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ORIGINAL ARTICLE

Malpractice litigation after total hip arthroplasty: A legal 10-year database

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ABSTRACT

Objectives: In this study, we aimed to identify the most frequently reported claims after total hip arthroplasty (THA) and the reasons put forward by the plaintiffs.

Patients and methods: Between January 2011 and December 2020, data of a total of 74 cases (21 males, 53 females; mean age: 53.7±12.8 years; range, 29 to 83 years) obtained from the Turkish Forensic Medicine Institute were retrospectively analyzed. Claims for litigation, demographic data, data regarding the identity of the accused and the hospital setting were recorded.

Results: The most common reason for lawsuits was death (n=15; 20.3%), followed by nerve injury (n=13; 17.6%), and eight patients had more than one complaint. According to the forensic medicine reports, malpractice was detected in 10 (12.5%) of the cases. Among the hospital types, only nerve injury made a significant difference among all complaint sources in different hospital settings (p=0.003).

Conclusion: In our study, death was the most common reason for lawsuits regarding malpractice accusations after THA, which is different from medical malpractice allegations throughout the world.

Keywords: Arthroplasty, complications, hip, litigation, malpractice lawsuits.

Over the past two decades, thanks to the improvements in implant technology and patient management, total hip arthroplasty (THA) has been increasingly adopted by many surgeons. The main reason for this is that THA causes a significant improvement in pain and function, as reported in meta-analyses and systematic reviews.[1] Although THA is a successful and reliable technique, it is not completely free from complications and may cause some problems that may be subject to litigation. The literature review with the terms "Malpractice" and "Total Joint Arthroplasty" reveals that there is a serious research intensity after 2012, particularly in 2016, as complications after THA were cited as the cause of many lawsuits and large amounts of compensation were received. Oyebode[2] reported that a report issued by the Institute of Medicine estimated the total cost of medical errors as $17 to 29 billion and 7,000 additional deaths per annum. In addition, orthopedic surgeons experience an annual risk of litigation that is twice the national average of all other physicians.[3]

In the United States, 78% of orthopedic arthroplasty surgeons have been named as defendants in at least one lawsuit alleging medical malpractice.[4] There has also been a considerable increase in the number of claims in orthopedic surgery.[5,6] In such litigations,

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nerve injury has been the most commonly cited source of litigation, followed by limb length discrepancy, infection, vascular injury, hip dislocation, compartment syndrome, deep vein thrombosis (DVT), chronic pain, and periprosthetic fracture.[7,8]

It is usually accepted that ethnic and sex differences, religious beliefs, language, education, and personal history are determinant expectations and behaviors for the patient-physician relationship. In Türkiye, both the family order based on patriarchy and the belief system based on fate carry the malpractice lawsuits filed due to medical error, which has been extensively studied in other Western societies, to a different dimension. In the literature, there is no study examining malpractice cases opened after total joint arthroplasty in this population, which is likely to present a different perspective on undesirable complications after surgery. In the present study, we, therefore, aimed to *(i)* determine the most commonly reported claims and reasons proposed by the claimants after THA; *(ii)* identify the institutions where the defendant orthopedic arthroplasty surgeons were working in Türkiye; and *(iii)* evaluate the results of litigations through the data retrieved from the Turkish Forensic Medicine Institute. We hypothesized that, in today's world, where economic, social and cultural interaction between countries is gradually increasing as a result of globalization, examining these cases particularly in this region would provide a better understanding of the factors causing malpractice.

PATIENTS AND METHODS

This retrospective, descriptive study was conducted at The Council of Forensic Medicine (ATK), Istanbul, Türkiye between January 2011 and December 2020. The data were retrieved from the Council of Forensic Medicine (ATK), Istanbul, Türkiye. The 7th and 8th higher specialization branches of the Council of Forensic Medicine report their scientific and technical opinions about the medical practice errors resulting or not resulting in death in the whole country. When the absolute majority of the Committee is achieved, the physician's malpractice is defined as malpractice. The data consisted of a subset of 79 cases (79 hips) referred to the Turkish Forensic Medicine Institute by public prosecutors and law courts in association with the medical litigations initiated after THA surgeries performed between December 2000 and June 2019. Of these, five cases were excluded as the file was been finalized yet, and the remaining 74 cases (21 males, 53 females; mean age: 53.7±12.8 years; range, 29 to 83 years) were included in the study.

All the patients who underwent THA were evaluated in the study. Clinical and operative data (age, sex, medical comorbidities, indication for primary THA, date of the operation, and surgical details) were retrieved from the medical records. The claims were classified as neurological deficits, technical errors, infections, leg length discrepancy, dislocation, postoperative care, pain, fatality, DVT/pulmonary embolism (DVT/PE), intraoperative periprosthetic fracture, vascular injury of external iliac artery and vein, off-label procedure, and implant failure. Hospitals in Anatolia and Thrace were divided into private hospitals, state hospitals, training and research hospitals, and university hospitals. The defendants were classified as orthopedic surgeons, hospitals, anesthesiologists, other medical staff (nurses), and implant suppliers.

Statistical analysis

Statistical analysis was performed using the SPSS for Windows version 15.0 software (SPSS Inc., Chicago, IL, USA). Descriptive data were expressed in mean ± standard deviation, median (min-max) or number and frequency, where applicable. The rates in the groups were compared using the chi-square test. A p value of <0.05 was considered statistically significant.

RESULTS

The most common indication for surgery was primary coxarthrosis in all patients (Table I). The most common cause of complaint was death (n=15; 20.3%), followed by sciatic nerve injury (n=13; 17.6%), and eight cases had more than one complaint (Table II). According to

TABLE I
Demographic and clinical characteristics of patients

	n	%	Mean±SD	Range
Age (year)			53.7±12.8	29-83
Sex				
Female	53	71.6		
Male	21	28.4		
Indications				
Primary OA	50	67.6		
DDH without OA	11	14.9		
Avascular necrosis	8	10.8		
Rheumatoid arthritis	2	2.7		
DDH with OA	2	2.7		
Posttraumatic OA	1	1.4		

SD: Standard deviationp; OA: Osteoarthritis; DDH: Developmental dysplasia of the hip.

TABLE II
Causes of complaints

	n	%
Death	15	17.8
Nerve injury	13	15.4
Periprosthetic fracture	10	11.9
Leg length discrepancy	8	9.5
Hip dislocation	7	8.3
Infection	7	8.3
Vascular injury	6	7.1
Implant loosening	4	4.7
Other anesthetic complications	4	4.7
Implant failure	2	2.3
Pulmonary embolism	2	2.3
Pain and weakness	2	2.3
Deep vein thrombosis	2	2.3
Off-label procedure	2	2.3
Total	84	100

LLD: Leg length discrepancy.

TABLE III
Defendants

	n	%
Orthopaedic surgeon	60	81.1
Orthopaedic surgeon + Hospital	7	9.5
Orthopaedic surgeon + Anesthesiologist	3	4.1
Orthopaedic surgeon + Other medical staff	2	2.7
Hospital + Implant supplier	1	1.4
Anesthesiologist	1	1.4

TABLE IV
Hospital types

	n	%
Private hospital	31	41.9
Public hospital	31	41.9
Training and research hospital	8	10.8
University Hospital	4	5.4

TABLE V
Forensic results

	n	%
No malpractice	64	86.5
Malpractice	10	13.5

the surgical notes and autopsy reports of the patients in the national registry system, two patients (13.3%) died from major vascular injuries (one external iliac veins and one artery), four patients (33.3%) from fatal PE, one patient (6.6%) from fat embolism syndrome, and four patients (33.3%) from acute myocardial infarction. In the other four patients, the exact cause of death could not be determined. The death records of these patients were reported as cardiovascular arrest. Of 74 defendants, 60 (81.1%) were orthopedists and seven (9.5%) filed a complaint against both the hospital and the physician (Table III). Of 74 cases, 43 (57.3%) were operated in a private hospital, 25 (33.3%) in a public hospital, six (8%) in a training and research hospital, and one (1.3%) in a university hospital (Table IV).

Based on the forensic reports, malpractice was identified in 10 (12.5%) and no malpractice was identified in 64 (86.5%) of the cases (Table V). An analysis of the sources of complaints indicated that the complaints were mostly filed against orthopedic surgeons (Table VI). Of all the sources of complaints, only permanent sciatic nerve injury established a significant difference among the hospital types (Table VII). There was no significant difference in the malpractice rate between the public and private hospitals (Table IVII). Similarly, there was no significant difference in the detection of malpractice between the defendants working in the public and private hospitals (Table XI).

DISCUSSION

Joint replacement surgery is one of the most beneficial surgical procedures in terms of cost-effectiveness and patient satisfaction with few complications. These complications, however, pose a potential source of compensation claims. To the best of our knowledge, there are no studies concerned with the claims reported after THA in Türkiye. Therefore, in this case series, we evaluated malpractice cases and reasons proposed by the claimants after THA. According to our study results, death was the most common cause of complaints filed in litigations referred to the Forensic Medicine Institute. Also, orthopedists working in private hospitals were the most frequently sued ones, while the rate of malpractice was significantly higher among orthopedists working in public hospitals compared to those working in private hospitals. These data obtained in this region, where almost a quarter of healthcare services are provided by private institutions, can be a guide for developing countries in solving

TABLE VI
Sources of complaints classified according to defendants

	Death		Nerve injury		Infection		Periprosthetic fracture		LLD	
Defendants	n	%	n	%	n	%	n	%	n	%
Orthopaedic surgeon	15	71.4	14	93.3	7	50.0	11	91.7	8	88.9
Anesthesiologist	1	4.8	0	0.0	0	0.0	0	0.0	0	0.0
Hospital	0	0.0	0	0.0	1	7.1	0	0.0	0	0.0
Orthopaedic surgeon + Hospital	1	4.8	1	6.7	6	42.9	1	8.3	1	11.1
Orthopaedic surgeon + Other medical staff	2	9.5	0	0.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Anesthesiologist	2	9.5	0	0.0	0	0.0	0	0.0	0	0.0
Hospital + Implant supplier	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

	Hip dislocation		Implant loosening		Other anesthetic complaints		Implant failure		Vascular injury	
	n	%	n	%	n	%	n	%	n	%
Orthopaedic surgeon	7	87.5	4	80.0	2	40.0	2	50.0	6	75.0
Anesthesiologist	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hospital	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Hospital	1	12.5	1	20.0	1	20.0	0	0.0	2	25.0
Orthopaedic surgeon + Other medical staff	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Anesthesiologist	0	0.0	0	0.0	2	40.0	0	0.0	0	0.0
Hospital + Implant supplier	0	0.0	0	0.0	0	0.0	2	50.0	0	0.0

	Pulmonary embolism		DVT		Limping		Off-label procedure		Recurrent surgery	
	n	%	n	%	n	%	n	%	n	%
Orthopaedic surgeon	1	25.0	1	50.0	1	100	2	100	1	100
Anesthesiologist	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hospital	1	25.0	0	0.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Hospital	2	50.0	1	50.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Other medical staff	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Orthopaedic surgeon + Anesthesiologist	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Hospital + Implant supplier	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

	Limited movement		Others	
	n	%	n	%
Orthopaedic surgeon	1	100	2	66.7
Anesthesiologist	0	0.0	0	0.0
Hospital	0	0.0	0	0.0
Orthopaedic surgeon + Hospital	0	0.0	0	0.0
Orthopaedic surgeon + Other medical staff	0	0.0	0	0.0
Orthopaedic surgeon + Anesthesiologist	0	0.0	1	33.3
Hospital + Implant supplier	0	0.0	0	0.0

LLD: Limb length discrepancy; DVT: Deep vein thrombosis.

TABLE VII
Sources of complaints classified according to hospital types

	TRH		University		Public hospital		Private hospital		
Sources of complaint	n	%	n	%	n	%	n	%	*p*
Death	2	16.6	0	0.0	7	20.5	6	20.6	0.086
Nerve injury	4	33.3	0	0.0	7	20.5	2	6.8	0.003
Infection	0	0.0	2	20	3	8.8	2	6.8	0.218
Periprosthetic fracture	1	8.3	2	20	2	5.8	5	17.2	0.261
Limb length discrepancy	2	16.6	2	20	2	5.8	2	6.8	0.126
Hip dislocation	0	0.0	0	0.0	4	8.8	3	10.3	1.000
Implant loosening	1	8.3	0	0.0	2	5.8	1	3.4	0.758
Other anesthetic complaints	0	0.0	0	0.0	2	5.8	2	6.8	1.000
Implant failure	0	0.0	1	10	0	0.0	1	3.4	0.232
Vascular injury	2	16.6	1	10	1	2.9	2	6.8	0.211
Pulmonary embolism	0	0.0	1	10	0	0.0	1	3.4	0.232
Deep vein thrombosis	0	0.0	0	0.0	1	2.9	1	3.4	1.000
Pain and weakness	0	0.0	0	0.0	2	5.8	0	0.0	1,000
Off-label procedure	0	0.0	0	0.0	1	2.9	1	3.4	1.000
Total	12		9		34		29		

TRH: Training and research hospital.

TABLE VIII
Comparison of public and private hospitals concerning malpractice

	Public					Private				
	No malpractice		Malpractice			No malpractice		Malpractice		
Sources of complaints	n	%	n	%	*p*	n	%	n	%	*p*
Death	8	20	4	40	0.081	3	9.6	0	0.0	1.000
Nerve injury	10	25	2	20	1.000	1	3.2	0	0.0	1.000
Infection	2	5	0	0.0	1.000	5	16.1	0	0.0	1.000
Periprosthetic fracture	4	10	0	0.0	1.000	4	12.9	2	66.7	0.088
Leg length discrepancy	5	12.5	0	0.0	0.572	3	9.6	0	0.0	1.000
Hip dislocation	2	5	1	10	0.421	4	12.9	0	0.0	1.000
Implant loosening	2	5	0	0.0	1.000	1	3.2	1	33.3	0.187
Other anesthetic complaints	1	2.5	1	10	0.302	2	6.4	0	0.0	1.000
Implant failure	0	0.0	0	0.0	1.000	2	6.4	0	0.0	1.000
Vascular injury	3	7.5	2	20	0.180	1	3.2	0	0.0	1.000
Pulmonary embolism	0	0.0	0	0.0	1.000	2	6.4	0	0.0	1.000
Deep vein thrombosis	1	2.5	0	0.0	1.000	1	3.2	0	0.0	1.000
Other	2	5	0	0.0	1.000	2	6.4	0	0.0	1.000
Total	40		10			31		3		

such problems. In particular, in these private institutions, the fact that such surgical methods, which can be complicated, are carried out by a single surgeon rather than a teamwork due to the setting of the institution, may reduce risk sharing and lay the groundwork for lawsuits. The fact that the complication and malpractice rates are lower in training hospitals can be explained by both

TABLE IX
Comparison of defendants in public and private hospitals concerning malpractice

	Public					Private				
	No malpractice		Malpractice			No malpractice		Malpractice		
Defendants	n	%	n	%	*p*	n	%	n	%	*p*
Orthopaedic surgeon	33	91.7	6	85.7	0.514	18	64.3	3	100	1.000
Orthopaedic surgeon + Hospital	1	2.8	0	0.0		6	21.4	0	0.0	
Orthopaedic surgeon + Anesthesiologist	1	2.8	0	0.0		2	7.1	0	0.0	
Orthopaedic surgeon + Other medical staff	1	2.8	0	0.0		1	3.6	0	0.0	
Hospital + Implant supplier	0	0.0	0	0.0		1	3.6	0	0.0	
Anesthesiologist	0	0.0	1	14.3		0	0.0	0	0.0	

preoperative planning of surgeries with templates and teamwork and meticulous follow-up.

In the present study, the most common cause of complaint was death (n=15; 20.3%).[9] In the literature, however, nerve injury has been reported as the most common cause of complaint after THA, with a reported incidence of 0.3 to 3.7%.[10] In our study, nerve injury was the second most common cause (n=13; 17.6%). In a study by Upadhyay et al.,[11] 64 (13%) respondents filed a lawsuit related to a postoperative nerve injury, rendering it the most frequently cited reason for litigation related to total joint arthroplasty. McGrory et al.[10] also reported that nerve injury was the most common cause of complaints (64 out of 490 cases) in their study. McWilliams et al.[12] found that nerve injury was the most common subject of a lawsuit with 13.9% in their large series study. Zengerink et al.[13] evaluated a total of 516 cases from the Netherlands and reported that the most common cause of complaint after THA was sciatic nerve lesion (19.6%). The aforementioned authors also reported that the rate of complaints after THA in the Netherlands was lower than the rate in Finland and concluded that this difference was due to the cultural traditions and legal systems of the two countries. In our study, death was the most common complaint rather than the most common cause of lawsuits after THA, such as nerve injury and limb length discrepancy. This finding may be due to the cultural tradition of our country, which is firmly tied to fate, and the respect and trust still shown to physicians, although both have been considerably diminished recently. The fact that hip surgeries are particularly successful in relieving pain in arthroplasty practice and may cause some patients to ignore major complications such as sciatica. However, in recent years, the relationship between physicians and patients has been compromised by the involvement of litigations.[14] To prevent such litigations, patients should be given more detailed information in the preoperative period, both verbally and in writing, particularly using visual effects.

In our study, a sex-based analysis of the defendants indicated that female physicians were sued significantly more frequently than men (76% vs. 24%, respectively), which is similar to the finding reported by Zengerink et al.[13] On the other hand, the most commonly sued physicians were those working in private hospitals (57.3%), followed by those working in public hospitals (33.3%). This finding indicates that the costs of surgical operations in private hospitals have a negative impact on patients' expectations. In contrast, the rate of malpractice was significantly higher among orthopedists working in public hospitals compared to those working in private hospitals, which could be explained by the possibility that those surgical operations might have been performed by orthopedists with limited experience in the field of arthroplasty. In a previous study, orthopedic adult reconstruction surgeons were queried about their experience with malpractice claims, and most of them (75%) reported that they were sued by the patients and/or their relatives.[11] If this number is divided by years in practice, the rate is more than twice the annual estimate for all physicians[15] and three times as high in the first decade of practice. This disproportionately high rate of claims reported in the first 10 years of practice (5.8%) may be a reflection of the lack of surgeon's experience or recent increases in malpractice claims.[16-18] Accordingly, we consider that it would be highly useful to conduct a study on the experiences of orthopedists (year-based), particularly those performing arthroplasty.

The present study has some limitations and strengths. First, it is a retrospective study and can be subject to challenges and biases such as patients being diagnostically inhomogeneous. Second, although it

is very unlikely, there may be more malpractice cases that are not reflected in the Forensic Medicine Institution. In terms of the general operation, the judges dealing with these cases ask this committee for technical opinion to check the suitability of the expert judgments and make the final decision. Therefore, it is not very likely for a decision to be made without the knowledge of this committee. Finally, the decisions made by the Forensic Medicine Institution are not obligatory and are not the final verdicts. The findings in this study were obtained as a result of the examination of the decisions made by this committee. The strengths of the study are that applications from almost all countries were evaluated and that the study conception, design, data collection and analysis were made by the author who is both an orthopedic and forensic medicine specialist.

In conclusion, trends in malpractice cases change over time, and claims of neglect and disability are increasing in orthopedics, particularly after adult reconstructive surgery. In this study, death was the most common cause of lawsuits, and it can be speculated that patients may have different sensitivities to complications that may develop after such major surgeries due to sociocultural differences. These different sensitivities may affect the acceptance of the death of the patient by his/her relatives. Therefore, in risk analysis for reconstructive surgery, the physician should consider the patient as a whole considering both physical and social determinants.

Ethics Committee Approval: The study protocol was approved by the Council of Forensic Medicine (ATK), Istanbul, Türkiye Ethics Committee (date: 01.12.2020, no: 21589509/2020/1147). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions: Conceived of the presented idea. Performed the analysis wrote the manuscript: M.M.S.; Collected the data: M.Y.A., E.Ö., A.S.; Reviewed the results and approved the final version of the manuscript: M.A.K.

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REFERENCES

1. Harris JD, McCormick FM, Abrams GD, Gupta AK, Ellis TJ, Bach BR Jr, et al. Complications and reoperations during and after hip arthroscopy: a systematic review of 92 studies and more than 6,000 patients. Arthroscopy 2013;29:589-95. doi: 10.1016/j.arthro.2012.11.003.
2. Oyebode F. Clinical errors and medical negligence. Med Princ Pract 2013;22:323-33. doi: 10.1159/000346296.
3. Jena AB, Seabury S, Lakdawalla D, Chandra A. Malpractice risk according to physician specialty. N Engl J Med 2011;365:629-36. doi: 10.1056/NEJMsa1012370.
4. Bokshan SL, Ruttiman RJ, DePasse JM, Eltorai AEM, Rubin LE, Palumbo MA, et al. reported litigation associated with primary hip and knee arthroplasty. J Arthroplasty 2017;32:3573-7.e1. doi: 10.1016/j.arth.2017.07.001.
5. Bhutta MA, Arshad MS, Hassan S, Henderson JJ. Trends in joint arthroplasty litigation over five years: The British experience. Ann R Coll Surg Engl 2011;93:460-4. doi: 10.1308/003588411X587226.
6. Khan IH, Jamil W, Lynn SM, Khan OH, Markland K, Giddins G. Analysis of NHSLA claims in orthopedic surgery. Orthopedics 2012;35:e726-31. doi: 10.3928/01477447-20120426-28.
7. Bal BS. An introduction to medical malpractice in the United States. Clin Orthop Relat Res 2009;467:339-47. doi: 10.1007/s11999-008-0636-2.
8. Çağlar Ö, Tokgözoğlu M, Akgün RC, Atilla B. Low-dose vancomycin-loaded cement spacer for two-stage revision of infected total hip arthroplasty. Jt Dis Relat Surg 2020;31:449-55. doi: 10.5606/ehc.2020.76108
9. Atik OŞ. Which articles do the editors prefer to publish? Jt Dis Relat Surg 2022;33:1-2. doi: 10.52312/jdrs.2022.57903.
10. McGrory BJ, Bal BS, York S, Macaulay W, McConnell DB. Surgeon demographics and medical malpractice in adult reconstruction. Clin Orthop Relat Res 2009;467:358-66. doi: 10.1007/s11999-008-0581-0.
11. Upadhyay A, York S, Macaulay W, McGrory B, Robbennolt J, Bal BS. Medical malpractice in hip and knee arthroplasty. J Arthroplasty 2007;22(6 Suppl 2):2-7. doi: 10.1016/j.arth.2007.05.003.
12. McWilliams AB, Douglas SL, Redmond AC, Grainger AJ, O'Connor PJ, Stewart TD, et al. Litigation after hip and knee replacement in the National Health Service. Bone Joint J 2013;95-B:122-6. doi: 10.1302/0301-620X.95B1.30908.
13. Zengerink I, Reijman M, Mathijssen NM, Eikens-Jansen MP, Bos PK. Hip arthroplasty malpractice claims in the Netherlands: Closed claim study 2000-2012. J Arthroplasty 2016;31:1890-3.e4. doi: 10.1016/j.arth.2016.02.055.
14. Samuel LT, Sultan AA, Rabin JM, Surace PA, Yao B, Moskal JT, et al. Medical malpractice litigation following primary total joint arthroplasty: A comprehensive, nationwide analysis of the past decade. J Arthroplas. 2019;34:102-7. doi: 10.1016/j.arth.2019.02.066.
15. Adams EK, Zuckerman S. Variation in the growth and incidence of medical malpractice claims. J Health Polit Policy Law 1984;9:475-88. doi: 10.1215/03616878-9-3-475.
16. Adams EK, Zuckerman S. Variation in the growth and incidence of medical malpractice claims. J Health Polit Policy Law 1984;9:475-88. doi: 10.1215/03616878-9-3-475.
17. Dırvar F, Dırvar SU, Kaygusuz MA, Evren B, Öztürk İ. Effect of malpractice claims on orthopedic and traumatology physicians in Turkey: A survey study. Acta Orthop Traumatol Turc 2021;55:171-6. doi: 10.5152/j.aott.2021.20167.
18. Atik OŞ, Ertürk C. Are outpatient total hip and knee arthroplasties safe? Jt Dis Relat Surg 2021;32:1-2. doi: 10.5606/ehc.2020.57898.