



Did the COVID-19 Pandemic Affect the Approach to Testicular Torsion Cases?

COVID-19 Pandemisi Testis Torsiyonu Vakalarına Yaklaşımı Etkiledi mi?

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ABSTRACT

Aim: The COVID-19 pandemic affects the approach to emergency pathologies as well as in many diseases. Testicular torsion is a scrotal emergency in which the time leading up to diagnosis and treatment is most important for organ protection. We planned to compare the time until diagnosis and treatment and the rate of organ loss between the pre-pandemic and pandemic periods in our clinic.

Material and Method: In our retrospective study, we included patients aged >1 year who were diagnosed with testicular torsion and treated at our clinic between March 2019 and March 2021. Patients were divided into two groups according to the time of admission. We named the period between March 2019 – March 2020 Group 1 and the interval between March 2020 – March 2021 as Group 2. We compared the two groups in terms of demographic data, ischemic duration, and orchiectomy rates.

Results: Of the 55 cases that met the study inclusion criteria, 26 occurred during the pre-pandemic period and 29 during the COVID-19 crisis period. The median age of the patients in Group 1 was 17 (IQR: 6–32) and that of the patients in Group 2 was 15 (IQR: 6–28) years ($p=0.019$). Incidence of orchiectomy in our center was 31% in the Group 2 and 15.4% in the Group 1, which was not statistically significant ($p=0.173$). In the evaluation of the whole cohort ($n=55$) according to early (before 12 h) and late admission (after 12 h), the rate of orchiectomy at early admission was found to be significantly lower (50% compared to 3.6% ; $p=0.006$). The median time from symptom onset to first presentation was not significantly different between group 1 and 2 ($p=0.439$).

Conclusion: Time to presentation, ischemic times, and orchiectomy rates for testicular torsion at our center were not significantly different during the COVID-19 period compared with the pre-pandemic period.

Key words: acute scrotal pathologies; COVID-19 pandemic; testicular torsion

ÖZET

Amaç: COVID-19 pandemisi birçok hastalıkta olduğu gibi acil patolojilere de yaklaşımı etkilemektedir. Testis torsiyonu önemli bir skrotal acil olup tanı ve tedaviye kadar geçen zaman organ korunmasında en önemli prediktif faktördür. Biz de kliniğimizde tanı ve tedaviye kadar geçen sürenin ve organ kaybı oranlarının pandemi öncesi dönemle pandemi süreci arasında karşılaştırılmasını planladık.

Materyal ve Metot: Retrospektif çalışmamıza kliniğimizde Mart 2019 – Mart 2021 tarihleri arasında 1 yaş üzeri testis torsiyonu tanısı alıp tedavi gören hastaları dahil ettik. Hastaları başvuru zamanlarına göre 2 gruba ayırdık. Mart 2019 – Mart 2020 aralığını (COVID-19 öncesi) Grup 1 ve Mart 2020 – Mart 2021 aralığını da (COVID-19 dönemi) Grup 2 olarak isimlendirdik. İki grubu demografik verileri ile iskemik süreleri ve orşiektomi oranları açısından karşılaştırdık.

Bulgular: Çalışmamıza dahil etme kriterlerini karşılayan toplam 55 hastanın 26'sı Grup 1 ve 29'u Grup 2'ye dahil edildi. Grup 1 için ortalama yaş ortalaması 17 (İnter Quantile Range (IQR): 6–32) iken grup 2'de 15 (IQR: 6–28) olarak saptandı ($p=0,019$). Pandemi dönemi orşiektomi oranı (%31) öncesine göre (%15,4) fazla olsa da istatistiksel anlamlılık izlenmedi ($p=0,173$). Tüm kohortun ($n=55$) erken (12 saat öncesi) ve geç başvuru (12 saat sonrası)'ya göre değerlendirilmesinde ise erken başvuruda orşiektomi oranı anlamlı olarak daha düşük saptandı (%17,8'e kıyasla %50; $p=0,045$). Grup 1 ve Grup 2'de erken ve geç başvuru açısından farklılık izlenmedi ($p=0,439$).

Sonuç: COVID-19 pandemisinin testis torsiyonuna olumsuz etkilerini başvuru süresi, başvuruda gecikme ya da orşiektomi oranları bakımından inceledik ve pandemi öncesi 1 yıllık dönemdeki vakalarla arasında bir farklılık saptamadık.

Anahtar kelimeler: akut skrotal patolojiler; COVID-19 pandemisi; testis torsiyonu

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Introduction

Testicular Torsion (TT) occurs when the testicle rotates around the spermatic cord attachments, which obstructs blood flow and causes tissue ischemia. TT remains the most important cause of testicular ischemia and organ loss in adolescents and young men¹.

Intervention in the first 6 h after admission has been associated with minimizing organ loss, and some studies have indicated that it is possible to preserve the testis for up to 16 h. However, in the literature, it is stated that the loss of organs will be two-thirds or more in cases exceeding 12 hours²⁻⁵. survival testis rate in applications with TT, where timing is critical to the results, varies widely from 30% to 70%⁶⁻⁸.

This study aimed to treat TT cases within the optimum time in accordance with well-defined standard treatment protocols from the diagnosis stage. Any epidemic that may affect the health system may involuntarily affect adherence to protocols in emergency cases⁹.

The COVID-19 pandemic has increased in our country especially since March 2020, as it has significantly affected the health system worldwide. The current literature shows that the avoidance of admission in emergency cases unrelated to the COVID-19 pandemic has increased, and this avoidance includes many disease groups, including all age groups and life-threatening ones¹⁰⁻¹³. General restrictions and avoidance of the risk of transmission by the community were effective in decreasing emergency service admissions, but the difficulties brought by the pandemic to the health system caused delays in non-COVID-19 emergency cases in many countries^{14,15}.

The first COVID-19 case in Türkiye was detected on March 11, 2020. Since then, various restrictions have been imposed throughout the country. In particular, as a result of the decision to continue school lessons with distance education, adolescent children going out to the street were restricted. The health system, especially the pandemic hospitals, had to close their services and operating rooms during the peak periods of the epidemic, except for emergency cases. Routine and elective surgeries in our clinic were not performed during the COVID-19 period, except for a period of a few months.

In this study, we aimed to compare the COVID-19 pandemic period patient group and the pre-pandemic cohort in terms of these predictive time parameters, assuming that the COVID-19 pandemic may affect the onset of symptoms and the duration of diagnosis and operation in TT patients.

Materials and Methods

Our study was designed as a single-center retrospective study following the approval of the Medipol University

non-interventional ethics committee (XXXXXX) and the Scientific Research Platform approval of the Ministry of Health General Directorate of Health Services. Patients who underwent surgery in our clinic between March 2019 and March 2021 with a diagnosis of TT and were older than 1 year were included in the study.

The hospital operating system (HIS) and ICD-10 diagnosis code (N44.00=testicular torsion) were used to identify the patients. In addition, the files of the patients were reviewed retrospectively, and those who underwent surgery for TT were included in the study. Undescended testicular torsion surgery, elective fixation surgery, appendix testicular torsion, and patients younger than one year of age were excluded from the study. In addition, cases within the controlled normalization periods—periods of partially lifted restrictions (June-September 2020 and October-November 2020) during the pandemic process—were also excluded from the study.

We named the cases that occurred in the pre-COVID-19 period (March 2019 – March 2020) as ‘Group 1’ and compared them with the case group seen during the COVID-19 crisis period –excluding normalization periods– (March 2020 – March 2021), called ‘Group 2’.

Demographic and clinical information of the patients included in the study was obtained from the “HIS,” our hospital electronic data system. Both groups were compared in terms of time from symptom onset to diagnosis, time from symptom onset to operation, and orchiectomy rates. In addition, groups were compared according to whether the time to operation was >12 h or <12 h, and whether the time from symptom onset to operation was >6 h or <6 h. The time from symptom onset to diagnosis was determined according to the history taken from the patient or family, from the time of diagnosis in our clinic, or in the emergency department of the external center. The time to the operating room after diagnosis was calculated based on the operation start time recorded from the HIS electronic data system.

Finally, two groups were formed as early (<12 h) and delayed (>12 h) according to the duration of hospital admission, and age, orchiectomy rate, and hospital stay between the groups were compared.

Statistical Analysis

Data were analyzed using Statistical Package for Social Sciences version 22.0 software (IBM Corporation, Armonk, NY, USA). Continuous variables are expressed as mean \pm standard deviation (SD), while categorical variables are defined using frequency distributions. Mann-Whitney U, chi-square, and Fisher’s exact tests were used to compare continuous and categorical variables between time periods. Continuous and categorical

data of the patients are presented as median and min-max. Statistical significance was set at $P < 0.05$.

Results

The mean age of the 55 TT patients included in the study was 16 (6–32) years. 26 of the patients belonged to Group 1, and 29 of them belonged to Group 2. The clinical and demographic data of the patients are summarized in Table 1.

The median age was 17 (IQR 6–32) in Group 1 and 15 (IQR 6–28) in Group 2 ($p=0.019$). There was no statistical difference between the groups in terms of median time from symptom onset to diagnosis (Group 1:3 hours (IQR 2–48) and Group 2:3 hours (IQR 1–48); $p=0.503$). Similarly, no difference was observed between the groups in terms of the median time from symptom onset to operation (Group 1:6.5 hours (IQR 3–51) and Group 2:6 h (IQR 2–51); $p=0.912$). Although the rate of orchiectomy was higher in Group 2 than group 1, no statistical difference was observed (Group 1:4/26 [15.4%] and Group 2:9/29 [31%]; $p=0.173$). There were 13/26 (50%) and 14/29 (48.2%) patients in Group 1 and Group 2, whose time from baseline to operation was longer than 6 h, and no statistical difference was observed between the groups. There was no statistical difference between the groups, even if this time was longer than 12 hours (Group 1:4/26 (15.4%) and Group 2:6/29 (20.7%); $p=0.173$). There was no statistical difference between the length of hospital stay during the pandemic period (15 hours [IQR 3.20]) and the period before the pandemic (14 hours (IQR 5–20)) ($p=0.487$) (Table 2). The orchiectomy rate of the delayed group with a hospital admission time of >12 hours was found to be statistically significantly higher (>12 hours group: 5/50 (50%) and <12 hours group: 8/45 (3.6%), $p=0.006$; $Z=-2.747$). There was no statistically significant difference between the groups in terms of age and length of hospital stay in these two groups ($p=0.991$ and 0.130, respectively) (Table 3).

Discussion

Along with the whole world, the COVID-19 epidemic in our country, especially after March 2020, has brought innovations and new burdens to the social life and health system. The functioning of the health system has undergone changes such as postponing elective cases and allocating services and intensive care units, mainly for patients with COVID-19 pneumonia.

Many studies have been designed on the assumption that the diagnosis and treatment delay of acute pathologies is a result of the compulsory impact of the pandemic on the health system. While some studies emphasize the

delay effect of the pandemic on acute cases, some studies have shown that it has no negative effects^{11–13,16–21}. Contradictory results were associated with whether symptoms could be bypassed with simple treatment. The reasons for the delay were related more to the fear

Table 1. Demographic and clinical characteristics of the patients (n=55).

Age (years, median, range)		16 (6–32)
Side (n, %)	Right	29 (52.7)
	Left	26 (47.3)
Case time (n, %)	Group 1	26 (47.3)
	Group 2	29 (52.7)
Procedure (n, %)	Open surgery	55 (100)
Time from symptom onset to diagnosis (hours) (median [IQR]{range})		3 (1–48)
Time from symptom onset to operation (hours) (median [IQR]{range})		6 (2–51)
Orchiectomy (n, %)		13 (23.6)
Length of hospital stay (hours) (median [IQR]{range})		15 (3–22)

Table 2. Comparison of parameters between pre-COVID-19 pandemic and COVID-19 pandemic-period groups.

	Group 1 (n=26)	Group 2 (n=29)	p-value
Age (years, median, range)	17 (6–32)	15 (6–28)	0.019*
Time from symptom onset to diagnosis (hours) (median [IQR]{range})	3 (2–48)	3 (1–48)	0.503*
Time from symptom onset to operation (hours) (median [IQR]{range})	6.5 (3–51)	6 (2–51)	0.912*
Orchiectomy, n (%)	4 (15.4)	9 (31)	0.173**
Time to operation ≤12 hours, n (%)	22 (84.6)	23 (79.3)	0.439**
Time to operation >12 hours, n (%)	4 (15.4)	6 (20.7)	
Time from symptom onset to operation ≤6 hours, n (%)	13 (48.3)	15 (51.7)	0.898**
Time from symptom onset to operation >6 hours, n (%)	13 (50)	14 (50)	
Length of hospital stay (hours)	14 (5–22)	15 (3–20)	0.487*

* The Mann-Whitney test, ** Chi-square test.

Table 3. Parameter differences between Acute (≤12 hours) and delayed (>12 hours) groups

	Acute (≤12 hours) (n=45)	Delayed (>12 hours) (n=10)	p-value
Age (years, median, range)	16 (6–32)	16 (6–30)	0.991*
Orchiectomy, n (%)	8 (3.6)	5 (50)	0.006**
Length of hospital stay (median [IQR]{range})	15 (3–22)	16 (12–20)	0.130*

* The Mann-Whitney test, ** Fisher's Exact Test

of transmission of infection by the patients or the parents rather than the change in the functioning of the healthcare system¹⁷. Lange et al.¹³ reported a 23% (MI), 20% (stroke), and 10% (hyperglycemic crisis) decrease in admissions to the emergency department in the USA during the pandemic period.

In a study where we compared the ischemic time and organ loss rates of TT cases before and during the pandemic, we found no statistical difference. The time from symptom onset, which is critical for testicular loss, to diagnosis and surgical intervention were found to be similar in both groups. Although both orchietomy rates and the percentage of admissions exceeding 12 hours were higher in the COVID-19 period, the lack of statistical difference may be related to the low power of the cohort, but it was interpreted in favor of not delaying, as in similar studies^{15,22,23}. Although Sarah et al.¹⁵ found that ischemic time was longer during the pandemic period, they did not find statistical significance in terms of organ loss. In a study by Tankel et al.¹⁰, the decrease in AA (Acute Appendicitis) cases during the pandemic process was attributed to the resolution of uncomplicated cases at home with simple symptomatic treatment. A similar resolution chance may be valid for torsion that recurs and resolves spontaneously, but it is less likely to delay admission in stable cases^{22,23}.

In our study, we were based on the number of cases in a one-year period, and TT cases were detected slightly more frequently in the pandemic period. This situation may be related to the shift of primary and secondary healthcare services to tertiary hospitals, especially when surgery is required, or may be directly related to the increase in the number of tertiary referrals among patients. We believe that direct applications did not increase the ischemic time due to transfer, resulting in no delay during the pandemic period. The strong and rapid onset of the disease and the inability of parents to resort to relaxing and prolonging manipulations in children may be related to the short ischemic period. Delaying acute pathologies in adult patients has been found to be associated with fear of contagion¹³, and the belief that a similar risk is less likely in pediatric patients also increases the possibility that they can be applied to the emergency department without hesitation for children²². The fact that there was no difference between the two terms regarding the application period in our study is consistent with these assumptions.

The rate of orchietomy was significantly lower in the early admissions (<12 h) group ($p=0.045$). Gold et al. attributed testicular rescue after torsion to two main factors: fast and efficient in-hospital management with rapid medical intervention²⁴. Including patient and parental awareness education as a third factor was found to be significant in terms of ischemia time until diagnosis^{25,26}.

Some factors made our study strong and weak. In particular, especially during the COVID-19 pandemic period and before, with one-year periods and the number of patients close to each other, offered a more homogeneous comparison compared with studies with similar hypotheses in the literature. In addition, we designed a study that deals with the cases of the pandemic period for the longest period of time, unlike the short periods of 1–3 months in other similar studies^{15,22,23}. However, our retrospective and observational study, single-centeredness, and limited number of patients can be stated as our important limitations. Although this was a single-center study, we think that the dense and immigration-based heterogeneous population of the region addressed by our 3rd level clinic represents the general country sample. Another limitation is that the advanced prognosis of the patients who were successfully detorsion and fixed was not determined, and the rate of atrophy was insufficient. We aim to continue the study with future findings.

Our findings showed that the COVID-19 pandemic did not affect the duration of hospital admission, time from admission to exploration, and rate of orchietomy in patients with acute TT. However, the pandemic continues to have an impact on society and the health system with increasing variant strains despite intensive vaccination programs and restrictions. In the upcoming period, training programs and information can be planned to maintain the current algorithm in emergency services and to reduce the hesitancy of the society in applying to the health center in acute cases.

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