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# Can the Effect of Torsion Duration Change in the Decision of Orchiectomy in Children with Testicular Torsion?

## Testis Torsiyonlu Çocuklarda Orşiektomi Kararında Torsiyon Süresinin Etkisi Değişebilir mi?

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### Abstract

**Objective:** Acute scrotum is especially important in terms of testicular torsion that causes organ loss. In this study, some variables of the patients [age, duration of admission, scrotal Doppler ultrasonography (SDU) application time, time to surgery, testicular appearance during surgery] in cases who were found to have testicular torsion over a four-year period were evaluated to evaluate the factors affecting orchiectomy.

**Methods:** The study sample consisted of patients who applied to the hospital with the complaint of acute scrotal pain and/or swelling between January 2017 and December 2020.

**Results:** It was determined that 199 patients with scrotal pain and/or swelling were admitted to the hospital within the specified period. The mean age of patients with testicular torsion (n=26) was 8.93±5.25 years. In the testicular torsion group, the time elapsed between the onset of patients' complaints and admission to the hospital was calculated, depending on the type of operation. While this period was 80.18±16.32 h in patients who underwent orchiectomy, it was determined as 17.46±8.75 h in patients whose testis was left in place. A significant difference was found between the onset of complaints and the time to hospital admission in cases where orchiectomy was performed and in cases where the testis was left in place.

**Conclusion:** As a result, in the case of acute scrotum, the time from the onset of the patient's complaints to hospital admission is important. The application of SDU to all acute scrotum cases may provide early detection of testicular torsion. In the literature, it has been stated that the chance of protection is high for testicles that are caught within 6 h, but in our series, testes that were torsion for 17.46±8.75 h could be preserved.

**Keywords:** Testicle, torsion, child, acute scrotum

### Öz

**Amaç:** Akut skrotum özellikle organ kaybına neden olan testis torsiyonu açısından önemlidir. Bu çalışmada, dört yıllık bir sürede testis torsiyonu saptanan olgularda hastaların bazı değişkenleri [yaş, başvuru süresi, skrotal Doppler ultrasonografi (SDU) uygulama zamanı, ameliyata kadar geçen süre, ameliyat sırasında testis görünümü] ve orşiektomiye etkileyen faktörlerin değerlendirilmesi amaçlandı.

**Yöntem:** Araştırmanın örneklemini Ocak 2017-Aralık 2020 tarihleri arasında akut skrotal ağrı ve/veya şişlik şikayeti ile hastaneye başvuran hastalar oluşturmaktadır.



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## Öz

**Bulgular:** Belirlenen süre içerisinde 199 skrotal ağrı ve/veya şişlik şikayetiyle hastaneye başvurduğu belirlendi. Testis torsiyonlu hastaların (n=26) yaş ortalaması 8,93±5,25 yıl idi. Testis torsiyonu grubunda hastaların şikayetlerinin başlaması ile hastaneye başvuruları arasında geçen süre ameliyatın şekline göre hesaplandı. Bu süre orşiektomi yapılan hastalarda 80,18±16,32 saat iken, testisi yerinde bırakılan hastalarda 17,46±8,75 saat olarak belirlendi. Orşiektomi uygulanan olgularda ve testisin yerinde bırakıldığı olgularda şikayetlerin başlama süresi ile hastaneye başvuru süresi arasında anlamlı fark bulundu.

**Bulgular:** Sonuç olarak akut skrotum olgularında hastanın şikayetlerinin başlamasından hastaneye yatışına kadar geçen süre önemlidir. SDU'nun tüm akut skrotum olgularına uygulanması testis torsiyonunun erken saptanmasını sağlayabilir. Literatürde 6 saat içinde yakalanan testisler korunabilirken, bizim serimizde 17,46±8,75 saat torsiyone olan testisler korunabilmiştir.

**Anahtar Kelimeler:** Testis, torsiyon, çocuk, akut skrotum

## Introduction

In pediatric surgery practice, it is common to present to the emergency department with a complaint of sudden scrotal pain and/or swelling. Adolescent boys frequently apply to emergency services or pediatric surgery outpatient clinics with complaints such as abdominal pain, groin pain, scrotal pain, perineal pain, and pain during urination.

Acute scrotum is especially important in terms of testicular torsion that causes organ loss<sup>(1)</sup>. In the differential diagnosis, pathologies such as orchitis, epididymitis, appendix testicular torsion, trauma, idiopathic scrotal edema, strangulated inguinal hernia, and varicocele should be considered in addition to testicular torsion<sup>(2)</sup>.

In this study, some variables of the patients [age, duration of admission, scrotal Doppler ultrasonography (SDU) application time, time to surgery, testicular appearance during surgery] in cases who applied to the hospital with the complaint of sudden scrotal pain and/or swelling were retrospectively found to have testicular torsion over a four-year period and to evaluate the factors affecting orchiectomy in light of the literature.

## Materials and Methods

The research has a retrospective design. The sample of the study consists of patients who applied to the hospital with the complaint of acute scrotal pain and/or swelling between January 2017 and December 2020. The data was taken from the hospital information management system.

The independent variables of the research were: the duration of admission to the hospital after the onset of the complaint, the age of the patient, the side of the complaint, the duration of SDU, the treatment methods applied, and the follow-up findings. Its dependent variables are testicular torsion and other acute scrotal causes. Causes of acute scrotum in the

data analysis are grouped as testicular torsion and other acute scrotum causes.

## Statistical Analysis

Research data was analyzed using the SPSS statistical package (version 25.0). Descriptive statistics and Student's t-test were calculated. Written informed consent was obtained from the families, permission from the relevant hospital, and approval (decision no: 2021/256, date: 24.11.2021) from the Balıkesir University Faculty of Medicine Ethics Committee for the use of the data.

## Study Limitations

It took a long time to obtain the information and complete the study because a significant part of the study time coincided with the pandemic process. Calculating the time between the start of the complaint and the time of application increased the workload due to deficiencies in the medical documents.

## Results

In the hospital information management system, it was determined that 199 patients with scrotal pain and/or swelling were admitted to the hospital within the specified period. The distribution of patients according to years and diagnosis groups is given in Table 1. It was observed that an average of 49.75±14.54 patients per year applied to the hospital, and the highest number of applications

**Table 1. Distribution of patients with acute scrotum by years**

Year	The acute scrotum	Testicular torsion	%	Other	%
2017	29	4	13.79	25	86.21
2018	54	7	12.96	47	87.04
2019	63	7	11.11	56	88.89
2020	53	8	15.09	45	84.91
Total	199	26	13.07	173	86.93

was detected in 2019. Testicular torsion was detected in an annual average of 13.07% of patients. Orchitis and epididymitis (35.46%), hydrocele (10.64%), and testicular and epididymal disorders (9.93%) are the most common causes of acute scrotum.

Patients were grouped as testicular torsion and other causes of acute scrotum. While 88.46% of the patients with testicular torsion were admitted to the emergency department, other acute scrotum causes were equally distributed between the emergency department and the outpatient clinic.

The mean age of patients with testicular torsion (n=26) was 8.93±5.25 years. There are also newborn patients in this group. The mean age, excluding newborns, is 10.54±3.91 years. In Table 2, the age distribution of the patients is given.

According to the clinical protocol, after the anamnesis taken at the time of admission to the hospital, the first examination was conducted and SDU was performed urgently for all patients. In all cases, SDU was applied with Toshiba Aplio 500 by the on-call radiologist. The SDU was entered into the system an average of 37±19 minutes after admission to the hospital.

According to SDU findings, patients without torsion (n=173) were treated for the cause and were called for SDU control again 5-7 days later. No problems were detected in the follow-up of these patients. In cases with testicular torsion (n=26), emergency scrotal exploration was decided. In these cases, the time elapsed between the onset of complaints and admission to the hospital was questioned. This period was found to be 44.77±16.38 hours on average.

The time elapsed between the time of SDU application and the start of the operation was 33±12 min on average. Explorations were made with the scrotal approach. The torsion testis was taken out through the incision, the degree of torsion was observed, detorsion was applied, and whether the circulation improved or not was observed.

Extravaginal and right-side torsion were detected in four patients (15.38%) in the neonatal period, intravaginal in the

**Table 2. Distribution of patients by age**

Diagnosis	Number	Average age	Standard deviation
Testicular torsion	26	8.93	5.25
Other	173	10.01	3.39
Total	199	10.03	3.62

remaining 22 patients (84.62%), left side in 14 patients, and right side in eight patients.

Eight testes (4 newborns, 4 adolescents) whose circulation did not improve and/or with signs of necrosis were removed. Unsure of the improvement in circulation, 3 testes were detorsioned and repositioned in the scrotum. An orchiectomy was performed when no circulation was detected in the SDU findings 24 h later. In 15 patients whose circulation appeared to have partially or completely recovered, deported testes were placed in the scrotum in 15 patients. In these patients, SDU was applied to the testicles again 24 hours later, and whether the circulation started or not was examined. In the SDU examination, a follow-up decision was made for testicles with less circulation compared to the contralateral side. These cases were followed up with SDU in the first week, 3<sup>rd</sup> and 6<sup>th</sup> months. It was observed that the circulation of torsion testicles was normal in 4 of the cases followed up (Table 3). In these cases, control with a spermogram was not possible.

In patients with testicular torsion, the time elapsed between the onset of patients' complaints and admission to the hospital was calculated, depending on the type of operation. While this period was 80.18±16.32 hours in patients who underwent orchiectomy, it was determined as 17.46±8.75 hours in patients whose testis was left in place. A significant difference was found between the onset of complaints and the time to hospital admission in cases where orchiectomy was performed and in cases where the testis was left in place (t=12.66, p=0.0001) (Table 4).

In testicular torsion cases, the exploration findings were recorded with photographs, the parents were informed during the waiting period after the detorsion, and the procedure to be performed was explained in detail. Contralateral fixation

**Table 3. Control SDU findings of preserved testicles**

Patient number	Testicular sizes at control SDU	Echogenity	Vascularization comment
1 (1 y, L torsion)	R:12x11x14 mm L: 9 8 7 mm	Hypoechoic	Normal
2 (14 y, R torsion)	R: 16x12X14 mm L: 24x22X26 mm	Heterogen	Normal
3 (17 y, R torsion)	R: 12X12X15 mm L: 29x28X24 mm	Heterogen	Normal
4 (15 y, R torsion)	R: 22X17X15 mm L: 28X24X24 mm	Heterogen	Normal

SDU: Scrotal Doppler ultrasonography

**Table 4. Time difference between complaint onset and hospital admission**

	Time
All testicular torsion (26)	44.77±16.38 hours
Orchiectomy patients (11)	80.18±16.32 hours
Patients with preserved testes (15)	17.46±8.75 hours* t=12.66 p=0.0001

\*The difference between the two groups was found to be statistically significant

was recommended to families in all cases, and contralateral fixation was performed in 7 out of 26 patients with the consent of the family. It was observed that the mean hospitalization period of testicular torsion cases was 2.11±1.36 days.

## Discussion

Acute scrotum is defined as the sudden onset of pain, swelling, and/or redness in the scrotum<sup>(1)</sup>. In diagnosis, although orchitis, epididymitis, trauma, and allergic problems are common, testicular torsion is more important because of the risk of organ loss<sup>(2)</sup>. In the United States, the incidence of testicular torsion was found to be 25-35% in patients under the age of 20 who were admitted to the hospital with acute scrotum<sup>(3)</sup>. Considering the age group difference in our series, the torsion rate was found to be 13.07% on average. The incidence of testicular torsion has not changed over the years. This situation has not changed under the conditions of the Coronavirus disease-2019 pandemic.

The incidence of testicular torsion increases in newborns and during adolescence<sup>(2)</sup>. The incidence of testicular torsion in the neonatal period has been reported as 6.1 per 100,000 live births<sup>(4)</sup>. In adolescence, testicular torsion is frequently intravaginal, and it is suggested to be related to Bell Clapper deformity<sup>(5)</sup>. In our series, four of 26 cases were newborns (15.38%). The complaints at admission also differ according to age. While a painless hard mass is observed in newborns, severe scrotal pain, swelling, and redness are evident in adolescents<sup>(5)</sup>. In this respect, our series is compatible with the literature.

In the literature, it is stated that hemorrhagic necrosis begins in the testis in the 2<sup>nd</sup> hour following torsion, and the first 6 hours are critical for irreversible damage<sup>(2,6)</sup>. For this reason, it is emphasized that the detorsion procedure should be performed within six hours from the onset of the complaints<sup>(6)</sup>. The time elapsed between the onset

of patients' complaints and their arrival at the hospital is the most important factor affecting testicular loss<sup>(7)</sup>. In our series, the difference between patients with testicular loss and those whose testis were preserved was significant. The mean time between the onset of complaint and admission in patients with torsion where the testis was left in place is longer than in the literature (17.46-8.75 hours). The fact that the difference is significant suggests that other factors other than the duration may also be effective. It can be thought that the degree of torsion (number of twists) as well as the duration of torsion affect the degree of ischemia developing in the testis. In the series published by Sessions et al.<sup>(8)</sup>, it was stated that the median torsion degrees of orchiectomy and salvaged testicles differed (540 degrees and 360 degrees), but the torsion degrees in both groups ranged between 180 and 1,080 degrees. In our data, we could not access the torsion degree record in patients.

This may mean that the torsion duration may be insufficient to decide on the type of surgical intervention, and that the decision of the cases according to the findings during the surgical procedure and the use of a conservative approach as much as possible can provide organ preservation.

## Conclusion

As a result, in the case of acute scrotum, the time from the onset of the patient's complaints to the hospital admission is important. The application of SDU to all acute scrotum cases may cause testicular torsion. In the literature, it has been stated that the chance of protection is high for testicles that are caught within 6 hours, but in our series, testes that were torsion for 17.46±8.75 hours could be preserved. In our personal opinion, the time taken for the torsion of the testis should not be evaluated as sufficient for the removal of the testis.

## Ethics

**Ethics Committee Approval:** The approval was obtained from the Ethics Committee of Balıkesir University Faculty of Medicine (decision no: 2021/256, date: 24.11.2021).

**Informed Consent:** Retrospective study.

**Peer-review:** Externally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: A.H.Ş., M.S.Y., Concept: A.H.Ş., Design: A.H.Ş., Data Collection or Processing: A.H.Ş., M.S.Y., Analysis or Interpretation: A.H.Ş., Literature Search: A.H.Ş., M.S.Y., Writing: A.H.Ş.

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## References

1. Kass EJ, Lundak B. The acute scrotum. *Pediatr Clin North Am* 1997;44:1251-66.
2. Kurt G, Cerrah Celayir A, Şahin C, Pelin K. 4.5 Years of Experience in Testicular Torsion Cases. *Zeynep Kamil Medical Bulletin* 2017;48:94-8.
3. Liang T, Metcalfe P, Sevcik W, Noga M. Retrospective review of diagnosis and treatment in children presenting to the pediatric department with acute scrotum. *AJR Am J Roentgenol* 2013;200:W444-9.
4. Monteilh C, Calixte R, Burjonrappa S. Controversies in the management of neonatal testicular torsion: A meta-analysis. *J Pediatr Surg* 2019;54:815-9.
5. Serdaroğlu E, Takcı Ş, User R, Güçer Ş, Yiğit Ş, Yurdakök M. Intrauterine testicular torsion: a case report. *Journal of Child Health and Diseases* 2011;54:223-26.
6. Imamoğlu M, Bülbül SS, Kaklıkkaya N, Sarihan H. Oxidative, inflammatory and immunologic status in children with undescended testes. *Pediatr Int* 2012;54:816-9.
7. Dias AC Filho, Marocco MVO, Ribeiro HP, Ricetto CLZ. Presentation delay, misdiagnosis, inter-hospital transfer times and surgical outcomes in testicular torsion: analysis of statewide case series from central Brazil. *Int Braz J Urol* 2020;46:972-81.
8. Sessions AE, Rabinowitz R, Hulbert WC, Goldstein MM, Mevorach RA. Testicular torsion: direction, degree, duration and disinfection. *J Urol* 2003;169:663-5.