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# Investigation of the Knowledge Levels of Physicians Working in the Emergency Department about Testicular Torsion: Observational Study

## Acil Serviste Çalışan Hekimlerin Testis Torsiyonu Konusunda Bilgi Düzeylerinin Araştırılması: Gözlemsel Çalışma

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**ABSTRACT Objective:** The aim of the study is to investigate the level of knowledge of emergency physicians about the clinical approach to testicular torsion. **Material and Methods:** A questionnaire with 10 questions was prepared to determine the level of knowledge about acute scrotum. 4 questions consisted of demographic data and 10 questions consisted of questions about clinical knowledge. Four of these questions were specifically measuring physical examination (PE) knowledge. The total scores of the answers given and the answers to the questions measuring PE knowledge were recorded separately, each question being one score. Total scores were compared according to gender, institution and degree. **Results:** A total of 99 emergency physicians were reached for the study. Mean age 27.6±4.6 years; male/female ratio was 55/44. The mean total score of all physicians was 6.13±1.63; The mean total score of the 4-question PE was 2.29±1.07. Physicians participating in the survey were separated according to their gender, institution, and degree, and their total scores were compared. No statistically significant difference was observed between the groups. While no statistically significant difference was observed in PE scores according to gender and the institutions they work at, there was a statistically significant difference between specialist physicians (3.09±1.04) and general practitioners (1.94±0.95) when compared according to their degrees (p: 0.009). **Conclusion:** It is important to increase the PE knowledge of the physicians working in the emergency department about testicular torsion through continuous education after graduation in order to prevent organ losses.

**Keywords:** Testicular torsion; acute scrotum; emergency department

**ÖZET Amaç:** Çalışmanın amacı, acil servis hekimlerinin testis torsiyonuna klinik yaklaşım konusundaki bilgi düzeylerini araştırmaktır. **Gereç ve Yöntemler:** Akut skrotumla ilgili bilgi düzeyini belirlemek amacıyla 10 soruluk anket hazırlandı. Dört soru demografik verilerden, 10 soru ise klinik bilgiyle ilgili sorulardan oluşuyordu. Bu sorulardan 4'ü özellikle fizik muayene (FM) bilgisini ölçmekteydi. Verilen cevapların toplam puanları ve FM bilgisini ölçen soruların cevapları her soru bir puan olacak şekilde ayrı ayrı kaydedildi. Toplam puanlar cinsiyet, kurum ve dereceye göre karşılaştırıldı. **Bulgular:** Araştırma için toplam 99 acil hekimine ulaşıldı. Ortalama yaş 27,6±4,6 yıl; erkek/kadın oranı 55/44 idi. Tüm hekimlerin toplam puan ortalaması 6,13±1,63; 4 soruluk FM'nin ortalama toplam puanı 2,29±1,07 idi. Araştırmaya katılan hekimler cinsiyet, kurum ve derecelerine göre ayrılarak toplam puanları karşılaştırıldı. Gruplar arasında istatistiksel olarak anlamlı bir fark gözlenmedi. Cinsiyete ve çalıştıkları kuruma göre FM puanlarında istatistiksel olarak anlamlı bir farklılık görülmezken, uzman hekimler (3,09±1,04) ile pratisyen hekimler (1,94±0,95) arasında derecelerine göre karşılaştırıldığında istatistiksel olarak anlamlı fark vardı (p: 0,009). **Sonuç:** Acil serviste çalışan hekimlerin testis torsiyonu konusunda FM bilgilerinin mezun olduktan sonra sürekli eğitim yoluyla artırılması organ kayıplarının önlenmesi açısından önemlidir.

**Anahtar Kelimeler:** Testis torsiyonu; akut skrotum; acil servis

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Acute scrotum is a clinical emergency that presents with sudden onset of pain, swelling and redness in the scrotum. Patients presenting with acute scrotum constitute 0.5% of emergency department admissions.[1] Causes of acute scrotum include testicular torsion, epididymo-orchitis, appendix testicular torsion, trauma, strangulated inguinal hernia, testicular tumor.[2] A careful physical examination (PE) and appropriate imaging methods are primarily used for differential diagnosis.

It is important to distinguish testicular torsion from other causes, as it is a condition that requires urgent surgical intervention among the causes of acute scrotum. If there is no intervention within the first 6 hours, the survival rates of living tissue decrease.[3] Unfortunately, the true cause of acute scrotum is difficult to distinguish with differential diagnosis due to the similarity of clinical signs and examination overlap. This difficulty can delay the initiation of treatment and increase the rate of organ loss.[4,5] Despite a relatively low incidence, testicular torsion is the fourth most commonly misdiagnosed disease, according to one review.[6]

The initial evaluation of patients who develop acute scrotum is performed in emergency departments. Although the urologist can quickly evaluate the patient with urology consultation in hospitals in city centers, urology evaluation may be delayed or not performed at all due to the low number of urologists in hospitals in the periphery and districts.[7] For this reason, it is important for physicians working in the emergency department to have knowledge about testicular torsion PE, both for the patient and for malpractice cases in which the physician may be involved.[6] In previous studies, the rate of performing scrotal PE by emergency physicians was found to be lower than urologists.[5]

In our study, we aimed to determine the level of knowledge of the physicians working in the emergency department about the approach to acute scrotum and to investigate whether there is a difference according to the demographic data of the physicians (gender, institution and degree).

## MATERIAL AND METHODS

After obtaining the ethics committee approval dated May 25, 2023 and numbered 2023-11/4 from the ethics committee of Erzincan Binali Yıldırım University, a questionnaire with 10 questions was prepared (Appendix 1) measuring the level of knowledge about acute scrotum. The questions were prepared by a urologist and an emergency specialist. This study was conducted in accordance with the principles of the Declaration of Helsinki.

The prepared questions were sent to physicians working in the emergency departments of different institutions in the country via Google forms and they were asked to answer all the questions. 4 questions were about demographic data (age, gender, time served in the emergency room, level of institution they work in and their degrees), and 10 questions were about clinical information. Questions 1-2-3-6 in our survey measure knowledge about the definition and differential diagnosis of testicular torsion, questions 4-5-7-8 measure the level of knowledge about PE, and questions number 9-10 measure the level of knowledge about treatment.

The total scores of the answers given and the answers to the questions 4-5-7-8 were recorded separately, each question being one point. Total scores were compared according to gender, institution and degree.

### STATISTICAL ANALYSIS

Statistical analysis was performed using IBM SPSS21 (IBM Corp., Armonk, NY, USA). Mean±standard deviation, number and percentage (%) were used to evaluate the data. The Kolmogorov-Smirnov test was applied to examine the normality of the distribution. Independent samples t-test was used to compare differences between two groups, while multiple groups were compared with one-way analysis of variance. Two-sided $p<0.05$ was considered statistically significant.

## RESULTS

A total of 99 emergency physicians were reached for the study. Mean age 27.6±4.6 years; male/female ratio was 55/44. Of the physicians who participated in the survey, 11 (11.1%) were emergency medicine specialists, 15 (15.2%) were emergency medicine residents, 34 (34.3%) were general practitioners, 39

| | |
|---|---|
| Age | |
| Gender | Male<br>Female |
| How many years have you been working in the emergency room? | |
| your degree ? | Specialist<br>Resident<br>general practitioner<br>Intern |
| In which institution do you work? | State Hospital<br>Training and research hospital<br>University Hospital |
| 1) What is the definition of acute scrotum ? | A) Sudden onset of testicular pain and tenderness<br>B) Sudden onset of testis<br>C) Sudden onset of testicular redness, swelling and pain*<br>D) Sudden onset of testicle upwards |
| 2) What is not included in the differential diagnosis of acute scrotum ? | A) Appendiceal testicular torsion<br>B) epididymo-orchitis<br>C)Hydrocele larger than 3 cm *<br>D) choked inguinal hernia<br>E) testicular tumor |
| 3) Which situation requires urgent surgical intervention? | A) Appendiceal testicular torsion<br>B) Grade 3 varicocele<br>C) Hydrocele<br>D) epididymo-orchitis<br>E) testicular torsion * |
| 4) Which one is wrong about the clinical distinction between torsion and epididymo-orchitis ?** | A) The application time is usually short (< 12 hours) in testicular torsion .<br>B) In orchitis, the application time is usually short (<12 hours)*<br>C) Testicle is sensitive in T torsion .<br>D) In epididymitis, the admission time is usually long (> 12 hours).<br>E) In epididymitis The epididymis is sensitive. |
| 5) Which is incorrect regarding the clinical distinction between torsion and epididymo-orchitis ?** | A) Testicular pain in torsion usually decreases with elevation .*<br>B) Pain in epididymo-orchitis usually decreases with elevation .<br>C) Cremaster reflex is lost in torsion .<br>D) Testicular pain in torsion may not change with elevation .<br>E) Pain in torsion usually increases with elevation . |
| 6) Which is not one of the symptoms that may accompany testicular torsion? | A) Nausea-vomiting<br>B) Urethral discharge*<br>C)Abdominal pain<br>D) Leukocytosis<br>E) Fire |
| 7)Which is not a symptom of testicular torsion FM?** | A) Swelling in the testicle<br>B) Testicular hardness<br>C) Transversely located testis<br>D)Blue dot sign*<br>E) Absence of cremaster reflex |
| 8)Which is not a symptom of testicular torsion FM?** | A) Testicular redness<br>B) Highly located testis<br>C) Translumination *<br>D) Ger's sign<br>E) Phren's sign |
| 9) What is the most effective intervention period in testicular torsion ? | A) First 6 hours*<br>B) 6-12 hours<br>C) 12-18 hours<br>D)>18 hours |
| 10) Which is wrong about the diagnosis and treatment of testicular torsion ? | A)Normal testicular torsion on USG definitely excludes torsion .*<br>B)Manual detorsion should be done outwards ( laterally ).<br>C) In surgical detorsion, the opposite side testicle should be fixed .<br>D) Even if manual detorsion is performed, surgical exploration should be performed.<br>E) In testicular torsion , bleeding may be observed in some cases. |
| *:Correct answer **: Questions about physical examination | |

**FIGURE 1:** Survey questions.

(39.4%) were was an intern. Of the physicians, 24 (24.2%) were working in a state hospital, 36 (36.4%) in a university hospital, and 39 (39.4%) in a training and research hospital/city hospital. The mean total score of all physicians was 6.13±1.63; The mean total score of the 4-question PE was 2.29±1.07.

When the physicians participating in the survey were separated according to their gender, the institutions they worked and their degrees and their total scores were compared, no statistically significant difference was observed in their total scores according to gender, institution and degree (p values; 0.733; 0.311; 0.285, respectively) (Table 1).

When the physicians were separated according to their gender, the institutions they worked for and their degrees and the scores of the PE questions were compared, no statistically significant difference was observed in the scores according to the gender and the institutions they worked in (p values; 0.588; 0.805, respectively) (Table 1). When the PE scores of the physicians were compared according to their degrees, a statistically significant difference was observed between specialists, residents, general practitioners and interns (p: 0.013) (Table 1).

According to the results of post hoc analysis, a statistically significant difference was observed between specialist physicians and general practitioners in terms of the scores of PE questions (p: 0.009), while no statistically significant difference was observed between other degrees (Table 2).

## DISCUSSION

The incidence of testicular torsion in men under the age of 25 is 1/4,000. Possible delays in diagnosis may lead to loss of viable testicular tissue.[8] Since the first place of application for these patients is usually emergency services, emergency room physicians need to know testicular torsion very well. In our study, we investigated the knowledge levels of emergency room physicians working with different degrees in different hospitals of the country about testicular torsion. According to the results, the average success rate of all physicians was 61% (6.13/10) and the average success score in PE-related questions was 57% (2.29/4). While there was no difference between the physician groups in terms of total score, the success of specialist physicians in questions related to PE was found to be higher than that of general practitioners.

In our study, physicians who specialized in PE scores were found to be significantly more successful than general practitioners. However, there was no difference between residents and interns. The reason for this may be that interns and assistant physicians see more patients and perform more PEs during their

**TABLE 1:** Comparison of the scores of emergency physicians according to their gender, institutions and degrees.

| Variables | | n | Total score | p value | PE score | p value |
|---|---|---|---|---|---|---|
| Gender | Male | 55 | 6.18±1.57 | 0.733 | 2.34±1.14 | 0.588 |
| | Female | 44 | 6.06±1.71 | | 2.22±0.98 | |
| Instution | State hospital | 24 | 6.37±1.58 | | 2.33±1.09 | |
| | University hospital | 36 | 6.30±1.19 | 0.311 | 2.36±1.12 | 0.805 |
| | TRH | 39 | 5.82±1.97 | | 2.20±1.03 | |
| Degree | Specialist | 11 | 6.63±1.85 | | 3.09±1.04 | |
| | Resident | 15 | 6.66±1.49 | 0.285 | 2.53±1.30 | **0.013** |
| | General practitioner | 34 | 5.85±1.70 | | 1.94±0.95 | |
| | Intern | 39 | 6.02±1.53 | | 2.28±0.97 | |

TRH: Training and research hospital; PE: Physical examination.

**TABLE 2:** Post hoc analysis of analysis of variance test of correct numbers of physicians according to their degrees.

| | | | | | | 95% Confidence interval | |
|---|---|---|---|---|---|---|---|
| | Degrees | Degrees | Mean difference (I-J) | Standard error | p value | Lower bound | Upper bound |
| | Specialist | Resident (2.53±1.30) | 0.55758 | 0.40813 | 0.524 | -0.5097 | 1.6249 |
| | (3.09±1.04) | General practitioner (1.94±0.95) | 1.14973* | 0.35663 | **0.009** | 0.2171 | 2.0824 |
| | | Intern (2.28±0.97) | 0.80886 | 0.35100 | 0.104 | -0.1090 | 1.7268 |
| | Resident | Specialist (3.09±1.04) | -0.55758 | 0.40813 | 0.524 | -1.6249 | 0.5097 |
| PE total score | (2.53±1.30) | General practitioner (1.94±0.95) | 0.59216 | 0.31869 | 0.253 | -0.2412 | 1.4256 |
| | | Intern (2.28±0.97) | 0.25128 | 0.31237 | 0.852 | -0.5656 | 1.0682 |
| | General practitioner | Specialist (3.09±1.04) | -1.14973* | 0.35663 | **0.009** | -2.0824 | -0.2171 |
| | (1.94±0.95) | Resident (2.53±1.30) | -0.59216 | 0.31869 | 0.253 | -1.4256 | 0.2412 |
| | | Intern (2.28±0.97) | -0.34087 | 0.24124 | 0.494 | -0.9717 | 0.2900 |
| | Intern (2.28±0.97) | Specialist (3.09±1.04) | -0.80886 | 0.35100 | 0.104 | -1.7268 | 0.1090 |
| | | Resident (2.53±1.30) | -0.25128 | 0.31237 | 0.852 | -1.0682 | 0.5656 |
| | | General practitioner (1.94±0.95) | 0.34087 | 0.24124 | 0.494 | -0.2900 | 0.9717 |

PE: Physical examination.

working period. The fact that general practitioners see fewer patients because they work in district hospitals may explain this difference. In addition, the lower level of knowledge of general practitioners may be due to the transition to distance education during the pandemic period. During this period, students may not have gained experience in PE due to online education, not by seeing patients in the hospital. Although there is no similar study on urology, there are studies in the literature that measure the knowledge levels of specialists and general practitioners in other subjects. Al-Haj et al. in their study in Saudi Arabia, they found that general dentists have less knowledge about traumatic dental injuries than specialist dentists.[9] In their study investigating the awareness level of emergency physicians regarding α-blocker therapy, which is frequently used in the medical expulsive treatment of ureteral stones in urology practice, Coşkun et al. similar to our study results, they concluded that the awareness rates of specialist physicians were significantly higher than those of assistant and general practitioners. Although the subject of the mentioned study is different, it is a similar study to ours in terms of methodology and our results.[10]

Clinicians' knowledge and equipment levels can be increased through post-graduate continuing education programs. There are sample studies in the literature on this subject. Marciniak et al. in a survey study involving 456 nurses and 73 physicians working in the palliative care service, they concluded that improvements were achieved in all subjects with the training programs implemented.[11] Ikai et al. investigated the effect of their postgraduate training program on physicians' management of community-

acquired pneumonia. According to the results, the training program was found to be effective in helping physicians choose appropriate antibiotics at appropriate doses.[12]

The rate of scrotal PE in emergency services was found to be low in some studies. Taşçı et al. in their study, the rate of patients who underwent scrotal PE in patients presenting with acute scrotum was found to be 79.2%.[5] With the PE performed at this rate, it is expected that the number of patients with missed testicular torsion will increase. The reason why emergency physicians give less importance to scrotal examination may be that they consider intra-abdominal pathologies in the foreground. In addition, due to the feeling of embarrassment, especially in young men who come with testicular pain, the rate of PE by emergency physicians may vary according to their gender. Lok et al. in their study, it was determined that the rate of PE by female physicians was 8% and male physicians was 92% in patients presenting to the emergency department with acute scrotum.[13] In the same study, it was revealed that the doctors in the emergency department did not perform the initial genital evaluation of the patients who applied with the complaint of testicular or scrotal pain, regardless of the gender of the practitioner, and that the patients were referred to the radiology unit for ultrasonography with insufficient genital examination notes.[13] In the study we presented, we also investigated whether the level of knowledge of the physicians about acute scrotum differs according to their gender. According to our results, although the total mean PE scores of female physicians (2.22±0.98) were lower than male physicians (2.34±1.14), the difference was not statistically significant (p: 0.588).

For the early diagnosis and early treatment of testicular torsion, it is very important for the patients and their parents to be informed about this issue as well as the emergency physicians.[14] Because the presence of pathology of the genital area leads to a reservation in adolescents. A 2014 survey of parents whose children underwent scrotal exploration for torsion showed that only 34% of parents admitted to being aware of the effects of acute scrotal pain in their child.[15] Lack of awareness is seen not only in parents, but also in adolescent boys. Among those aged 12-18 years, 64% of the respondents knew that they should seek medical help within 2 hours for painful testicular swelling, but only 15% knew that they should seek emergency help for painless swelling as well.[16] These studies highlight several social and societal barriers to timely evaluation of testicles. Social media campaigns offer a potential way to raise awareness and reduce orchiectomy delays. Sawchuk and Metcalfe investigated whether the information campaign they carried out on social media affected the awareness of testicular torsion in young men. As a result of the study, the proportion of those who knew the signs and symptoms of testicular torsion in a 6-month period increased from 30% to 58%.[17]

It is difficult to distinguish testicular torsion from appendiceal testicular torsion and epididymo-orchitis based on PE features alone, which should be considered in the differential diagnosis. A retrospective review of 204 boys with testicular torsion, appendix testicular torsion, or epididymo-orchitis found no difference in symptoms other than the duration of symptoms or in PE characteristics.[18] However, in this study, boys with testicular torsion presented to the emergency department earlier (9.5 hours compared to 48 hours in children with appendiceal testicular torsion).[18] Epididymitis can occur in any age group, it is more common after adolescence. If there is a history of scrotal trauma, scrotal pain can be attributed to the trauma. However, if the pain persists for more than one hour after trauma, the testis should be evaluated for trauma-related torsion.

The limitations of our study are that it was conducted with a small number of volunteer physicians. In addition, the number of specialist physicians we could reach was less, and the number of interns was higher. Further studies with larger numbers of volunteers and close groups are needed.

## CONCLUSION

Education after graduation from medical school is gaining importance day by day. Because health sciences, which is a dynamic branch, is improving itself day by day. In order to follow these developments closely, the concept of continuing medical education

has developed. With continuous medical education at universities, training continues in many branches. For the correct diagnosis and management of TT, it is necessary to increase the level of knowledge of physicians and to investigate patients urgently in case of clinical suspicion. Updating the knowledge of medical faculty students with postgraduate continuing education programs may reduce delayed diagnoses.


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### *Conflict of Interest*

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### *Authorship Contributions*

***Idea/Concept:*** *Özgür Ekici, Abdullah Gül;* ***Design:*** *Ali Seydi Bozkurt, Ercüment Keskin;* ***Control/Supervision:*** *Muhammed Emin Doğan, Emre Aykanlı;* ***Data Collection and/or Processing:*** *Ayşenur Balıkçı, Muhammed Emin Doğan;* ***Analysis and/or Interpretation:*** *Özgür Ekici, Ercüment Keskin;* ***Literature Review:*** *Abdullah Gül, Ali Seydi Bozkurt;* ***Writing the Article:*** *Ayşenur Balıkçı, Emre Aykanlı;* ***Critical Review:*** *Ali Seydi Bozkurt, Özgür Ekici;* ***References and Fundings:*** *Ercüment Keskin, Abdullah Gül.*




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