

Magnetic resonance imaging (MRI) findings after knee, foot, and ankle traumas

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Abstract. – OBJECTIVE: The aim of this study is to investigate the demographic and clinical characteristics of knee and ankle traumas that could not be detected in the first post-traumatic evaluation and diagnosed within 15 days after the follow-up examination and to discuss the results we obtained with current data.

PATIENTS AND METHODS: Patients admitted to the emergency department trauma department between January 1, 2017, and December 31, 2018, were retrospectively analyzed. Applications due to traffic accidents and all traumas except knee and ankle trauma were excluded from the study. Medical records were used to reveal the demographic characteristics of the cases, clinical findings, mechanisms of injury, additional injuries, and interventions in the emergency room.

RESULTS: The mean age of 2,039 patients included in the study due to knee, foot, and ankle trauma was 35.69±12.01, and the median value was 36 (age range 11-71). The patients were divided into 2 groups knee trauma and ankle trauma and statistical evaluations were made. Of the patients evaluated for knee trauma (n=1,157), 463 (40%) were female and 694 (60%) were male. Of the patients evaluated for ankle trauma (n=882), 397 (45%) were female and 485 (55%) were male.

CONCLUSIONS: It is evident that knee, foot, and ankle traumas after simple falls and sports injuries are frequently encountered by emergency physicians. It is known that post-traumatic ligament injury, bone contusion, intraarticular fluid/hematoma formation, and fractures that cannot be detected by radiographs can be overlooked in emergency departments where patient density is high.

Key Words:

Knee traumas, Ankle traumas, Foot trauma, Magnetic resonance imaging.

Introduction

Lower extremity traumas constitute an important part of the cases admitted to the emergency

department in our country as well as all over the world. According to the National Hospital Ambulatory Medical Care Survey (NHAMCS) conducted to emergency departments in the United States in 2007, 14.6% of hospital admissions were found to have lower extremity injuries. However, detailed information about injuries was not provided in above mentioned questionnaire¹. In an article published in 2012 in which patients with lower extremity injuries were evaluated according to their anatomical regions, it was found that strains and sprains constituted 36% of all lower extremity injuries and the injury with the greatest incidence was ankle sprain². Post-traumatic foot, ankle, and knee injuries are among the most common situations encountered by emergency physicians³⁻⁵.

Clinical approach and correct use of radiological imaging are vital in the evaluation of trauma patients in the emergency department. X-rays are the first preferred radiological method for detecting extremity fractures, but they may sometimes be insufficient in the detection of fractures⁶. Most of the knee and ankle injuries in the emergency department are soft tissue injuries rather than bone injuries. Magnetic resonance imaging (MRI) is an excellent test to diagnose ligament and meniscal injuries, to determine whether surgery is necessary or if conservative management will be sufficient. However, MRI has limited use in the emergency department due to its cost, time requirement, and limited availability⁷.

While most of the existing literature data on pathologies that may occur after simple trauma in the knee and ankle originate from European and American societies, epidemiological data on the knee and ankle in the Turkish population were limited. The purpose of this retrospective study is to examine the patients who were initially evaluated in the emergency department due to

trauma in the knee and ankle in a city in Turkey but were discharged after no bone fracture was detected and control was recommended. The aim of this study is to investigate the demographic and clinical features of knee and ankle traumas that could not be detected in the first evaluation and diagnosed after the control examination in approximately 15 days and to discuss our results together with the current data.

Patients and Methods

124,485 patients who applied to the emergency room trauma department between January 1, 2017, and December 31, 2018, were retrospectively analyzed. Among these patients, patients who were admitted due to lower extremity injuries and no fracture was found as a result of examinations and tests were retrospectively analyzed using the ICD-10 coding system (ICD-10 codes: S83, S87.0, S90, S93, S96, S99) by scanning the digital hospital database. Among these patients, the patients who applied to the orthopedics department within an average of 15 days for post-traumatic control and underwent knee and ankle MRI were included in the study. Applications due to traffic accidents and all traumas except knee and ankle trauma were excluded from the study. All radiological imaging files and medical records of the patients were obtained from The Picture Archiving and Communication System (PACS) and the clinical database. Medical records were used to reveal the demographic characteristics of the cases, clinical findings, mechanisms of injury, additional injuries, and interventions in the emergency room. Radiological images were evaluated by the orthopedic surgeon and radiologist. During the study, the foot and ankle MRIs of 882 patients and knee MRIs of 1,157 patients were examined and recorded.

The research protocol was reviewed and approved by the Health Sciences University Gazi Yaşargil Training and Research Hospital Clinical Research Ethics Committee (07.05.2021/459). The study was conducted according to the Declaration of Helsinki.

Statistical Analysis

Descriptive analysis of continuous and categorical data using ratios, frequency distributions, means, and standard deviations was performed using the SPSS program (IBM corp., Armonk, NY, USA). Student *t*-test was used to compare the

means of independent groups and Pearson χ^2 test was used for comparisons between groups. *p*-values $< .05$ were considered statistically significant.

Results

The mean age of 2,039 patients included in the study due to knee, foot, and ankle trauma was 35.69 ± 12.01 , and the median value was 36 (age range 11-71). The patients were divided into 2 groups as knee trauma and ankle trauma and statistical evaluations were made. Of the patients evaluated for knee trauma ($n=1157$), 463 (40%) were female and 694 (60%) were male. The mean age of women was 40.49 ± 11.55 , median age was 43 (range: 11-58), and mean age of men was 33.67 ± 11.71 , median age was 32 (range: 11-58).

In the MRI evaluation of the patients we examined for knee trauma, fracture was not observed in both genders, but anterior cruciate ligament rupture and bone contusion were found to be more common in males and statistically significant ($p=0.000 \times 2$, $p=0.001 \times 2$, respectively). When we examine other injuries, while patellar dislocation, medial meniscus tear, anterior cruciate ligament tear, medial collateral ligament tear, intra-articular fluid/hematoma formation and bone contusion were detected more in men, posterior cruciate ligament tear, lateral collateral tear and patellar tendon tear were more common in women. Despite these data, it was not statistically significant. The distribution by gender of the patients we examined for knee trauma is shown in Table I.

When we examined the injuries caused by the causes of knee trauma, we found a patient ($n=971$, 83.92%) who applied with a sports injury. Patients ($n=186$, 16.08%) who presented with a simple fall (falling as a result of walking on the road or falling from a not very high place) were evaluated. Although it was observed that knee and intra-knee traumas due to sports injuries were more common, only posterior cruciate ligament rupture after sports injury was statistically significant ($p=0.031 \times 2$). Injuries to the knee according to the causes of trauma are shown in Table II.

When we examined the patients who were found to have Fluid/Hematoma in the joint space in knee after MRI ($n=611$); in these patients, medial meniscal tear was the highest ($n=541$, 88.5%) and was statistically significant ($p=0.004 \times 2$). Bone contusion ($n=145$, 23.7%) and medial collateral ligament tear ($n=33$, 5.4%) were statistically

Table I. Distribution of patients examined for knee trauma by gender.

Parameters	N = 1,157		p
	Female	Male	
Patellar dislocation			$p = 0.102 \times \chi^2$
Yes	4 (0.9%)	15 (2.2%)	
No	459 (99.1%)	679 (97.8%)	
Medial meniscus tear			$p = 0.102 \times \chi^2$
Yes	408 (88.1%)	584 (84.1%)	
No	55 (11.9%)	110 (15.9%)	
Lateral meniscus tear			$p = 0.945 \times \chi^2$
Yes	118 (25.5%)	179 (25.8%)	
No	345 (74.5%)	515 (74.2%)	
Anterior cruciate ligament tear			$p = 0.945 \times \chi^2$
Yes	158 (34.1%)	318 (45.8%)	
No	305 (65.9%)	376 (54.2%)	
Posterior cruciate ligament tear			$p = 0.076 \times \chi^2$
Yes	8 (1.7%)	4 (0.6%)	
No	455 (98.3)	690 (99.4%)	
Medial collateral ligament tear			$p = 0.293 \times \chi^2$
Yes	23 (5%)	25 (3.6%)	
No	440 (95%)	669 (96.4%)	
Lateral collateral ligament tear			$p = 0.88 \times \chi^2$
Yes	11 (2.4%)	7 (1%)	
No	452 (97.6%)	687 (99%)	
Patellar tendon rupture			$p = 0.395 \times \chi^2$
Yes	3 (0.6%)	2 (0.3%)	
No	460 (99.4%)	692 (99.7%)	
Fluid/Hematoma in the joint space			$p = 0.149 \times \chi^2$
Yes	257 (55.5%)	354 (51%)	
No	206 (45.5%)	340 (49%)	
Bone contusion			$p = 0.001 \times \chi^2$
Yes	69 (14.9%)	160 (23.1%)	
No	394 (85.1%)	534 (76.9%)	
Patient age (year)	Mean \pm SD	Mean \pm SD	
	Median (min-max)	Median (min-max)	
	40.49 \pm 11.55	33.67 \pm 11.71	
	43 (11-58)	32 (11-58)	

χ^2 : Pearson Chi-square test.

Table II. Injuries to the knee according to the causes of trauma..

	Simple fall n = 186	Sports injury n = 971	p
Patellar dislocation	2 (10.5%)	17 (89.5%)	$p = 0.754 \times \chi^2$
Medial meniscus tear	154 (15.5%)	838 (84.5%)	$p = 0.209 \times \chi^2$
Lateral meniscus tear	52 (17.5%)	245 (82.5%)	$p = 0.464 \times \chi^2$
Anterior cruciate ligament tear	86 (18.1%)	390 (81.9%)	$p = 0.143 \times \chi^2$
Posterior cruciate ligament tear	5 (41.7%)	7 (58.3%)	$p = 0.031 \times \chi^2$
Medial collateral ligament tear	8 (16.7%)	40 (83.3%)	$p = 0.842 \times \chi^2$
Lateral collateral ligament tear	5 (27.8%)	13 (72.2%)	$p = 0.190 \times \chi^2$
Patellar tendon rupture	0 (0%)	5 (100%)	$p = 1 \times \chi^2$
Fluid/Hematoma in the Joint Space	104 (17%)	507 (83%)	$p = 0.378 \times \chi^2$
Bone contusion	42 (18.3%)	187 (81.7%)	$p = 0.315 \times \chi^2$
Gender			
Male	106 (15.3%)	588 (84.7%)	$p = 0.370 \times \chi^2$
Female	80 (17.3%)	383 (82.7%)	

χ^2 : Pearson Chi-square test.

significant ($p=0.000^{\times 2}$, $p=0.02^{\times 2}$, respectively). Other intra-knee injuries observed in patients with Fluid/Hematoma in the joint space are shown in Table III.

In patients evaluated for ankle trauma, lateral malleolar fracture was found to be more common in males than females and was statistically significant ($p=0.019^{\times 2}$). When we examine other injuries, Achilles tendon rupture, posterior talofibular ligament rupture, anterior talofibular ligament tear, cuneiform bone fracture, lateral malleolus fracture, medial malleolus fracture, navicular bone fracture, bone contusion, and joint space fluid/hematoma were more common in male patients. Although deltoid ligament tear and cuboid bone fracture were more common in women, they were not statistically significant. While no injury was found in 124 (14.1%) of 882 patients evaluated, joint dislocation in 16 (1.8%) patients, foot, and ankle fractures in 43 (4.9%) patients, ligamentous injuries in 140 (15.9%) patients. There was hematoma/fluid in the joint space in 456 (51.7%) patients. When we evaluate the patients due to tendon and ligament ruptures, isolated anterior talofibular ligament rupture (ATFL) was detected in 59 (6.7%) patients, isolated posterior talofibular ligament rupture (PTFL) in 27 (3.1%) patients, and ATFL and PTFL ruptured together in 14 (1.6%) patients. Deltoid ligament rupture was seen in 8 (0.9%) patients, Achilles tendon rupture in 16 (1.8 %) patients, and PTFL and Achilles tendon rupture in 8 (0.9%) patients. The distribution of the patients we examined for ankle trauma by gender is shown in Table IV.

When we evaluated all the patients included in the study due to foot, ankle and knee trauma, knee trauma was the most common cause of trauma in both genders ($p=0.027^{\times 2}$). Intra-ar-

ticular hematoma and ligament rupture due to trauma were more common after knee trauma, while bone contusion was more common after ankle trauma (p -values $p=0.62^{\times 2}$, $p=0.000^{\times 2}$, $p=0.017^{\times 2}$, respectively). Demographic data according to knee and ankle trauma are shown in Table V.

When we examined the injuries according to the causes of foot and ankle trauma, the patients who presented with sports injury (Sport injury $n=690$) and patients who presented with simple falls (falling as a result of walking on the road or falling from a not very high place) (Simple Falls $n=192$) were evaluated. It was observed that foot and ankle traumas due to sports injuries were more common. When evaluated according to gender, it was determined that sports injuries were more common in men. This situation was statistically significant ($p=0.001^{\times 2}$). Although there were more patients admitted for sports injuries in all the injuries we evaluated after trauma, the difference between injuries was not statistically significant when compared to simple falls and sports injuries. Injuries to the foot and ankle according to the causes of trauma are shown in Table VI.

Discussion

In this study, patients who applied to the emergency department due to knee and ankle trauma but were discharged because no pathology was detected in the initial evaluation were examined. The prevalence and demographic characteristics of connective tissue and bone injuries were examined after the control examination and MRI performed in these patients in about 2 weeks. To the best of our knowledge, this is the first study

Table III. Other intra-knee injuries observed in patients with Fluid/Hematoma in the Joint Space.

	Fluid/Hematoma in the Joint Space	p
Patellar dislocation	10 (1.6%)	$p = 1^{\times 2}$
Medial meniscus tear	541 (88.5%)	$p = 0.004^{\times 2}$
Lateral meniscus tear	174 (28.5%)	$p = 0.02^{\times 2}$
Anterior cruciate ligament tear	255 (41.7%)	$p = 0.676^{\times 2}$
Posterior cruciate ligament tear	9 (1.5%)	$p = 0.152^{\times 2}$
Medial collateral ligament tear	33 (5.4%)	$p = 0.02^{\times 2}$
Lateral collateral ligament tear	12 (2%)	$p = 0.342^{\times 2}$
Patellar tendon rupture	2 (0.3%)	$p = 0.671^{\times 2}$
Bone contusion	145 (23.7%)	$p = 0.000^{\times 2}$

χ^2 : Pearson Chi-square test.

Table IV. Distribution of ankle trauma patients by gender.

Parameters	N = 882		p
	Female = 397	Male = 485	
Achilles tendon rupture			$p = 0.3 \times \chi^2$
Yes	8 (2%)	16 (3.3%)	
No	389 (98%)	469 (96.7%)	
Deltoid ligament tear			$p = 0.478 \times \chi^2$
Yes	5 (1.3%)	3 (0.6%)	
No	392 (98.7%)	482 (99.4%)	
Posterior talofibular ligament tear			$p = 0.459 \times \chi^2$
Yes	20 (5%)	29 (6%)	
No	377 (95%)	456 (94%)	
Anterior talofibular ligament tear			$p = 0.54 \times \chi^2$
Yes	30 (7.6%)	43 (8.9%)	
No	367 (92.4%)	442 (91.1%)	
Cuneiform fracture			$p = 0.79 \times \chi^2$
Yes	6 (1.5%)	9 (1.9%)	
No	391 (98.5%)	476 (98.1%)	
Cuboid fracture			$p = 0.41 \times \chi^2$
Yes	4 (1%)	2 (0.4%)	
No	393 (99%)	483 (99.6%)	
Lateral malleol fracture			$p = 0.019 \times \chi^2$
Yes	0	7 (1.4%)	
No	397 (100%)	478 (98.6%)	
Navicular fracture			$p = 1 \times \chi^2$
Yes	3 (0.8%)	4 (0.8%)	
No	394 (99.2%)	481 (99.2%)	
Medial malleol fracture			$p = 0.3 \times \chi^2$
Yes	2 (0.5%)	6 (1.2%)	
No	395 (99.5%)	479 (98.8%)	
Bone contusion			$p = 1 \times \chi^2$
Yes	96 (24.2%)	118 (24.3%)	
No	301 (75.8%)	367 (75.7%)	
Fluid/Hematoma in the Joint Space			$p = 0.96 \times \chi^2$
Yes	206 (51.9%)	250 (51.5%)	
No	191 (48.1%)	235 (48.5%)	
Patient age (year)	Mean \pm SD	Mean \pm SD	
	Median (min-max)	Median (min-max)	
	37.47 \pm 10.73	31.74 \pm 10.71	
	39 (15-55)	30 (15-55)	

 χ^2 : Pearson Chi-square test.

to examine the demographic characteristics of the Turkish population to show possible conditions in the knee and ankle after trauma.

It is known that knee radiography is widely used in the emergency department in post-traumatic situations, but it has been found to have the lowest efficiency for diagnosing significant fractures⁷. Most of the patients (93.5%) presenting to the emergency department with acute knee injury have soft tissue injury rather than bone injury. However, 25% of clinical findings were not correlated with findings seen on radiographs. Some studies^{7,8} have shown that MRI has a high diagnostic value in detecting traumatic intra-ar-

ticular knee lesions. MRI is an excellent test to diagnose ligament and meniscal injuries and to determine whether surgery is necessary or if conservative management will be sufficient. However, MRI has very limited use in the emergency department due to its cost, time requirement, and limited availability. Injuries requiring MRI diagnosis are rarely emergencies and do not require inpatient treatment^{7,8}.

Pain after patellar trauma can be caused by a variety of causes, including patella fracture and temporary patellar dislocation. Transient patellar dislocation may not be detected clinically in 45%-73% of patients with dislocations seen on

Table V. Demographic data by knee and ankle trauma.

	All patients n = 2,039		p
	Simple Fall n = 192	Sports Injuries n = 690	
Gender			
Male	694 (60%)	485 (55%)	p = 0.027 ^{x2}
Female	463 (40%)	397 (45%)	
Fluid/Hematoma in Joint Space			
Yes	611 (52.8%)	456 (51.7%)	p = 0.62 ^{x2}
No	546 (47.2%)	426 (48.3%)	
Ligament tear			
Yes	1070 (92.5%)	140 (15.9%)	p = 0.000 ^{x2}
No	87 (7.5%)	742 (84.1%)	
Bone Contusion			
Yes	229 (19.8%)	214 (24.3%)	p = 0.017 ^{x2}
No	928 (80.2%)	668 (75.7%)	

x²: Pearson Chi-square test.

MRI. MRI is more sensitive than radiographs for imaging findings of lateral patellar dislocation, including medial patellofemoral ligament injury, bone contusions, and osteochondral injuries⁹. In our study, which we examined for knee trauma, patellar trauma findings were less common than other pathologies. 19 (1.6%) patients had patellar dislocation and 5 (0.4%) patients had patellar tendon rupture. When we look at their distribution by gender, it was not statistically significant (*p*-values *p*=0.102^{x2}, *p*=0.395^{x2}, respectively).

The study by Olsson et al¹⁰ of 1,145 patients with acute knee trauma evaluated by MRI within a median of 8 days after injury, showed an anterior cruciate ligament tear, transient patellar dislocation, and medial collateral ligament tear in

52%, 17%, and 28% of individuals, respectively. While a concomitant meniscal tear was detected in 55% of patients with anterior cruciate ligament injury, an isolated anterior cruciate ligament tear was detected in only 17% of individuals. In the same study, it was determined that the overall rate of traumatic knee hemarthrosis and anterior cruciate ligament injury was higher in men. In our study, medial meniscus tear (n=992, 85.7%) was observed to be more common in general. When we examined other developing pathologies, intra-articular fluid/hematoma (n=611, 53.8%), anterior cruciate ligament tear (n=476, 42.1%), lateral meniscus tear (n=297, 25.7%), bone contusion (n=229, 19.8%), medial collateral ligament tear (n=48, 4.1%), lateral collateral ligament tear

Table VI. Injuries caused by trauma.

	Knee trauma n = 1157	Ankle trauma n = 882	p
Medial malleolus fracture	2 (1%)	6 (0.9%)	p = 0.687 ^{x2}
Lateral malleolus fracture	2 (1%)	5 (0.7%)	p = 0.650 ^{x2}
Navicular fracture	1 (0.5%)	6 (0.9%)	p = 1 ^{x2}
Cuboid fracture	2 (1%)	4 (0.6%)	p = 0.616 ^{x2}
Cuneiform fracture	3 (1.6%)	12 (1.7%)	p = 1 ^{x2}
Anterior talofibular ligamen rupture	21 (10.9%)	52 (7.5%)	p = 0.139 ^{x2}
Posterior talofibular ligamen rupture	13 (6.8%)	36 (5.2%)	p = 0.392 ^{x2}
Deltoid ligament rupture	0 (0%)	8 (1.2%)	p = 0.212 ^{x2}
Achilles tendon rupture	5 (2.6%)	19 (2.8%)	p = 1 ^{x2}
Bone contusion	47 (24.5%)	167 (24.2%)	p = 0.924 ^{x2}
Hematoma/Liquid in Joint Space	100 (52.1%)	356 (51.6%)	p = 0.935 ^{x2}
Joint dislocation	4 (2.1%)	12 (1.7%)	p = 0.761 ^{x2}
Gender			
Male	86 (44.8%)	399 (57.8%)	p = 0.001 ^{x2}
Female	106 (55.2%)	291 (42.2%)	

x²: Pearson Chi-square test.

(n=18, 1.6%), posterior cruciate ligament tear (n=12, 1%)), patellar tendon rupture (n=5, 0.4%). In both sexes, more so in men, it has been shown in studies that the prevalence of both symptomatic and asymptomatic meniscal tears increases with age, and since some of these are probably non-traumatic, the importance of this finding will be uncertain¹⁰⁻¹². Therefore, we do not think that all meniscal tears seen on MRI after injury are directly related to trauma. However, in a study by Abbasi et al¹³, a 60% meniscal tear risk was reported in adolescents with anterior cruciate ligament injury. In our study, we found medial meniscus tear in 85.9% of patients with anterior cruciate ligament tear in both sexes (n=476) and lateral meniscus tear in 25.8%. This suggests that patients may have a meniscal injury independent of our previous study.

Other studies¹⁴⁻¹⁶ have shown a higher incidence of anterior cruciate ligament injury in men when we evaluated according to gender, all pathologies except posterior cruciate ligament, lateral collateral ligament and patellar tendon ruptures were found to be more common in males, which was generally consistent with the literature.

In the absence of a clinically significant fracture, 88.5% of all knees with intra-articular fluid/hematoma had medial meniscal tear, and 28.5% had lateral meniscus tear. The rate of co-occurrence of medial meniscus and lateral meniscus tear was 28.8%. Anterior cruciate ligament rupture was present in 41.7% of the patients with intra-articular Fluid/Hematoma. This situation alone showed us that medial meniscus, lateral meniscus and anterior cruciate ligament ruptures are much less.

It is widely accepted that ankle injuries constitute 10% of emergency department admissions¹⁷. Due to the high incidence of this condition, although ankle sprains are often overlooked as a harmless injury, a high degree of variability has been reported in outcomes after ankle sprains¹⁸. Most of these injuries can be successfully treated with a cast, nonsteroidal anti-inflammatory drugs, and peroneal augmentation and physical therapy. 20-40% of patients with acute ligament injury followed with conservative measures have activity limitation, joint instability, and recurrent swelling and chronic pain symptoms¹⁹.

In the retrospective analysis of 6,581 foot and ankle injuries performed by Pflüger et al²⁰, the mean age of patients with foot fracture was 39 ± 17.4 years and the mean age of patients with ankle fracture was 47 ± 19.2 years. In our study, the mean age of foot and ankle injuries was

37.47±10.73 in women and 31.74±10.71 in men. In a study²¹ evaluating ankle sprain with MRI, injuries observed in patients after trauma included 379 ligament injuries (including Lisfranc injury), 51 foot and ankle fractures (including avulsion fractures), 19 tendon injuries (including calcaneal tendon injury), and 9 osteochondral injury was detected. In the same study, the most common ligament injury was ATFL injury with 35.6%, followed by calcaneofibular ligament (CFL) injury with 28.5% and deltoid ligament injury with 16.9%. The most common osteochondral injury was medial talus injury with 77.8%. Among fractures, the ATFL avulsion fracture (23.5% of fractures and 6.7% of patients) was the most common, followed by anterior calcaneal fracture (17.6% of fractures and 5% of patients) and cuboid fracture (13.7% of fractures and 3.9% of patients) followed. In our study, ligament rupture was present in 140 (15.9%) patients, intra-articular hematoma/fluid was present in 456 (51%) patients, and bone contusion was present in 214 (24%) patients who presented with foot and ankle trauma. Anterior talofibular ligament (ATFL) ligament rupture was the most common ligament injury seen in 73 (8.27%) patients. In terms of prevalence, it was compatible with the literature. Studies²² have shown that 8-18% of all foot fractures and 3-22% of ankle fractures are overlooked in the first evaluation in the emergency department.

Limitations

The study has some limitations due to its retrospective nature:

- Because the data were analyzed using the ICD code, errors may have occurred when defining the ICD code to patients. This situation prevents us from finding all patients who applied to our emergency department.
- Due to the lack of clinical data in the data obtained from the hospital system, no explanation can be made about the related comorbidities.
- Only patients who were admitted to the emergency department and discharged after examination and treatment, and who applied to the orthopedic outpatient clinic within an average of 15 days were included in our study. Patients with multiple traumas and hospitalized or operated patients were not included.
- Since intra-articular fluid aspiration could not be performed in patients with intra-articular fluid/hematoma detected in MRI, the characteristic of the fluid detected in imaging could not be determined.

Conclusions

It is evident that knee, foot, and ankle traumas after simple falls and sports injuries are frequently encountered by emergency physicians. It is known that post-traumatic ligament injury, bone contusion, intra-articular fluid/hematoma formation, and fractures that cannot be detected by radiographs can be overlooked in emergency departments where patient density is high.

However, it should not be forgotten that if the use of MRI in the emergency department increases, injuries that cannot be detected by examination and radiographs will be detected, although hospital costs will increase.

According with our experience, we believe that following the patient with the appropriate immobilization and the necessary medical treatment approach on the correct diagnosis at the right time after the trauma, would be sufficient.

In knee traumas, we have seen that medial meniscus tear is more common in general, but this is due to the high prevalence of asymptomatic meniscal tears, however, intra-articular fluid/hematoma and anterior cruciate ligament rupture are more common compared to other conditions. It was observed that medial meniscus, lateral meniscus and anterior cruciate ligament ruptures alone were much less. Patellar trauma findings were less common than other pathologies.

It was observed that intra-articular hematoma/fluid and ligament rupture were more common in patients who presented with foot and ankle trauma, and anterior tibiofibular ligament (ATFL) rupture was the most common among ligament ruptures.

Conflict of Interest

The authors declare that the manuscript has not been submitted to more than one journal for simultaneous consideration. The authors declare that the manuscript has not been published previously and declare no conflict of interest.

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Informed Consent

For this retrospective study, formal consent is not required.

Ethical Approval

The research protocol was reviewed and approved by the Health Sciences University Gazi Yaşargil Training and Research Hospital Clinical Research Ethics Committee (07.05.2021/459). Authors declare that human rights were respected according to Declaration of Helsinki.

Data Availability

The data used to support the findings of this study are available from the associated author upon reasonable request.

Authors' Contribution

The study's conception and design were contributed by MT, ÖA, and AŞ. The first draft of the manuscript was written by MT, ÖA. Material preparation, data collection, and analysis were performed by MT, ÖA, and BA. The final versions of the manuscript were revised by MT, AŞ, BA, and CT. The final manuscript was read and approved by all authors.

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