



## The Effect of Manual Detorsion on Testicular Salvage Rates in Adult Testicular Torsion Patients: Single Center Experience

Erişkin Testis Torsiyonu Hastalarında Manuel Detorsiyonun Testis Kurtarma Oranlarına Etkisi: Tek Merkez Deneyimi


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### ABSTRACT

**Aim:** The aim of this study was to reveal the effect of manual detorsion on testicular salvage rates and the factors affecting the success of manual detorsion in adult testicular torsion.

**Material and Methods:** The records of patients who applied to the emergency department with pre-diagnosis of acute scrotum were examined. A total of 62 adult patients diagnosed with testicular torsion were included in the study. Manual detorsion was attempted in all patients before surgery. Demographic characteristics of the patients, time from onset of scrotal pain to hospital admission (<24 hours/>24 hours), physical examination and ultrasonography findings, type of surgery performed, and long-term results were evaluated. The data were statistically compared between patients with manual detorsion considered successful and unsuccessful.

**Results:** Manual detorsion was considered successful in 36 (58.1%) patients and unsuccessful in 26 (41.9%) patients. Orchiopexy was performed in 35 (97.2%) of the successful patients and in 11 (42.3%) of the unsuccessful patients (p<0.001). When subgroup analysis was performed, although there was no significant difference in pain duration between patients with and without successful manual detorsion for patients with pain duration of less than 24 hours (p=0.648), there was a statistically significant difference in testicular salvage rates. While the rate of orchiectomy was 1/35 (2.9%) in patients with successful manual detorsion, this rate was 8/19 (42.1%) in unsuccessful patients (p<0.001).

**Conclusion:** Manual detorsion increases testicular salvage rates in adult patients diagnosed with testicular torsion, and it should be attempted especially in patients with pain duration less than 24 hours.

**Keywords:** Testicular torsion; manual detorsion; orchiopexy; orchiectomy.

### ÖZ

**Amaç:** Bu çalışmanın amacı erişkin testis torsiyonunda manuel detorsiyonun testis kurtarma oranlarına etkisini ve manuel detorsiyonun başarısını etkileyen faktörleri ortaya koymaktır.

**Gereç ve Yöntemler:** Akut skrotum ön tanısı ile acil servise başvuru yapan hastaların kayıtları incelendi. Testis torsiyonu tanısı konulan 62 erişkin hasta çalışmaya dahil edildi. Hastaların tamamına cerrahi öncesinde manuel detorsiyon denendi. Hastaların demografik özellikleri, skrotal ağrının başlangıcından hastaneye başvuruya kadar geçen süreleri (<24 saat/>24 saat), fizik muayene ve ultrasonografi bulguları, uygulanan cerrahinin tipi ve uzun dönem sonuçları değerlendirildi. Elde edilen veriler manuel detorsiyonu başarılı ve başarısız kabul edilen hastalar arasında istatistiksel olarak karşılaştırıldı.

**Bulgular:** Manuel detorsiyon 36 (%58,1) hastada başarılı, 26 (%41,9) hastada ise başarısız olarak kabul edildi. Başarılı olan hastaların 35'inde (%97,2) ve başarısız olan hastaların ise 11'inde (%42,3) orşiopeksi uygulandı (p<0,001). Alt grup analizi yapıldığında, ağrı süresi 24 saatten daha kısa olan hastalarda, manuel detorsiyonu başarılı olan ve olmayan hastalar arasında ağrı süresi açısından anlamlı bir farklılık olmamasına rağmen (p=0,648), testis kurtarma oranları arasında istatistiksel olarak anlamlı bir farklılık mevcuttu. Başarılı manuel detorsiyon uygulanan hastalarda orşiektomi oranı 1/35 (%2,9) iken, başarısız olan hastalarda bu oran 8/19 (%42,1) olarak bulundu (p<0,001).

**Sonuç:** Testis torsiyonu tanısı alan erişkin hastalarda manuel detorsiyon testis kurtarma oranlarını artırmaktadır, özellikle 24 saatten az ağrı süresi olan hastaların tamamında denenmelidir.

**Anahtar kelimeler:** Testiküler torsiyon; manuel detorsiyon; orşiopeksi; orşiektomi.

## INTRODUCTION

Testicular torsion is a disease that is characterized by rotation of the spermatic cord around itself, causes ischemic organ damage in the affected testis, and requires urgent diagnosis and treatment (1). It is the second most common cause of acute scrotum after acute epididymo-orchitis. Since it is known that ischemic damage to the testicle is associated with the amount and duration of cord rotation, time is of critical importance in testicular torsion (1-4). Delay in diagnosis and detorsion of the affected spermatic cord results in high rates of orchiectomy (5-7).

The standard approach in the treatment of testicular torsion is surgical exploration (7). Manual detorsion performed before surgery is known to be a safe and noninvasive method that reduces the duration of testicular ischemia and increases the testicular salvage rate (7-10). Even when manual detorsion is partially successful, reducing testicular rotation may allow some perfusion and may result in a significant prognosis difference (4,10,11).

The literature about the effectiveness of manual detorsion is usually obtained from data of pediatric patients, rather than adult patients. In this study, we aimed to determine the effect of manual detorsion on testicular salvage rates in adult patients admitted to the emergency department with testicular torsion and also the factors affecting the success of manual detorsion.

## MATERIAL AND METHODS

Following ethics committee approval (Adana City Training and Research Hospital Clinical Research Ethics Committee affiliated to Adana Governorship Provincial Health Directorate with reference number 2022/1765), the computer records and files of patients who applied to the emergency department with the diagnosis of acute scrotum between January 2010 and January 2020 were examined. Patients diagnosed with testicular torsion based on a history of testicular pain, physical examination findings, and color Doppler ultrasonography (CDUS) findings were included in our study. Patients diagnosed with acute scrotal causes other than testicular torsion, patients diagnosed with testicular torsion with missing data such as duration of pain, CDUS findings, degree of torsion during surgery, manual detorsion results, and follow-up records, and patients under 18 years of age were excluded from the study.

Manual detorsion was attempted in all patients with testicular torsion before surgical exploration. The procedure was performed from medial to lateral without spermatic cord block or sedation as standard. Detorsion was considered successful in patients with immediate relief of pain and whose testicular blood flow was obtained again on the control CDUS. In addition, the success of manual detorsion was evaluated with scrotal exploration after detorsion. Emergency scrotal exploration was performed without delay in patients with failed manual detorsion.

Viability of testicles was evaluated after spermatic cord detorsion and heat application during scrotal exploration. Orchiectomy was performed for necrotic testicles where tissue perfusion could not be achieved. Patients with good testicular viability underwent orchiopexy on the affected side and contralateral side.

Demographic characteristics of the patients, time from the onset of scrotal pain to hospital admission (<24 hours / >24 hours), physical examination and CDUS findings, pain relief after manual detorsion and CDUS findings, surgical findings, type of surgery performed, and long-term results were evaluated. The data were statistically compared between patients with manual detorsion considered successful and unsuccessful.

Atrophy/viable testicle evaluations in the postoperative period were performed with the results of CDUS and physical examination findings of patients at three-month intervals.

### Statistical analysis

Data are expressed as n (%), mean±standard deviation, or median (interquartile range, IQR) [min-max] as appropriate. The normality assumption was checked with the Shapiro-Wilk test. The Mann-Whitney U test or Student's t-test was used for continuous variables. Pearson chi-square or Fisher's exact test was performed for categorical variables. Statistical analysis was performed using IBM SPSS Statistics for Windows version 22.0 (IBM Corp., Armonk, NY). A p value of <0.05 was considered statistically significant.

## RESULTS

Our study consisted of 62 adult patients with a mean age of 24.0±6.9 years. While manual detorsion was considered successful in 36 (58.1%) of these patients, it was considered unsuccessful in 26 (41.9%) patients. Residual torsion was observed in all patients who were considered unsuccessful when scrotal exploration was subsequently performed. Orchiopexy was performed in 35 (97.2%) of the patients with successful manual detorsion, and in 11 (42.3%) of the unsuccessful patients (p<0.001). Median pain durations were 4.5 (range, 2-26) and 6 (range, 2-96) hours in the successful and unsuccessful groups, respectively (p=0.042). The clinical and demographic characteristics of the patients are shown in Table 1.

In addition, subgroup analysis was performed for patients according to the duration of pain as less than 24 hours and more than 24 hours. Manual detorsion was found to be successful in 35 (64.8%) of 54 patients whose pain duration was less than 24 hours. Although there was no significant difference in pain duration between those with and without successful manual detorsion among these patients (p=0.648), there was a statistically significant difference in testicular salvage rates. While the rate of orchiectomy was 1/35 (2.9%) in patients with successful manual detorsion, this rate was 8/19 (42.1%) in unsuccessful patients (p<0.001). Manual detorsion was found to be successful in only 1 (12.5%) of 8 patients with pain duration of more than 24 hours and orchiopexy was performed for this patient. Orchiectomy was performed in all 7 patients with failed manual detorsion. The subgroup analysis results of the patients are shown in Table 2.

## DISCUSSION

The degree and duration of spermatic cord twist in testicular torsion is the most important factor in maintaining testicular viability (7,12). If not treated urgently, testicular infarction or atrophy develops during follow-up. The amount of rotation of the spermatic cord

**Table 1.** Clinical and demographic characteristics of patients

Manual Detorsion	Success (n=36)	Failed (n=26)	p
Age (years), mean±SD	23.5±5.7	24.7±8.4	0.505 <sup>T</sup>
<b>Findings, n (%)</b>			
Abnormal horizontal position of the testis	29 (80.6)	20 (76.9)	0.729 <sup>¥</sup>
Absent cremasteric reflex	20 (55.6)	14 (53.8)	0.894 <sup>¥</sup>
Abnormal CDUS	36 (100)	26 (100)	-
<b>Pain duration</b> (hours), median (IQR) [min-max]	4.5 (4.8) [2-26]	6 (25) [2-96]	<b>0.042<sup>†</sup></b>
<b>Surgical type, n (%)</b>			
Orchiopexy	35 (97.2)	11 (42.3)	<b>&lt;0.001<sup>¥</sup></b>
Orchiectomy	1 (2.8)	15 (57.7)	
<b>Follow-up time</b> (months), mean±SD	13.1±3.5	12.6±2.6	0.547 <sup>T</sup>

SD: standard deviation, IQR: interquartile range, CDUS: color Doppler ultrasonography, T: Student's t test, †: Mann Whitney-U test, ¥: Chi-square test

**Table 2.** Subgroup analysis results of patients

Pain Duration	<24 hours (n=54)		P	>24 hours (n=8)		P
	Success	Failed		Success	Failed	
<b>Manual Detorsion, n (%)</b>	<b>35 (64.8)</b>	<b>19 (35.2)</b>		<b>1 (12.5)</b>	<b>7 (87.5)</b>	
<b>Surgical type, n (%)</b>			<b>&lt;0.001<sup>¥</sup></b>			
Orchiopexy	34 (97.1)	11 (57.9)		1 (100)	-	-
Orchiectomy	1 (2.9)	8 (42.1)	-	-	7 (100)	-
<b>Pain duration</b> (hours), median (IQR) [min-max]	4 (4) [2-15]	5 (5) [2-12]	0.648 <sup>†</sup>	26	36 (40) [28-96]	-
<b>Testicular atrophy, n (%)</b>	-	2 (10.5)	-	-	-	-
<b>Degree of peroperative torsion, n (%)</b>						
>360°	-	6 (31.6)	-	-	4 (57.1)	-
<360°	-	2 (10.5)	-	-	3 (42.9)	-

IQR: interquartile range, †: Mann Whitney-U test, ¥: Chi-square test

and the delay in treatment are associated with testicular salvage rates and subsequent atrophy rates (10,11,13-15). Patient history, physical examination findings, and CDUS come to the fore in the diagnosis of testicular torsion. All of our patients applied to the emergency department with the complaint of sudden onset testicular pain. As a physical examination finding, 79.0% of our patients had an abnormal horizontal position of the testicle and 54.8% had a loss of cremasteric reflex. Although there are many imaging methods that evaluate testicular vascularity, CDUS can be used safely for diagnosis because of its easy accessibility, cheap and fast results, the sensitivity of 63.6%-100%, and the specificity of 97-100%. Although better results were reported with high-resolution ultrasonography for the diagnosis of testicular torsion, its availability is not as common as CDUS (16). Therefore, CDUS has an important role in the diagnosis of testicular torsion and in the evaluation of the effectiveness of manual detorsion. After manual detorsion, restoration of normal blood flow in the affected testis should be demonstrated by ultrasonography (7,17). The patients in our study were diagnosed with testicular torsion based on history, physical examination, and CDUS findings.

Manual detorsion, first described by Nash in 1893, is known as a safe and noninvasive method that reduces testicular ischemia time and increases the rate of testicular salvage (7-10,18). After successful manual detorsion, the pain resolves in a short time (less than 5 minutes), testicular blood flow is restored on CDUS, and the testicle usually returns to its lower position in the scrotum (7,8). However, restoration of blood flow should be confirmed

after this maneuver and orchiopexy should be applied under elective conditions (8,19). Local anesthesia or sedation is not performed during manual detorsion in our clinic, as the resolution of pain, which is an important parameter in determining the success of the detorsion maneuver, will be lost with anesthesia.

With manual detorsion, the aim is to temporarily alleviate testicular ischemic damage. The extent of ischemic damage increases with the degree of rotation of the spermatic cord. Therefore, even when the detorsion procedure is partially successful, reducing testicular rotation may allow some perfusion (4,10,11). Manual detorsion of the testis was shown to be associated with a significant reduction in the amount of testicular rotation evaluated intraoperatively (10). Although Dias Filho et al. (10) recommended that manual detorsion be performed only in patients with testicular pain of less than 24 hours, Vasconcelos-Castro et al. (7) showed that the advantage of manual detorsion was independent of the duration of pain and reported that it should be applied to all patients. In our study, manual detorsion was attempted in all patients, and when the patients who were considered successful were explored, residual torsion was not detected in any of them. In particular, our manual detorsion success rate and testicular salvage rates were found to be higher for patients whose pain duration did not exceed 24 hours. For this reason, we think that manual detorsion should be attempted, especially in patients whose pain duration is less than 24 hours. In addition, although the number of our patients is not high, we believe that surgical exploration may be appropriate without wasting time, due to the

decrease in the success rate of manual detorsion in patients with pain duration longer than 24 hours.

The limitations of our study are that it was designed retrospectively and manual detorsion was applied by different physicians over time. However, we think it will contribute to the literature since it is one of the few studies on testicular torsion in adult patients.

## CONCLUSION

Manual detorsion increases testicular salvage rates in adult patients diagnosed with testicular torsion, and it should be attempted especially in all patients with pain duration of less than 24 hours. We believe that randomized prospective studies with larger numbers of patients will support our findings and increase the level of evidence.

**Ethics Committee Approval:** The study was approved by the Ethics Committee of Adana City Training and Research Hospital (10.02.2022, 1765).

**Conflict of Interest:** None declared by the authors.

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