point of respecting the human body and they understand during their course of training with cadavers that they are persons and didn't lose their values of existence after death.

We are aware that there are some improper situations between popular media and medicine recent years, and it is increased by the access power of the media.

Some sensationalistic topics began to seen as: "Medical students' cadaver photos get scrutiny after images show up online", "Nursing students expelled from university after posting pictures of themselves posing with a human placenta on Facebook", "Fired for Facebook: ER personnel lost their jobs for online posts", etc. An exponential increase in the use of social sharing platforms and practices is also associated with concerns about privacy and responsibility for healthcare professions (16,17). On this point, beside dissecting the body or treating the cadaver sensitively, respecting the privacy of the deceased has been essential at anatomy teaching (18).

In the study of Ögenler et al. 2017, they obtained the thoughts of 201 students of Mersin University about privacy of cadavers. They scored the answers between 0 and 10 points. They obtained the results (means±SD) by asking the following questions given as examples; "Taking photos or videos of dead body in order to keep in memory (4.09±3.736)", "The privacy of a dead body must be protected and people who are not interested should be prevented from seeing or having information about deceased (7.77±3.132)", "The images (photo/video) taking part in mass media (television, internet sites, magazines etc.) is inconvenient (7.28±3.205)" (19). In our study we asked the question that "Sharing the photos / videos including cadaver images on social media is not ethical" and our results were 4.69±0.62 and 4.45±0.84; academicians/assistants and students, respectively.

In the study of Erbay et al. 2015, (scored 1-5) the authors obtained the results (means±SD) by asking the following questions given as examples; "Students should not be opposed to taking souvenir photographs with cadavers (2.42 ± 1.39), "Exhibiting of the dead human body in public areas for non-educational purposes, adversely affecting cadaver donation (3.79 ± 1.02). Similar question in our study was "Sharing cadaver photos / videos on social media negatively affects cadaver donation (academicians/assistants; 4.39±0.89 and students; 4.31 ± 0.68) (20). In the study of Ögenler et al. 2014, (Scored 1-10) they also asked a similar question: "It is an application that should not be disputed because students have to take a souvenir photo together with the cadaver (1.39±2.68) (21). Other similar questions and results in the studies of Ögenler et al. and Erbay et al. were given at Table 5. Hennessy et al. 2020 studied about social media use in Anatomy education. The 50 delegates joined to two-hours workshop. The attendees gave feedback about the usefulness of the different social media. Besides they declared that a growing concern for the ethical challenges in anatomy education because of sharing cadaver images on social media (22).

Conclusion

Anatomy has been a medical discipline of science that the students first meet the human body and in which they feel that they would become a doctor. In this sense of cadaver as a first patient model, they study on cadavers in anatomy classes. It must have seen as a living being, rather than objectifying the cadaver because of its lifeless body. So, the students should acquire the first ethical values of human body and death related to patient privacy in the first years of their education. In this context, the ethical concern and things to do about privacy of dead bodies should take part among the essential education strategies of anatomists. It is necessary to organize activities like panels, multimedia-based discussions etc. about approaching the cadavers dead body privacy and ethics in cooperation with medical ethics department, other relevant departments, boards or institutions.

References

1. Moore KL, Dalley A. Clinically Oriented Anatomy. Lippincott Williams & Wilkins 2 1999.
2. Gökmen GF. Sistematik Anatomi. Izmir Güven Kitabevi 1, 2003.
3. Sindel M, Şenol Y. Akdeniz Üniversitesi Tıp Fakültesinde Anatomi Eğitiminin Öğrenciler Tarafından Değerlendirilmesi. Tıp Eğitimi Dünyası 2008;28(28):31-36.
4. Ajita R. Singh YI. Body donation and its relevance in anatomy learning. J. Anat. Soc. India. 2007; 56:44–47.
5. Arraez-Aybar LA, Bueno-Lopez JL, Moxham BJ. Anatomists' views on human body dissection and donation: An international survey. Annals of Anatomy. 2014; 196:376–386.
6. Boulware LE, Ratner LE, Coooper LA et al. Whole Body Donation for Medical Science: A Population-Based Study. Clinical Anatomy. 2004; 17:570–77.
7. Şehirli Ü, Saka E, Sarikaya Ö. Attitudes of Turkish Anatomists Toward Cadaver Donation. Clinical Anatomy. 2004; 17:677–681.
8. Rai R, Shereen R, Protas M et al. Social Media and Cadaveric Dissection: A Survey Study. Clinical Anatomy. 2019; 32:1033–1041.
9. Kara A, Ögenler O, Elvan Ö Anatomi Anıları. İnönü Üniversitesi Tıp Fakültesi Dergisi. 2012;19(1):54-6.
10. Morar S, Perju-Dumbrava D, Cristian A. Ethical and Legal Aspects of the Use of the Dead Human Body for Teaching and Scientific Purposes. Romanian Journal of Bioethics. 2008;6(4):75-83.
11. Shaikh ST. Cadaver Dissection in Anatomy: The Ethical Aspect, Anat Physiol. 2015;5(5):1-2.
12. Williams AD, Greenwald EE, Soricelli RL, DePeace DM. Medical Students' Reactions to Anatomic Dissection and the Phenomenon of Cadaver Naming. Anat Sci Educ. 2014; 7:169–180.
13. Zhang L. Wang Y, Xiao M, et al. An Ethical Solution to the Challenges in Teaching Anatomy with Dissection in the Chinese Culture. Anat Sci Edu. 2008; 1:56–59.
14. Satyapal KS. Ethics, Transplantation, and the Changing Role of Anatomists. Clin. Anat. 2005; 18:150–153.
15. Saad TC, Riley, Hain RA. Medical curriculum in transition: audit and student perspective of undergraduate teaching of ethics and professionalism. J Med Ethics. 2017; 43:766–770.
16. Hade RAL, Brown ED. Patient Privacy and Social Media. AANA Journal. 2010;78(4):270-74.
17. White J, Kirwan P, Lai K et al. 'Have you seen what is on Facebook?' The use of social networking software by healthcare professions students. BMJ Open. 2013;3: e003013.
18. Jones DG. Anatomical Investigations and Their Ethical Dilemmas. Clin Anat. 2007; 20:338–343.
19. Ögenler O, Kadıoğlu NS. Ölü İnsan Bedeni ile İlişkiler: Mersin Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu Öğrencilerinin Görüşleri. Türkiye Biyoetik Dergisi. 2017;(1):3-13.
20. Erbay H, Bilir A, Gönül Yet al. Tıp fakültesi öğrencilerinin kadavra algısı ve eğitimde kadavra kullanımına yönelik yaklaşımları. Türkiye Biyoetik Dergisi. 2015;2(1);63-72.
21. Ögenler O, Kara A, Kadıoğlu S et al.Sungur MA. Bir grup anatomi öğretim elemanının kadavra ve eğitimde kadavrakullanma hakkındaki görüşleri. Türkiye Biyoetik Dergisi. 2014;1(1):57-68.
22. Hennessy C, Brown K, Mike P et al. 21st Century Anatomists: Social Media Use in Anatomy Education and Research. International Federation of Associations of Anatomists 19th Congress 2020, Abstract Book, 363.

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Original Article

Morphometric evaluation of the relationship between the osseous orifice of the auditory tube and the other cranial base structures on the adult skulls

Erişkin kafataslarında östaki borusunun kemik parçasının kafatası tabanında yer alan diğer oluşumlar ile olan ilişkisinin morfometrik değerlendirilmesi

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Abstract

Background: The eustachian tube consists of cartilage, fibrocartilagenous part and osseous part anteriorly from lateral to medial. Functional evaluation of the auditory tube has become important in myringoplasty and tympanoplastic procedures and also 3-dimensional (3D) modeling. The aim of the study is to perform morphometric measurements of the bony part of the tube and relation with the other anatomical formations at the base of the skull and to give the descriptive values of these values.

Materials and Methods: In the study, measurements of 12 variables were carried out using 26 dry skulls belonging to the bone collection of Uludag University Faculty of Medicine, Department of Anatomy. Measurements were made with Somet Inox caliper and SPSS 22.0 program was used for statistical analysis.

Results: The mean values of the parameters are given. It was observed that the distances between the right and left lateral and medial edges of the osseous orifice of the auditory tube were in relation with each other. In addition, it was also determined that these distances and the bilateral medial pterygoid distance showed a high correlation.

Conclusion: As a result, data were provided for 3-dimensional functional models using the eustachian bone part and the correlation values between the variables were evaluated.

Key Words: Auditory tube, osseous part, cranial base, morphometry

ÖZ

Amaç: Östaki borusu, en dıştan içe doğru kıkırdak, fibrokartilaginöz ve kemik kısımlardan oluşmaktadır. Östaki borusunun işlevsel olarak değerlendirilmesi miringoplasti, timpanoplastik prosedürlerde ve ayrıca 3 boyutlu modellemelerde önemli hale gelmiştir. Çalışmanın amacı, östaki borusunun kemik kısmı ile ilgili morfometrik ölçümler gerçekleştirmek ve kafatası tabanında yer alan diğer anatomik oluşumlar ile bu değerlerin tanımlayıcı değerlerini vermektir.

Materyal ve metod: Çalışma, Uludağ Üniversitesi Tıp Fakültesi Anatomi Anabilim Dalı kemik koleksiyonuna ait 26 adet kuru kafatası kullanılarak belirlenen 12 değişkene ait ölçümler gerçekleştirilmiştir. Ölçümler Somet Inox sürme kumpas ile yapılmış ve istatistiksel analizler için SPSS 22.0 programı kullanılmıştır.

Bulgular: Ölçülen değerlere ait ortalama değerleri verilmiştir. Kemik alanın sağ ve sol lateral ve medial kenarları arasındaki mesafelerin birbiri ile ilişkide olduğu görülmüştür. Ayrıca yine bu mesafeler ile bilateral medial pterygoid mesafenin de yüksek korelasyon gösterdiği belirlenmiştir.

Sonuç: Sonuç olarak östaki kemik kısmı kullanılarak 3 boyutlu fonksiyonel modellemeler için veri sağlanmış olup ayrıca değişkenler arası korelasyon değerlerini değerlendirilmiştir.

Anahtar Kelimeler: Östaki borusu, kemik kısım, kafatası tabanı, morfometri

Introduction

The eustachian or auditory tube is a shape like a funnel channel that connects the middle ear and nasopharynx (1). The posterolateral part of the auditory tube is formed with the osseous part and its orifice, junctional or membrano-cartilginous part and the cartilaginous anteromedial part (1,2). The osseous portion of the canal is mainly located in the petrous part of the temporal bone. The cartilage part has a more complex structure, and it forms the functional part of the tube. The main function of the tube is the ventilation, protection and clearance of the middle ear (2,3). It is the part of the contiguous organs which includes the nose, middle ear, nasopharynx, and also mastoid air cells. Disruption in the systems cause problems with functional middle ear ventilation and this are the main cause of the chronic otitis media (4).

Magnetic resonance imaging (MRI) is an excellent method of evaluating anatomical points around the auditory tube. Although a small number of human cadavers are present in studies with temporal bones, some details still need to be discussed for example, 3D anatomy of the auditory tube and functional relationship with the tensor veli palatini muscle (5,6). The anatomy of the auditory tube and its related muscles has been described in the literature (7,8). The vectorial relationship between the tensor veli palatini muscle and the cranial base are structures that are important in determining the effectiveness of middle ear pressure regulation and are also necessary parameters for modeling the auditory tube function (9).

A method that shows the vector relationships between tensor veli palatini muscle, the anterior osseous orifice of the auditory tube and the cranial base from measurements on adult human skulls has been described (9,10). The aim of this study is to provide data for 3D computer-generated functional models of the osseous part of the auditory tube and to evaluate the correlation values.

Material and Method

The study was carried out on 26 adult dry skulls in xxx University Anatomy Department of the Medicine Faculty. The bones which have deformities or fractures were excluded from the study. For the measurements, Somet Inox brand mechanical caliper with 1/20 mm precision was used. A total of 12 parameters (Figure 1 and Figure 2) were evaluated in the study. The parameters are respectively;

1-The distance between lateral margins of the right and left osseous orifice of the auditory tube

2-The distance between medial margins of the right and left osseous orifice of the auditory tube

3-The distance between the right and left hamular process

4-The distance between the right and left basal lamina of the pterygoid process

5-The distance between the right and left medial pterygoid tubercle

6-The distance between the posterior nasal spine and the midpoint of the anterior margin of the foramen magnum

7-The distance between the center of the osseous orifice of the auditory tube and the basal lamina of the pterygoid process for the right and left sides

8-The distance between the center of the osseous orifice of the auditory tube and the medial pterygoid tubercle for the right and left sides

9-The distance between the osseous orifice of the auditory tube and the midpoint of the anterior margin of the foramen magnum for the right and left sides

10-The distance between the medial pterygoid tubercle and the midpoint of the anterior margin of the foramen magnum for the right and left sides

11-The distance between the basal lamina of the pterygoid tubercle and the midpoint of the anterior margin of the foramen magnum for the right and left sides

12-The distance between posterior nasal spine and the midpoint of the ala of the vomer

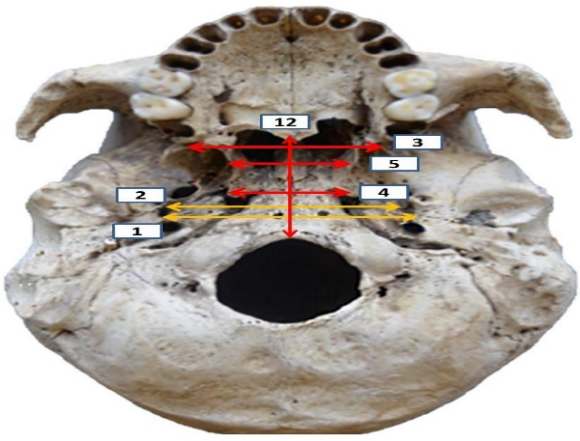

Figure 1. Parameters of the osseous orifice of the auditory tube

1. The distance between lateral margins of the OAE; **2.** The distance between medial margins of the OAE; **3.** The distance between the right and left HP; **4.** The distance between the right and left BPT; **5.** The distance between the right and left medial PT; **12.** The distance between PNS and the midpoint of the ala of the vomer

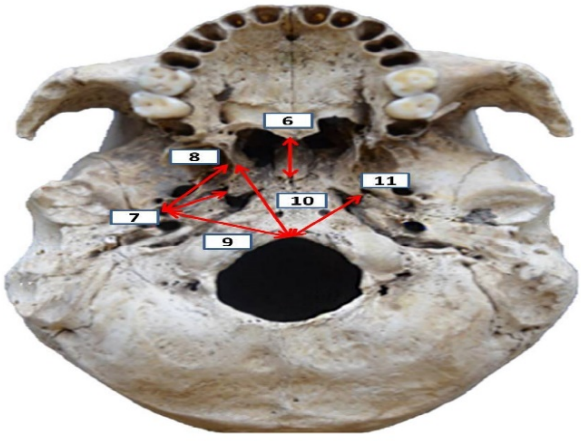

Figure 2. Parameters of the osseous orifice of the auditory tube (continue)

6. The distance between the PNS and FM; **7.** The distance between the center of the OAE and the BPP for the right and left side; **8.** The distance between center of the OAE and the medial PT for the right and left side; **9.** The distance between the OAE and FM for the right and left side; **10.** The distance between the medial PT and FM for the right and left side; **11.** The distance between the BPP and FM for the right and left side

Statistical analyses

The statistical analyses were performed with SPSS 22.0 software (IBM). For the determination of the relations of the variables, Spearman analysis was conducted ($p<0.05$).

Results

The mean and standard deviation values of the measurements were shown in Table 1 and no side difference was observed between the right and left sides. According to the Spearman correlation analysis, it was observed that the highest correlation coefficient value existed between the medial and lateral edges of the osseous orifice of the auditory tube (R=0.904). It was also determined that the distances between the lateral edges of the osseous orifice of the auditory tube and the medial edges have correlated with the distance between the right and left medial pterygoid tubercle (R=0.741 and R=0.782 respectively). The distance between the right and left hamular process and the distance between the right and left basal lamina of the pterygoid process showed a correlation (R=0.743). The distance between the right and left basal lamina of the pterygoid process and the distance between the right and left medial pterygoid tubercle showed a high correlation and the coefficient value was 0.834. It has been found that the distance between the posterior nasal spine and ala of the vomer was related to the distance between the midpoint of the anterior of the foramen magnum and basal lamina of the pterygoid tubercle for the right and left sides (R=0.817 and R=0.832 respectively). The coefficient values of the variables were shown in Table 2.

Table 1. Descriptive values of the parameters of the osseous orifice of the auditory tube

Parameters	Mean±S.D.	Range (mm)
1. The distance between lateral margins of the OAE	59.80±3.81	53.00-65.00
2. The distance between medial margins of the OAE	57.95±4.30	49.00-64.00
3. The distance between the right and left HP	36.31±4.38	31.00-45.00
4. The distance between the right and left BPT	27.22±4.02	22.00-35.00
5. The distance between the right and left medial PT	28.20±3.26	23.00-34.00
6. The distance between the PNS and FM	38.60±4.12	33.00-46.00
7. The distance between the center of the OAE and the BPP for the right side	16.78±2.65	12.00-21.00
The distance between center of the OAE and the BPP for the left side	16.28±3.55	16.00-22.00
8. The distance between center of the OAE and the medial PT for the right side	25.00±2.42	22.00-31.00
The distance between center of the OAE and the medial PT for the left side	23.88±3.02	19.00-33.00
9. The distance between the OAE and FM for the right side	31.61±2.88	27.00-38.00
The distance between the OAE and FM for the left side	31.06±2.69	27.00-36.00
10. The distance between the medial PT and FM for the right side	33.06±3.49	24.00-38.00
The distance between the medial PT and FM for the left side	32.80±3.26	26.00-39.00
11. The distance between the BPP and FM for the right side	26.00±2.76	21.00-32.00
The distance between the medial PT and FM for the left side	25.41±2.92	19.00-32.00
12. The distance between PNS and the midpoint of the ala of the vomer	21.50±3.81	13.00-27.00

* S.D.: Standart Deviation; OAE: Osseous orifice of the auditory tube; HP: Hamular process; BPP: Basal lamina of the pterygoid processus; PT: Pterygoid tubercle; PNS: Posterior nasal spine; FM: midpoint of the anterior margin of the foramen magnum

Table 2. Correlation values between variables (Spearman correlation analysis, $p<0.05$)

Parameters	R value
The distance between lateral and medial margins of the OAE	0.904
The distance between lateral margins of the OAEs and the distance between the right and left medial PT	0.741
The distance between medial margins of the OAE and the distance between the right and left medial PT	0.782
The distance between the right and left HP and the distance between the right and left BPT	0.743
The distance between the right and left BPT and the distance between the right and left medial PT	0.834
The distance between PNS and the midpoint of the ala of the vomer and right the distance between the BPP and FM	0.817
The distance between PNS and the midpoint of the ala of the vomer and the left distance between the BPP and FM	0.832

Discussion

The complex anatomical structure of the auditory tube makes it difficult to access the area of surgical and endoscopic imaging. The morphometry of the tube and its relationship with the neighboring anatomical structures play an important role in understanding the anatomy and also the pathology of the disorders (11). The study aims to analyze the osseous part of the auditory tube and its relation with the other structures on the skull base thus providing the data for the reconstruction of the area for the functional 3D remodeling. One of the functions of the auditory tube is the regulation of the air pressure between the middle ear and the nasopharynx (9). In healthy individuals, bolus gas transfer occurs by the contraction of the tensor veli palatini muscle which is the main dilator muscle of the auditory tube with aid of the levator veli palatini muscle (12). The study is aimed that show the relation of osseous structures of the auditory tube on the cranial base.

In the literature, there are few studies about the auditory tube with the skulls. Doyle and Swarts studied the auditory tube with 20 adult (10 male, 10 female) and 18 child skulls. While they reported that the bilateral anterior orifice osseous distance (lateral margins of the osseous orifice of the auditory tube) was 53.9 mm, in our study this distance was measured as 59.8 mm. Bihamulus distance (distance between the hamular process) was reported 32.2 mm in this study, and this was 36.3 mm in our study. The bilateral medial pterygoid distance was reported as 27.0 mm, in our study it was 28.2 mm. Doyle and Swart's study, the distance from the osseous orifice of the auditory tube to the medial pterygoid tubercle is defined as the inferior length of the junctional part of the auditory tube and its length was reported as 24.5 mm. This distance was 25 mm for the right and 23.88 m for the left side in our study. The distance from the posterior nasal spine to the foramen magnum was 41.5 mm, in this study it was 38.6 mm. Doyle and Swart also specified that there were no differences between the genders for these variables (9).

The junctional part of the auditory tube is attached to the osseous orifice of the tube and the medial pterygoid tubercle firmly (13). The tensor veli palatini muscle is the main dilator muscle of the eustachian tube. It plays a role in the relationship between the temporomandibular joint and the auditory system with the tensor tympani muscle. It is accepted that they are involved in mastication, chewing, swallowing and velopharyngeal movements (3). The tensor veli palatini is initiated from the scaphoid fossa posteriorly and sphenoid spine superiorly and probably the lateral lamina of the cartilage part of the auditory tube. It descends vertically then end in a tendon around the hamular process pass horizontally and insert into the palatal aponeurosis and the hard plate (11). When we compare our results with this study it has seen that the distance of the lateral margins of the osseous orifice of the auditory tube, the bihamular distance and the distance from the posterior nasal spine to the foramen magnum show the dramatic differences but the bilateral medial pterygoid tubercle distance shows no difference. It is brought to mind the idea that it might be due to racial differences because Doyle and Swarts studied with the American adult and child skulls (9). In the literature, it is stated that the length of the auditory tube varies with the race from 30 mm to 40 mm, but the mean length is described as 31-38 mm (3,10). A method for reconstructing the relationships between the tensor veli palatini muscle, fibrocartilaginous part and the cranial base was described previously (9).

Limitations

The study is the low number of samples and unknown gender. Also, it is recommended to examine the study with other age groups as well as the adult group.

Conclusion

The osseous part of the auditory tube and its relationship with the cranial base and the other anatomical structures especially the tensor veli palatini muscle is important for the reconstruction of the area. In the literature, there are not many studies about this topic, especially for the

Turkish population so with this study. We believe this study set an example for future studies.

Acknowledgement
We thank to all the individuals who have donated their bodies as cadaver because of belief in Science.

Ethical Approval

The authors declare that the study was performed in accordance with the ethical standards as mentioned in the 1964 Declaration of Helsinki. This study does not contain human participants or experiments on animals and the skulls are the donation of the cadavers and belong to the Anatomy department so there is no ethics committee decision

REFERENCES

1. Mansour S, Magnan J, Haidar H, et al. Comprehensive and Clinical Anatomy of the Middle Ear. Springer: Verlag Berlin Heidelberg, 2013:145-51.

2. Dornhoffer JL, Leuwer R, Schwager K, et al. A Practical Guide to the Eustachian Tube. Springer: Verlag Berlin Heidelberg, 2014: 1-11.

3. Aristeguieta JMR, Acuna LEB, Ortiz GPS. Tensor veli palatini and tensor tympani muscles: Anatomical, functional and symptomatic links. Acta Otorrinolaringol Esp. 2010;61(1):26-33.

4. Ramírez LM, Ballesteros LE, Sandoval GP. Otological symptoms among patients with temporomandibular joint disorders. Rev Med Chil. 2007;135(12):1582-90.

5. Takahashi H. The middle ear. The role of ventilation in disease and surgery. 1st ed. Chapter 3, Springer: Verlag Tokyo, 2001: 1-19.

6. Ghadiali SN, Banks J, Swarts JD. Finite element analysis of active Eustachian tube function. J Appl Physiol. 2004;97(2):648–54.

7. Doyle WJ. Functional eustachian tube obstruction and otitis media in a primate model. A review. Acta Otolaryngol. 1984; 414:52–7.

8. Drake RL, Vogl W, Mitchell AWM. Gray's Anatomy for Students. 2nd ed. Canada: Elsevier Inc., 2010: 820-1.

9. Doyle WJ, Swarts JD. Eustachian tube-Tensor veli palatini muscle-cranial base relationships in children and adults: An osteological study. International Journal of Pediatric Otorhinolaryngology 2010;74(9):986–90.

10. Doyle WJ. A functiono-anatomic study of Eustachian tube vector relation in four ethnic populations: an osteologic study (Dissertation). Department of Anthropology, University of Pittsburg, 1997.

11. Bluestone CD, Doyle WJ. Anatomy and physiology of eustachian tube and middle ear related to otitis media. J Allergy Clin Immunol. 1988;81(5 pt 2):997- 1003.

12. Alzahrani HJ, Alzahrani AJ, Ramadan WS. Topographical anatomy and morphometrical analysis of the pharyngeal orifice of the Eustachian tube: A cadaveric study. Int Res J Med Med Sci. 2020;8(3):97-108.

13. Rood SR, Doyle WJ. Morphology of tensor veli palatini, tensor tympani, and dilatator tubae muscles. Ann Otol Rhinol Laryngol. 1978; 87:202–10.

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Original Article

An Examination of the Laboratory Data of Paediatric COVID-19 Cases

Pediatrik COVID-19 Olgularında Laboratuvar Verilerinin İncelenmesi

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Abstract

Background: Aim: The aim of this study was to investigate abnormalities in the laboratory tests of children with COVID-19 disease.

Material and Method: The study included 71 pediatric cases infected with SARS-CoV-2 virus, and a control group of 60 healthy children. A retrospective examination was made of age, gender, clinical findings and laboratory data.

Results: The patients comprised 39 males and 32 females and the control group comprised 30 males and 30 females with. The clinical characteristics of the patient group were fever in 36.6%, cough in 12.7%, and respiratory problems in 7%. When the laboratory test results were examined, the leukocyte and lymphocyte levels in the patient group were found to be statistically significantly lower than those of the control group ($p=0.01$, $p<0.001$). No significant difference was determined between the groups in respect of neutrophil and thrombocyte counts ($p>0.05$, $p>0.05$). The median C-reactive protein measurement was found to be statistically significantly higher in the patient group than in the control group ($p<0.001$).

Conclusion: The results of this study showed that lymphocyte levels were significantly low and C-reactive protein levels were significantly high in children with COVID-19 infection, and these two findings could have significant predictive value for COVID-19 disease. Therefore, the evaluation of lymphocytes and C-reactive protein together in children infected with SARS-CoV-2 virus could increase diagnostic success in COVID-19 cases.

Key Words: Pediatric, COVID-19, laboratory parameters

ÖZ

Amaç: Bu çalışmada, COVID-19 hastalığı olan çocuklarda laboratuvar tetkiklerindeki anormallikleri araştırmayı amaçladık.

Materyal ve Metod: Bu çalışmaya, SARS-CoV-2 virüsü ile enfekte 71 olgu ve 60 sağlıklı çocuktan oluşan kontrol grubu dahil edildi. Tüm olguların yaş, cinsiyet, klinik bulguları ve laboratuvar verileri retrospektif olarak incelendi.

Bulgular: Hastalar 39 erkek ve 32 kadın, kontrol grubu ise 30 erkek ve 30 kadından oluşuyordu. Hasta grubunun klinik özellikleri; vakaların %36,6'sında ateş, %12,7'sinde öksürük ve %7'sinde solunum sıkıntısı vardı. Laboratuvar bulguları incelendiğinde; hasta grubunda lökosit ve lenfosit düzeyleri kontrol grubuna göre anlamlı olarak düşük bulundu ($p = 0.01$ ve $p <0.001$). Nötrofil ve trombosit sayıları açısından gruplar arasında anlamlı fark saptanmadı ($p> 0.05$ ve $p> 0.05$). Medyan C-reaktif protein ölçümü hasta grubunda kontrol grubuna göre istatistiksel olarak anlamlı derecede yüksek bulundu ($p <0.001$).

Sonuç: Bu çalışma, COVID-19 hastalığı olan çocuklarda lenfosit düzeylerinin anlamlı derecede düşük olduğunu, C-Reaktif Protein düzeylerinin ise anlamlı derecede yüksek olduğunu ve bu iki bulgunun COVID-19 hastalığı için önemli prediktif değer olduğunu göstermiştir. Bu nedenle SARS-CoV-2 virüsü ile enfekte çocuklarda lenfosit ve C-Reaktif Protein düzeylerinin birlikte değerlendirilmesi, COVID-19 vakalarında tanısal başarıyı artırabilir.

Anahtar Kelimeler: Pediatrik, Covid-19, laboratuvar parametreleri

Introduction

The novel coronavirus disease caused by SARS-CoV-2 virus was first determined in December 2019 in Wuhan, China. The disease was named COVID-19 and on 11 March 2020, was declared a global pandemic by the World Health Organisation (1). The first cases were in the adult age group, but following the first pediatric case infected with SARS-CoV-2 virus in Shenzhen on 20 January 2020, cases reported in the pediatric population have shown an increase (2). The clinical and laboratory characteristics of the pediatric age group differ from those of adults and generally there is a milder prognosis (3). After two years, despite all the precautions taken around the world and the advances in vaccination programs, spread of the SARS-CoV-2 virus continues with mutations, the COVID-19 pandemic is still ongoing and pediatric cases are frequently reported.

Recently study, it was determined that CRP, WBC, Glucose, urea and creatinine values in the patient group increased significantly compared to the control group (4). In studies of pediatric COVID-19, some results have been obtained related to laboratory data, and these have focussed on the lower incidence of leukocytosis (neutrophilia and/or lymphocytosis) and especially that there may be a precursor of bacterial infection in thesse patients (5). It has also been emphasized that neutrophilia in COVID-19 could be a marker of cytokine storm and hyperinflammatory status (6). The aim of this study was to investigate changes in leukocyte (WBC), lymphocyte (LYM), neutrophil (NEU), thrombocyte (PLT), and C-reactive protein (CRP) levels in pediatric COVID-19 infection.

Material and Method

This retrospective study included 71 pediatric COVID-19 cases confirmed by real-time reverse transcription polymerase chain reaction (rRT-PCR) testing and a control group of 60 healthy children. Nasal and pharyngeal smear samples or blood samples were tested for the determination of SARS-CoV-2 virus specific RNA using the rRT-PCR test, and confirmed when necessary with the nucleic acid series analysis method. A 2 ml blood sample was taken for complete blood count during first presentation at the hospital before any treatment of all the cases with an rRT-PCR-confirmed COVID-19 diagnosis who were included in the study. complete blood count was performed on the blood samples taken using an automatic blood count device (Abbott Celldyn 3500, IL, USA). The WBC (10^3/uL), LYM (10^3/uL), NEU (10^3/uL), and PLT (10^3/uL) levels were examined with complete blood count. A 2cc venous blood sample was taken into a gel biochemistry tube for CRP measurement (mg/dL) using a spectrophotometric chemical analysis device (Architect C16000, Abbott Daignostics, Abbott Park, IL, USA). The laboratory data of complete blood count and CRP were also obtained from the 60 control group subjects who had blood samples taken for another reason and had no history or findings of COVID-19 infection.

The complete blood count and CRP data, age, gender, and findings on presentation were compared in all the cases in the patient and control groups.

Permission for this scientific research was obtained from the Turkish Republic Ministry of Health and approval for the study was granted by the Clinical Research Ethics Committee of Harran University (decision no:21, session no:11, dated:15.06.2020). All procedures were applied in compliance with the Helsinki Declaration.

Study Inclusion Criteria: Cases aged <18 years with rRT-PCR test positivity for COVID-19 infection were included in the study.

Study Exclusion Criteria: Patients aged >18 years, or with a negative rRT-PCR test result despite a history of contact and/or clinical suspicion of COVID-19 were excluded from the study.

Statistical analysis

Data obtained in the study were analysed statistically using SPSS vn. 24.0 software (SPSS Inc., Chicago, IL, USA). Descriptive statistics were stated as mean ± standard deviation (SD), median (minimum-maximum) values or number (n) and percentage (%). Conformity of the data to normal distribution was assessed with visual tests (histogram and probability graphs) and the Kolmogorov-Smirnov test. In the comparisons between the groups of variables not showing normal distribution, the Mann Whitney U-test was used. The Pearson Chi-square test was applied in the comparisons of qualitative data.

Multivariate linear regression analysis was performed to determine independent predictors of COVİD-19. Receiver operating characteristic (ROC) curve analysis was used to determine the optimum cut-off value of CRP level for predicting the COVİD-19. A value of $p<0.05$ was accepted as statistically significant.

Results

Evaluation was made of 131 cases, as a patient group of 71 cases with rRT-PCR test positivity for COVID-19 and a control group of 60 healthy children. The patients comprised 39 males and 32 females with a mean age of 9.77±5.35 years, and the control group comprised 30 males and 30 females with a mean age of 9.45±3.75 years. The demographic characteristics of the study population are shown in Table 1. No significant difference was determined between the groups in respect of median age and gender distribution ($p>0.05$).

The clinical characteristics of the patient group with rRT-PCR test positivity for COVID-19 were fever in 36.6%, cough in 12.7%, and respiratory problems in 7% (Table 1).

Table 1. Demographic and clinical characteristics of the study population

Parameters	**COVID group (n = 71)**	**Control group (n=60)**	***P***
Age, years	11(0-17)	9(1-17)	0.394
Gender, *(%)* *Male* *Female*	 39(54.9) 32(45.1)	 30(50) 30(50)	0.573
Fever,(>38.5 ^{0}C) Yes/No,*(%)*	26(36.6/)/45(63.4)	-	
Cough *Yes/No, (%)*	9(12.7)/62(87.3)	-	
Respiratory distress *Yes/No, (%)*	5(7)/66(93)	-	

The control group was formed of healthy children and there were no clinical pathological findings. When the laboratory test results were examined, the WBC and LYM levels in the patient group were found to be statistically significantly lower than those of the control group (p=0.01, p<0.001). No significant difference was determined between the groups in respect of NEU and PLT counts (p>0.05, p>0.05). The median CRP measurement was found to be statistically significantly higher in the patient group than in the control group (p<0.001) (Table 2). Multivariate linear regression analysis was used to assess the independent predictors of COVİD-19. It was found that CRP was the independent predictor of COVİD-19 (β=0.60, P<0.001) (Table 3). Also, ROC curve analysis was used to determine the optimal cut-off value of CRP for predicting the COVİD-19. CRP sCD40L ≥0.255 mg/l predicted the COVİD-19 with a sensitivity of 79% and specificity of 75% (AUC: 0.821, 95% CI: 0.748–0.893, p<0.001) (Figure-1) Also, ROC curve analysis was used to determine the optimal cut-off value of CRP for predicting the COVİD-19. CRP sCD40L ≥0.255 mg/l predicted the COVİD-19 with a sensitivity of 79% and specificity of 75% (AUC: 0.821, 95% CI: 0.748–0.893, p<0.001) (Figure-1)

Table 2. Analysis of total blood count and biochemical parameters in the study population

Parameters	**COVID group (n = 71)**	**Control Group (n = 60)**	**P**
WBC (10e3/uL) LYM (10e3/uL)	6 (2,8-22,6) 2.11 (0,6-12.04)	7.1 (3.59-10.52) 3.07 (1.5-7.04)	0.01 <0.001
NEU (10e3/uL) PLT (10e3/uL) CRP (mg/dL)	3.03 (1.04-20,6) 261(113-644) 1 (0.01-44.17)	2.85 (1,4-6.74) 290.9 (92-525.7) 0.15 (0.01-1.9)	0.773 0.133 <0.001

Abberations: WBC: White blood cells counts; LYM: Lymphocyte; NEU: Neutrophil; PLT: Platelet; CRP: C-reactive protein

Table 3. Multivariate linear regression analysis showing independent predictor of the COVİD-19

	Unstandardized coefficients		**Standardized coefficients**		
	B	**SE**	**β**	**t**	**P**
CRP	2.819	0.664	0.60	18.022	<0.001
WBC	1.108	0.844	3.027	1.723	0.189
Neutrophil	1.150	0.890	0.317	1.670	0.196
Lymphosit	0.666	0.894	0.514	0.555	0.456

Aberrations: B. Unstandardized regression coefficient; SE. Standard error; β. Standardized β coefficient; CRP. C reactive protein. WBC: white blood count

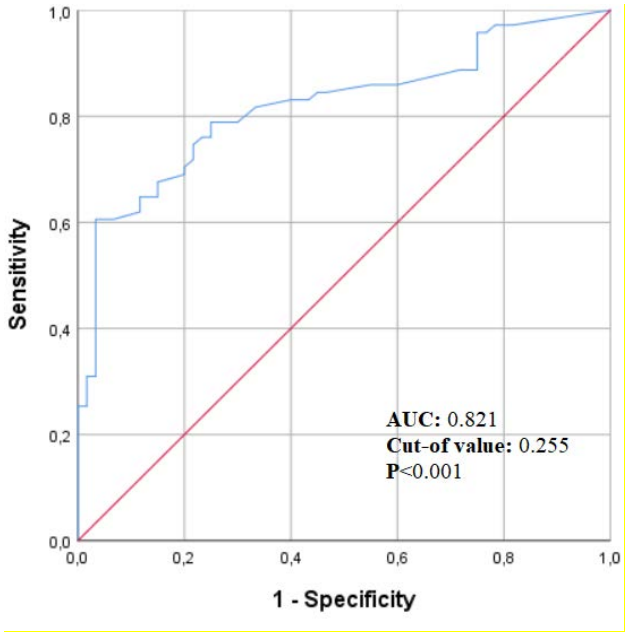

Figure 1: Receiver operating characteristic curve analysis CRP and COVİD-19.

Discussion

In previous studies of pediatric COVID-19 disease, there have been determined to be several changes in laboratory parameters and it has been suggested that these changes could be useful in the diagnosis of COVID-19 disease (7). In the laboratory findings of 10 pediatric patients reported by Cai et al (8), median WBC was 7.35 x 109/L. In a study of 20 children by Xia et al (9), the WBC level was found to be normal in 14 (70%), low in 4 (20%) and increased in 2 (10%). A meta-analysis in literature showed that leukocytosis was determined in 11.4% of patients with severe disease compared to 4.8% of patients with mild and moderate disease (10). Leukocytosis (neutrophilia and/or lymphocytosis) is seen less in COVID-19 patients and there are publications reporting that this is a precursor of bacterial infection (5). Henry et al (7) examined laboratory abnormalities in children with COVID-19, and while WBC was found to normal at the rate of 69.6%, leukocytosis was determined in 15.2% and leukopenia in 15.2%. In a study of 31 cases by Wang et al (11), there was determined to be a decrease in total WBC in peripheral blood in the early stage in 2 (6%) cases. In the current study, the WBC levels were determined to be significantly low (p=0.01).

Although there are reports of lymphopenia rate of around 9.8% (12-15), Wang et al (11) determined this rate as 6%. In another study, the LYM percentage was determined to be decreased in 7 patients (7/20, 35%), and increased in 3 patients (3/20, 15%) (9). That the LYM count is normal in most children has been associated with less immune suppression in some studies in literature (16, 17). In a review by Henry et al (7) of 12 studies conducted in China, which included 66 pediatric patients, lymphopenia was determined in only 3% of cases. Gumus et al (18) found a significant decrease in lymphocyte count in their study in children infected with COVID-19. Unlike these findings in literature, the LYM levels in the current study were determined to be significantly low (p<0.001). Therefore, low LYM levels should be accepted as a parameter worthy of attention.

There are different opinions in literature about NEU and PLT counts. Neutrophilia is thought to reflect a hyperinflammatory state and cytokine storm, although there are insufficient data on this (6). Studies have generally shown lymphocytosis and/or neutrophilia in a status of bacterial infection (5). In the literature related to thrombocytopenia, there are also different opinions. In one study, thrombocytopenia was determined in 57,7% of patients with severe infection and in 31,6% of patients with less evident symptoms (10). However, there are also studies showing the contrary. In studies of 1099 children, Guan et al (19) determined thrombocytopenia in 36% and stated that this laboratory finding was more evident in severe cases than in less severe cases. Wang et al (11) observed that thrombocyte count was increased in 6% of cases (2/31). Despite the different results and opinions, thrombocytopenia is accepted as a marker of poor prognosis in COVID-19 patients (20, 21). In the current study, no significant difference was determined between the patient and control groups in respect of NEU and PLT counts (p>0.05).

In a report by Cai et al (8), median CRP was determined as 7.5mg/L. The CRP value was seen to be increased in 9 of 20 patients (45%) in a study by Xia et al (9), and Wang et al (11) determined increased CRP in 10% of cases (3/31). Henry et al (7) reported increased CRP, which is an inflammatory marker, in 13.6% of cases. In the study by Cai et al (8), 2 of the 4 patients with radiological anomaly were determined to have significantly elevated CRP. In the current study, the CRP measurements of the COVID-19 patients were determined to be statistically significantly high (p<0.001). In contrast to previous literature, the predictive value of CRP in this study was concluded to be higher than had been estimated. Therefore, it is important that the CRP value is examined, as the diagnostic value can be considered to be higher than previously assumed.

Conclusion

It can be recommended that the CRP levels are investigated in children being examined in respect of COVID-19 infection.

Limitation

The number of cases in our study was low, since the clinical findings in the pediatric age group were milder than adults, and the hospitalization rates due to Covid-19 were lower.

References

1. Adhikari SP, Meng S, Wu YJ, et al. Epidemiology, causes, clinical manifestation and diagnosis, prevention and control of coronavirus disease (COVID-19) during the early outbreak period: a scoping review. Infect Dis Poverty. 2020;17;9(1):29.
2. Chan JF, Yuan S, Kok KH, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020; 15;395:514-23.
3. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. Acta Paediatr. 2020;109(6):1088-95.
4. OCAK Metin, et al. A new predictor for indicating clinical severity and prognosis in COVID-19 patients: Frontal QRS-T angle. The American Journal of Emergency Medicine, 2021, 50: 631-635.
5. Lippi G, Plebani M. The critical role of laboratory medicine during coronavirus disease 2019 (COVID-19) and other viral outbreaks. Clin Chem Lab Med. 2020;58(7):1063-69.
6. Mehta P, McAuley DF, Brown M, et al. HLH Across Speciality Collaboration, UK. COVID-19: consider cytokine storm syndromes and immunosuppression. Lancet. 2020;395(10229):1033-34.
7. Henry BM, Lippi G, Plebani M. Laboratory abnormalities in children with novel coronavirus disease 2019. Clin Chem Lab Med. 2020 ;58(7):1135-38.
8. Jiehao C, Jin X, Daojiong L, et al. A Case Series of Children With 2019 Novel Coronavirus Infection: Clinical and Epidemiological Features. Clin Infect Dis. 2020;71(6):1547-51.
9. Xia W, Shao J, Guo Y, et al. Clinical and CT features in pediatric patients with COVID-19 infection: Different points from adults. Pediatr Pulmonol. 2020;55(5):1169-74.
10. Lippi G, Plebani M. The critical role of laboratory medicine during coronavirus disease 2019 (COVID-19) and other viral outbreaks. Clin Chem Lab Med. 2020;58(7):1063-69.
11. Wang D, Ju XL, Xie F, et al. [Clinical analysis of 31 cases of 2019 novel coronavirus infection in children from six provinces (autonomous region) of northern China]. Zhonghua Er Ke Za Zhi. 2020;58(4):269-74.
12. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020 ;395(10223):497-506.
13. Guan WJ, Zhong NS. Clinical Characteristics of Covid-19 in China. Reply. N Engl J Med. 2020;382(19):1861-62.
14. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020;395(10223):507-13.
15. Wang D, Hu B, Hu C, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA. 2020;323(11):1061-69.
16. Liu J, Liu Y, Xiang P, et al. Neutrophil-to-lymphocyte ratio predicts critical illness patients with 2019 coronavirus disease in the early stage. J Transl Med. 2020;18(1):206.
17. Cao Q, Chen YC, Chen CL, et al. SARS-CoV-2 infection in children: Transmission dynamics and clinical characteristics. J Formos Med Assoc. 2020;119(3):670-73.
18. Gumus H, Demir A, Yükkaldıran A. Is mean platelet volume a predictive marker for the diagnosis of COVID-19 in children? Int J Clin Pract. 2021; 75(4): e13892.
19. Guan WJ, Ni ZY, Hu Y, et al. China Medical Treatment Expert Group for Covid-19. Clinical Characteristics of Coronavirus Disease 2019 in China. N Engl J Med. 2020;382(18):1708-20.
20. Lippi G, Plebani M, Henry BM. Thrombocytopenia is associated with severe coronavirus disease 2019 (COVID-19) infections: A meta-analysis. Clin Chim Acta. 2020; 506:145-48.
21. Perlman S. Another Decade, Another Coronavirus. N Engl J Med. 2020;382(8):760-62.

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Original Article

Evaluation of Hopelessness and Loneliness Among Healthcare Professionals in Different Areas of the Hospitals

Hastanelerin Farklı Alanlarında Çalışan Sağlık Profesyonelleri Arasında Umutsuzluk ve Yalnızlığın Değerlendirilmesi

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Abstract

Background: Healthcare professionals face psychosocial and emotional challenges in different areas of the hospital environment. This study is aimed at exploring the loneliness and hopelessness levels of those working in different units in the hospital.
Material and Method: Nurses were the subjects enrolled in this study due to nurses being the largest group among health professionals in a variety of hospital environments. Nurses working at the psychiatry, surgery, and intensive care units in three hospitals in Istanbul were included in the survey. Nurses were administered UCLA Loneliness and Beck hopelessness scales.
Results: Mean loneliness scores of nurses who worked at psychiatry clinics were lower as compared to the scores of those who worked at surgery and intensive care units (p=0.007). Mean loneliness scores of nurses who worked at surgery and intensive care units were similar. Mean hopelessness scores of the nurses who worked at psychiatry clinics were the lowest ones, and the mean hopelessness scores of nurses who worked at intensive care clinics were higher than the others (p=0.001). There were positive correlations between measures of loneliness and hopelessness feelings across all the hospital units in the study (p=0.048).
Conclusion: The loneliness and hopelessness levels of nurses were affected differently depending on the work settings and conditions. It is suggested for healthcare professionals of all sorts to pay greater attention to the loneliness and hopelessness at work.

Keywords: healthcare professional, nurse, hopelessness, loneliness

ÖZ

Amaç: Sağlık çalışanları, hastane ortamının farklı alanlarında psikososyal ve duygusal zorluklarla karşı karşıyadır. Bu çalışma, hastanenin farklı birimlerinde çalışanların yalnızlık ve umutsuzluk düzeylerini araştırmayı amaçlamaktadır.
Gereç ve Yöntem: Bu çalışma, sağlık profesyonelleri arasında çeşitli hastane ortamlarında en büyük grup olmaları nedeniyle hemşireler üzerinde yapılmıştır. Çalışmaya, İstanbul'da üç farklı hastaneden psikiyatri, cerrahi ve yoğun bakım ünitelerinde çalışan hemşireler dahil edildi. Hemşirelere UCLA Yalnızlık ve Beck Umutsuzluk ölçekleri uygulandı.
Bulgular: Psikiyatri kliniklerinde çalışan hemşirelerin ortalama yalnızlık seviyeleri ameliyathane ve yoğun bakım ünitelerinde çalışanlara göre daha düşüktü (p=0.007); ameliyathane ve yoğun bakım ünitelerinde çalışan hemşirelerin ortalama yalnızlık seviyeleri ise benzerdi. Psikiyatri kliniklerinde çalışan hemşirelerin umutsuzluk ölçeği puan ortalamaları en düşükken, yoğun bakım kliniklerinde çalışan hemşirelerin umutsuzluk ölçeği puan ortalamaları ise diğerlerinden daha yüksekti (p=0.001). Çalışmadaki tüm birimlerde yalnızlık ve umutsuzluk seviyeleri arasında pozitif korelasyon vardı (p=0.048).
Sonuç: Hemşirelerin yalnızlık ve umutsuzluk düzeyleri çalışma ortamı ve koşullarına bağlı olarak farklı şekilde etkilenmektedir. Her türden sağlık profesyonelinin iş yerindeki yalnızlık ve umutsuzluğa daha fazla dikkat etmesi önerilir.

Anahtar Kelimeler: sağlık çalışanı, hemşire, umutsuzluk, yalnızlık

INTRODUCTION

People experience numerous emotions and different combinations of these emotions in their workplaces (1). Emotional intensity can be expressed in many ways; however, all the emotions refer to a certain value that they belong to positive or negative. In other words, all emotions point out that one should abstain from or get near to the object perceived. Negative and positive stimuli are not equal; negative stimuli are processed faster and more efficiently than positive stimuli. (2).

Since an important part of life is spent at the places where people work; work setting plays a crucial role in one's life. In work settings, there may be conditions that cause worries and suspicions, threaten future hopes and expectations, and lead to resentments and fights, which -in turn- affect health negatively by producing physiological and psychological pressure on individuals (2). Therefore, it is emphasized that work settings conditions are important in protecting and maintaining health of workers (3, 4).

Recently, researchers have noted a significant increase in the chronic and debilitating state of work-related stress, that is nothing less than a public health crisis. Hospital setting is a place full of stressors for healthcare professionals and the stress healthcare workers experience may eventually lead to burnout (2-4). Loneliness, or feeling disconnected from others is an important psychological construct and almost universally a consequence of burnout. As a reciprocal one, hopelessness indicates negative expectations regarding oneself and one's future life and a negative emotional state characterized by the lack of finding a solution for one's problems.

Nurses are the largest group among healthcare professionals in a variety of hospital environments. Therefore, this study is aimed at exploring the loneliness and hopelessness levels of the nurses working in different areas of the hospitals.

MATERIALS AND METHODS

The current study was undertaken at three different hospitals in Istanbul. With a sample proportion of 0.80, a sample size of 82 nurses who worked at intensive care, psychiatry, and surgical clinics, and volunteered to participate, were recruited for the study. The data were collected through face-to-face interviews with nurses. As data collection tools, a questionnaire form, UCLA Loneliness Scale and Beck Hopelessness Scale were used. The questionnaire form included questions addressing socio-demographic characteristics and professional characteristics of the nurses.

UCLA Loneliness Scale (UCLA-LS): UCLA (University of California, Los Angeles) Loneliness Scale was developed by Russell, Peplau and Ferguson in 1978. It is 20-item measure that assesses how often a person feels disconnected from others. The scale was revised by Russell, Peplau and Cutrona (5) in 1980 and by Russell (6) in 1996 for the last time. It is a 4-point Likert type scale (1 = never; 2 = rarely; 3 = sometimes; 4 = always.); the lowest score from UCLA-LS is 20 whereas the highest score is 80 (7). High scores indicate high level of disconnection from others. The total loneliness score can be categorized as one of four levels: not lonely, moderate loneliness, severe loneliness, and very severe loneliness (8). The validity and reliability tests of Turkish version of the scale, were performed by Yaparel in 1984 and Demir in 1989 (7-9).

Beck Hopelessness Scale: It was developed by Beck et al. in 1974 (10). The Turkish version of the scale was prepared by Seber (1991) and Durak (1994) (11,12). It is a 20-item self-report inventory designed to measure three major aspects of hopelessness: feelings about the future, loss of motivation, and expectations. It measures the extent of the respondent's negative attitudes, or pessimism, about the future. It is assumed that high score indicates high level of hopelessness among individuals (10,12).

Statistical Analysis

For the statistical assessments of the study data, IBM SPSS Statistics 19.0 statistical software was used (13). The descriptive statistics of the data were presented as percentages, arithmetical means, standard deviations, median, minimum, and maximum values. Shapiro-Wilk normality test was employed whether the data followed a normal distribution. Since the data did not follow a normal distribution; Mann Whitney U test was used for dependent pairwise group comparisons while Kruskal Wallis test was used for comparisons of more than two dependent groups. Spearman correlation analysis was done to test direction and strength of the correlations among the scales. The level of statistical significance was set at $p<0.05$.

RESULTS

Table 1 demonstrates the descriptive characteristics of the nurses. Among the participants, 47.5% of them were aged between 19 and 24 years, 82.9% of them were female and 61.0% of them had undergraduate degree. 46.3% of the nurses had a total professional experience of 1-5 years, 42.7% of them were employed at the current health facility for 1-4 years and 39.1% of them worked at intensive care clinics.

Table 2 demonstrates the mean loneliness scores of the nurses in different clinics. It was determined that the mean loneliness scores of nurses who worked at psychiatry clinic were lower than the mean loneliness scores of the others ($p=0.007$).

Table 1. The socio-demographic characteristics and professional characteristics of the nurses.

Descriptive Characteristics	**Number**	**%**
Age		
19-24 years	39	47.5
25-29 years	15	18.3
30-35 years	10	12.2
≥36 years	18	22.0
Gender		
Female	68	82.9
Male	14	17.1
Educational Status		
Vocational high school degree	19	23.1
Associate degree	13	15.9
Undergraduate degree	50	61.0
Duration of professional experience		
Less than a year	13	15.9
1-5 year	38	46.3
6-10 year	11	13.4
≥11 year	20	24.4
Clinic where nurses worked		
Psychiatry	23	28.0
Surgery	27	32.9
Intensive care	32	39.1
Duration of work at the clinic where they currently worked.		
Less than a year	33	40.2
1-4 years	35	42.7
5-8 years	9	11.0
≥9 years	5	6.1
Total	82	100.0

Table 3 demonstrates the mean hopelessness scores of the nurses in different clinics. It was determined that the mean hopelessness scores of the nurses who worked at psychiatry clinic were the lowest and the mean hopelessness scores of the nurses who worked at intensive care clinic were highest (p=0.001).

Table 4 demonstrates the correlation between the scores of the loneliness and hopelessness scales of the nurses. It was determined that there was a positive and moderate correlation among the scores of loneliness and hopelessness scales (p=0.048).

Table 2. The mean loneliness scores of the nurses in different clinics.

Clinics where nurses worked	N	Mean±SD	Median (Min-Max)	Test
Psychiatry*	23	41.47±5.48	40.00 (34-52)	KW=9.797 p=0.007
Surgery	27	46.55±6.00	47.00 (30-59)	
Intensive care	32	46.03±7.57	45.00 (29-60)	

* Indicates the statistical significance (p<0.05).

Table 3. The mean hopelessness scores of the nurses in different clinics.

Clinics where nurses worked	N	Mean±SD	Median (Min-Max)	Test
Psychiatry	23	8.82±1.43	9.00 (6-13)	KW=13.936 p=0.001
Surgery	27	9.77±2.62	9.00 (2-15)	
Intensive care*	32	11.25±2.98	10.00 (7-20)	

* Indicates the statistical significance (p<0.05).

Table 4. Correlation between the scores of the loneliness and hopelessness scales of the nurses.

Scales	Loneliness	Hopelessness
Loneliness	-	r=0.185** p=0.048
Hopelessness	r=0.185** p=0.048	-

**Spearman correlation analyses were performed.

DISCUSSION

In the current study, it was found that nurses who worked at these clinics experienced a moderate level of loneliness. Loneliness is not only related to the ordinary daily life of individuals, but also to business life. Establishing healthy and strong interpersonal relationships is an important part of professional life. Loneliness is not only related to the ordinary daily life of individuals, but also to work life. Establishing healthy and strong interpersonal relationships is an important part of professional life. Loneliness is a psychological state that results from deficiencies experienced in professional life is a situation that in a person's social relationships (8). The reason for loneliness is the weak social relations of the person and the dissatisfaction with these relations. Loneliness experienced in professional life is different from ordinary everyday loneliness and may only affect the work environment. In other words, a person who develops very satisfying and healthy relationships in ordinary life and does not have feelings of loneliness may have difficulty in developing social relationships in work life and may experience loneliness (14). Nursing profession is a health discipline that provides continuous service to individuals who need healthcare and their relatives. Especially in facilities with inpatient services, since nurses accompany patients 24 hours a day, they are the nurses that individuals with health problems can reach most easily (4).

It was determined that the average loneliness scores of nurses working in psychiatry clinics were lower than those working in surgery and intensive care clinics, but the average loneliness scores of nurses working in surgery and intensive care clinics were similar. Different health disciplines may have different challenges, which can affect loneliness levels differently. The working environment in psychiatry clinics offers therapeutic features in favor of healthcare team members and patients. The therapeutic environment in psychiatry clinics is an ideal and dynamic environment that helps individuals return to their normal social lives as soon as possible, improves their self-confidence and relationships with others, and develops their abilities and skills (15). Since psychiatry clinics are built in this context, they have numerous advantages over other clinics for the healthcare team. Psychiatric nursing is a special field of the nursing profession. Psychiatric nursing includes professional skills such as being aware of

emotions, thoughts and behaviors, developing therapeutic communication, analytical thinking and problem solving, and developing new attitudes in new situations. (15). It may be argued that nurses who are trained and work in this field can integrate these professional skills into their professional life and –thus- may experience negative feelings such as loneliness less.

Surgical clinics and intensive care units are technologically complex and complicated settings. These are the places in which nursing care is needed most because there is a high number of patient population and patients are dependent on nurses to meet personal needs. Due to heavy work burden, life threatening situations and necessity to decide quickly; it is difficult to find sufficient time for social interaction at these clinics (16,17). In particular, the features of intensive care environments such as being a closed area from the outside reduce the possibility of meeting new people other than patients. Therefore, all of these may cause nurses working in these environments to feel a higher level of loneliness.

It was found that the mean hopelessness scores of the nurses who worked at intensive care clinics were higher than the others. Hope is a positive expectation to realize a goal about future while hopelessness is negative. Hopelessness is having believes that individuals cannot overcome their failures and solve their problems because they have a negative approach, although they attribute wrong meanings to their experiences without a realistic reason and do not fight enough for their goals. The difficulties of the health system (hospital routines, patient care, witnessing death) negatively affect health workers. (18). Intensive care units are special places that provide continuous care to critically ill patients equipped with the highest level of technology. At the same time, intensive care units are places where clinical tension and work pressure are intense. The fact that it has a different structure from other clinical services, patients are in critical condition, professional relations between the healthcare team, working in a place where tension can occur at any time can cause a certain stress among nurses (19). On the other hand, dealing with patients and their families suffering physically, emotionally, and psychologically and witnessing death frequently is exhausting and painful. Nurses who identify themselves with patients or feel inadequate, causing them to experience hopelessness.

In the study, it was determined that there was a positive correlation between the feelings of loneliness and hopelessness. The individual who feels lonely may also fall into hopelessness (20). While loneliness is a state in which the adaptation to the environment is impaired, the individual feels lonely and is not understood, hopelessness is a state in which unhappiness prevails. It includes loneliness, hopelessness and unhappiness and harms the individual (21-23). In this study, since most of the nurses experienced loneliness, they may have also developed a sense of hopelessness.

The descriptive characteristics of the nurses and the mean scores of loneliness and hopelessness were compared, but no statistically significant difference was found. In some previous studies, no relationship was found between descriptive features and loneliness (24,25).

The main limitation of this study is the sample size and it used only those in the nursing profession. Subsequent studies with larger sample sizes to include other healthcare professionals in different fields would strengthen the discussion of this study.

In conclusion, since the healthcare is a personal service provided by one human being to another, it needs healthy professionals to address the needs of those being treated in the healthcare environment. In the current study, the loneliness and hopelessness levels of healthcare professionals were affected differently depending on the work settings and conditions. The quality of work life for those who are employed by facilities that operate in crucial fields such as the healthcare sector should not be neglected. It is highly important to improve the conditions of clinics such as those related to intensive care and surgical services. It is essential for the healthcare professionals experiencing loneliness and hopelessness at work to understand workplace burnout, and to best navigate the workplace experience in a healthy way.

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REFERENCES

1. McShane SL, Von Glinow MA. Organizational behavior: Emerging Knowledge Global Reality. 9th Edition. McGraw-Hill Education, 2021. — 1086 p. — ISBN 978-1-260-57065-6.
2. Kuhbandner, C., Spachtholz, P. & Pastötter, B. Bad things come easier to the mind but harder to the body: Evidence from brain oscillations. Cogn Affect Behav Neurosci. 2016; 16, 768–778
3. Ocak M, Şimşek Yurt N, Yurt Y. C, et al. The Burnout Levels of Emergency Employees in COVID -19 Pandemic and the Related Factors. J Harran Med. 2021; 18(2): 250-255.
4. Özgür G, Babacan Gümüş A, Gürdağ Ş. Investigation of psychiatric symptoms in nurses working in a hospital. Düşünen Adam J Psych Neur Sci 2011:24:296-305
5. Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: Concurrent and discriminant validity evidence. J Pers Soc Psychol. 1980:39:472-480.
6. Russell D. The UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. J Person Assess 1996:66:20-40.
7. Demir, A. Validity and reliability of UCLA loneliness scale. Turk J Psychol. 1989:7:14-18.
8. Wright SL, Burt CDB, Strongman KT. Loneliness in the workplace: Construct definition and scale development. NZ J Psychol. 2006:35 (2), 59-68.
9. Yaparel R. Sosyal The Connection Between Loneliness and Perception of Success and Failure Reasons in Relationships. Unpublished Master Thesis, H.Ü. Social Sciences Institute, Ankara. 1984.
10. Beck AT, Weissman A, Lester D, Trexler L. The measurement of pessimism: The hopelessness scale. J Consul Clin Psychol 1974:42(6):861-5.
11. Seber G. A study on the validity and reliability of the Beck Hopelessness Scale. Unpublished Doctoral Thesis, Anadolu University, Institute of Social Sciences, Eskişehir. 1991.
12. Durak A, Palabıyıkoğlu R. Validity of the Beck hopelessness scale. Kriz Dergisi 1994:29(2), 311-319.
13. IBM Corp. Released 2010. IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp; 2010.
14. Doğan T, Bayram Ç, Sungur MZ. Reliability and validity of the Turkish version of loneliness at work scale. Anatol J Psychiatry. 2009:10:271-277
15. Oflaz F. Therapeutic milieu in a psychiatric ward and the responsibilities of nurses. Anatol J Psychiatry 2006:7:55-61
16. Karabulut N, Çetinkaya F. Motivation levels and difficuilties encountered in the patient care of the nurses working in surgery clinics. J Anatol Nurs Health Sci. 2011:14:1;14-23.
17. Bakker A, Le Blanc P, Schaufeli W. Burnout contagion among intensive care nurses. J Adv Nurs 2005:(3):276-287.
18. Taslak S, Işıkay Ç. Study for the investigation of the nursing students' perceptions of education and anxiety and hopelessness levels: The case of the school of health. Suleyman Demirel Univ J Health Sci. 2015:6(3):108-115.
19. Turgay M. Stress in intensive care unit nurses. J Turk Critical Care Nurs. 2001:5(2):80-82.
20. Güloğlu B, Karaırmak Ö. Self-esteem and resilience as the predictors of loneliness among university students. Ege J Edu. 2010:(11) 2:73–88.
21. Karaoğlu N, Avşaroğlu S, Deniz ME. Are you lonely? A study about loneliness, in university students, in Selcuk University. Marmara Medical J. 2009:22(1):19-26.
22. Yaşar MR. Loneliness. Fırat University Journal of Social Science 2007:17(1):237-260.
23. Gönül Ö, Yıldırım S, Aktaş N. Determination of operating room and intensive care nurses's mental health in the university hospital. Cumhuriyet Nurs J 2008:12:21-30.
24. Wright SL. Is it lonely at the top? An empirical study of managers' and nonmanagers' loneliness in organizations. J Psychol. 2012:146(1-2):47-60.
25. Silman F, Doğan T. Social intelligence as a predictor of loneliness in the workplace. Span J Psychol. 2013:16 (36): 1-6.

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Original Article

Effects of Curcumın, Sulforaphane And Intralıpıd İn The Management of Organophosphate Toxİcİty

Organofosfat Zehirlenmelerinde Kurkumin, Sülforafan ve İntralipidin Etkilerinin Değerlendirilmesi

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Abstract

Background: Organophosphates (OP) are a group of chemical agents with frequent exposure due to accidents, suicide attempts or occupational reasons consisting of agricultural and industrial usage. The aim of the present study is to examine the influence of curcumin (CUR), sulforaphane (SFN) and intralipid treatments with known antioxidant effects in OP poisoning.
Material and method: In the experimental study, an OP toxicity model was created by administering a dose of 30 mg / kg p.o malathion (MAL) to 30 rats divided into five equal groups, excluding the control group. Electrocardiography (ECG) and electromyography (EMG) examinations were performed on all rats at the 2nd and 12th hours and CUR, SFN and intralipid were administered in certain doses to rats other than the control group. In the liver and kidney tissue samples taken after the rats were sacrificed at the 24th hour; Superoxide Dismutase (SOD), Active Glutathione (GSH), Malondialdehyde (MDA) levels were assessed, whereas in the serum; Alanine aminotransferase (ALT), Aspartate transaminase (AST), urea, creatinine and pseudocholinesterase (PChE) levels were studied.
Results: PChE levels of the rats were significantly lower in the OP group, and ALT and AST levels were significantly higher. There was no significant difference in the levels of SOD, MDA and GSH. ECG and EMG results were evaluated as normal in all groups.
Conclusion: the present study, it is thought that CUR may have a therapeutic effect on liver tissues in OP toxicity, while SFN and intralipid may be effective in liver tissues by showing antioxidant properties and reducing organophosphate-induced pseudocholinesterease suppression, respectively. Additionally, it is suggested that ECG and EMG alone are not sufficient in evaluating cardiotoxicity and neurotoxicity in the acute period.
Keywords: Organophosphate poisoning, Curcumin, Sulforaphane, Intralipid

ÖZ

Amaç: Organofosfatlar, tarım ve sanayide kullanılan, kaza, intihar amaçlı veya mesleksel nedenlerle insanların da sıkça maruz kaldığı bir grup kimyasal ajandır. Çalışmamızın amacı organofosfat zehirlenmesinde, antioksidan etkinliği bilinen CUR, SFN ve intralipid tedavisinin etkilerini incelemektir.
Gereç ve Yöntem: Deneysel olarak yapılan çalışmamızda beş eşit gruba ayrılmış 30 adet rata, kontrol grubu hariç tutularak 30 mg/kg p.o. dozunda MAL verilerek organofosfat zehirlenmesi modeli oluşturuldu. Tüm ratlara, 2. ve 12. saatte elektrokardi EKG ve EMG tetkikleri yapıldı ve yine bu saatlerde kontrol grubu dışındaki ratlara CUR, SFN ve intralipid maddeleri belirli dozlarda verildi. 24. saatte ratlar sakrifiye edildikten sonra alınan karaciğer ve böbrek dokularında; SOD, GSH, MDA düzeyleri, serumda ALT, AST, üre, kreatinin ve PChE düzeyleri çalışıldı.
Bulgular: Ratların PChE düzeyleri organofosfat grubunda anlamlı şekilde düşük, ALT ve AST düzeyleri ise anlamlı olarak yüksek bulundu SOD, MDA ve GSH üzerinde anlamlı etki oluşmadı. EKG ve EMG tüm gruplarda normal olarak değerlendirildi.
Sonuç:Çalışmamızda, organofosfat zehirlenmesinde, kurkuminin karaciğer dokularında iyileştirici bir etkisinin olabileceği, sülforafanın karaciğer dokularında antioksidan özellik göstererek, intralipidin de organofosfata bağlı psödokolinestereaz baskılanmasını azaltarak etkin olabileceği düşünülmektedir. Bunun yanında akut dönemde kardiyotoksisite ve nörotoksisiteyi değerlendirmekte EKG ve EMG'nin tek başlarına yeterli olmayacağı öngörülmektedir.
Anahtar Kelimeler: Organofosfat zehirlenmesi, Kurkumin, Sülforafan, İntralipid

INTRODUCTION

Organophosphate (OP) compounds are highly fat-soluble compounds formed as a result of the reaction of alcohol and phosphoric acid. They can be absorbed from the skin, conjunctiva, oral mucous membranes, gastrointestinal and respiratory tracts. The severity and duration of intoxication varies depending on the dose taken, the route of intoxication, chemical structure of the OPs and the metabolic rate of the body (1-2).

The main mechanism of action of OP compounds is that they cause excessive stimulation at the cholinergic junction by inhibiting serum acetylcholinesterase (AChE) and cholinesterase enzymes (3). The measurement of AChE levels is a valuable diagnostic criterion that can be used as a mortality and morbidity marker (4,5). Pesticides have been shown to induce oxidative stress by causing the formation of free radicals and leading to changes in the antioxidant or oxygen-free radical scavenger systems of cells (6).

Curcumin (CUR), which is obtained from the Curcuma longa plant, is a spice of the polyphenol super family, widely used in India. Numerous studies have shown that CUR has antioxidant, anti-inflammatory, and anti-cancerous properties (7).

Sulforaphane (SFN) is an anti-carcinogenic compound, first discovered to be a potent phase-2 detoxification enzyme activator, found in vegetables such as broccoli and Brussels sprouts (8,9).

Lipid emulsion is a compound containing soybean oil, egg phospholipids and glycerin, used parenterally in patients whose oral nutrition is not adequately provided. Lipid emulsion is generally referred to by its brand name; intralipid. It is used in different concentrations including 10%, 20%, 30% and it contains linoleic acid, omega 6, omega 3, and alpha-linolenic acid (10).

The aim of this study is to reveal the possible protective effects of CUR, SFN and intralipid solution against the damage on the heart, liver and kidney tissues caused by malathion (MAL) poisoning, which is one of the derivatives of OP.

MATERIALS AND METHODS

In this study, 30 Wistar Albino rats weighing 250-300 g were used. The rats were fed with ready-made pellet rat food under standard conditions (21-22 ° C, 55-65% humidity, 12 hours light-12 hours dark) and there were no limitations on the consumption of drinking water.

The rats were divided into five groups of six. Group 1 was determined as the control group and there were no administrations, while the other groups received 30 mg / kg OP (p.o.). Group 2 rats received no additional agent. Group 3 rats were given the first dose of CUR (100 mg / kg p.o.) 2 hours after the OP administration and CUR (100 mg / kg p.o.) at the 12th hour. Group 4 rats were administered OP + SFN 2 mg / kg (i.p) in 2 doses at the 2nd and 12th hours. Group 5 rats received intralipid fat emulsion (18.6 mg / kg p.o) at the 2nd and 12th hours. Electrocardiography (ECG) recordings were performed twice; at the 2nd hour (onset) and the 12th hour. After the rats were anesthetized with 40 mg / kg ketamine and 4 mg / kg xylazine, ECG recordings were performed in the prone position. The data were evaluated using the BIOPAC System. The P wave, P-R distance, QT interval, T wave duration and heart beats per minute were calculated. Any arrhythmias and findings outside of the normal durations and amplitudes were interpreted as abnormal ECG findings. Bazzet formula was used to calculate QTc. Results were analyzed via the Mann-Whitney U Test. After the ECG recordings were completed, electromyography (EMG) recordings were started without any additional anesthetics. EMG recordings were performed on all groups 2 times in total; at the 2nd hour (onset) and at the 12th hour. BIOPAC MP 100 Acq. system (Santa Barbara, USA) was used for the EMG recordings by the supramaximal stimulation of the right sciatic nerve with a bipolar subcutaneous needle. The results were evaluated using the BIOPAC Acq. Knowledge software and analyzed by the Mann-Whitney U test. At the end of the 24th hour, venous blood samples were taken into EDTA tubes to evaluate the biochemical parameters (ALT, AST, PChE, urea and creatinine) of the rats. Rats were sacrificed following the administration of 40mg / kg pentobarbital. Kidney and liver tissue samples were taken from the postmortem rats.

Statistical Analysis

Obtained findings (ALT, AST, urea, creatinine, PChE, SOD, GSH (Active Glutathione) and MDA) statistical calculations were made using the SPSS 10.0 package program. The data obtained in the study were expressed as “mean ± standard deviation” (X ±SD). By applying analysis of variance (ANOVA) and Tukey's HSD (honestly significant difference) test in groups statistical relationship was determined. $P< 0.05$ was accepted for statistical significance. ECG and EMG findings were compared using the Mann-Whitney U test.

RESULTS

The highest AST value was found in the OP group, while the lowest value was found in the control group. The increase in the OP group compared to the control group was statistically significant. Although the AST levels were observed to be lower in the other

groups in comparison to the OP group, this difference was not statistically significant. The ALT increase in the OP group was found to be statistically significant compared to the control group, while the lowest ALT value in the OP + SFN group was not statistically significant compared to the other groups as presented in Table1.

Table 1. AST, ALT, UREA, Creatinine, PChE Measurements in Serum

GROUPS	AST U/L	ALT U/L	Urea mg/dl	Creatinine mg/dl	PChE U/L
Group 1 (Control)	80.5±3.2 p:0,630	68.7±1.9 p:0,057	15.0±1.2 p:0,088	0.3±0.0 p:1,924	838.4±0.0 p:0,916
Group 2 (OP)	799.4±2.0* p<0,05	257.9±0.9* p<0,05	17.3±3.3 p:1,934	0.4±0.0 p:3,280	136.0±0.0* p<0,05
Group 3 (OP+CUR)	387.0±2.5 **, ¥, Ω p<0,05	183.6±0.0 p:0,560	18.0±1.0 p:0,297	0.3±0.0 p:0,523	390.2±0.0 p:0,190
Group 4 (OP+SFN)	533.9±1.6 p:0,093	110.5±0.2 p:0,542	22.8±2.1 p:0,562	0.4±0.0 p:0,733	583.3±0.0 p:0,779
Group 5 (OP+LIPID)	562.0±2.2 p:0,183	201.1±0.2 p:0,954	25.3±3.4 p:1,180	0.4±0.0 p:0,994	793.5±0.0 **,#,¥ p<0,05

p <0.05 was considered significant.PChE: Pseudocholinesterase OP: Organophosphate, SFN: Sulforaphane, LIPID: Lipid emulsion, CUR: Curcumin. * p <0.05 different from control group; #p <0.05 different from OP + CUR group
** p <0.05 different from OP group; ¥ p <0.05 different from OP + SFN group. Ωp <0.05 different from OP + LIPID group

The level of urea, which is an indicator of kidney function, was measured the lowest in the control group. The highest urea value was in the OP + LIPID group, however this difference was not statistically significant compared to the control group (Table 1). There was no statistically significant difference between the groups in terms of urea and creatinine values.

In the present study, the highest and lowest levels of PChE were observed in the control group and OP group, respectively and this difference was statistically significant. The highest PChE value after the control group was recorded in the OP + LIPID group. The fact that this value was significantly higher compared to the OP group was in favor of LIPID preventing PChE suppression. The values in the OP + CUR and OP + SFN groups were found to be lower than the OP + LIPID group, while there was no significant difference compared with the OP group (Table 1).

There was no statistically significant difference between the groups in terms of SOD and MDA levels in the liver tissue. The highest GSH level was measured in the control group, while the lowest value was measured in the OP group and this difference was statistically significant compared to the control group (p <0.05) as presented in Table 2.

Table 2. SOD, GSH, MDA levels in liver tissue

Groups	SOD(L) (nmol/g tissue)	GSH (L) (nmol/g tissue)	MDA (L) (nmol/g tissue)
Group 1 (Control)	0.03±0.01 p:0,145	11.6±3.8 p:1,136	0.94±0.13 p:0,182
Group 2 (OP)	0.05±0.01 p:0,744	4.7±2.15* p <0,05	1.51±0.29 p:1,234
Group 3 (OP+CUR)	0.03±0.01 p:0,093	4.9±1.05 p:0,262	1.33±0.05 p:0,785
Group 4 (OP+SFN)	0.04±0.01 p:0,542	8.6±2.93**, ¥, Ω p <0,05	1.56±0.22 p:0,092
Group 5 (OP+LIPID)	0.05±0.01 p:0,560	4.8±2.41 p:0,365	1.00±0.09 p:1,164

SOD: Superoxide Dismutase, GSH: Active Glutathione, MDA: Malondialdehyde p <0,05 was considered significant. OP: Organophosphate, SFN: Sulforaphane, CUR: Curcumin, L: Liver, LIPID: Lipid emulsion* p <0,05 different from control group; #p <0.05 different from OP + CUR group ** p <0.05 different from OP group; ¥ p <0.05 different from OP + SFN group

Ωp <0.05 different from OP + LIPID group

The highest GSH level after the control group was recorded in the OP + SFN group. The difference between the GSH levels of the OP + SFN group and the OP, OP + CUR and OP + LIPID groups was statistically significant (Table 2).

No statistically significant difference was found between the control group and the other groups in terms of SOD, GSH and MDA levels in kidney tissue as seen in Table 3.

Table 3. SOD, GSH, MDA levels in kidney tissue

Groups	SOD (Kidney) (nmol/g tissue)	GSH (Kidney) (nmol/g tissue)	MDA (Kidney) (nmol/g tissue)
Group 1 (Control)	0.06±0.16 p:0,063	0.73±0.3 p:1,93	2.4±0.6 p:1,54
Group 2 (OP)	0.03±0.01 p:1,18	2.03±0.1 p:0,89	1.7±0.3 p:0,72
Group 3 (OP+CUR)	0.07±0.01 p:1.01	1.81±0.6 p:0,16	2.1±0.2 p:0,43
Group 4 (OP+SFN)	0.07±0.01 p:1.59	0.86±0.2 p:1,15	3.7±1.2 p:2,39
Group 5 (OP+LIPID)	0.07±0.01 p:0,23	1.66±0.6 p:0,56	1.7±0.2 p:1,52

p <0.05 was considered significant. OP: Organophosphate, SFN: Sulforaphane, LIPID: Lipid emulsion, CUR: Curcumin

When the ECG findings of the toxicity model were observed, a prolonged QTc interval was detected in the recordings of a rat in the OP group compared to other rats, however there was no statistically significant difference (p> 0.05). Lastly, there were no abnormal EMG findings in any of the rats.

DISCUSSION

In the present study, which investigated the effects of curcumin, sulforaphane and intralipid in the management of organophosphate toxicity; it was determined that in the OP group compared to the control group AST and ALT values measured in serum to evaluate liver tissues were found to be significantly increased. This indicates the damage to the liver tissues in OP poisoning.

There are many studies in the literature indicating a decrease in liver enzymes after CUR administration in OP poisoning and its restorative effect on liver tissue (16-19). In the present study, AST and ALT levels were found to be decreased in the group treated with CUR, in accordance with the literature. However, only the AST levels presented a statistically difference in comparison to the OP group; this may be because AST is also a marker of cardiac and skeletal muscle damage besides the liver.

SFN is a compound mostly found in vegetables such as Brussels sprouts and broccoli, which was first determined to activate phase 2 detoxification enzymes and has been shown to have anti-carcinogenic effects (20,21). On the other hand, the results of the present study indicated no beneficial effects of SFN on liver and kidney tissues.

Although OPs are highly lipophilic compounds, according to the biochemical data, it was observed that intralipid had no protective effect on liver and kidney tissues. However, the researchers believe that no renal damage occurred in the rats of the MAL toxicity model. This may be due to insufficient dosing or time required for damage to occur.

PChE is an enzyme that shows OP exposure and can be easily measured in blood. The PChE level was found to be suppressed in all groups except the control group. Although this result suggests that the intoxication model was formed properly, due to the fact that the experiment was terminated in the acute period, it could not be determined whether these values were significant in terms of clinical course.

MAL is known to activate various reactive oxygen radicals; superoxide anion, nitrogen dioxide and hydroxyl radicals in particular (22,23). In the present study, there was an increase in the SOD levels of the OP group compared to the control group, however

this difference was not statistically significant. There was no statistically significant difference between the treated groups and the OP group. Due to the lack of research on the relationship between the available drugs and SOD mechanism, a definite conclusion regarding this issue cannot be drawn.

In a study in which experimental MAL toxicity was created, a decrease in GSH in the tissues was found with the increase in serum lipid peroxide (LPO) and glutathione S transferase in the blood (24). In another study, on the contrary, it was reported that GSH levels increased in rats with Fenthion poisoning as an adaptive response to oxidative stress (25). In a study conducted by Alp et al. it was reported that the GSH level in liver tissue decreased significantly in rats with MAL toxicity, whereas it increased in the group given SFN and CUR due to MAL blocking (26). In the current study, similar to the study of Alp et al., the GSH level in the liver tissue of the group receiving MAL decreased significantly compared to the control group, and this difference was statistically significant. There is no consensus on GSH levels in tissues due to OP intoxication in the literature. Additionally, a statistically significant increase was detected in the SFN group compared to the OF group. This suggests that SFN is more effective than CUR and LIPID in preventing oxidative stress in liver tissue caused by MAL toxicity.

It is believed that the major factor contributing to the decrease of cell functions in oxidative stress is the increase of lipid peroxides and the most important and most used marker of lipid peroxidation is the MDA level. There was no significant difference between the groups concerning the MDA levels in liver and kidney tissue. This suggests that in the present study, an injury did not develop in the liver through lipid peroxidation.

In their study, in which EMG recordings were analyzed to evaluate the neuromuscular effects of acute OP intoxication, R.S. Wadia et al. reported that EMG findings were mostly normal in acute poisoning (27). The data obtained in the current study were divided into two as normal and abnormal findings before evaluation. No abnormal EMG findings were found in any of the rats.

In the present study, when the 2nd hour and 12th hour ECG findings of the subjects were evaluated, no ECG disorder was found in any of the subjects, and the EMG values of all subjects were also found to be normal.

CONCLUSION

In summary, as the findings of the present study indicate; curcumin and sulforaphane are effective in preventing liver damage, while intralipid contributes by reducing PChE suppression.

LIMITATION

The number of rats was limited in line with the decision of the ethics committee. Contrary to what was predicted in the hypothesis, no significant difference was found in ECG and EMG. However, there is a need for further research supported by histopathological imaging to reach a definitive conclusion.

Ethical Approval: This experimental study was carried out in Gaziosmanpaşa University Animal Experiments laboratory and Gaziosmanpaşa University Biophysics Department laboratory with project number 2014 HADYEK-38 (permission no: 51879863-05), after the approval of Gaziosmanpaşa University Animal Experiments Local Ethics Committee dated 03.06.2014.

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Analysis and interpretation: S.G., A.Y.S.
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REFERENCES

1. Robey WC, Meggs WJ. Insectisides, Herbicides, Rodenticides. In: Tintinalli JE, KelenGD, Stapczynski JS Emergency Medicine A Comprehensive Study Guide. 6th ed. NewYork NY, McGraw-Hill 2004; 1134-1143.
2. Karalliedde L, Edwards P, Marrs TC, Food Chem. Variables influencing the toxic response to organophosphates in humans. Toxicology 2003; 41: 1-13.
3. Eddleston M, Eyer P, Worek F, et al. Differences between organophosphorus insecticides in human self-poisoning: a prospective study. Lancet 2005; 366:1452- 9.
4. Yamashita M, Tanaka J. Human mortality in organophosphate poisonings. Vet Human Toxicol 1997; 39: 84-85.
5. Brahmi N, Mokline A, Kouraichi N, et al. Prognostic value of human erythrocyte acetyl cholinesterase in acute organophosphate poisoning. Am J Emerg Med. 2006; 24(7): 822–7.
6. Kwong TC. Biochemistry and Clinical Toxicology: Organophosphate pesticides. Ther Drug Monit 2002; 24: 144-9.
7. Vallianou NG, Evangelopoulos A, Schizas N, et al. Potential Anticancer Properties and Mechanisms of Action of curcumin. Anticancer Res. 2015;35(2):645-51.
8. Juge N, Mıthen RF, Traka M. Molecular basis for chemoprevention by sülforafan: a comprehensive review. Cell Mol Life Sci 2007; 64: 1105-27.
9. Myzak M, Dashwood RH. Chemoprotection by sülforafan:keep one eye beyond Keap1. Cancer Lett 2006; 233: 208-18.
10. Foxall G, McCahon R, Lamb J, et al. Levobupivacaine-induced seizures and cardiovascular collapse treated with Intralipid. Anaesthesia 2007; 62: 516-8.
11. Paknikar K M, Nagpal V, Pethkar A V et al. Degradation of lindane from aqueous solutions using iron sulfide nanoparticles stabilized by biopolymers 2005; 6: 370-4
12. Khan S, Khan NN. The mobility of some organophosphorus pesticides in soils as affected by some. Soil Sci; 142: 214-220.
13. Guven M, Ünlühızarcı K, Göktaş Z,et al.Intravenous organophosphate injection: An unusual way of intoxication. Hum Exp Toxicol 1997; 16: 279-80.
14. Namba T, Greenfield M and Grob D. Malathion poisoning. A fatal case with cardiac manifestations. Arch Environ Health 1970; 21: 533–40.
15. Farago A. Fatal, suicidal malathion poisonings. Jusic A and Milic S. Neuromuscular synapse testing in two cases of suicidal organophosphorous pesticide poi- soning. Arch Toxicol 1967; 23: 11–6.
16. Preeti Y, Sunil EJ, Kumar V, et al. Protective efficacy of 2-PAMCl, atropine and curcumin against dichlorvos induced toxicity in rats, 2012;5(1):1-8.
17. Dwivedi & Flora, Concomitant exposure to arsenic and organophosphates on tissue oxidative stress in rats Food Chem Toxicol.2011 May;49(5):1152-9
18. Dwivedi, N., Bhutia, Y. D., Kumar, V., Yadav, P., Kushwaha, P., Swarnkar, H., & Flora, S. (2010). Effects of combined exposure to dichlorvos and monocrotophos on blood and brain biochemical variables in rats. Human & Experimental Toxicology, 29(2), 121–9.
19. Perananthamet S, Shaha K, Sahai A, et al. A hospital based epidemiological study of deaths due to organophosphorus compound poisoning. IAJPR 2014; 4: 3773-9.
20. Juge N, Mithen RF, Traka M. Molecular basis for chemoprevention by sülforafan: a comprehensivereview. Cell Mol Life Sci 2007; 64: 1105-27.
21. Myzak M, Dashwood RH. Chemoprotection by sülforafan:keep one eye beyond Keap1. Cancer Lett 2006; 233: 208-18.
22. Thıyagarajan M, Sharma SS. Neuroprotective effect of Curcumin in middle cerebral artery occlusion induced focal cerebral ischemia in rats. Life Sci 2004; 74: 969-85.
23. Sreejayan and Rao MN. Nitric oxide scavenging by Curcumin. J Pharmacy Pharmacol 1997; 49: 105- 7.
24. Ahmed RS, Seth VS, Pasha T, Banerjee BD. Influence of dietary ginger (Zingiber officinales Rosc) on oxidative stres ınduced by malathion in rats. Food Chem Toxicol 2000; 38: 443-50
25. Karalliedde L. Organophosphorus Poisoning and Anaesthesia. Anaesthesia. 1999; 54: 1073-88.
26.Tuzcu K, Alp H, Özgur T, et al. Oral intralipid emulsion use: a novel therapeutic approach to pancreatic b-cell injury caused by malathion toxicity in rats Drug Chem Toxicol 2014; 37: 261–7
27. Neurological manifestations of organophosphorous insecticide poisoning. J Neurol Neurosurg Psychiatry. 1974; 37(7): 841–7.

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Original Article

Applying to Comparing the Levels of Coping with Postpartum Depression and Stress of Mothers of Premature Babies and Term Infants Who is the Pediatric Emergency Department

Pediatri Acil Servise Başvuran Prematur Bebek ve Term Bebek Annelerini Postpartum Depresyon ve Stresle Baş Etme Düzeyleri Açısından Karşılaştırma

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Abstract

Background: The aim is to compare the frequency of depression in mothers of premature and term infants, determine the relationship between stress coping styles, identify sources of stress and reduce the applying to the emergency department.
Material and Method: 50 mothers of premature and 50 term infants who applied to the Emergency Department of the Training and Research Hospital between August 2017 and November 2017, were included in the study. Sociodemographic data form, Structured Clinical Interview for DSM-IV Axis I Disorders, Edinburgh Postpartum Depression Scale and Stress coping styles scale were applied to these individuals.
Results: At the end of work; according to Edinburgh postpartum depression scale, 32% of the mothers of premature infants and 28% of the mothers of term infants were diagnosed with depression. When the styles of coping with stress are examined, there was no statistically significant difference between the premature and term group ($p>0.05$). As a result of the evaluation made using the Edinburgh Postpartum Depression Scale, 30 patients were diagnosed with postpartum depression. When those who were diagnosed with postpartum depression and those who did not were compared in terms of coping styles with stress, there was a statistically significant difference between only those who applied to the helpless approach and it was higher in cases with postpartum depression ($p<0.05$).
Conclusion: There was no difference in terms of postpartum depression between patients with preterm and term delivery. However, postpartum depression rates were higher than expected in both groups.
Keywords: Stress, depression, postpartum

ÖZ

Amaç: Postpartum dönemde premature bebek annelerinde ve zamanında doğan bebek annelerinde depresyon sıklığını kıyaslamak, stresle başa çıkma tarzları ile anksiyete ve depresyon düzeyi arasındaki ilişkiyi belirlemek, kişilerin stres kaynaklarını belirleyip bununla ilgili acile başvuru nedenlerini azaltmaktır.
Gereç ve Yöntem: Eğitim ve Araştırma Hastanesi pediatri acil servisine, Ağustos 2017-Kasım 2017 tarihleri arasında başvuran 50 premature ve 50 term bebek annesi çalışmaya dahil edildi. Bu kişilere Sosyodemografik veri formu, DSM-IV Eksen I Bozuklukları İçin Yapılandırılmış Klinik Görüşme ölçeği, Edinburgh Postpartum Depresyon Ölçeği ve Stresle başa çıkma tarzları ölçeği verildi.
Bulgular: Yaptığımız çalışmanın sonunda; Edinburg postpartum depresyon ölçeğine göre, premature bebek annelerinin %32'si, term bebek annelerinin %28'i pospartum depresyon tanısı aldı. Stresle başa çıkma tarzları incelendiğinde; sosyal destek arama, iyimser yaklaşım, çaresiz yaklaşım, kendine güvenli yaklaşım ve boyun eğici yaklaşıma başvuranlarda premature grup ile term grup arasında istatistiksel olarak anlamlı bir farka rastlanmadı ($p>0,05$). Edinburgh Postpartum Depresyon Ölçeği kullanılarak yapılan değerlendirme sonucunda; 30 olgu postpartum depresyon tanısı aldı. Postpartum depresyon tanısı alanlar ve almayanlar, stresle başa çıkma tarzları açısından kıyaslandığında; sadece çaresiz yaklaşıma başvuranlar arasında istatistiksel olarak anlamlı bir fark vardı ve postpartum depresyonlu olgularda daha yüksekti ($p<0,05$).
Sonuç: Preterm ve term doğum yapan hastalar arasında postpartum depresyon açısından fark yoktu. Ancak doğum sonrası depresyon oranları her iki grupta da beklenenden yüksekti.
Anahtar kelimeler: Stres, depresyon, postpartum

INTRODUCTION

The postpartum period is a difficult period for mothers and it has been observed that women are depressed 2 times more than other life periods (1). In the psychiatric approach, postpartum depression (PPD) is considered as a major depressive disorder that develops within 1 month after birth (2). Some studies define PPD more broadly as depressive episodes occurring up to 12 months after birth (3). Patients may develop postpartum blues, which usually consists of mild depressive symptoms that resolve spontaneously, as well as more severe signs and symptoms of minor or major depression may also occur. While the approximate prevalence of depression is 6-12% during pregnancy, it rises to 20% in the postpartum period. (4). Depression during pregnancy: associated with an increased risk of preterm birth, low birth weight, abnormal fetal heart rate and delayed intrauterine growth, while postpartum depression similarly for both mothers and infants can lead to serious consequences ranging from sleep difficulties to delayed/impaired development of cognitive, emotional, verbal and social skills in children (5). Mothers of newborns who have a medical illness, born prematurely or whose care is difficult are also at higher risk for PPD (6, 7). In previous studies, mothers of premature newborns, especially in the early postpartum period, have almost twice the rates of PPD compared to term births (8).

The mother's inability to adapt to new roles, physical and emotional changes may predispose the mother to be anxious and stressed. With this; low levels of optimism and inability to cope with stress may also increase the frequency and intensity of somatic complaints of the mother and make the mother more prone to depression (9). Coping is defined as the cognitive and behavioral processes that a person uses to cope with stressful situations that are judged to be challenging, threatening and/or have the potential for harm or loss (10). Patients use different ways to cope with the stress that accompanies or triggers depression, albeit involuntarily.

Stressful life experiences and ways of coping with them can predispose to mood disorders, and depression itself can be the cause of severe stress and underdeveloped techniques to counter it. Therefore, variables related to the onset and course of depression remain in significant association with coping strategies (11). Adopting an adaptive or appropriate coping style during pregnancy can minimize or even prevent the negative effects of stressors. The research objective is to compare the frequency of depression in mothers of premature and term infants in the postpartum period, determine the relationship between stress coping styles and the level of anxiety and depression, identify sources of stress and reduce the frequency of applying to the emergency department.

Materials and Methods

Our research is a case-control study conducted between August 2017 and December 2017. The cases were selected from volunteers who applied to the pediatric emergency department of a training and research hospital. The data of the research were collected between August 2017 and November 2017, and the data were evaluated for 2 months. The data were processed with the SPSS statistical program using statistical tests that were compatible with the data. Fifty mothers of preterm infants and 50 mothers of term infants who applied to the pediatric emergency department of Training and Research Hospital and were informed about the study were included in the study. Sociodemographic data form, Structured Clinical Interview for DSM-IV Axis I Disorders, depression and anxiety sections, Edinburgh Postpartum Depression Scale and Stress coping styles scale were given to these individuals. All of the patients to be included in the study were found from a training and research hospital pediatric emergency service.

While defining the population to be examined, the acceptance criteria for the study were determined as follows: 1) Giving birth in the last 3 months, 2) Applying to the pediatric emergency department, 3) At least primary school graduate, 4) Signing the informed consent form. The exclusion criteria are as listed: 1) Being illiterate 2) Mental retardation and cognitive deficit at an understandable level upon interview 3) Presence of a severe general medical condition-related illness at an understandable level upon interview 4) Diagnosis of schizophrenia and other psychotic disorders.

Because there was no similar previous study a pilot study was performed with 10 subjects from each group. The effect size was determined using Edinburgh Postpartum Depression Scale. According to the results 34 subjects from each group was found to be the required number to reach an alpha value of 0.05 and 1-beta value of 0,20 (Table 1). We reached 50 subjects from each group

Necessary permissions for the study were obtained from the Ministry of Health Istanbul Ümraniye Training and Research Hospital Clinical Research Ethics Committee with the decision number 108 on 20.07.2017.

Tools

Structured Clinical Interview for DSM-IV Axis I Disorders: is a semi-structured clinical interview scale developed for the diagnosis of DSM-IV axis-I including clinical psychopathological conditions (12). Turkish adaptation and clinical studies have been carried out by Özkürkçigil et al. (13).

Edinburgh Postpartum Depression Scale: The validity and reliability study of the scale developed by Cox et al. was carried out by Engindeniz (14). It was prepared for screening purposes in order to determine the level of depression risk and measure the change in severity in women in the postpartum period. It is not a scale for diagnosing depression. The scale is a 4-point Likert-type, self-report scale consisting of 10 items. The cut-off point of the scale is calculated as 13, and women with a score of 13 or more are considered as the risk group.

The scale of coping styles with stress: The Turkish validity and reliability study of the scale developed as "Coping Ways Inventory" by Lazarus and Folkman was developed by Şahin and Durak (15). The scale, which was created by doing three studies, consists of 30 items and includes 5 sub-dimensions. Sub-dimensions of the scale; self-confident approach, helpless approach, submissive approach, optimistic approach and seeking social support approach. The measurement tool is in 4-point Likert type, scored between 1 and 4, and the highest 120 and the lowest 30 points are obtained from the scale.

Statistical Analysis

The data were analyzed using IBM SPSS V23. Conformity to normal distribution was evaluated with the Kolmogorov-Smirnov test. Chi-square and Fisher's Exact tests were used to compare categorical variables according to groups. Independent two-sample t-test was used to compare the normally distributed quantitative data according to the groups, and the Mann-Whitney U test was used to compare the non-normally distributed data. Analysis results are given as mean± standard deviation and median (minimum-maximum) for quantitative data and as frequency (percentage) for categorical data. The level of significance was taken as $p<0.050$.

Results

The study was conducted on a total of 100 cases who applied to the pediatric emergency department of a training and research hospital between August 2017 and December 2017.

Of the term cases included in the study, 96% were formally married and 4% were religiously married; all of the preterm cases were officially married. Considering the distributions according to educational status, 8% of preterm pregnants were literate, 36% primary school graduates, 26% secondary school graduates, and 24% higher education graduates; in term cases, 10% were literate, 44% primary school graduates, 28% secondary school graduates, and 14% higher education graduates. (Table: 1).

Table 1. Examination of the cases included in the study

	Preterm N (%)	Term N (%)	Test statistic	P
School situation				
Primary school	18 (36)	22 (44)		
Highschool	13 (26)	14 (28)		
Literate	4 (8)	5 (10)	χ^2=2.064	0.724
University	12 (24)	7 (14)		
No	3 (6)	2 (4)		
Marital status				
Married	49 (100)	48 (96)		0.495[F]
Informal wedding	0 (0)	2 (4)		
Place of residence				
Town	1 (2)	1 (2)		
City	46 (92)	46 (92)	χ^2=0.000	1.000
Suburb	3 (6)	3 (6)		
Social Support				
Yes	18 (36)	19 (38)		
Insufficient	2 (4)	0 (0)	χ^2=2.043	0.360
No	30 (60)	31 (62)		
History of previous psychiatric disease				
Yes	18 (36)	21 (42)	χ^2=0.378	0.539
No	32 (64)	29 (58)		

χ^2: Chi-square test statistic, F: Fisher's Exact test statistic

When marital satisfaction was questioned, 2% of cases from both groups were bad; 24% of preterm cases were moderate, 74% were good; they stated that they were moderately satisfied in 10%, and well satisfied in 88% in term cases. Satisfaction between spouses was poor in 2% of both groups; 24% of preterm cases were moderate, 74% were good; they stated that they were moderately satisfied in 10%, and well satisfied in 88% in term cases. (Table: 2).

Table 2. Distribution of descriptive features of the cases included in the study

	PretermN(%)	TermN(%)	Test statistic	P
Spouse communication				
Good	37 (74)	44 (88)		
Bad	1 (2)	1 (2)	χ^2=3.487	0.175
Medium	12 (24)	5 (10)		
Marriage satisfaction				
Good	37 (74)	44 (88)		
Bad	1 (2)	1 (2)	χ^2=3.487	0.175
Medium	12 (24)	5 (10)		

χ^2: Chi-square test statistic, F: Fisher's Exact test statistic

Planned pregnancy was 76% of the cases in the preterm group and 82% of the cases were planned pregnancy in the term group. While 92% of the preterm cases were followed up, all of the term cases were followed-up pregnancy. The rate of chronic disease in the preterm cases was 8%, and the rate of chronic disease in the term group was 4%. There was a statistically significant difference between the distributions of smoking during pregnancy according to the groups (p=0.006). While 16% of the preterm group was smoking, none of the term group was smoking. 8% of preterm cases and 6% of term cases were conceived by assisted reproductive technique. There was a statistically significant difference between the distributions of maternal health status at birth according to the groups (p=0.002). While 64% of the preterm group did not have a health problem, 92% of the term group did not have a health problem. There was a statistically significant difference between the distributions of maternal health status at birth according to the groups (p=0.002). While 64% of the preterm group did not have a health problem, 92% of the term group did not have a health problem. There was a difference between the distributions of infant birth weights according to the groups (p<0.001). While 44% of the preterm group was over 2500 g, 92% of the term group had an infant birth weight over 2500 g. There is a statistically significant difference between the distribution of breastfeeding status according to the groups (p=0.014). While 80% of the preterm group is breastfeeding, 96% of the term group is breastfeeding (Table: 3).

Table 3. Distribution of cases according to pregnancy characteristics

	Preterm n, (%)	Term n, (%)	Test statistic	P
How is pregnancy				
Planned	38 (76)	41 (82)	χ^2=0.542	0.461
Unplanned	12 (24)	9 (18)		
Assisted Reproductive Techniques				
Yes	4 (8)	3 (6)		1.000^F
No	46 (92)	47 (94)		
Delivery Method				
C/s	30 (60)	25 (50)	χ^2=1.010	0.315
Normal	20 (40)	25 (50)		
Health problem in mother at birth				
Serious	5 (10)	0 (0)		
Mild	7 (14)	4 (8)	χ^2=14.331	0.002
Medium	6 (12)	0 (0)		

No	32 (64)	46 (92)		
Health problem in baby at birth				
Yes	21 (42)	6 (12)	χ^2=11.416	0.001
No	29 (58)	44 (88)		
Baby birth weight				
under 1500	10 (20)	0 (0)		
1500-2500	18 (36)	4 (8)	χ^2=27.380	<0.001
over 2500	22 (44)	46 (92)		
Smoking during pregnancy				
Yes	8 (16)	0 (0)		0.006[F]
No	42 (84)	50 (100)		

χ^2: Chi-square test statistic, F: Fisher's Exact test statistic, C/s: cesarean section

In the past, SCID diagnoses of the cases were 19% for depressive episode, 8% for generalized anxiety disorder, social phobia 2%, bipolar disorder 2%, dysthymia 4%, obsessive compulsive disorder 3%, panic disorder 3%; When we compared the mothers of preterm and term infants, the current SCID diagnoses of the cases were found to have an anxiety rate of 14% in preterms, while the rate of PPD was 24%, the rate of anxiety in term babies was 20%, and ppd was 14% (Table: 4).

Table 4. Past and present SCID diagnoses and postpartum depression rates of the cases

	PRETERM n (%)	TERM n,(%)	Test statistic	P
Current diagnosis of SCID				
Mild anxiety	1 (2)	0 (0)		
PPD	12 (24)	7 (14.3)		
PPD and social phobia	1 (2)	0 (0)	χ^2=8.462	0.206
PPD and generalized anxiety	0 (0)	4 (8,2)		
General Anxiety	5 (10)	6 (12.2)		
None	30 (60)	32 (65.3)		
Past SCİD diagnosis				
No	30 (60)	29 (58)	χ^2=6.438	0.929
Depression	8 (16)	11 (22)		
Generalized anxiety disorder,	4 (8)	4 (8)		
Adjustment Disorder	4 (8)	2 (4)		
Dysthymic disorder	1 (2)	3 (6)		
Panic disorder	1 (2)	2 (4)		
Obsessive Compulsive Disorder	1 (2)	2 (4)		
Social Phobia	1 (2)	1 (2)		

Conversion disorder	1 (2)	1 (2)	
PTSB	0 (0)	1 (2)	
Bipolar affective disorder-2	0 (0)	1 (2)	
Bipolar affective disorder-1	1 (2)	0 (0)	
Edinburgh postpartum depression			
Postpartum depression	16(32)	14(28)	0.234

χ^2: Chi-square test statistic, F: Fisher's Exact test statistic, SCID: Structured Clinical Interview for DSM-IV Axis I Disorders, PPD: postpartum depression, PTSB: posttravmatic stress disorder

In our study, 30 cases were diagnosed with PPD. When patients with and without PPD diagnosis were compared; social support recipients in the PPD group were 2.80±0.62, and 2.69±0.65 in cases without PPD, and there was no statistically significant difference (p>0.05). In the optimistic approach group in the PPD group it was 3.20±1.06, 3.73±1.31 in cases without PPD, and there was no statistically significant difference (p>0.05). In cases with a diagnosis of PPD helpless approach was 4.10±1.83, 64±1.60 in cases without PPD diagnosis, and there was a statistically significant relationship between helpless approach and PPD. Submissive approach was 3.30±1.34 in cases with PPD, 3.19±1.32 in cases without PPD, and there was no statistically significant difference. In the self-confidence group, it was 5.67±1.72 in cases with PPD diagnosis, while it was 5.91±1.81 in cases without PPD, and there was no statistically significant difference (Table 5).

Table 5. Comparison Styles of Coping with Stress Scale in PPD case

	PPD	Mean ± SD	P
Social Support	AVAILABLE	2.80±0.62	0.365
	NONE	2.69±0.65	
Optimistic Approach	AVAILABLE	3.20±1.06	0.215
	NONE	3.73±1.31	
Helpless Approach	AVAILABLE	4.10±1.83	0.001
	NONE	2.64±1.60	
Submissive Approach	AVAILABLE	3.30±1.34	0.236
	NONE	3.19±1.32	
Self-confident Approach	AVAILABLE	5.67±1.72	0.853
	NONE	5.91±1.81	

Discussion

Maternal depression is a common but often underdiagnosed condition. Maternal depression adversely affects children's behaviour, development and mental health. Increased maternal depressive symptoms have been associated with missed pediatric outpatient visits, delayed immunization rates, decreased use of child safety measures, and increased use of emergency services. Women, whose babies are seen in the emergency department or who have problem-focused visits in primary care in the first few months of their lives, are more likely to have depressive symptoms (16). Screening for PPD in the pediatric setting may also be important as an opportunity to detect PPD, as mothers with severe depressive symptoms may neglect their self-care and infant care and may not be able to seek help from their obstetrician or primary care physician. Postpartum depression is defined in DSM-V as a major depression episode that begins within 4 weeks after birth (17). Other studies have defined PPD more broadly as depressive episodes occurring up to 12 months after birth (3). In our current study, we limited PPD to cover 3 months postpartum.

The estimated prevalence of postpartum unipolar major depression is not yet certain (18). Estimates vary widely among different studies, depending on which country the study is conducted in, the period during which postpartum prevalence is to be defined,

whether depression is determined based on self-report or clinical interviews, patients with minor depression are included, and whether the assessment is performed in clinical settings (18,19). However, the prevalence of PPD is estimated to be approximately 9% in studies conducted in Europe (18). In studies conducted under clinical conditions, the prevalence of depression in postpartum women varies between 10-16%. In our study, when mothers of preterm infants and term infants were evaluated together, we found that postpartum depression was higher with a frequency of 30% compared to the literature, since the patient population consisted only of mothers who applied to the pediatric emergency service (20). Although some studies showing the relationship between preterm birth and postpartum depression stated that preterm birth is a risk factor for postpartum depression (21, 22), no significant difference was found in a few studies (23, 24), similar to our results. Since depression in the mother before birth may also cause preterm birth, determining whether preterm birth causes depression or depression causes preterm birth may enable to take precautions for etiology and prevent premature births and postpartum depression

In a study conducted on patients with postpartum unipolar major depression, relatively more severe episodes were determined according to the presence of onset of depressive symptoms during pregnancy, mean score of 20 on EPDS, symptoms of anxiety and suicidal ideation, and obstetric complications (e.g. fetal stress, postpartum hemorrhage and low birth weight) In our study, low birth weight, health problems in the baby at birth and health problems in the mother were found to be higher in the preterm group compared to the term group. However, larger-scale studies are needed to obtain more comprehensive results on whether health problems trigger depression or whether depression triggers health problems. Patients use different ways to cope with the stress that accompanies or triggers depression, albeit involuntarily. There are few studies on coping strategies during pregnancy or during the transition to parenthood (25). In our study, the Stress Coping Styles Scale, previously defined by Folkman and Lazarus, was used for all patients who had preterm and term births. The 30-item study form of this scale was prepared by Şahin NH and Durak A., which was revealed through a Turkish validity and reliability study (14). Ways of coping with stress according to this form are options such as the helpless approach, the submissive approach, the optimistic approach, the self-confident approach, and the seeking of social support. Considering the patient groups in our study, there was no statistically significant difference between the patients who had preterm and term births in terms of coping styles with stress. But when all patient groups are considered, while there was no statistically significant difference in the other four parameters in terms of coping styles with stress between patients with and without PPD, there was a statistically significant difference in terms of resorting to the helpless approach, and it was higher in patients with PPD. Our study suggests that the use of certain coping strategies predisposes women to develop depressive symptoms in response to adverse events. It is also an expected result that people who use the helpless approach to cope with stress are depressed. The helpless approach is an inadequate approach to problem solving, and unresolved problems are likely to cause depression.

Changing coping strategies through various psycho-educational programs is one of the most effective preventive approaches that can be applied to women who are vulnerable to postpartum stress and therefore at high risk of depression.

Limitation

The limitation of our study was that the medical problems in the babies of the mothers who applied to the emergency service were obtained with the statements of the mothers and could not be medically confirmed Although no such bias has been reported before, it is possible that mothers with depressive symptoms were biased in their recall of health care use. Other measures of child health use, such as immunizations, hospitalizations, and healthy child appointments, were not collected in this study. Future studies should examine the impact of maternal depression on these broader child health care use outcomes.

Conclusion

We could not determine increased risk of postpartum depression in mothers of premature children although depression and anxiety scores of the mothers of premature children were higher. Studies with larger samples or meta-analysis of several studies may yield more significant results, which may enable allocation of limited mental health resources to mothers of premature children.

Ethical Approval: The institutional ethics committee of Umraniye Research and Education Hospital (decision date 20-07-2017; no: 108) approved the study.

Author Contributions:
Concept: *E.E. B.*
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Design: Sıdıka Baziki Çetin
Data acquisition: *S.B.Ç.*
Analysis and interpretation: *S.B.Ç.*
Writing manuscript: *S.B.Ç.*
Critical revision of manuscript: *E.E. B.*
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References

1. Alshikh Ahmad, A Alkhatib., & Luo, J. Prevalence and risk factors of postpartum depression in the Middle East: a systematic review and metaanalysis. BMC pregnancy and childbirth, 2021; 21(1), 1-12.
2. American Psychiatric Association (2000). Diagnostic and statistical manual of mental disorders 5th ed, text revised. Washington, DC: American Psychiatric Press; 1997.
3. Gaillard A., Le Strat Y., Mandelbrot L., et al. Predictors of postpartum depression: prospective study of 264 women followed during pregnancy and postpartum. Psychiatry research, 2014;215(2), 341-346.
4. Peñacoba Puente C., Suso-Ribera C., Blanco Rico S., et al. (2021). Is the Association between Postpartum Depression and Early Maternal–Infant Relationships Contextually Determined by Avoidant Coping in the mother? International journal of environmental research and public health, 18(2), 562.
5. Jahan N., Went T. R., Sultan W., et al. Untreated Depression During Pregnancy and Its Effect on Pregnancy Outcomes: A Systematic Review. Cureus, 2021;13(8).
6. Eastwood J. G, Jalaludin B. B, Kemp LA, et al. Relationship of postnatal depressive symptoms to infant temperament, maternal expectations, social support and other potential risk factors: findings from a large Australian cross-sectional study. BMC pregnancy and childbirth, 2012; 12(1), 148
7. Räisänen S., Lehto SM, Nielsen HS, et al. Fear of childbirth predicts postpartum depression: a population-based analysis of 511 422 singleton births in Finland. BMJ open, 2013;3(11), e004047.
8. Norliza J., AS, SK, Emad, AS, & Norimah, S. Depression and coping strategies used by postnatal mothers during the postpartum period. Malaysian Journal of Psychiatry, 2015; 23(2), 63-72
9. Vigod SN Villegas, L. Dennis, CL, & Ross, LE. Prevalence and risk factors for postpartum depression among women with preterm and low birth weight infants: a systematic review. s.l: BJOG: An International Journal of Obstetrics & Gynaecology, 2010; 117(5), 540-550.
10. Folkman S. Personal control and stress and coping processes: a theoretical analysis. J Pers Soc Psychol. 1984; 46:839–52
11. Sariusz-Skąpska E, Czabała I Dudek D Zięba A. Ocena stresujących wydarzeń życiowych poczucie koherencji u pacjentów z choroba afektywną jedno-ı dwubiegunową Psychiatr Pol. 2003; 37 (5):863.
12. The Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association; 1994.
13. Öztürkçügil A, Aydemir Ö, Yıldız MDA et al. DSM-IV Eksen I Bozuklukları için yapılandırılmış klinik görüşmenin (SCID-I) Türkçeye uyarlanması ve güvenilirlik çalışması.İlaç ve Tedavi Dergisi 1999;12:233-36.
14. Engindeniz, A. N., Kuey, L., & Kultur, S. Validity and reliability of Turkish version of Edinburgh Postnatal Depression Scale. In Book of Annual Meeting of Psychiatric Association of Turkey. Turkish Psychiatric Association Press, Ankara 1996 ;51-52.
15. Şahin NH, & Durak A. A Stress Coping Style Scale for University Students. Turkish Journal of Psychology, Ankara, 1995;10 (34): 56-73.
16. Birmingham, M. C., Chou, K. J., & Crain, E. F. Screening for postpartum depression in a pediatric emergency department. Pediatric emergency care, 2011; 27(9), 795-800.
17. Gaynes BN, Gavin N, Meltzer-Brody S, et al. Perinatal Depression: Prevalence, Screening Accuracy, and Screening Outcomes. Rockville, MD: Agency for Healthcare Research and Quality; 2005. Evidence Report/Technology Assessment No. 119
18. Evans J, Heron J, Francomb H, et al. Cohort study of depressed mood during pregnancy and after childbirth. BMJ 2001; 323:257.
19. Da Costa D., Larouche J., Dritsa M., & Brander W. Psychosocial correlates of prepartum and postpartum depressed mood. Journal of Affective Disorders, 2000; 59(1), 31-40.
20. Karen Pridham, Chin-Yu Lin, Roger Brown. Mothers evaluation of their caregiving for premature and full-term infants through the first year: Contributing factors, 2001; 24(3), 157–169.
21. Vigod, S. N., Villegas, L., Dennis, C. L., et al. Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. *BJOG: An International Journal of Obstetrics & Gynaecology*,2010; *117*(5), 540-550.
22. Bener, A. Psychological distress among postpartum mothers of preterm infants and associated factors: a neglected public health problem. *Brazilian Journal of Psychiatry*, 2013;*35*, 231-236.
23. Robertson, E., Grace, S., Wallington, T., et al. Antenatal risk factors for postpartum depression: a synthesis of recent literature. Gen. Hosp. Psychiatry 2004;26, 289–295.
24. Forman, D., Videbech, P., Hedegaard, M., et al. Postpartum depression: identification of women at risk. Br. J. Obstet. Gynaecol.2000; 107, 1210–1217.
25. Huizink et al., 2002; Levy-Shiff et al., 1998; De Tychey et al., 2004; akenham et al., 2007

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Review

Foods That Improving the Immune System against Covid-19 and Its Infectiousness

Covid-19 ve Bulaşıcılığına Karşı Bağışıklık Sistemini İyileştiren Gıdalar

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Abstract

Background: The main aim of this study is to comment nutrients that can potentially increase immunity to coronavirus (COVID-19) and lower the risk of getting sick.

Methods: Severe acute respiratory syndrome associated with coronavirus [SARS-CoV] and SARSCoV-2 pathogenic to human enter their target cells such as lung, intestine, kidney and blood vessels via angiotensin converting enzyme 2 (ACE2) indicated by epithelial (Fang et al., 2020, Wan et al., 2020). Moreover, in COVID-19 patients, the level of Protein C in the cell was decreased after infection. (Panigada et al.). These conditions can cause a cross-linked fibrin clot. In this case, it may be possible to lower the risk of COVID-19 by inhibition of ACE2 and higher immunity of protein C. Levels of ACE2 and Protein C are important in this respect. While ACE2 and Protein C levels can control any nutrient, the risk can be significantly reduced. Thus, the effects of ACE2 and Protein C were evaluated from the literature.

Results: The level of Angiotensin converting enzyme 2 is significantly effective for protection from coronavirus disease (COVID-19). In this case, foods that provide ACE2 inhibition were evaluated in this study. In Table 1 shows a list of foods that inhibit angiotensin converting enzyme 2 (ACE2).

Conclusion: Foods that can strengthen immunity against coronavirus (COVID-19) and reduce the risk of disease are of great importance in this period. In addition, it may be important to slow down the factors that cause coronavirus. ACE2 and Protein C levels are important in this regard. If any nutrient can control ACE2 and Protein C levels, the risk can be significantly reduced. It was noticed that the immunity against COVID-19 could be improved with Cuttlefish, Sardinelle (Sardinella aurita), Rohu (Labeo rohita), Grass carp, European Carp (Cyprinus carpio L.), Cirrhinus mrigala, Salmon (Salmo salar), Katsuo-bushi, Acetes indicus, Common Oat (Avena sativa), Goat milk protein, Kacang goat meat, Milk protein, Yoghurt beverages with quinoa, Lupin and Other legumes, Whey protein, Mungbean, Walnut protein, Peanut protein, Corn germ protein, Sunflower (Helianthus annuus L.) protein, Antioxidants and fish oil, Wheat germ protein, Rice bran protein, Sesame (Sesamum indicum L.), Egg yolk and Cucurbita ficifolia, Egg protein, Egg white protein, Fucus spiralis, Cannabis sativa L., Sweet sorghum grain protein, and Onion seeds.

Key words: COVID-19, nutrients food, immunity, ACE

Introduction

COVID-19, which emerged in the city of Wuhan, China, is a rapidly spreading disease transmitted from person to person by droplet infection. The coronavirus epidemic, which started as an epidemic at first, later turned into an endemic and was later declared a pandemic by the World Health Organization. It is of great importance to comply with the hygiene rules and to have an adequate and balanced diet, both during the pandemic process and the mutation period after it (1, 2).

Health risks still remain important in our country, where the mutation process is experienced after the second and third stages of the coronavirus epidemic (Covid-19). While it was previously stated that only the elderly and individuals with health problems were at risk, today it has become more contagious due to mutated viruses, and accordingly, it is seen that young people and children are also caught in the epidemic and undesirable results leading to death are encountered (3).

Although there is no drug that can prevent or treat the transmission of coronavirus so far, it is not yet clear that the vaccine will bring a complete solution (4). Therefore, one of the greatest measures that can be taken today is to keep our immune system strong and not to get sick as much as possible. For this, it is necessary to have a healthy and balanced diet as well as regular sleep and physical activity (5).

Especially in nutrition, it should be preferred to consume more foods containing elements that increase body resistance and strengthen the immune system. In terms of a balanced diet, it is of great importance that the foods consumed are rich in protein, fiber, vitamins, minerals and especially antioxidants (6).

Regular nutrition is very important during and after the infection in the body. Especially when infections turn into a febrile illness, they damage the body, creating a need for more energy and nutrients. Therefore, a healthy diet is very important both during and after the COVID-19 illness. While no food has been able to prevent COVID-19 so far, it is important to have a healthy and balanced diet and a strong immune system (7).

Angiotensin converting enzyme 2 or ACE2 for short; It is a kind of enzyme found in the lungs, arteries, heart, kidneys and intestines, which is attached to the outer surface of the cells (cell membrane) (8).

The transmembrane protein ACE2 serves as the main entry point for cells and causes various types of coronavirus to infiltrate into cells. The S1 protein is located at the ends of SARS-CoV and SARS-CoV2. When this protein binds to the enzymatic portion of ACE2 on the cell membrane, both virus and enzyme enter the cell by endocytosis. This event led to the idea that it could help curb the coronavirus by reducing the amount of ACE2 in cells (8).

It has been realized that ACE2 and protein C can be controlled and thus the risk can be reduced with some nutrients, and some of these nutrients are given in Table 4.

In this paper, it has aimed to reveal the approaches between the relationships of nutrient and COVID-19 virus as well as ACE-II enzyme.

Protein

Proteins are linear polymers composed of 20 different L-alpha-amino acids (9). The different chemical properties of the side chains of amino acids determine the three-dimensional structure of proteins and therefore affect protein function (10).

Proteins are nitrogen-containing substances made up of amino acids. They serve as the main structural component of other tissues in the body, including muscles. In addition to being used to produce hormones, enzymes, and hemoglobin, proteins can also be used as a source of energy (11).

In order for proteins to be used by the body, they must be catalyzed into their simplest form, amino acids. 20 amino acids are required for human growth and metabolism. Twelve of these amino acids are non-essential amino acids that can be synthesized by our body. The other eight amino acids are essential amino acids that cannot be synthesized in our body and must be consumed in our diet (11) (Table 1).

Table 1. Bases amino acids found in the human body (12)

Essential amino acids	**Non-essential amino acids**
Phenylalanine	Glycine
Valine	Alanine
Tryptophan	Sistine
İsolosin	Tyrosine
Methionine	Aspartic Acid
Lysine	Glutamic acid
Losin	Serine
Hemi-Essential amino acids	Aspargin
Histidine	Glutamine
Arginine	Prolin

Protein C

Protein C (PC) is an important anticoagulant and antithrombotic for the human coagulation system. Protein C exerts its anticoagulant effect by inactivating FVa and FVIIIa together with protein S (PS). Protein C is found in human blood at a concentration of 4 µg/mL. In its deficiency, the risk of thrombosis in the veins is high. When these blood clots (thrombocytes) break off from the vein surface and mix with the blood stream, it can cause stroke, heart attack. A blood clot can be life-threatening if not detected and treated early (13).

Protein C (PC) is an important natural inhibitor of the human blood coagulation system. Protein C is a vitamin K-dependent glycoprotein with a molecular weight of 62,000 Daltons. Protein C is a special protein with both anticoagulant and antithrombotic functions in blood coagulation steps. Human Protein C is synthesized in the liver as a single-chain protein precursor and remains in the blood as an inactive zymogen until it is proteolytically degraded and

activated. Protein C is activated only where and when it is needed (14).

For protein C to be activated, thrombin must associate with the thrombomodulin (TM) receptor located on the endothelial cell surface. The thrombin-thrombomodulin complex formed on the endothelial cell surface binds to the inactive Protein C. Protein C becomes active as a result of thrombin-Protein C interaction. Activated protein C then complexes with protein S, a vitamin K-dependent cofactor (13) (Figure 1).

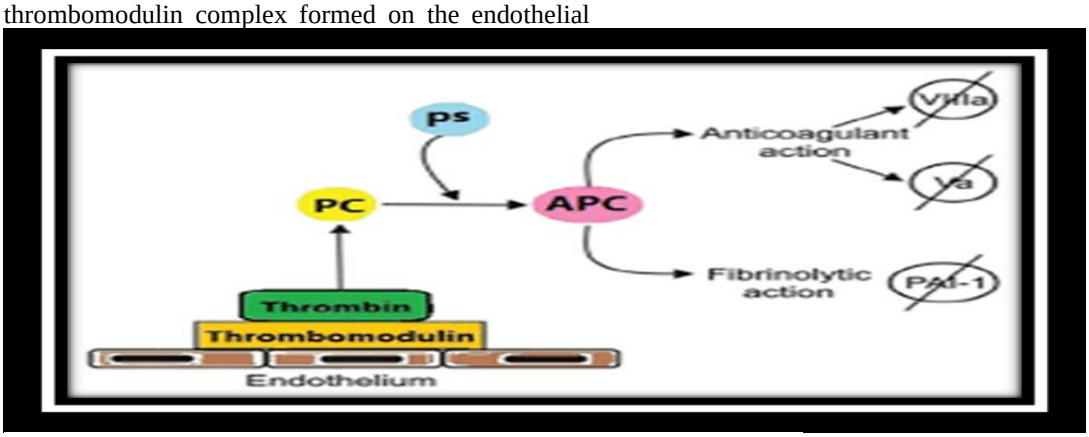

Figure 1. Model of thrombin-thrombomodulin activation of protein C (15)

Protein C is a serine protease that requires Vitamin K for its normal biosynthesis. It is a member of a vitamin K-dependent family that also includes coagulation protein factors VII, IX, X, S and Z proteins and prothrombin (16, 17) (Table 2).

Table 2. Vitamin K-dependent proteins (16)

Protein	Molecular weight (Da)	Number of polypeptide chains	Number of Gla zones	Carbohydrate content (%)	Plasma concentration (µg/mL)
Factor II	72000	1	10	8	80-90
Factor VII	50000	1	10	9-10	0.47
Factor IX	57000	1	12	17	4
Factor X	59000	2	11	15	6.4
Protein C	62000	2	9	29	4
Protein S	71000	1	11	7-8	25-35

Protein C was isolated from bovine plasma by Johan Stenflo in 1976 and was named "Protein C" because it was the third protein purified by DEAE-Sepharose. However, the function of Protein C in the physiological regulation of coagulation remained elusive for the next several years. Human plasma Protein C was purified by Kisiel in 1979 (16, 18).

Human Protein C circulates in the plasma as a zymogen and is converted to activated Protein C (APC) by specific cleavage by thrombin-bound thrombomodulin on the membranes of endothelial cells and plays a critical role in regulating the functioning of thrombin (16, 19).

Synthesis and Structural Properties of Protein C

Protein C, like all Vitamin K-dependent proteins that play a role in coagulation steps, is synthesized in the liver. This protein is synthesized as a long single-chain protein precursor consisting of 461 amino acids and is present in the blood as a two-chain inactive zymogen until it is proteolytically degraded and activated (13). The cDNA for human Protein C (hPC) encodes a protein consisting of 461 amino acids. The primary sequence of protein C is either directly detected or inferred from cDNA sequencing. Protein C is a glycoprotein with a molecular weight of 62000 Da (20). Protein C contains 23% carbohydrates and consists of 2 chains, one light (21 kDa) and the other heavy chain (41 kDa) linked by disulfide bonds (21). The structure of APC includes the interaction of the protease with the Ca2+ dependent cofactor Protein S on the membrane surface and the endothelial cell Protein C receptor (EPCR). Glutamic acid is carboxylated by reacting in the liver due to Vitamin K. This region interacts with the negatively charged phospholipid in the presence of calcium ions, and this is a prerequisite for the anticoagulant effect of APC. As protein S cofactor, it functions to regulate the anticoagulant function of APC (22) (Figure 2).

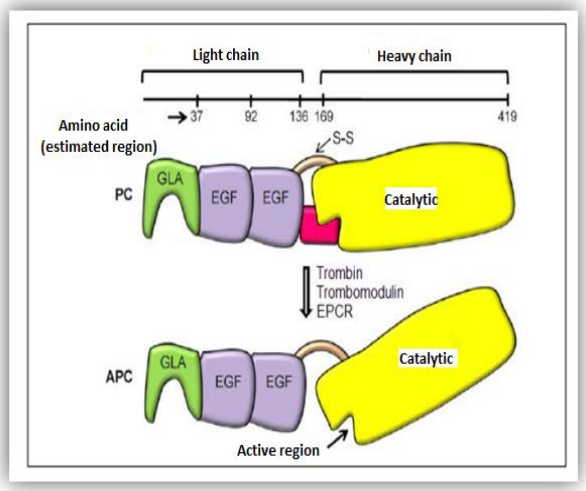

Figure 2. Protein C structure (16)

Protein C Activation

Protein C circulates in the blood as a zymogen (inactive) and is activated only where and when it is needed. For protein C to be physiologically functional, it must be converted to an active serine protease. Human Protein C activation occurs by enzymatic removal of a small activation peptide from the amino acid end of the heavy chain (21) (Figure 3).

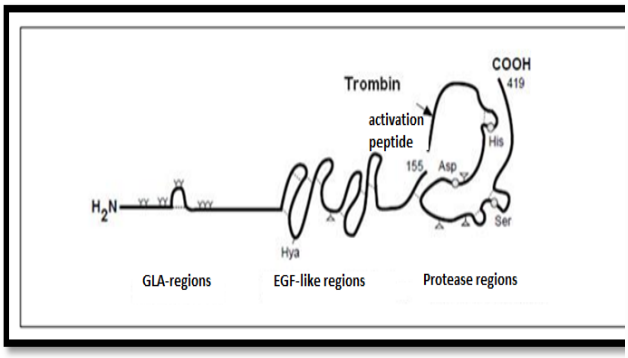

Figure 3. Human Protein C structure. Symbols: Y=Gla-sites, Hya=erytho-β-hydroxyaspartic acid, O=catalytic sites, Δ= N-linked glycosylation/glycosylation sites (16)

The Physiological Role of Protein C

All Vitamin K-dependent proteins have so far been stated to have a coagulation-related activity. In contrast, Protein C is a coagulation inhibitor and plays a critical role in regulating the functioning of thrombin (18). Many mechanisms that inhibit the spread of the coagulation process have been described on the endothelial cell surface. The anticoagulant Protein C cascade, one of the anticoagulant mechanisms, regulates blood coagulation by inactivation of Factors VIIIa and Va and increased fibrinolytic activity (23) (Figure 4).

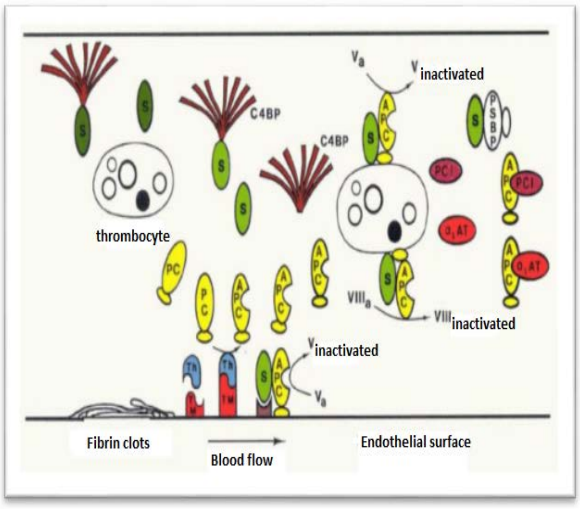

Figure 4. Formation and function of Activated Protein C (16)

Protein C Deficiency

Protein C with a half-life of 6 hours is a trace protein found in human blood at a concentration of 4 □g/mL. Serious problems occur when the amount of Protein C in the blood drops. Patients with protein C deficiency are at risk of deep vein thrombosis (DVT) and other coagulation complications as a result of tissue oxygen deprivation; some can be life threatening (13, 16) (Figure 5).

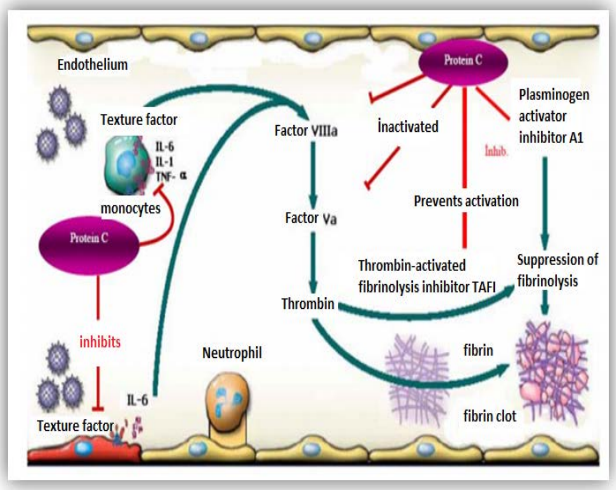

Figure 5. Protein C and the inflammation cascade (16)

PROTEIN S

The spike protein (S protein) is a diverse type I transmembrane protein with up to 1,160 amino acids for avian infectious bronchitis virus (IBV) and up to 1,400 amino acids for feline coronavirus. In addition, this protein is highly glycosylated due to the presence of 21 to 35 N-glycosylation sites. Spike proteins bind to trimers on the virion surface to have a distinctive "corona" or crown-like appearance. The ectodomains of all CoV spike proteins share the same function in two domains, an N-terminal domain called S1 responsible for receptor binding, and a C-terminal S2 domain responsible for fusion: the diversity of CoV into disordered spike proteins (S proteins) that

transform into various forms in receptor interactions. and their response to various environmental triggers of virus-cell membrane fusion (24).

Structure of Protein S

The coronavirus spike protein (S Protein) is a class I fusion protein (25, 26). The formation of an α-helix-helix structure of these fusion proteins is characteristic of the class, including the α-helix secondary structure and regions of C-terminal fragments predicted to form helices. While the S2 subunit is the most conserved of the protein, the S1 subunit can sequentially cleave between strains of even a single coronavirus. S1 consists of two subunits, the N-terminal domain (NTD) and the C-terminal domain (CTD). It acts as binding both (NTD) and (CTD) receptor binding domains (RBDs), various proteins and sugars (25) (Figure 6).

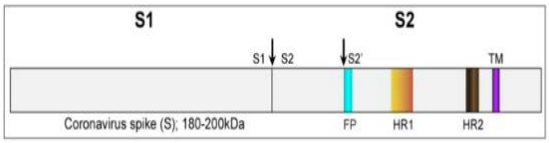

Figure 6. Severe acute respiratory syndrome (SARS)-CoV spike protein schematic (25)

Spike protein (S protein) plays a very important role in viral infection and pathogenesis. S1 binds by recognizing the receptors, and subsequent conformational changes in S2 facilitate fusion between the viral envelope and the host cell membrane. Models describing the S-mediated membrane fusion event have expanded from knowledge of S protein structures and their functions (24, 26).

Spike Glycoprotein (S) The spike glycoprotein (S), formerly called "E2", forms large, petal-shaped spikes on the virion surface. The S protein can be divided from its N-terminal end outside the envelope to its C-terminal end inside the envelope, into three structural regions: These consist of a large outer region, a transmembrane region, and a short carboxyterminal cytoplasmic region, which can be subdivided into two sub-regions, S1 and S2, respectively. The S1 subregion contains the N-terminal portion of the molecule and forms the spherical portion of the spikes. It is responsible for binding to specific receptors on the surface of appropriate cells (24) (Figure 7).

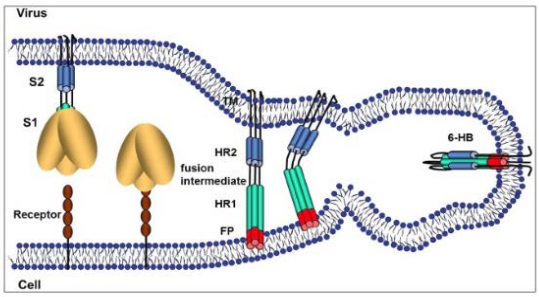

Figure 7. Schematic illustration of CoV S protein-mediated membrane fusion (25)

The S glycoprotein has adapted to species-specific differences in the host cell receptor (ACE2). The S protein binds to the specific receptor on the host cell, fusing the viral envelope with the host cell membrane; it also induces cell-cell fusion. Expression of the S protein alone can induce fusion of receptor-bearing cells (25) (Figure 8).

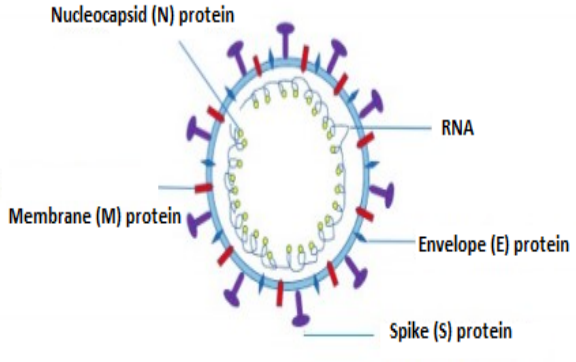

Figure 8. Schematic structure of the coronavirus(27)

The S glycoprotein is the primary factor in virus recognition by the immune system of the infected host. It is the chief inducer of neutralizing antibodies produced during infection. In conclusion, the S protein is considered as a multifunctional protein that plays an important role in cell tropism, host selection, neutralizing antibody formation, and the pathogenesis and biology of CoV infections (25) (Table 3).

Table 3. S protein-based vaccines against SARS-CoV (28)

Category	Advantages	Disadvantages
Vaccines*		
Full-length S protein	Promotes protective immunity as well as neutralizes antibody and T-cell responses	May cause unhelpful immune responses (64,65)
DNA-based	Promotes immunoglobulin G, neutralizing antibody and T cell responses and/or protective immunity	May have low efficacy in humans; repeated doses may cause toxicity (59,131)
Viral vector-based	Promotes neutralizing antibody responses, protective immunity and/or T-cell responses	May cause ADE effect, possibly due to pre-existing immunity (60,61,65)
Recombinant S protein-based	Promotes high neutralizing antibody responses and protective immunity	Basically, humoral responses; needs repeated doses and adjuvants (62)
RBD	Extremely potent neutralizing antibody promotes T-cell responses and protective immunity	Not identified (70-73)

DNA-based	Neutralizing antibody promotes T-cell responses and/or protective immunity	May cause low responses that cannot neutralize mutants (132-134)
Viral vector-based	Promotes neutralizing antibody responses, protective immunity and/or T-cell responses	Possible genomic integration of external DNA; viral vector instability (75,135)
Recombinant RBD protein-based	It is more reliable and effective than other RBD vaccines; promotes neutralizing antibody and T cell responses, protective immunity and cross protection	Requirement to repeat doses and adjuvants (26,70-72)

ACE-II ENZYME

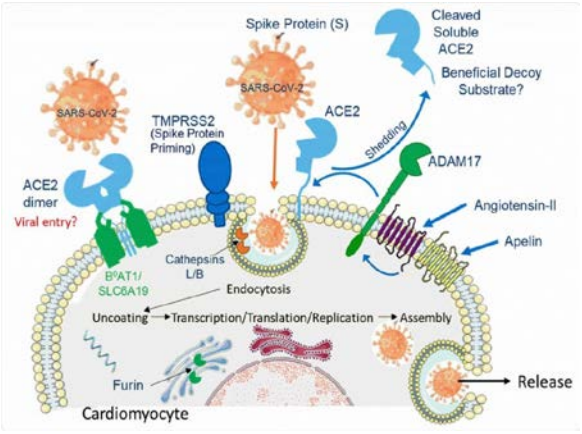

Figure 9. Schematic diagram of key proteins predicted to be expressed by human cardiomyocytes from RNASeq data (29)

Angiotensin converting enzyme 2 or ACE2 for short; It is an enzyme attached to the outer surface (cell membrane) of cells in the lungs, arteries, heart, kidneys, and intestines (30). ACE2 accelerates the hydrolysis of angiotensin II hormone, which is a vasoconstrictor, to angiotensin (1-7), thereby reducing blood pressure. In addition, ACE2 acts as the entry point into cells for some coronaviruses. The human version of the enzyme is called hACE2 (31) (Figure 9).

ACE2 counteracts the activity of angiotensin converting enzyme (ACE) by decreasing the amount of angiotensin-II and increasing. In this way, it has become a promising drug target in the treatment of cardiovascular diseases (32). Angiotensin converting enzyme 2 is a zinc-containing metalloenzyme found on the surface of endothelial cells and other cells.

ACE2 is a single-pass type I membrane protein with an enzymatically active domain on the surface of cells in lung and other organ tissues (30). The extracellular domain of ACE2 is cleaved from its transmembrane domain by another enzyme known as ceddase. Subsequently, the soluble protein obtained is released into the blood stream and excreted through the urine (33) (Figure 10).

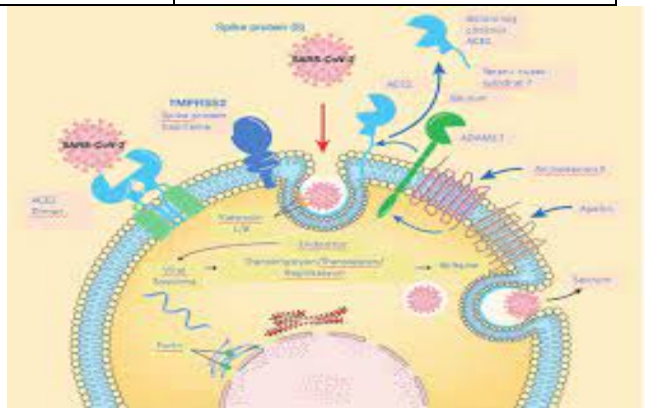

Figure 10. Life cycle of SARS-CoV-2 (34)

Position in the Body

ACE2 is known to be found in many organs. The most common sites of ACE2 binding are the cell membrane of alveolar epithelial cells of the lung, enterocytes of the small intestine, arterial and venous endothelial cells, and arterial smooth muscle cells in many organs. ACE2 mRNA is also found in the cerebral cortex, striatum, hypothalamus, and brain stem (35).

The main task of ACE2 is to act as a counterbalance to ACE. The ACE enzyme cleaves the hormone angiotensin I to the vasoconstrictor angiotensin II. ACE2 in turn cleaves the carboxyl-terminal amino acid phenylalanine from angiotensin II and hydrolyzes it to the vasodilator angiotensin (1-7). In addition, ACE2 can cleave many other peptides (36).

Entry Point to Human Body for Coronavirus

The transmembrane protein ACE2 serves as the main entry point for cells and causes various strains of coronavirus to infiltrate into the cell. To explain in more detail, when the S1 protein, located at the ends of SARS-CoV and SARS-CoV2, attaches to the enzymatic domain of ACE2 on the cell membrane, both the virus and the enzyme are taken into the cell by endocytosis (37). In addition, with this entry process, the production of the S protein in the virus begins to be carried out by the serine protease in the cell. This inhibition is considered a potential therapeutic and is currently being studied (38).

This led to the idea that coronavirus could be prevented by reducing the amount of ACE2 in cells. As an antithesis to this, it has been stated that ACE2 has a protective effect against viral lung injury by increasing the production of vasodilator angiotensin 1-7 (39).

A systematic review and meta-analysis published July 11, 2012 found that “the use of ACE inhibitors resulted in a 34% reduction in pneumonia risk compared to controls. Additionally, in patients at high

risk of pneumonia, particularly those with stroke and heart failure, use of ACE inhibitors It has also been shown that the risk of pneumonia is reduced by treating it (40).

WHAT IS ACE-II INHIBITOR

ACE is defined as an important enzyme in the renin-angiotensin system (RAS), which plays an important role in the regulation of blood pressure (41). RAS, which plays a role in the regulation of fluid balance and blood pressure in the body, is a proteolytic system and is one of the important metabolic pathways that are effective in the control of the cardiovascular system. In RAS, angiotensinogen protein synthesized from the liver is converted to angiotensin-I by the action of the renin enzyme secreted by the kidney. Angiotensin-I is converted to angiotensin-II, which has vasoconstrictor properties, by ACE produced in the lungs (42). The presence of angiotensin II causes an increase in blood pressure and stimulates the secretion of aldosterone. As a result, inhibition of angiotensin II formation with ACE-inhibitors prevents vasoconstriction and lowers blood pressure (43).

Therefore, ACE inhibition activity appears to be a useful method in the treatment of hypertension (44). Hypertension, a common condition worldwide, is a controllable risk factor associated with cardiovascular disease. The use of food protein-derived natural ACE inhibitor peptides in the treatment of hypertension is considered a safer alternative since they do not have side effects (45).

With this; It is reported that bioactive peptides of natural origin generally show activity at higher concentrations than their synthetic counterparts, and functional foods containing these peptides are recommended to be used for disease prevention rather than disease treatment (46).

According to ACE-II enymes, the nurtition sources that ımproving the ımmune system against Covid-19 were illustrated in Table 4.

Table 4. The nutrition food as caused inhibition of angiotensin-converting enzyme 2

Nutrition Sources	Nutrition Sources
Cuttlefish (47, 48)	Mungbean (71)
Sardinelle (*Sardinella aurita*) (49-51)	Walnut protein (72, 73)
Rohu (*Labeo rohita*) (52)	Peanut protein (74)
Grass carp (53)	Corn germ protein (75)
European Carp (*Cyprinus carpio* L.) (54)	Sunflower (*Helianthus annuus* L.) protein (76)
Cirrhinus mrigala (55)	Antioxidants and fish oil (77)
Salmon (*Salmo salar*) (56)	Wheat germ protein (78)
Katsuo-bushi (57)	Rice bran protein (79)
Acetes indicus (58)	Sesame (*Sesamum indicum* L.) (80)
Common Oat (*Avena sativa*) (59)	Egg yolk and Cucurbita ficifolia (81)
Goat milk protein (60)	Egg protein (82)
Kacang goat meat (61)	Egg white protein (83)
Milk protein (62)	Fucus spiralis (84)
Yoghurt beverages with quinoa (63)	Cannabis sativa L. (85)
Lupin and Other legumes (64)	Sweet sorghum grain protein (86)
Whey protein (65-70)	Onion seeds (87)

Nutritions

In addition to these nutrients, it is important to increase the body's resistance and improve the immune system.

The World Health Organization (WHO) and the Food and Agriculture Organization of the United Nations (FAO) recommend eating a variety of seasonal fresh local foods in our daily diet, consuming less processed foods and striking a balance between different food groups.

According to the proposal of these organizations; 50% of our daily diet is energizing foods (whole wheat bread and cereal groups, potatoes, rice, etc.), 35% is protective foods (foods containing vitamins, minerals and antioxidants such as vegetables and fruits) and 15% is protein. rich foods (fish, chicken, meat, eggs, milk, etc.).

Legumes are another source of protein with sufficient strength and high nutritional value. Green, red lentils, chickpeas, bean varieties, kidney beans, etc. are among the foods that can be consumed every day.

In addition to ensuring adequate water consumption, it will be very beneficial to use olive oil in daily nutrition.

In addition, products such as probiotic-fortified yogurt and kefir can be consumed especially during this period, as they support the immune system.

It is important to consume vegetables such as carrots, broccoli, zucchini, cabbage, cauliflower, parsley, as well as fruits such as oranges, tangerines, and apples, which are rich in vitamins A, B, C, D, E, zinc and antioxidants that strengthen the immune system. Especially since citrus fruits are rich in vitamin C, which supports the immune system, the consumption of these fruits should be emphasized, and if possible, fresh lemon should be squeezed into meals and salads.

Vitamin A helps in the formation of teeth, bones, soft tissues and mucus in a healthy way and in maintaining eye health. The antioxidant beta carotene is a fat-soluble bioactive provitamin and is converted into vitamin A, which is essential for a strong immune system. It is known to reduce susceptibility to infection and is critical as it improves immunity.

B group vitamins are water soluble vitamins. It is necessary for glucose metabolism. It helps prevent complications in the nervous system, brain, muscles, heart, stomach and intestines.

Vitamin C (ascorbic acid) is one of the essential vitamins that cannot be synthesized by humans, so it must be taken from the outside, is a natural antioxidant. Vitamin C helps improve the immune system and increases the production of white blood cells that fight infections. It has been observed that vitamin C limits the transformation of upper respiratory tract infections into lower respiratory tract infections. The most common source; citrus fruits (grapefruit, oranges, lemons, tangerines and limes).

Vitamin D provides the synthesis of antimicrobial peptides in the body and has a positive effect on antioxidant genes. It is synthesized in our body under the influence of sunlight. It is a fat-soluble vitamin and its absorption in the body increases when consumed with fat. During the COVID 19 pandemic, vitamin D supplementation is important in case of reduced contact with the sun due to quarantine and protection measures. 600 IU/day is recommended for vitamin D supplementation.

Vitamin E is also effective in strengthening the immune system. Good sources of vitamin E; green leafy vegetables, legumes and oily seeds such as hazelnuts and walnuts. 3 servings of seasonal vegetables, 15-20 hazelnuts (30 gr) or 5-6 walnuts (30 gr) and legumes (lentils, dried beans, chickpeas) 2-3 times a week should be consumed daily.

Zinc is a trace element that acts as a regulator of the immune system. It has been shown that zinc deficiency increases the risk of pneumonia, while high zinc levels decrease it. It is reported that zinc is a potential protective microcomponent against pneumonia caused by COVID 19, and a dose of 75 mg/day shortens the duration of pneumonia.

Naringenin, a naturally occurring flavonoid in foods, is commonly found in the skins of citrus fruits such as tangerines, citrus fruits, lemons and bergamot, tomatoes and figs. Antioxidant naringenin is effective against DNA-repairing, anti-cancer, bacteria and viruses, and has protective effects on heart health.

Grape seeds, blueberries, black elderberries, blackcurrants, persimmons, carob are the main sources of antioxidants and proanthocyanidins.

Attention is drawn to the importance of using citrus peels among components such as potential COVID 19 suppressive green tea and olive leaf tea.

Green tea; It is a source of antioxidants that help fight infection (Effective Ingredients: polyphenols, catechins (EGCG, EGC), caffeine, strictinin)

Ginger: Helps reduce sore throat and other inflammatory diseases (Active Ingredients: zingerone, shogaols, gingerols).

Cinnamon; Antioxidant, Neurodegenerative, antibacterial, blood sugar regulator, cholesterol lowering, heart protective (Active Ingredients: cinnamaldehyde, polyphenols, coumarin)

Clove: Antioxidant, antibacterial, protects the lungs, antique

Conclusion

Foods that can strongly increase immunity against coronavirus (COVID-19) and minimize the risk of getting sick are gaining great importance in this period. It is also important to slow down the factors that cause this disease. ACE2 and Protein C levels are potentially important. If ACE2 and Protein C levels in any food are kept under control, the risk of disease can be strongly avoided. It has been noticed that immunity against COVID-19 can be improved with Cuttlefish, Sardinelle (Sardinella aurita), Rohu (Labeo rohita), Grass carp, European Carp (Cyprinus carpio L.), Cirrhinus mrigala, Salmon (Salmo salar), Katsuo. -bushi, Acetes indicus, Common Oats (Avena sativa), Goat milk protein, Kacang goat meat, Milk protein, Yogurt drinks with quinoa, Lupine and other legumes, Whey protein, Mung bean, Walnut protein, Peanut protein, Corn germ protein, Sunflower (Helianthus annuus L.) protein, Antioxidants and fish oil, Wheat germ protein, Rice bran protein, Sesame (Sesamum indicum L.), Egg yolk and Cucurbita ficifolia, Egg protein, Egg white protein, Fucus spiralis, Cannabis sativa L., Sweet sorghum grain protein and Onion seeds.

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Analysis and interpretation: A.C; İ.H
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References

1. Alwarawrah Y, Kiernan K, MacIver NJ. Changes in nutritional status impact immune cell metabolism and function. Frontiers in immunology. 2018;9:1055.
2. Muslu M, Ersü DÖ. Yeni Koronavirüs (SARS-CoV-2/COVID-19) Pandemisi Sırasında Beslenme Tedavisi ve Önemi. Beslenme ve Diyet Dergisi. 2020;48(1):73-82.
3. WHO. Coronavirus disease (COVID-19). . Availablefrom: https://www.who.int/emergencies/diseases/novel-coronavirus-2019.
4. Sarıtaş A, Çalışkan T, Öztop MB. SARS-CoV-2 (Covid-19) Hastalığında Nutrisyon.
5. Galanakis CM. The food systems in the era of the coronavirus (COVID-19) pandemic crisis. Foods. 2020;9(4):523.
6. Muscogiuri G, Barrea L, Savastano S, Colao A. Nutritional recommendations for CoVID-19 quarantine. European journal of clinical nutrition. 2020;74(6):850-1.
7. FAO. Maintaining a healthy diet during the COVID-19 pandemic Food and Agriculture Organization of The United Nations. Available from: https://doi.org/10.4060/ca8380en.

8. Gheblawi M, Wang K, Viveiros A, et al. Angiotensin-converting enzyme 2: SARS-CoV-2 receptor and regulator of the renin-angiotensin system: celebrating the 20th anniversary of the discovery of ACE2. Circulation research. 2020;126(10):1456-74.
9. Cox MM, Nelson DL. Lehninger principles of biochemistry: Wh Freeman New York; 2008.
10. Lodish H, Berk A, Kaiser CA, et al. Molecular cell biology: Macmillan; 2008.
11. Hoffman JR, Falvo MJ. Protein–which is best? Journal of sports science & medicine. 2004;3(3):118.
12. Meister A. Biochemistry of the amino acids: Elsevier; 2012.
13. Wu H, Bruley DF. Chelator, metal ion and buffer studies for protein C separation. Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology. 2002;132(1):213-20.
14. Radosevich M, Zhou F-L, Huart J-J, Burnouf T. Chromatographic purification and properties of a therapeutic human protein C concentrate. Journal of chromatography B. 2003;790(1-2):199-207.
15. Dittman WA, Majerus PW. Structure and function of thrombomodulin: a natural anticoagulant. 1990.
16. Demirci B. Protein C Saflaştırılması İçin Moleküler Baskılanmış Adsorbentler. 2013.
17. Castellino FJ. Human protein C and activated protein C: components of the human anticoagulation system. Trends in cardiovascular medicine. 1995;5(2):55-62.
18. Goldenberg N, MANCO-JOHNSON MJ. Protein C deficiency. Haemophilia. 2008;14(6):1214-21.
19. Josic D, Hoffer L, Buchacher A. Preparation of vitamin K-dependent proteins, such as clotting factors II, VII, IX and X and clotting inhibitor Protein C. Journal of Chromatography B. 2003;790(1-2):183-97.
20. Zambaux M, Bonneaux F, Gref R, et. al. Preparation and characterization of protein C-loaded PLA nanoparticles. Journal of controlled release. 1999;60(2-3):179-88.
21. Kisiel W. Human plasma protein C: isolation, characterization, and mechanism of activation by α-thrombin. The Journal of clinical investigation. 1979;64(3):761-9.
22. Rezaie AR. Exosite-dependent regulation of the protein C anticoagulant pathway. Trends in cardiovascular medicine. 2003;13(1):8-15.
23. Esmon CT. Protein S and protein C: biochemistry, physiology, and clinical manifestation of deficiencies. Trends in cardiovascular medicine. 1992;2(6):214-9.
24. Belouzard S, Millet JK, Licitra BN, et al. Mechanisms of coronavirus cell entry mediated by the viral spike protein. Viruses. 2012;4(6):1011-33.
25. Heald-Sargent T, Gallagher T. Ready, set, fuse! The coronavirus spike protein and acquisition of fusion competence. Viruses. 2012;4(4):557-80.
26. Bosch BJ, Van der Zee R, De Haan CA, et al. The coronavirus spike protein is a class I virus fusion protein: structural and functional characterization of the fusion core complex. Journal of virology. 2003;77(16):8801-11.
27. Zhou Y, Yang Y, Huang J, et al. Du L. Advances in MERS-CoV vaccines and therapeutics based on the receptor-binding domain. Viruses. 2019;11(1):60.
28. Du L, He Y, Zhou Y, et al. The spike protein of SARS-CoV—a target for vaccine and therapeutic development. Nature Reviews Microbiology. 2009;7(3):226-36.
29. Robinson EL, Alkass K, Bergmann O, et al. Genes encoding ACE2, TMPRSS2 and related proteins mediating SARS-CoV-2 viral entry are upregulated with age in human cardiomyocytes. Journal of molecular and cellular cardiology. 2020;147:88-91.
30. Hamming I, Timens W, Bulthuis M, et al.Tissue distribution of ACE2 protein, the functional receptor for SARS coronavirus. A first step in understanding SARS pathogenesis. The Journal of Pathology: A Journal of the Pathological Society of Great Britain and Ireland. 2004;203(2):631-7.
31. Kasmi Y, Khataby K, Souiri A, et al. Coronaviridae: 100,000 years of emergence and reemergence. Emerging and reemerging viral pathogens: Elsevier; 2020. p. 127-49.
32. Mascolo A, Urbanek K, De Angelis A, et al. Angiotensin II and angiotensin 1–7: which is their role in atrial fibrillation? Heart failure reviews. 2020;25(2):367-80.
33. Lambert DW, Yarski M, Warner FJ, et al. Tumor necrosis factor-α convertase (ADAM17) mediates regulated ectodomain shedding of the severe-acute respiratory syndrome-coronavirus (SARS-CoV) receptor, angiotensin-converting enzyme-2 (ACE2). Journal of Biological Chemistry. 2005;280(34):30113-9.
34. Tunçok Y, İncir C. BÖLÜM 7 COVID-19 İÇİN AŞI VE İLAÇ ÇALIŞMALARI.
35. Kabbani N, Olds JL. Does COVID19 infect the brain? If so, smokers might be at a higher risk. Molecular pharmacology. 2020;97(5):351-3.
36. Kuba K, Imai Y, Penninger JM. Multiple functions of angiotensin-converting enzyme 2 and its relevance in cardiovascular diseases. Circulation Journal. 2013;77(2):301-8.
37. Wang H, Yang P, Liu K, et al. SARS coronavirus entry into host cells through a novel clathrin-and caveolae-independent endocytic pathway. Cell research. 2008;18(2):290-301.
38. Akhmerov A, Marbán E. COVID-19 and the heart. Circulation research. 2020;126(10):1443-55.
39. Imai Y, Kuba K, Penninger JM. The discovery of angiotensin-converting enzyme 2 and its role in acute lung injury in mice. Experimental physiology. 2008;93(5):543-8.
40. Caldeira D, Alarcão J, Vaz-Carneiro A, et al. Risk of pneumonia associated with use of angiotensin converting enzyme inhibitors and angiotensin receptor blockers: systematic review and meta-analysis. Bmj. 2012;345.
41. Korhonen H, Pihlanto A. Bioactive peptides: production and functionality. International dairy journal. 2006;16(9):945-60.
42. Marques C, Manuela Amorim M, Odila Pereira J, et al. Bioactive peptides-Are there more

antihypertensive Mechanisms beyond ACE inhibition? Current pharmaceutical design. 2012;18(30):4706-13.
43. Villegas JM, Picariello G, Mamone G, Espeche Turbay MB, Savoy G, Hebert EM. Milk-derived angiotensin-I-converting enzymeinhibitory peptides generated by Lactobacillus delbrueckii subsp. lactis CRL 581. 2014.
44. Stuknytė M, Cattaneo S, Masotti F, et al. Occurrence and fate of ACE-inhibitor peptides in cheeses and in their digestates following in vitro static gastrointestinal digestion. Food chemistry. 2015;168:27-33.
45. Rasika D, Ueda T, Jayakody L, et al. ACE-inhibitory activity of milk fermented with Saccharomyces cerevisiae K7 and Lactococcus lactis subsp. lactis NBRC 12007. Journal of the National Science Foundation of Sri Lanka. 2015;43(2).
46. Hayes M, Tiwari BK. Bioactive carbohydrates and peptides in foods: An overview of sources, downstream processing steps and associated bioactivities. International journal of molecular sciences. 2015;16(9):22485-508.
47. Amado IR, Vazquez JA, Gonzalez P, et al. Identification of the major ACE-inhibitory peptides produced by enzymatic hydrolysis of a protein concentrate from cuttlefish wastewater. Marine drugs. 2014;12(3):1390-405.
48. Balti R, Bougatef A, Sila A, et al. Nine novel angiotensin I-converting enzyme (ACE) inhibitory peptides from cuttlefish (Sepia officinalis) muscle protein hydrolysates and antihypertensive effect of the potent active peptide in spontaneously hypertensive rats. Food Chem. 2015;170:519-25.
49. Bougatef A, Nedjar-Arroume N, Ravallec-Ple R, et al.Angiotensin I-converting enzyme (ACE) inhibitory activities of sardinelle (Sardinella aurita) by-products protein hydrolysates obtained by treatment with microbial and visceral fish serine proteases. Food Chem. 2008;111(2):350-6.
50. Jemil I, Mora L, Nasri R, et al.A peptidomic approach for the identification of antioxidant and ACE-inhibitory peptides in sardinelle protein hydrolysates fermented by Bacillus subtilis A26 and Bacillus amyloliquefaciens An6. Food research international. 2016;89(Pt 1):347-58.
51. Martinez-Alvarez O, Batista I, Ramos C, et al. Enhancement of ACE and prolyl oligopeptidase inhibitory potency of protein hydrolysates from sardine and tuna by-products by simulated gastrointestinal digestion. Food & function. 2016;7(4):2066-73.
52. Chalamaiah M, Jyothirmayi T, Diwan PV, et al. Antiproliferative, ACE-inhibitory and functional properties of protein hydrolysates from rohu (Labeo rohita) roe (egg) prepared by gastrointestinal proteases. Journal of food science and technology. 2015;52(12):8300-7.
53. Chen J, Wang Y, Zhong Q, et al. Purification and characterization of a novel angiotensin-I converting enzyme (ACE) inhibitory peptide derived from enzymatic hydrolysate of grass carp protein. Peptides. 2012;33(1):52-8.
54. Darewicz M, Borawska-Dziadkiewicz J, Vegarud GE, et al. Protein-Derived Ex Vivo Digests and In Vitro Hydrolysates Differ in the ACE I Inhibitory Activity and Composition of Released ACE Inhibitory Peptides. Protein and peptide letters. 2017;24(2):156-64.
55. Elavarasan K, Shamasundar BA, Badii F, et al. Angiotensin I-converting enzyme (ACE) inhibitory activity and structural properties of oven- and freeze-dried protein hydrolysate from fresh water fish (Cirrhinus mrigala). Food Chem. 2016;206:210-6.
56. Darewicz M, Borawska J, Vegarud GE, et al. Angiotensin I-converting enzyme (ACE) inhibitory activity and ACE inhibitory peptides of salmon (Salmo salar) protein hydrolysates obtained by human and porcine gastrointestinal enzymes. International journal of molecular sciences. 2014;15(8):14077-101.
57. Fujita H, Yoshikawa M. LKPNM: a prodrug-type ACE-inhibitory peptide derived from fish protein. Immunopharmacology. 1999;44(1-2):123-7.
58. Dhanabalan V, Xavier M, Kannuchamy N, et al. Effect of processing conditions on degree of hydrolysis, ACE inhibition, and antioxidant activities of protein hydrolysate from Acetes indicus. Environmental science and pollution research international. 2017;24(26):21222-32.
59. Bleakley S, Hayes M, N OS, et al. Predicted Release and Analysis of Novel ACE-I, Renin, and DPP-IV Inhibitory Peptides from Common Oat (Avena sativa) Protein Hydrolysates Using in Silico Analysis. Foods. 2017;6(12).
60. Espejo-Carpio FJ, Perez-Galvez R, et al. Optimisation of the hydrolysis of goat milk protein for the production of ACE-inhibitory peptides. The Journal of dairy research. 2013;80(2):214-22.
61. Mirdhayati I, Hermanianto J, Wijaya CH, et al. Angiotensin converting enzyme (ACE) inhibitory and antihypertensive activities of protein hydrolysate from meat of Kacang goat (Capra aegagrus hircus). Journal of the science of food and agriculture. 2016;96(10):3536-42.
62. Cui P, Yang X, Liang Q, et al. Ultrasound-assisted preparation of ACE inhibitory peptide from milk protein and establishment of its in-situ real-time infrared monitoring model. Ultrason Sonochem. 2020;62:104859.
63. Obaroakpo JU, Liu L, Zhang S, et al. alpha-Glucosidase and ACE dual inhibitory protein hydrolysates and peptide fractions of sprouted quinoa yoghurt beverages inoculated with Lactobacillus casei. Food Chem. 2019;299:124985.
64. Boschin G, Scigliuolo GM, Resta D, et al. ACE-inhibitory activity of enzymatic protein hydrolysates from lupin and other legumes. Food Chem. 2014;145:34-40.
65. Chatterjee A, Kanawjia SK, Khetra Y, et al. Discordance between in silico & in vitro analyses of ACE inhibitory & antioxidative peptides from mixed milk tryptic whey protein hydrolysate. Journal of food science and technology. 2015;52(9):5621-30.

66. FitzGerald RJ, Meisel H. Lactokinins: whey protein-derived ACE inhibitory peptides. Die Nahrung. 1999;43(3):165-7.
67. Guo Y, Jiang X, Xiong B, et al. Production and transepithelial transportation of angiotensin-I-converting enzyme (ACE)-inhibitory peptides from whey protein hydrolyzed by immobilized Lactobacillus helveticus proteinase. Journal of dairy science. 2019;102(2):961-75.
68. Martin M, Hagemann D, Nguyen TT, et al. Plasma concentrations and ACE-inhibitory effects of tryptophan-containing peptides from whey protein hydrolysate in healthy volunteers. European journal of nutrition. 2020;59(3):1135-47.
69. Vermeirssen V, Van Camp J, Augustijns P, et al. Angiotensin-I Converting Enzyme (ACE) inhibitory peptides derived from pea and whey protein. Mededelingen. 2002;67(4):27-30.
70. Vermeirssen V, van der Bent A, Van Camp J, et al. A quantitative in silico analysis calculates the angiotensin I converting enzyme (ACE) inhibitory activity in pea and whey protein digests. Biochimie. 2004;86(3):231-9.
71. Gupta N, Srivastava N, Bhagyawant SS. et al. major storage protein of mungbean exhibits antioxidative potential, antiproliferative effects and ACE inhibitory activity. Plos One. 2018;13(2):e0191265.
72. Liu M, Du M, Zhang Y, et al. Purification and identification of an ACE inhibitory peptide from walnut protein. J Agric Food Chem. 2013;61(17):4097-100.
73. Wang C, Tu M, Wu D, et al. Identification of an ACE-Inhibitory Peptide from Walnut Protein and Its Evaluation of the Inhibitory Mechanism. International journal of molecular sciences. 2018;19(4).
74. Shi A, Liu H, Liu L, et al. Isolation, purification and molecular mechanism of a peanut protein-derived ACE-inhibitory peptide. Plos One. 2014;9(10):e111188.
75. Musa A, Gasmalla MAA, Ma H, S et al. Effect of a multi-frequency counter-current S-type ultrasound pretreatment on the defatted corn germ protein: enzymatic hydrolysis, ACE inhibitory activity and structural characterization. Food & function. 2019;10(9):6020-9.
76. Megias C, del Mar Yust M, Pedroche J, et al. Purification of an ACE inhibitory peptide after hydrolysis of sunflower (Helianthus annuus L.) protein isolates. J Agric Food Chem. 2004;52(7):1928-32.
77. McCarty MF. A central role for protein kinase C overactivity in diabetic glomerulosclerosis: implications for prevention with antioxidants, fish oil, and ACE inhibitors. Medical hypotheses. 1998;50(2):155-65.
78. Qu W, Ma H, Jia J, et al. Enzymolysis kinetics and activities of ACE inhibitory peptides from wheat germ protein prepared with SFP ultrasound-assisted processing. Ultrason Sonochem. 2012;19(5):1021-6.
79. Uraipong C, Zhao J. Rice bran protein hydrolysates exhibit strong in vitro alpha-amylase, beta-glucosidase and ACE-inhibition activities. Journal of the science of food and agriculture. 2016;96(4):1101-10.
80. Wang R, Lu X, Sun Q, Gao J, et al. Novel ACE Inhibitory Peptides Derived from Simulated Gastrointestinal Digestion in Vitro of Sesame (Sesamum indicum L.) Protein and Molecular Docking Study. International journal of molecular sciences. 2020;21(3).
81. Eckert E, Zambrowicz A, Pokora M, et al. Egg-yolk protein by-product as a source of ACE-inhibitory peptides obtained with using unconventional proteinase from Asian pumpkin (Cucurbita ficifolia). J Proteomics. 2014;110:107-16.
82. Wang Y, Landheer S, van Gilst WH, et al. Attenuation of renovascular damage in Zucker diabetic fatty rat by NWT-03, an egg protein hydrolysate with ACE- and DPP4-inhibitory Activity. Plos One. 2012;7(10):e46781.
83. Yu Z, Liu B, Zhao W, et al. Primary and secondary structure of novel ACE-inhibitory peptides from egg white protein. Food Chem. 2012;133(2):315-22.
84. Paiva L, Lima E, Neto AI, et al. Angiotensin I-Converting Enzyme (ACE) Inhibitory Activity, Antioxidant Properties, Phenolic Content and Amino Acid Profiles of Fucus spiralis L. Protein Hydrolysate Fractions. Marine drugs. 2017;15(10).
85. Teh SS, Bekhit AEA, Carne A, et al. Antioxidant and ACE-inhibitory activities of hemp (Cannabis sativa L.) protein hydrolysates produced by the proteases AFP, HT, Pro-G, actinidin and zingibain. Food Chem. 2016;203:199-206.
86. Wu Q, Du J, Jia J, et al.Production of ACE inhibitory peptides from sweet sorghum grain protein using alcalase: Hydrolysis kinetic, purification and molecular docking study. Food Chem. 2016;199:140-9.
87. Tassin S, Broekaert WF, Marion D, et al. Solution structure of Ace-AMP1, a potent antimicrobial protein extracted from onion seeds. Structural analogies with plant nonspecific lipid transfer proteins. Biochemistry-Us.1998;37(11):3623-37.

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Case Report

Your Disease is Related to The Stomach, Not the Heart! A Family Medicine Routine

Hastalığınız Kalp ile Değil, Mide ile İlgili! Bir Aile Hekimliği Rutini

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Abstract

Holistic medicine is one of the core competencies of the family medicine discipline, and in this context, it deals with the physical, mental and social health of the patient. In this case report, the management of a patient who did not have a family doctor contact is mentioned with a holistic approach. An eighty-year-old male patient applied to our family medicine clinic with complaints of frequent shortness of breath and palpitation while walking, and to be referred to the cardiology outpatient clinic. As a result of the examinations, gastric adenocarcinoma was detected. It is important for people to visit their family doctor at regular intervals.

Keywords: Holistic medicine, family practice, gastric cancer

Öz

Bütüncül bakım aile hekimliği disiplininin çekirdek yeterliliklerinden biridir, bu kapsamda hastanın bedensel, ruhsal ve sosyal sağlığı ile ilgilenilmektedir. Bu vaka sunumunda aile hekimi teması olmayan bir hastanın bütüncül yaklaşımla yönetilmesinden bahsedilmiştir. Seksen yaşında erkek hasta aile hekimliği kliniğimize, yürürken sıklaşan nefes darlığı, çarpıntı hissi şikayetleriyle ve kardiyoloji polikliniğine sevk edilmek için başvurmuştur. Yapılan tetkikler sonucu mide adenokarsinomu saptanmıştır. Kişilerin belirli aralıklarla aile hekimlerini ziyaret etmeleri önem arz etmektedir.

Anahtar Kelimeler: Bütüncül bakım, aile hekimliği, mide kanseri

Introduction

Family medicine is the first medical contact point in the society, it protects individuals from diseases by providing preventive health services and enables early diagnosis (1). It achieves this by recommending and supporting individuals with positive lifestyle changes and by performing periodic health examinations (2). Holistic care is one of the core competencies of the family medicine discipline, and in this context, it deals with the physical, mental and social health of the patient. At the same time, both acute and chronic problems of patients are managed. Since the person is evaluated as a whole in the management of health problems, all existing health problems are addressed. Comprehensive service is provided for the protection and development of health (3-4). In this case report, the management, diagnosis, and treatment process of an elderly patient who did not have a family doctor contact are discussed with a holistic approach.

Presentation of the case

An eighty-year-old male patient applied to our family medicine clinic in June 2021 with the complaints of dyspnea and palpitation, which has been increasing recently and has become more frequent while walking, and with a request to be referred to the cardiology outpatient clinic. Tachycardia was found in the patient whose systemic examination was performed (pulse: 119/min/rhythmic). Pain was described on palpation in the abdomen. No additional findings were found. In his medical history, it was learned that he never applied to health institutions and did not have any additional disease other than benign prostatic hyperplasia.

When laboratory tests were examined, hemoglobin value in complete blood count is 5.6 g/dl (low), platelet value is 2081 109/l (high), MCV 63.8 fL (low), RDW 19% (high), creatinine 1.3 mg/dl (high), iron 13 ug/dl (low), iron binding capacity 421 ug/dl (high), ferritin 7.42 µg/l (low). Sinus tachycardia was noted in his electrocardiography. A complete urinalysis was natural.

The patient was consulted to the internal medicine department due to deep anemia and erythrocyte suspension was administered there. Upper and lower endoscopy were performed to determine the possible bleeding focus. During the procedure, an ulcerovegetant mass lesion of approximately 4 cm in diameter was observed starting from the posterior corpus wall and extending to the incisura angularis. The antrum mucosa was nodular hyperemic and edematous (Figure-1).

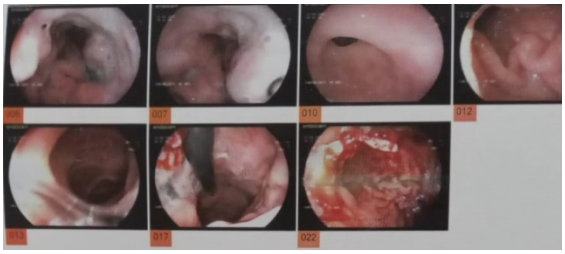

Figure-1. Upper gastrointestinal videoendoscopy image

Multiple biopsies were taken. In terms of staging, thorax, abdomen, and neck images were taken by computed tomography, no metastasis was found. No unusual situation was encountered in colonoscopy.

Our patient was informed that his disease was related to the stomach, not the heart, and was directed to general surgery and total gastrectomy was performed. Upper surgical margin width 4 cm, lower surgical margin width 3.5 cm, lesser curvature length 9 cm, greater curvature length 18 cm, 33x14 cm omentum adjacent to the greater curvature, 8x4 cm omentum minus adjacent to the lesser curvature; when the total gastrectomy material was opened at the level of the greater curvature, a tumoral lesion of 4 cm in diameter, ulcerovegetant and serosa-invading, located at the lesser curvature, starting at a distance of 1.5 cm from the upper surgical margin, was observed. Nine lymph nodes with diameters ranging from 2-0.5 cm were dissected from the lesser curvature. The patient, who was taken to the intensive care unit and then to the service, was given training in terms of dumping syndrome by the nutrition unit and was discharged with wound care recommendations. The patient, whose excisional surgical material biopsy revealed adenocarcinoma (moderately differentiated), metastatic lymph nodes and reactive lymph nodes, still continues to receive radiotherapy.

Discussion

Family medicine practice has the advantages of being able to follow the patients for a long time, easy monitoring, and evaluation, and providing protection and treatment by allocating sufficient time. Continuous access to patients is the most important power in this regard (5). Continuity in the follow-up can also eliminate possible errors or disruptions. It can be understood that our patient did not have adequate conversations with his family doctor, by the fact that his current complaint is a chronic event. Periodic consultation with the family physician may provide early diagnosis of some diseases that are not symptomatic. Cancer screenings play an important role at this point. In accordance with the standards set in Turkey, it is aimed to perform a fecal occult blood (FOB) test every two years for everyone between the ages of 50-70. The monoclonal antibody test, which detects in 10 minutes, is used in family healthcare centers. The family doctor directs the patients with positive results of this screening to the upper steps for further examination with the suspicion of gastrointestinal system diseases (6). It was learned that our patient had never had a FOB test before.

It is known that approximately 50% of gastric cancers originate from the cardia or fundus, and factors such as obesity, smoking, gastroesophageal reflux, Helicobacter pylori infection, and excessive use of proton pump inhibitors increase the frequency of gastric cancer (7). The incidence of gastric cancer is dominated by male patients aged 60 and over (8). Our patient is compatible with the literature in terms of age and gender, and there is no known risk factor.

Although specializations in medicine have come to the fore in the last century, Francis Peabody laid the foundations of family medicine in 1923 by stating that specialization is a fragmented health service delivery (9). In a study, it was seen that health follow-ups could be done by family medicine, without the need to go to specific branch physicians such as cardiology, internal medicine, and endocrinology (10). It is tragic that our patient came with a request to be referred to cardiology. Our patient, who was evaluated holistically, was managed in an ideal way without wasting time in unrelated branches.

Within the framework of holistic care, the physician should evaluate the patient in terms of the part-whole relationship and should consider the patient as a whole while making any diagnosis or during the treatment phase. In particular, it is important to spare enough time for the patients and to follow up in detail and continuously in the routine practice of family medicine. It is essential for people to visit their family doctor at regular intervals.

References

1. Kringos DS. The importance of measuring and improving the strength of primary care in Europe: results of an international comparative study. Turk Aile Hek Derg 2013;17(4):165-79.
2. Görpelioğlu S. Sağlıklı yaşam tarzı ve davranış değişikliği. Sağlıklı Yaşam Tarzı Dergisi 2009; 1:36-41.
3. Akdeniz M, Ungan M, Yaman H. Aile hekimliği: çağdaş bir sağlık hizmeti sunma biçimi. GeroFam 2010; 1(1):15-28. http://dx.doi.org/10.5490/gerofam.2010.1.1.3
4. Öztürk O, Şen İsmail, Bal G, Göktepe ME. Dramatıc Response to Ozone Applıcatıon: Raynaud's Phenomenon: Ozone Applıcatıon and Raynaud's Phenomenon. International Journal of Current Medical and Biological Sciences, 2021;1(1), 16–18.
5. McWhinney IR. Primary care: core values. Core values in a changing world. BMJ 1998; 316:1807-9
6. Öztürk O, Göktepe ME, Fidancı İ, et al. The importance of fecal occult blood in preventive health services and the concept of chromatography. TJFMPC 2021;15(1): 08-11.
7. Şahintürk Y, Taşkoparan M, Uyar S, et al. The current status in gastric cancer: localization, pathology, and age. Endoscopy Gastrointestinal 2016; 24:61-4.
8. Crew KD, Neugut AI. Epidemiology of gastric cancer. World J Gastroenterol 2006;12: 354-62.
9. Rakel R. The family physician. In: Rakel R (ed) Textbook of Family Medicine (7e). Philadelphia: Saunders Elsevier Publishing; 2007: 3–14.
10. Öztürk O, Ünal M, Oruç MA, et al. Bir aile hekimliği biriminde düzenlenen ilaç raporlarının değerlendirilmesi. TJFMPC 2021;15(1):27-32.

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Case Report

Catheter Induced Coronary Intramural Hematoma: A Case Report

Kateter Kaynaklı Koroner İntramural Hematom: Bir Olgu Sunumu

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Abstract

Catheter-induced coronary artery dissection (CICAD) is a relatively rare complication during coronary procedures. The natural history of CICAD is not entirely understood, but prior reports describe varied outcomes. The CICAD management is currently made case-by-case basis, with no evidence-based guidelines to assist the operator. We present a case of catheter-induced coronary intramural hematoma (IMH), which is conservatively managed. On the follow-up two weeks later, we performed IVUS – guided percutaneous coronary intervention (PCI) with good results. We highlighted the approach in managing iatrogenic coronary IMH.

Keywords: Catheter induced coronary artery dissection (CICAD), conservative management, intravascular ultrasound

Öz

Kateter kaynaklı gelişen aortokoroner diseksiyon koroner prosedürler sırasında nispeten nadir bir komplikasyondur. Kateter kaynaklı gelişen aortokoroner diseksiyon 'in doğal geçmişi tam olarak anlaşılamamıştır, ancak önceki raporlar çeşitli sonuçları açıklamaktadır. Kateter kaynaklı gelişen aortokoroner diseksiyon yönetimi şu anda, operatöre yardımcı olacak kanıta dayalı kılavuzlar olmaksızın duruma göre yapılmaktadır. Konservatif olarak yönetilen bir catheter-induced coronary intramural hematoma, olgusunu sunuyoruz. İki hafta sonraki kontrolde IVUS rehberliğinde peruktan korener girşim uyguladık ve iyi sonuçlar aldık. İyatrojenik koroner intramural hematoma yönetiminde yaklaşımı vurguladık.

Anahtar kelimeler: Kateter kaynaklı gelişen aortokoroner diseksiyon, konservativ tedavi, intravasküler ultrason

INTRODUCTION

Iatrogenic coronary intramural hematoma (IMH) is a complication that could occur during the PCI procedure. The incidence and natural history of iatrogenic IMH are not entirely comprehended; however, several studies have described it. To date, there is no uniformity in IMH management; hence, the case-based approach is the treatment strategy in such cases. We present a case of catheter-induced IMH with initial conservative, and on the follow-up two weeks later, we performed IVUS – guided PCI with good results. We highlighted the approach in managing iatrogenic coronary IMH.

Case presentation

A 48 years old male came with typical angina despite optimal medical therapy. His risk factors were Type 2 diabetes mellitus, smoker, and dyslipidemia. His vital signs and physical examinations were within normal limits. An echocardiogram revealed an ejection fraction of 60% with hypokinetic in inferior and inferoseptal segments. Cardiac catheterization was planned for the patient. Angiogram revealed LM bifurcation stenosis and chronic total occlusion (CTO) at distal RCA with collateral from LAD and LCx (Fig 1). With these findings, the patient was offered CABG, but he refused; hence we planned to perform PCI CTO RCA and followed with PCI LM bifurcation.

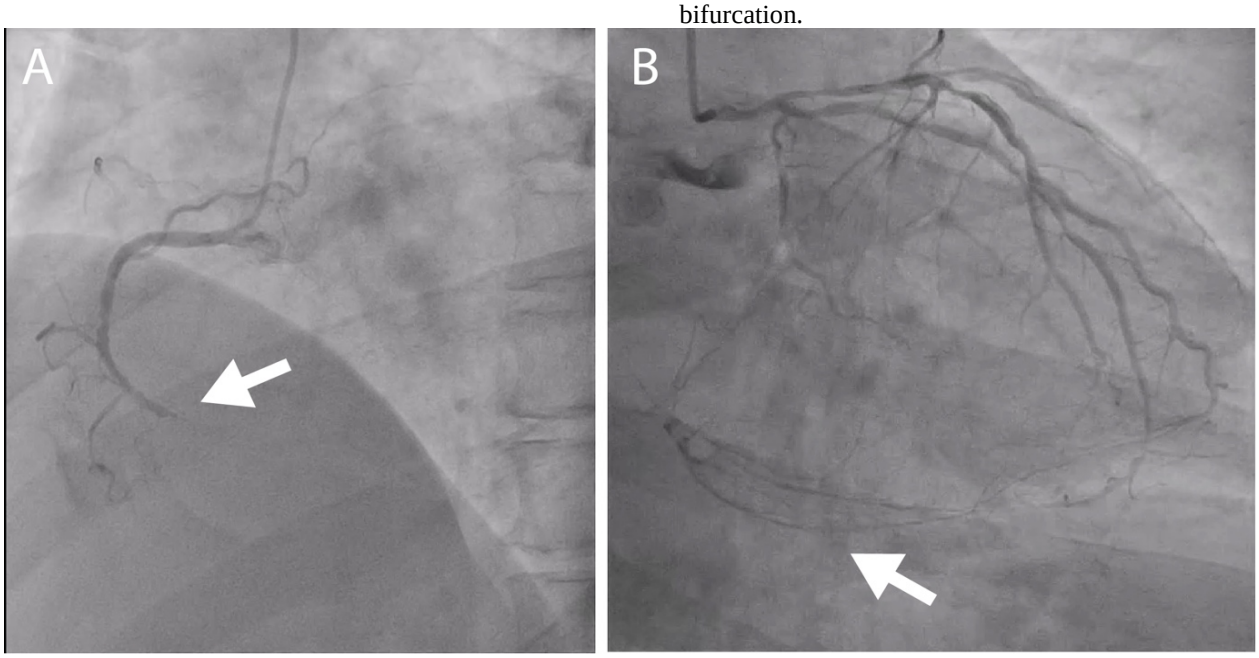

Figure 1. Angiogram revealed (A) CTO at distal RCA and (B)collateral channel from LCA.

We proceeded with PCI to the CTO lesion at RCA. RCA cannulation was performed with GC Amplatz Left (AL) 0.75 7 Fr. PCI was performed with an antegrade approach. Supported with 6Fr GEC Guidezilla (Boston Scientific, USA), GW Run-through Intermediate (Terumo Japan) with backup 2.6Fr Elong Microcatheter (APT Medical, China) was successfully crossed the CTO lesion. IVUS study was performed after dilation with a 2.5/20mm Ikazuchi SCB (Kaneka, Japan), which revealed diffuse fibrotic plaque. Lesion preparation was performed with further predilation with a prior SCB balloon.

A 3.5/38 mm Xience Prime LL (Abbott, USA) was deployed at distal RCA. Nonetheless, the GC was unexpectedly disengaged while the wire was still intact in the lumen (Fig 2A). An attempt at recannulation was achieved, but the wire was unintentionally removed. Small and careful contrast injection revealed dissection at the proximal part of RCA.

The patient was asymptomatic, hemodynamically stable, without any ECG changes; therefore, we opted to stop the procedure. The patient was then transferred to the cardiac intensive care unit for observation and discharged the following days.

Follow up was performed two weeks later. RCA cannulation was performed with GC JR 3.5 6Fr, and an angiogram revealed dissection at proximal to mid-RCA with haziness (Fig 2B). IVUS study showed large intramural hematoma (Fig 3A). Our strategy to deal with the IMH was to use high-pressure inflation of a 3.5/10 mm Wolverine cutting balloon (Boston Scientific, USA). IVUS evaluation revealed a reduction of the intramural hematoma (Fig 3B). We deployed a 3.5/38 mm Ultimaster (Terumo, Japan) at proximal RCA and stent optimization with a 3.5/15

atm Emerge NC balloon (Boston Scientific, USA). Final IVUS evaluation showed no distal stent edge dissection, well expanded and well-apposed stent, and MSA of 8.5 mm2 (Fig 3C). The final angiogram revealed TIMI 3 flow (Fig 2C).

The patient was sent to the cath lab for staged LM bifurcation PCI three months later. RCA angiogram revealed a patent stent at proximal and distal RCA. IVUS – guided PCI to LM bifurcation was performed, with good results.

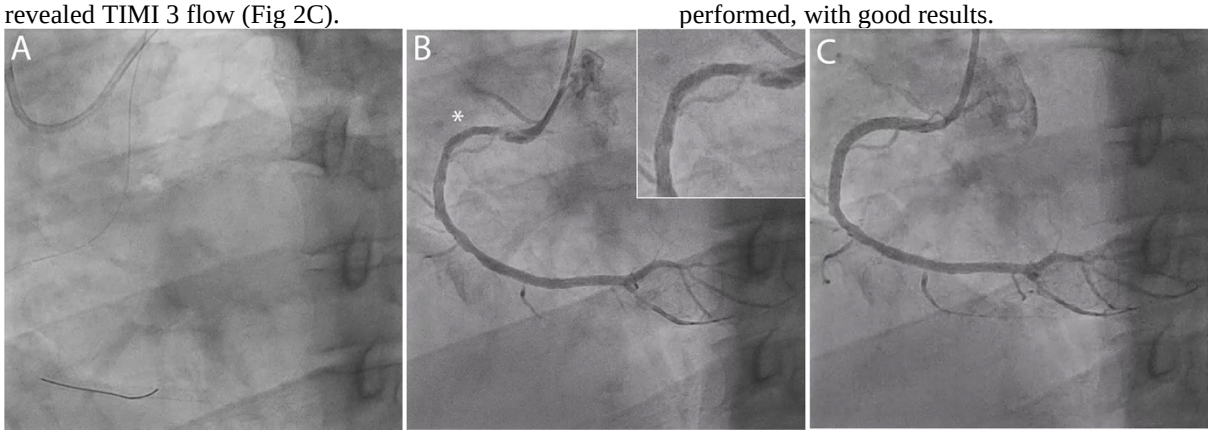

Figure 2. (A) Guiding catheter was unexpectedly disengaged while the wire was still in the lumen, (B) A follow-up two weeks later revealed haziness at proximal RCA, and (C) Final angiogram after stenting.

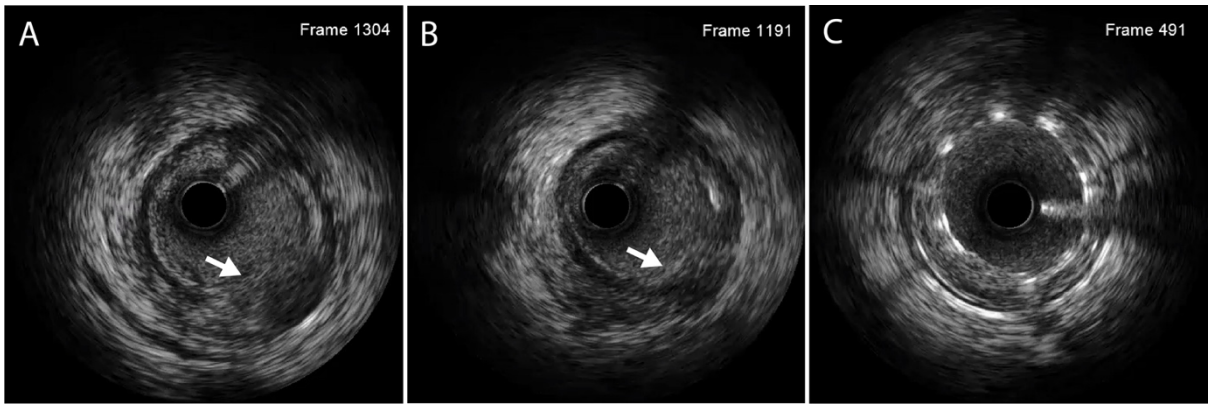

Figure 3. IVUS study showed (A) Large intramural hematoma, (B) after cutting balloon dilation, the hematoma volume was reduced, and (C) Final IVUS evaluation showed well expanded and well-apposed stent, with MSA of 8.5 mm2.

Discussion

Complications of PCI may significantly impact patient outcomes; hence, prompt recognition is essential to prevent unfavorable outcomes. CICAD is a relatively rare complication during the coronary procedure. Prior studies described CICAD as associated with guiding catheter Amplatz Left and guide catheter extension, as in our case (1,2).

Intramural hematoma (IMH) is a blood accumulation within the medial space displacing the internal elastic membrane inward and the external elastic membrane outward, with or without identifiable entry and exit points (3). Maehara et al. reported IMH most likely involved proximal segments and involving the RCA, as in our case (4). There are no universal guidelines regarding the management of IMH. Yamamoto et al. have described a conservative approach in a case of large intramural hematoma (5). In this case, we opted for conservative management initially because the patient was stable and to prevent the risk of rewiring to subintimal and worsen the dissection.

A follow-up angiogram and IVUS guided PCI was performed two weeks later. Prior studies recommended using intravascular imaging in assessing intramural hematoma (3,6,7). In this case, the IVUS study has identified the true and false lumen, detecting the large intramural hematoma, the length of the dissection, and the reference diameters. Furthermore, Ito et al. have described the feasibility of cutting balloons in treating IMH by fenestrating the large intramural hematoma and thus reducing its volume (8). As in our case, the high-pressure cutting balloon was inflated at the affected segments, and IVUS evaluation revealed reduced IMH volume, followed by stenting with good results.

Conclusion

Conservative management of catheter-induced coronary artery dissection should be considered in non-flow limiting dissection and stable patients. Intravascular ultrasound is a safe and effective intracoronary imaging device detecting PCI complications, particularly intramural hematoma. A high-pressure cutting balloon should be considered in managing coronary intramural hematoma.

Author Contributions:
Concept: AFY
Literature Review: SS,AS
Design: ANN
Data acquisition: AFY,SS,AS
Analysis and interpretation: AFY,SS,AS
Writing manuscript: SS,AS
Critical revision of manuscript: AFY
Conflict of Interest: The authors have no conflicts of interest to declare.
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REFERENCES

1. Boyle AJ, Chan M, Dib J, Resar J. Catheter-induced coronary artery dissection: risk factors, prevention, and management. J Invasive Cardiol 2006; 18:500–3.
2. Waterbury TM, Sorajja P, Bell MR, et al. Experience and complications associated with the use of guide extension catheters in percutaneous coronary intervention. Catheter Cardiovasc Interv. 2016;88(7):1057-65.
3. Mintz GS, Nissen SE, Anderson WD, et al. Standards for the acquisition, measurement, and reporting of intravascular ultrasound studies: a report of the American College of Cardiology Task Force on Clinical Expert Consensus Documents. J Am Coll Cardiol. 2001; *37*: 1478–92.
4. Maehara A, Mintz GS, Bui AB, et al. Incidence, morphology, angiographic findings, and outcomes of intramural hematomas after percutaneous coronary interventions: an intravascular ultrasound study. Circulation. 2002 ;105(17):2037-42.
5. Yamamoto, K., Sakakura, K., Momomura, S., et al. Conservative management of severe coronary artery hematoma and dissection following stent implantation. Cardiovascular Revascularization Medicine, 2019:20(4), 347-350.
6. Poon K, Bell B, Raffel OC, et al. Spontaneous coronary artery dissection: Utility of intravascular ultrasound and optical coherence tomography during percutaneous coronary intervention. Circ Cardiovasc Interv. 2011;4: 5–7.
7. Sakakura K, Wada H, Taniguchi Y, et al.. Intravascular ultrasound-guided coronary stenting without contrast medium for the treatment of catheter-induced aortocoronary dissection. Cardiovasc Interv Ther 2013; 28:71–5.
8. Ito S, Ojio S, Suzuki T. A novel use of cutting balloon in treating coronary artery dis- section that developed during PCI. J Invasive Cardiol 2003; 15:216–20.