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RESEARCH ARTICLE / ÖZGÜN ARAŞTIRMA

A Retrospective Analysis of a Training and Research Hospital's Occupational Diseases Outpatient Clinic: Where are we in Diagnosing Occupational Diseases?

Bir Eğitim ve Araştırma Hastanesi Meslek Hastalıkları Polikliniğinin Retrospektif İncelenmesi: Meslek Hastalıkları Tanısında Neredeyiz?

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ABSTRACT

Objective: Occupational diseases (OD) are preventable conditions, which pose a significant burden on healthcare and economy. OD is a new field of specialization in Turkey. This study aimed to assess the diagnoses of patients presenting to the newly established OD clinic within the first 3 years to contribute to revealing the status of OD in our country.

Material and Methods: This is a cross-sectional study, which assessed 1101 patients presenting between August 2018 and April 2021 based on sex, age, type of presentation, reason for referral, workplace, exposure time, potential exposure risks, and final diagnosis.

Results: Of 1101 patients, 1000 (90.8%) were male and 101 (9.2%) were female. The mean age was 40.9±9.7 years, the median duration of employment was 120 (25^{th}–75^{th} percentile; 60–210) months. Occupational respiratory disease, with 1025 (93.0%) patients was the most common reason for application. Examinations were completed on 888 (80.6%) patients and medical status reports were issued accordingly. The assessment of the patients revealed no disease or occupational relationship in 640 (58.1%) patients. On the other hand, 208 (18.9%) patients were diagnosed with OD, 40 (3.6%) with work-aggravated diseases. Among those with OD, 112 (10.1%) were diagnosed with pneumoconiosis, 39 (3.5%) with occupational asthma, 32 (2.9%) with noise-induced hearing loss, and 18 (1.6%) with epicondylitis/tendonitis/impingement.

Conclusion: İt is essentially required to enable health surveillance in the workplace for the identification and management of employee health problems, and to establish the legal infrastructure of inter-institutional cooperation. In Turkey, the leading occupational health risks are dust, chemicals, ergonomic risks, and noise. Occupational

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lung diseases are still the most common OD. It seems that the quality levels of the current monitoring system for OD and the results of periodic examinations and tests are insufficient to identify and manage employee health problems.

Keywords: Occupational diseases, occupational lung diseases, occupational medicine specialty, pneumoconiosis.

ÖZ

Amaç: Meslek hastalıkları önlenebilir hastalıklardır. Sağlık ve ekonomi üzerinde önemli yük oluşturmaktadırlar. Türkiye'de uzmanlık alanı olarak yeni bir oluşumdur. Bu çalışmada, ülkemizde meslek hastalıklarının durumuna katkıda bulunmak amacıyla yeni kurulan meslek hastalıkları kliniğinin ilk üç yılında başvuran hastaların tanılarının değerlendirilmesi amaçlandı.

Gereç ve Yöntemler: Çalışma kesitsel bir çalışmadır. Ağustos 2018-Nisan 2021 tarihleri arasında başvuran 1101 olgunun cinsiyet, yaş, başvuru şekilleri, yönlendiren kurumlar ve nedeni, çalıştığı iş yeri, maruz kalım süresi, maruz kaldıkları olası riskler ve son tanıları değerlendirildi.

Bulgular: Toplam 1101 olgudan 1000'i (%90,8) erkek, 101'i (%9,2) kadın, en genci 18 ve en yaşlısı 82 yaşında olmak üzere yaş ortalaması 40,9±9,7 yıl idi. Çalışma süreleri ortancası 120 (25-75 persentil; 60-210) aydı. En sık başvuru nedeni 1025 (%93,0) olgu ile mesleksel solunum sistemi hastalığı şüphesi idi. Olguların 888'i (%80,6) tetkiklerini tamamladı ve tıbbi durum bildirir raporu düzenlendi. Olguların değerlendirilmesi sonucunda 640 (%58,1) olguda hastalık veya mesleki ilişki saptanmadı. Tanı konulan 208 (%18,9) olgu mesleki, 40 (%3,6) olgu işin şiddetlendirdiği hastalık, mesleki hastalık tanısı koyulan olgulardan 112'si (%10,1) pnömokonyoz, 39'u (%3,5) mesleksel astım, 32'si (%2,9) gürültüye bağlı işitme kaybı, 18'i (%1,6) epikondilit/tendonit/impingement tanıları aldı.

Sonuç: Ülkemizde çalışanların sağlık sorunlarının tanımlanması ve yönetimi için iş yerinde sağlık gözetiminin etkinleştirilmesi, kurumlar arası iş birliğinin yasal altyapısının oluşturulması temel gerekliliktir. Türkiye'de toz, kimyasallar, ergonomik riskler ve gürültü önde gelen iş sağlığı riskleridir. Mesleki göğüs hastalıkları hala en sık görülen mesleki hastalıklardır. Mevcut meslek hastalıkları izleme sisteminin ve periyodik muayene tetkik sonuçlarının kalite düzeylerinin çalışanların sağlık sorunlarını tanımlamak ve yönetmek için yetersiz olduğu görülmektedir.

Anahtar kelimeler: Meslek hastalıkları, meslek hastalıkları uzmanlığı, mesleki akciğer hastalıkları, pnömokonyoz.

INTRODUCTION

According to the Protocol of 2002 to the Occupational Safety and Health Convention, 1981 (No. 155), the International Labor Organization defines the term "occupational disease (OD)" as any disease resulting from exposure to risk factors arising from work activity.[1] It is a group of diseases with a demonstrated cause-effect/effect-response relationship specific to work activity between exposure to a harmful agent and the affected human body. The work-related factor(s) (risk/hazard) emphasized in the definition are directly responsible for the development of the disease. Therefore, OD is a preventable health problem. It is also one of the indicators of the efficacy of health and safety practices in the workplace.

Estimates of the global incidence of OD vary widely. Although it varies across countries, a new case of OD is expected in 4–12 of every thousand workers per year.[2] The expected number of cases is 88,000–246,000 in our country; however, the number was 1091 according to the 2019 Social Security Institution (SSI) statistics.[3] As in Europe and America, there are deficiencies in the diagnosis and reporting of OD in Turkey.[4,5]

In our country, Occupational Medicine is a newly developing specialty and was established in 2014 due to the limitations in diagnosing OD. Graduated specialists work in various secondary and tertiary hospitals. Patients who present to our clinic, which is one of these units, are evaluated with a multisystemic approach, following their

Table 1: General patient characteristics

Features	All patients		Patients diagnosed with occupational diseases	
Age (years) (mean±SD, min-max)	40.9±9.7 (18–82)		42.1±10.5 (21–75)	
	n	%	n	%
Sex				
Male	1000	90.8	188	90.4
Female	101	9.2	20	9.6
Exposure time (months) (median 25th–75th percentile)	120	60–210	144	60–240
Smoking status				
Active smoker	571	51.9	90	43.3
Former smoker	211	19.2	55	26.4
Never smoker	319	29.0	63	30.3
Amount smoked (packs/year) (median 25th–75th percentile)	15	7–25	15	7.5–20
Presence of active symptoms				
Present	537	48.8	129	62
Absent	564	51.2	79	38
Referring Institution				
Occupational physicians	612	55.6	68	32.7
Chest physicians	291	26.4	68	32.7
Direct application of patient	108	9.8	24	11.5
The Social Security Institution	45	4.1	27	13
Other physicians (allergy, physical medicine)	45	4.1	21	10.1
Total	1101	100	208	100

clinical assessments including a comprehensive occupational and environmental exposure history. The present paper aimed to assess the diagnoses of the patients presenting to the newly established OD clinic within the first 3 years to contribute to revealing the status of OD diagnosis and notification system in our country.

MATERIAL AND METHODS

This is a descriptive study. The assessment included all 1101 cases that were presented between August 2018 and April 2021. Patients' gender, age, type of application, referring institutions, the reason for referral, sector, exposure time, and potential exposure risks were evaluated by file review.

Diagnosing OD

The patients with a definitive clinical diagnosis based on medical history, clinical assessment, laboratory findings, and necessary consultations were evaluated by considering detailed occupational history. The final diagnosis and whether the current condition was work-related were reported after the assessment. The OD is defined as a group of diseases with a demonstrated cause-effect/effect-response relationship specific to work activity between the exposure to a harmful agent and the affected human body. A work-related disease is defined as any disease with the involvement of many causal factors and other risk factors together, which, even if it does not arise directly from the workplace, is affected by factors in the workplace and changes its course.[1,6]

Two main elements in the definition of OD; the causal relationship between exposure in a specific working environment or work activity and a specific disease, and the occurrence of the disease among a group of exposed persons with a frequency above the average morbidity of the rest of the population were considered. The causal relationship was established based on clinical and pathological data, occupational history and job analysis, identification and assessment of occupational risk factors, and the role of other risk factors. Epidemiological and toxicological data were used to determine the causal relationship between a specific OD and exposure to a specific work environment or work activity.

Data were analyzed by using SPSS Version 20.0 software package. The distribution of numerical (quantitative) variables was evaluated using the Kolmogorov-Smirnov test, and the kurtosis and Skew-

Table 2: Sectors and jobs of the patients

Sectors	Jobs	All patients		Patients diagnosed with occupational diseases	
		n	%	n	%
Metal	Molding	116	10.5	24	11.5
	Welding	56	5.1	14	6.7
	Lathe leveling/CNC	27	2.5	2	1
	Rolling mill	20	1.9	2	1
	Metal grinding-sanding	13	1.1	2	1
Mining-Marble	Coal and metal ore mining	35	3.2	15	7.2
	Stone crusher operator	48	4.3	18	8.7
	Marble/Granit/Cimstone cutting	22	2.0	6	2.8
Chemistry/Plastic	Composite/wind turbine production	149	13.5	21	10.1
	Manufacture of chemical products	52	4.7	4	1.9
	Painting (auto/furniture/metal)	25	2.3	2	1
	Plastic injection/cutting operator	12	1.0	1	0.4
Dental technician	Sandblasting and metal grinding	76	7.0	42	20.2
Cement Sector	Cement production	63	5.7	3	1.5
Ceramic	Ceramic/vitreous worker	51	4.6	12	5.8
Sandblasting	Jeans/metal/glass sanding	17	1.5	6	2.9
Machinery	Mechanical maintenance	21	2.0	1	0.4
Construction	Building/ industrial construction	33	3.0	2	1
Furniture	Furniture manufacturing, painting, and polishing	25	2.3	2	1
Textile, Leather	Textile product cutting-sewing	44	4.0	7	3.4
	Leather tanning-cutting-gluing	11	1.0	1	0.4
Food industry	Agriculture/ processing	46	4.1	7	3.4
	Marketing	21	2.0	–	
Service industry	Cleaners	42	3.8	7	3.4
	Transportation/ drivers	21	2.0	–	
	Warehouse transport worker-porter	2	0.1	1	0.4
Healthcare workers	Healthcare workers	12	1.0	4	1.9
Other	Archaeologist, restorer, office worker	41	3.8	2	1
Total		1101		208	

CNC: Computer numerical control.

ness coefficients. The data were considered normally distributed in the case that the coefficients were between –1.5 and +1.5. For descriptive findings, categorical (qualitative) variables were expressed as numbers and percentages, while numerical variables as mean±standard deviation if normally distributed, and as median (minimum value-maximum value) if not normally distributed. This study was approved by the local Institutional Ethics Committee (Decision Date: 29.01.2021, Approval Number: 3). It was conducted in accordance with the Helsinki Declaration.

RESULTS

A total of 1101 patients were admitted to our outpatient clinic between August 2018 and April 2021. Among these, 1000 (90.8%) were male and 101 (9.2%) were female patients. The mean age was 40.9±9.7 years, with the youngest age of 18 and the oldest of 82 years. Most of the patients (n=571, 51.2%) were smokers. The median pack/year was 15 (25^{th}–75^{th} percentile; 7–25) in 782 cases with a history of smoking. The median duration of work was 120 (25^{th}–75^{th} percentile;

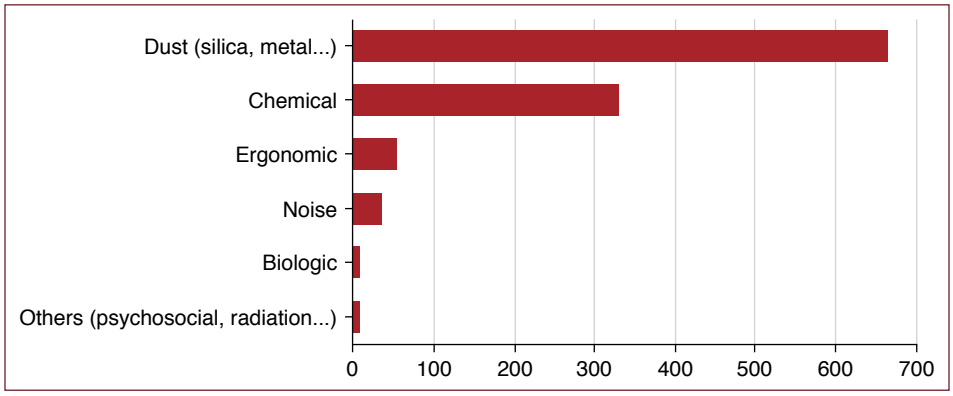

Figure 1: The main risks factors.

60–210) months. The general characteristics of the evaluated cases and the referring institutions are presented in Table 1. The distribution of the patients by the places of referral was examined showed that 612 (55.6%) patients were referred to the OD' outpatient clinic by an occupational physician and 291 (26.5%) patients by a pulmonologist (Table 1). The most common reason for referral was suspected occupational respiratory disease, with 1025 (93.0%) patients.

The jobs and sectors of the patients are summarized in Table 2. The main sectors were metal, mining, chemistry, dental technician, cement production, ceramics, machinery, furniture, textile leather, service, and healthcare. Patients classified as others in the table refer to the lines of work such as archaeology and restoration. The evaluation of occupational histories revealed exposure to too many risks, especially dust (Fig. 1).

While 213 (19.4%) patients did not show up for the assessment of the results and could not be evaluated for the presence of disease or occupational causality, there were 888 (80.6%) patients with complete examinations and medical status reports issued. The assessment of the patients revealed no disease or occupational relationship in 640 (58.1%) patients. The diagnosis was OD in 208 (18.9%) and work-aggravated disease in 40 (3.6%) patients (Fig. 2). The most diagnosed OD was pneumoconiosis in 112 (10.1%) patients, occupational asthma in 39 (3.5%) patients, noise-induced hearing loss in 32 (2.9%) patients, and epicondylitis/tendonitis/impingement in 18 (1.6%) patients (Table 3). Five (0.4%) patients who had radiological findings compatible with respiratory bronchiolitis, occupational dust, and smoke exposure but no smoking history were considered as having OD due to the regressed and improved radiological findings at the follow-up visit after workplace exposure was prevented. Two (0.1%) patients with silica exposure, without any radiological parenchymal findings but with lymph node enlargement or calcification were considered as having lymph node silicosis. After the assessment, 40 (3.6%) patients were diagnosed with the work-aggravated disease. Among these, 5 (0.5%) cases of asthma, 23 (2.0%) cases of lumbar disc herniation, 8 (0.7%) cases of cervical disc herniation were reported as work-aggravated diseases.

DISCUSSION

Reporting, recording, and notification of OD are obligatory in Turkey. According to the relevant legislation, every physician who suspects an OD is required to refer the patient to one of the authorized units; OD hospitals, university hospitals, and training and research hospitals. The reports prepared by these units are notified to the SSI. The SSI evaluates whether the reported occupational accidents and ODs have any basis for benefits and publishes annual statistics. As a result of this evaluation, cases without a loss of earning capacity in a profession lower than 10% are not included in the statistics. This is the most important barrier to having information on the actual extent of ODs and developing prevention policies and programs. In addition, the Ministry of Health does not collect any data on ODs in our country.

Several reasons are involved in underdiagnosing OD. There are uncertainties about how to carry out the diagnosis and management of OD in secondary and tertiary healthcare facilities in our country.

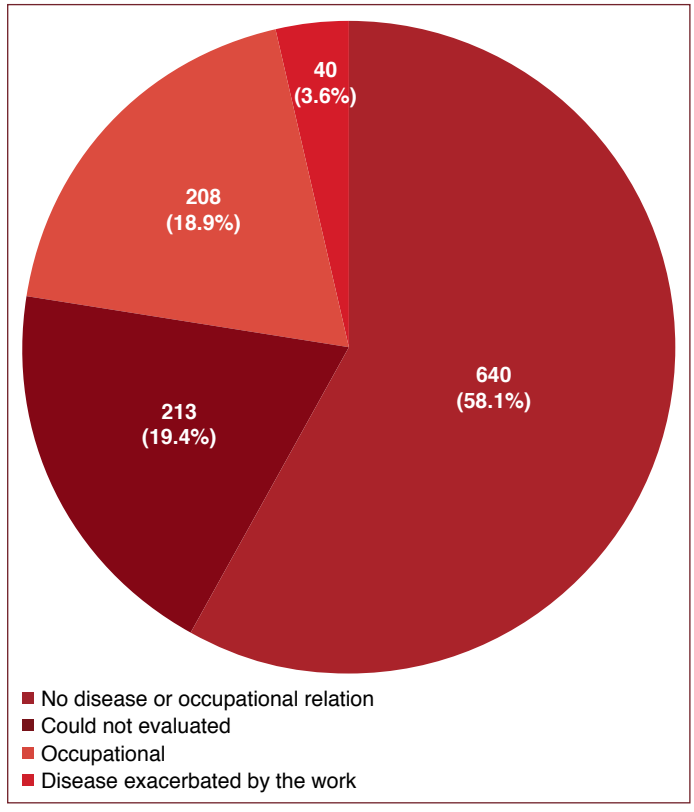

Figure 2: Evaluation of patients following presentation to our outpatient clinic.

Table 3: Distribution of diagnosed occupational diseases by system

System	Disease	n*	%
Respiratory system	Pneumoconiosis/Welder's lung	112	10.1
	Occupational asthma	39	3.5
	RADS/DAH/DIP/Metal fume fever/chemical pneumonitis	11	1.0
	Asbestosis/Pleural pathologies	8	0.7
	Respiratory bronchiolitis	5	0.5
	Hypersensitivity pneumonitis	4	0.4
	Lymph node silicosis	2	0.1
Musculoskeletal system	Epicondylitis/tendonitis/impingement/other	18	1.6
	Lumbar disc herniation (LDH)	12	1.0
	Cervical disc herniation (CDH)	8	0.7
Otolaryngology	Noise-induced hearing loss	32	2.9
	Allergic rhinitis	11	0.9
Dermatology	Allergic contact dermatitis	5	0.5
	Irritant contact dermatitis	3	0.2
Other	Inguinal hernia	1	0.1
	Cataract	2	0.1

*Number of cases with occupational diseases is 208, but some cases have more than one diagnosis.

The leading uncertainty is the lack of a surveillance system. In addition, the awareness of OD among physicians is generally poor in our country. The scope and content of the education on occupational health and ODs in undergraduate and graduate programs of medical faculties is not sufficient.[7] Therefore, physicians do not give enough importance and pay attention to the occupational assessment while taking the patient's history. Therefore, the causal relationship between diseases and occupational exposure is not evaluated, preventive measures are not taken, the statistics lack such data and significant economic losses are incurred.

When the number of compulsory insurance holders is taken as 22 million in 2021 in our country, it is estimated that approximately 500,000 people have a work-related disease.[3] There is limited data to compare the number of patients presenting to our clinic, which has recently joined the healthcare organization in Turkey, and our results related to OD. Although the institutions that are legally authorized with the diagnosis of OD in our country are OD hospitals, university hospitals, and training and research hospitals, the departments of Work-Related and OD have been providing subspecialty training since 2017 and these specialists work in OD outpatient clinics in various cities. There is no OD and work-aggravated disease data related to these clinics, which are affiliated with the Ministry of Health. The annual data declared by SSI are official. The institution, which regards the current situation from the perspective of an insurance institution, established a rate for the loss of earning capacity, and cases with a loss of ≥10%, that is, those who are entitled to receive benefits, can be included in these statistics. The study by Çımrın et al.[8] evaluated 862 cases during the first 3-year period in our country's first university hospital providing OD subspecialty training and presented detailed data. Likewise, our study presented data on the subject and thus contributed to revealing the situation in our country and to the literature.

On the other hand, the number of cases presenting to three OD hospitals (Zonguldak, Ankara, and İstanbul) with a suspected OD (and diagnosed with an OD) in 2008 was 3825 (1610), 614 (325), 2353 (1453), respectively, totaling to 6792. (3388).[9] The rate of cases from the whole country to the total employed population is 0.03%. The number of employees in İzmir is approximately 1 million.[10] Accordingly, the annual average number of cases presenting to our clinic, which provides service to Izmir and nearby cities should have been at least 300. The number of cases presenting to our outpatient clinic with a suspected OD from Izmir and nearby cities is 1101 during an almost 3-year period. As is seen, the number of cases evaluated by our clinic is comparable to the number of cases presenting to the three OD hospitals providing service nationwide.

The rate of cases diagnosed with OD in OD hospitals to the cases presenting to such hospitals is 40–60%.[9] While the results were similar in the study by Çımrın et al., this rate was 20% in our study. When the presenting patients were examined, the majority (55.6%) were referred by an occupational physician upon suspicious findings in the results of periodic examinations. This result can be explained by the poor quality (techniques, etc.) of the test results obtained in periodic examinations.

Given the SSI data, the total number of ODs declared as having a loss of earning capacity of ≥10% in 2019 was 1091. According to the distribution by OD types, respiratory diseases (406 cases) and

pneumoconiosis (381 cases) among respiratory diseases were the leading conditions.[3] In the study by Çımrın et al., pneumoconiosis was the leading condition, with 169 (38.9%) cases out of 435 cases diagnosed with OD. In our study, 112 (53.8%) of 208 cases diagnosed with the OD had pneumoconiosis. Pneumoconiosis is still the leading cause of ODs in our country. Given the data from other countries, however, the most common OD is occupational hearing loss in the USA and occupational skin diseases in Germany. The OD that causes the greatest economic loss is musculoskeletal diseases.[11,12] The distribution of ODs in our cases suggests that the risks such as dust, noise, and ergonomic risks, which are mostly the problems of developing countries, and the diseases arising from exposure to these risk factors are still not fully managed in our country.

Asthma is one of the most common occupational lung disease worldwide, and it has been reported that 10–25% of adult-onset asthma cases are related to occupational factors.[13] In our study, 39 (20%) of 195 cases referred with a preliminary diagnosis of asthma were diagnosed with occupational asthma by establishing a causal relationship. Further evaluation was planned to establish a causal relationship in patients diagnosed with asthma, but 151 patients did not complete their further evaluation. This might be due to factors such as work pressure and fear of being fired. The study by Alıcı et al. on patients with pneumoconiosis reported that 33.3% of the patients left their workplace after the diagnosis of OD, while Beyan et al. showed that 34 patients who were working in the same factory and diagnosed with occupational musculoskeletal diseases were fired.[14,15] These results are proof of the threat to the job security of employees when they have health problems.

In our study, lymph node silicosis was diagnosed and reported in two (0.1%) cases. Lymphadenopathy may occur in silica-exposed workers without co-existent pulmonary silicosis or parenchymal findings, so-called "lymph node silicosis."[16] Calcification may be present. A study of 264 deceased miners indicated that 20% had lymph node silicosis alone, 4% had parenchymal silicosis alone, and 39% had both.[17] The available data on progression to pulmonary silicosis is limited; however, the presence of lymph node fibrosis impairs the elimination of silica from the lungs, leading to a higher load of silica and possibly increasing the likelihood of lung injury and parenchymal silicosis.[18]

One of the study limitations is the absence of toxicological assessment due to the lack of technical infrastructure in the study center. Systemic diseases occurring after exposure to chemical and toxic substances could not be identified. It would contribute to the literature and the current situation in Turkey if the data related to ODs arising from chemical and toxicological exposures are recorded and listed by the OD Hospitals that have advanced toxicological laboratory facilities.

CONCLUSION

In our country, it is essentially required to enable health surveillance in the workplace for the identification and management of workers health problems, and to establish the legal infrastructure of inter-institutional cooperation. The introduction of OD surveillance would improve the efficacy of health surveillance and workplace risk prevention. The target policies of the future should involve issues such as improving recommendations and interventions to workplaces after diagnosis, practices related to rehabilitation and return to work for employees after diagnosis, updating the necessary training for occupational physicians and employees, occupational hygiene support, and eliminating difficulties in collecting toxicological data.

Disclosures

Ethics Committee Approval: The study was approved by The Dr. Suat Seren Chest Diseases and Surgery Training and Research Hospital Clinical Research Ethics Committee granted approval for this study (date: 29.01.2021, number: 3).

Peer-review: Externally peer-reviewed.

Conflict of Interest: The authors have no conflict of interest to declare.

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