

The Effectiveness of Manual Detorsion Applied in the Emergency Department in Testicular Torsion: A Single - Center Experience of 13 Years

Acil Serviste Uygulanan Manuel Detorsiyonun Testis Torsiyonunda Etkinliği: 13 Yıllık Tek Merkez Deneyimi

Hulya Yılmaz Baser¹ , Kursat Kucuker² 

¹Department of Emergency Medicine, Bandırma Onyedü Eylül University School of Medicine, Balıkesir, Türkiye

²Department of Urology, Pamukkale University School of Medicine, Denizli, Türkiye

Cite as: Yılmaz Baser H, Kucuker K. The effectiveness of manual detorsion applied in the emergency department in testicular torsion: A single- center experience of 13 years. Grand J Urol 2023;3(3):70-4

Submission date: 23 April 2023

Acceptance date: 29 May 2023

Online first: 07 June 2023

Publication date: 20 September 2023

Corresponding Author: Kursat Kucuker / Pamukkale University School of Medicine, Department of Urology, Denizli, Türkiye / kursat_kucuker@hotmail.com
ORCID ID: 0000-0002-5558-327X

Abstract

Objective: As a urological emergency, testicular torsion is one of the causes of acute scrotum in all age groups. This study aimed to evaluate the effectiveness of manual detorsion performed before surgical intervention.

Materials and Methods: Retrospective data analysis of the patients with acute scrotum who applied to the emergency department of a 3rd level hospital between the years January 2010 and January 2023 with the complaint acute unbearable pain within the first 12 hours of its onset was performed. Patients were grouped according to whether or not manual detorsion was performed in the emergency department. Successful manual detorsion was defined as post-procedural normal color Doppler ultrasound findings and complete resolution of pain. All patients had undergone surgical exploration. Age, laterality of the torsioned testis, manual testicular detorsion attempt (if any), and surgical conditions resulting in testis preservation or orchiectomy were the patient data analyzed.

Results: Sixty patients were included in the study. Manual detorsion was performed in 29 (48.3%) patients in the emergency department (Group 1). Scrotal exploration was performed in 31 (51.7%) patients without applying manual detorsion (Group 2). In Group 1, testicular preservation was achieved in 26 (89.7%) patients. In Group 1, in 3 patients (10.3%) testicular necrosis occurred due to failure to achieve adequate blood supply, while orchiectomy was performed in 11 (35.5%) patients in Group 2. Lower rates of orchiectomy were observed in Group 1 compared to Group 2 ($p=0.021$). We also observed that manual detorsion decreased the rate of orchiectomy ($\rho=0.297$, $p=0.021$), and the probability of undergoing orchiectomy increased with increasing age ($\rho=0.512$, $p<0.001$).

Conclusion: Manual testicular detorsion is a noninvasive method that can be safely applied to all patients diagnosed with testicular torsion. We think that it will shorten the duration of testicular ischemia in the emergency department and contribute to testicular salvage.

Keywords: testicular torsion, manual detorsion, emergency, orchiectomy

Öz

Amaç: Ürolojik bir acil durum olarak testis torsiyonu tüm yaş gruplarında akut skrotum nedenlerinden biridir. Bu çalışmada cerrahi müdahale öncesi yapılan manuel detorsiyonun etkinliğinin değerlendirilmesi amaçlandı.

Gereçler ve Yöntemler: Ocak 2010-Ocak 2023 tarihleri arasında 3. basamak bir hastanenin acil servisine ilk 12 saat içerisinde akut dayanılmaz ağrı şikayeti ile başvuran akut skrotumlu hastaların retrospektif veri analizi yapıldı. Hastalar acil serviste manuel detorsiyon yapıp yapılmadığına göre gruplandırıldı. Başarılı manuel detorsiyon, işlem sonrası normal renkli Doppler ultrason bulguları ve ağrının tamamen çözülmesi olarak tanımlandı. Tüm hastalara cerrahi eksplorasyon uygulandı. Yaş, torsiyonlu testisin lateralitesi, manuel testiküler detorsiyon girişimi ve testisin korunması veya orşiektomi ile sonuçlanan cerrahi durumlar analiz edilen hasta verileri oldu.

Bulgular: Çalışmaya 60 hasta dahil edildi. Acil serviste 29 (%48,3) hastaya (Grup 1) manuel detorsiyon uygulandı. 31 (%51,7) hastaya manuel detorsiyon uygulanmadan skrotal eksplorasyon yapıldı (Grup 2). Grup 1’de testis korunan hasta sayısı 26 (%89,7) olarak belirlendi. Grup 1’de 3 hastada (%10,3) yeterli kanlanma sağlanamaması nedeniyle testis nekrozu izlenmesi üzerine orşiektomi uygulanırken Grup 2’de 11 (%35,5) hastaya orşiektomi uygulandı. Grup 1’de Grup 2’ye göre daha düşük orşiektomi oranları gözlemlendi ($p=0,021$). Ayrıca manuel detorsiyonun orşiektomi oranını azalttığını ($\rho=0,297$, $p=0,021$), yaş arttıkça orşiektomi geçirme olasılığının arttığını ($\rho=0,512$, $p<0,001$) gözlemledik.

Sonuç: Manuel testis detorsiyonu, testis torsiyonu tanısı alan tüm hastalara güvenle uygulanabilen noninvaziv bir yöntemdir. Acil serviste testiküler iskemii süresini kısaltacağını ve testisin kurtarılmasına katkı sağlayacağını düşünüyoruz.

Anahtar kelimeler: testis torsiyonu, manuel detorsiyon, acil, orşiektomi

ORCID ID: H.Y. Baser 0000-0002-1416-1521

Introduction

Testicular torsion is defined as twisting of the testis along the spermatic cord resulting in venous congestion and poor arterial supply eventually leading to ischemia [1]. As a urological emergency, it is one of the causes of acute scrotum in all age groups. The overall incidence of testicular torsion in males is 2.02 to 21.76 per 100,000 population [2,3]. Differentiation of testicular torsion from other acute scrotal emergencies is important in terms of fertility and organ preservation. It is most often confused with epididymitis. An abnormal (horizontal) position of the testis is more common in testicular torsion than in epididymitis [4]. Searching for the absence of cremasteric reflex is a simple diagnostic test for testicular torsion with 100% sensitivity and 66% specificity [5,6]. Elevation of the scrotum (testes) may reduce symptoms in epididymitis, but not in testicular torsion. Determining the cause of acute scrotum based on history and physical examination alone is not easy [7]. Although scrotal color Doppler ultrasonography (CDU) is helpful in diagnosis, the possibility of false negatives and variable CDU findings pose a problem in clinical practice [8].

In case of suspected testicular torsion, manual detorsion of the testis is performed without anesthesia and should be attempted in all patients if possible [9]. As long as the pain does not increase or there is no obvious resistance, it should initially be done by turning the testicles outward as if opening a book. Success is defined as the immediate resolution of all symptoms and disappearance of abnormal findings on physical examination [10]. In case of failed attempts at detorsion, emergency surgical treatment is required. Although success rates related to manual testicular detorsion ranging between 61.5%, and 91% have been reported in the literature, residual torsion has been demonstrated in 27-32% of the patients who had undergone manual detorsion [11-13]. With this study, as a contribution to the literature, we aimed to investigate the effectiveness and success rates of manual detorsion in the light of our clinical experience.

Materials and Methods

Study Design and Ethics Approval

This study was designed as a cross-sectional retrospective study. The study protocol was reviewed and approved by the Institutional Review Board of Pamukkale University School of Medicine Ethics Committee (ethics committee approval date and number: 04.04.2023/353797).

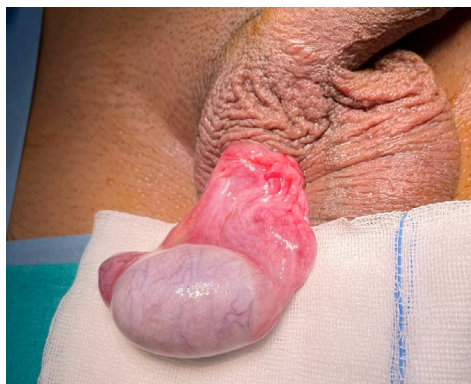


Figure 1. Appearance after surgical detorsion



Figure 2. Appearance before surgical detorsion



Figure 3. Necrotic testis appearance before orchietomy

Study Population and Data Collection

The medical files of 71 patients who were admitted to the emergency department of Pamukkale University School of Medicine with the complaint of the acute onset of scrotal pain and diagnosed with testicular torsion between the years January 2010 and January 2023 were retrospectively analyzed. Although discrepancies in postoperative outcomes of orchietomies performed have been reported in the literature, it has been stated that the rates of testicular salvage decrease significantly if intervened 12 hours after onset of pain [13,14]. Therefore, the cases that applied within the first 12 hours after the onset of complaints were included in the study. All patients were diagnosed with testicular torsion by physical examination and CDU. Scrotal exploration was performed in all patients. Testicular fixation was performed in cases with testicular detorsion detected in scrotal exploration, while surgical detorsion and fixation were performed in cases without detorsion. These patients were noted as cases with preserved testis. Orchietomy was performed in cases with impaired blood supply and testicular necrosis detected during scrotal exploration. Retrospectively, patients who had, and had not undergone manual detorsion in the emergency department were included in Groups 1 and 2, respectively. Successful manual detorsion was defined based on the cessation of pain and the demonstration of adequate testicular blood flow by CDU. The patients' age and laterality of torsioned testis were recorded.

Statistical Analysis

Statistical analyses were performed using the SPSS version 22 software. The fitness of variables to normal distribution was tested using the Shapiro-Wilk test. Descriptive statistics were expressed as mean and standard deviation for variables with normal distribution, median, minimum and maximum values for ordered ordinal data, and numbers and percentages for categorical variables. In the evaluation of numerical data between the groups, the parameters with normal distribution were evaluated with Student t-test, ordinal data with Mann-Whitney U test, and categorical data with chi-square test. The correlations between the orchietomy and application of manual detorsion, age, laterality of torsioned testis were analyzed using the Spearman correlation coefficients. The model fit was analyzed using the required residual and fit statistics. The cases with a type-1 error level below 0.5% were statistically interpreted.

Table 1. The characteristics of the groups

		Group 1 (Manual detorsion +) n=29	Group 2 (Manual detorsion -) n=31	P
Age (years) (mean±SD)		22.79±5.41	24.06±8.71	0.994
Laterality	Right testis n (%)	14 (48.3)	17 (54.8)	0.611
	Left testis n (%)	15 (51.7)	14 (45.2)	
Scrotal exploration	Testicular preservation (No testicular loss) n (%)	26 (89.7)	20 (64.5)	0.021
	Orchiectomy (There is testicular loss) n (%)	3 (10.3)	11 (35.5)	

Results

Sixty patients admitted to the emergency department with the diagnosis of testicular torsion within the first 12 hours of onset of acute scrotum in the last 13 years were included in the study. The mean age of 60 patients was 23.45 ± 7.27 years. Right testicular torsion was observed in 31 (51.7%), and left testicular torsion in 29 (48.3%) patients. Orchiectomy was performed in 14 (23.3%) patients. Twenty-nine (48.3%) patients had undergone manual detorsion in the emergency department (Group 1), and scrotal exploration had been performed in 31 (51.7%) patients without manual detorsion (Group 2). Testicular fixation was performed in 19 (65.5%) of 29 patients in Group 1, whose testicular blood flow was normal during scrotal exploration (**Figure 1**). In 7 (24.1%) patients in Group 1, manual detorsion was not found to be sufficiently effective during exploration, and surgical detorsion together with testicular fixation was applied (**Figure 2**). Testicular preservation was achieved in a total of 26 (89.7%) patients. In Group 1, 3 patients (10.3%) had testicular necrosis and since testicular blood supply did not improve, orchiectomy was performed, while in Group 2, 11 (35.5%) patients underwent orchiectomy (**Figure 3**). The characteristics of the groups are shown in **Table 1**.

There was no difference between the groups in terms of age and laterality of testicular torsion ($p=0.994$ and $p=0.611$, respectively). Patients who underwent manual detorsion in the emergency department (Group 1) were less likely to undergo orchiectomy than those who did not (Group 2) ($p=0.021$).

In the correlation analysis between the application of orchiectomy and age at orchiectomy, laterality of testicular torsion, and manual detorsion; we observed that manual detorsion decreased the orchiectomy rates ($\rho=0.297$, $p=0.021$), and the probability of undergoing orchiectomy increased with increasing age ($\rho=0.512$, $p<0.001$).

Discussion

Testicular torsion is an emergency that requires urgent surgical treatment. It is the second most common cause of acute scrotum in children and adolescents [12]. The two most important determinants of early testicular salvage rate are the time elapsed between symptom onset and detorsion and the degree of torsion

[15]. Apart from these, in studies conducted in Ireland and Korea, age (infancy and advanced age), lack of private insurance, place of residence far away from healthcare facilities and transfer from another hospital were associated with increased rates of orchiectomy [2,3]. In our study, a positive correlation was found between increasing age and rates of orchiectomy, although the neonatal group was not fully evaluated since it was not the group in which we intervened. Rates of testicular salvage after testicular torsion were reported as 75.22-76% in South Korea [2,16], 84% in Ireland [3], 58-68% in the USA [17-19], and 74% in Taiwan [20]. In our study, in consistent with the literature data, rates of testicular salvage were 89.7%, and 64.5% in those who had, and had not undergone manual detorsion, respectively with an overall testicular salvage rate of 76.7%. In a study the success rate of manual detorsion reported based on evaluation of scrotal color Doppler ultrasound scan results was reported as 61.5%, which was lower than our testicular salvage rates [11]. In their study, S. Vasconcelos-Castro et al. reported results similar to ours. In other words, testicular preservation was achieved in 91% of the patients who had, and in 56% of them who had not undergone manual detorsion [12].

Manual detorsion is a known noninvasive and effective maneuver since it was first described by Nash in 1893 who reported its advantage in testicular preservation [9,10,21-25]. Manual detorsion is always recommended in patients diagnosed with testicular torsion clinically and/or with CDU so as to restore testicular blood flow as soon as possible and to refrain from orchiectomy [12]. With the patient overload of the emergency system and the delay in consultation, surprisingly we observed that manual detorsion was not applied in the emergency departments. Testicular torsion should be suspected in patients presenting with an acute scrotum until proven otherwise. The potential risk of other possible causes causing testicular torsion in a patient presenting with an acute scrotum is theoretically possible but very unlikely, and has been never previously reported [26]. In addition, any attempt to rotate a testicle without testicular torsion, even if suspected, or manual detorsion in the wrong direction causes or increases pain [10,27]. It has been stated that manual detorsion to be applied in the emergency department will reduce testicular loss [9]. Manivel et al. [28] stated that it is important to teach and apply manual detorsion to general practitioners who intervene in the acute scrotum. We think that manual detorsion will be beneficial for the preservation

of testicles during the referral of patients who cannot undergo urology consultation and/or CDU in the emergency department.

This study has some limitations such as the pediatric age group was not included in the study, the patients were intervened within at most 1 hour after onset of their symptoms, and duration of testicular torsion could not be exactly determined due to the missing retrospective data. In addition, the lack of long-term follow-up results, and inability to differentiate between intravaginal / extravaginal testicular torsion can be stated as a limitation of the study.

Conclusion

Manual detorsion is a noninvasive method that can be safely applied to all patients diagnosed with testicular torsion. We think that manual detorsion will reduce the longevity of testicular ischemia and contribute to testicular salvage, both in the waiting period for consultation in the emergency department and in patients who will be referred to an advanced medical center.

Ethics Committee Approval: The study protocol was reviewed and approved by the Institutional Review Board of Pamukkale University School of Medicine Ethics Committee (ethics committee approval date and number: 04.04.2023/353797).

Informed Consent: An informed consent was obtained from all the patients.

Publication: The results of the study were not published in full or in part in form of abstracts.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Any contribution was not made by any individual not listed as an author. Concept – H.Y.B., K.K.; Design – H.Y.B., K.K.; Supervision – H.Y.B., K.K.; Resources – H.Y.B., K.K.; Materials – H.Y.B., K.K.; Data Collection and/or Processing – H.Y.B., K.K.; Analysis and/or Interpretation – H.Y.B., K.K.; Literature Search – H.Y.B., K.K.; Writing Manuscript – H.Y.B., K.K.; Critical Review – H.Y.B., K.K.

Conflict of Interest: The authors declare that they have no conflicts of interest.

Financial Disclosure: The authors state that they have not received any funding.

References

- [1] Lacy A, Smith A, Koyfman A, Long B. High risk and low prevalence diseases: Testicular torsion. *Am J Emerg Med* 2023;66:98-104.
<https://doi.org/10.1016/j.ajem.2023.01.031>
- [2] Choi JB, Han KH, Lee Y, Ha US, Cho KJ, Kim JC, et al. The incidence of testicular torsion and testicular salvage rate in Korea over 10 years: A nationwide population-based study. *Investig Clin Urol* 2022;63:448-54.
<https://doi.org/10.4111/icu.20220122>
- [3] Sugrue DD, O'Connor E, Davis N. Testicular torsion in Ireland: a 10-year analysis of incidence and risk of orchidectomy. *Ir J Med Sci* 2022;191:2267-74.
<https://doi.org/10.1007/s11845-021-02816-8>
- [4] Mäkelä E, Lahdes-Vasama T, Rajakorpi H, Wikström S. A 19-year review of paediatric patients with acute scrotum. *Scand J Surg* 2007;96:62-6.
<https://doi.org/10.1177/145749690709600112>
- [5] Kadish HA, Bolte RG. A retrospective review of pediatric patients with epididymitis, testicular torsion, and torsion of testicular appendages. *Pediatrics* 1998;102:73-6.
<https://doi.org/10.1542/peds.102.1.73>
- [6] Nelson CP, Williams JF, Bloom DA. The cremasteric reflex: a useful but imperfect sign in testicular torsion. *J Pediatr Surg* 2003;38:1248-9.
[https://doi.org/10.1016/s0022-3468\(03\)00280-x](https://doi.org/10.1016/s0022-3468(03)00280-x)
- [7] Paediatric Urology Guidelines.
<https://uroweb.org/guidelines/paediatric-urology/chapter/the-guideline>
- [8] Kalfa N, Veyrac C, Lopez M, Maurel A, Kaselas C, Sibai S, et al. Multicenter assessment of ultrasound of the spermatic cord in children with acute scrotum. *J Urol* 2007;177:297-301.
<https://doi.org/10.1016/j.juro.2006.08.128>
- [9] Dias Filho AC, Oliveira Rodrigues R, Ricetto CL, Oliveira PG. Improving Organ Salvage in Testicular Torsion: Comparative Study of Patients Undergoing vs Not Undergoing Preoperative Manual Detorsion. *J Urol* 2017;197:811-7.
<https://doi.org/10.1016/j.juro.2016.09.087>
- [10] Cornel EB, Karthaus HF. Manual derotation of the twisted spermatic cord. *BJU Int* 1999;83:672-4.
<https://doi.org/10.1046/j.1464-410x.1999.00003.x>
- [11] Hosokawa T, Tanami Y, Sato Y, Ishimaru T, Kawashima H, Oguma E. Role of ultrasound in manual detorsion for testicular torsion. *J Clin Ultrasound* 2021;49:860-9.
<https://doi.org/10.1002/jcu.23039>
- [12] Vasconcelos-Castro S, Flor-de-Lima B, Campos JM, Soares-Oliveira M. Manual detorsion in testicular torsion: 5 years of experience at a single center. *J Pediatr Surg* 2020;55:2728-31.
<https://doi.org/10.1016/j.jpedsurg.2020.02.026>
- [13] Ta A, D'Arcy FT, Hoag N, D'Arcy JP, Lawrentschuk N. Testicular torsion and the acute scrotum: current emergency management. *Eur J Emerg Med* 2016;23:160-5.
<https://doi.org/10.1097/MEJ.0000000000000303>
- [14] Jefferson RH, Pérez LM, Joseph DB. Critical analysis of the clinical presentation of acute scrotum: a 9-year experience at a single institution. *J Urol* 1997;158:1198-1200.
<https://doi.org/10.1097/00005392-199709000-00134>
- [15] Visser AJ, Heyns CF. Testicular function after torsion of the spermatic cord. *BJU Int* 2003;92:200-3.
<https://doi.org/10.1046/j.1464-410x.2003.04307.x>
- [16] Lee SM, Huh JS, Baek M, et al. A nationwide epidemiological study of testicular torsion in Korea. *J Korean Med Sci* 2014;29:1684-7.
<https://doi.org/10.3346/jkms.2014.29.12.1684>

- [17] Zhao LC, Lautz TB, Meeks JJ, Maizels M. Pediatric testicular torsion epidemiology using a national database: incidence, risk of orchiectomy and possible measures toward improving the quality of care. *J Urol* 2011;186:2009-13.
<https://doi.org/10.1016/j.juro.2011.07.024>
- [18] Cost NG, Bush NC, Barber TD, Huang R, Baker LA. Pediatric testicular torsion: demographics of national orchiopexy versus orchiectomy rates. *J Urol* 2011;185:2459-63.
<https://doi.org/10.1016/j.juro.2011.01.016>
- [19] Mansbach JM, Forbes P, Peters C. Testicular torsion and risk factors for orchiectomy. *Arch Pediatr Adolesc Med* 2005;159:1167-71.
<https://doi.org/10.1001/archpedi.159.12.1167>
- [20] Huang WY, Chen YF, Chang HC, Yang TK, Hsieh JT, Huang KH. The incidence rate and characteristics in patients with testicular torsion: a nationwide, population-based study. *Acta Paediatr* 2013;102:e363-e367.
<https://doi.org/10.1111/apa.12275>
- [21] Nash WG. Acute torsion of spermatic cord: reduction: immediate relief. *Br Med J* 1893:742-3.
<https://scholar.google.com/>
- [22] Demirbas A, Demir DO, Ersoy E, Kabar M, Ozcan S, Karagoz MA, et al. Should manual detorsion be a routine part of treatment in testicular torsion? *BMC Urol* 2017;17:84.
<https://doi.org/10.1186/s12894-017-0276-5>
- [23] Betts JM, Norris M, Cromie WJ, Duckett JW. Testicular detorsion using Doppler ultrasound monitoring. *J Pediatr Surg* 1983;18:607-10.
[https://doi.org/10.1016/s0022-3468\(83\)80370-4](https://doi.org/10.1016/s0022-3468(83)80370-4)
- [24] Harvey M, Chanwai G, Cave G. Manual Testicular Detorsion under Propofol Sedation. *Case Rep Med* 2009;2009:529346.
<https://doi.org/10.1155/2009/529346>
- [25] Siu Uribe A, Garrido Pérez JI, Vázquez Rueda F, Ibarra Rodríguez MR, Murcia Pascual FJ, Ramnarine Sánchez SD, et al. Detorsión manual y cirugía diferida en la torsión testicular aguda [Manual detorsion and elective orchiopexy as an alternative treatment for acute testicular torsion in children]. *Cir Pediatr* 2019;32:17-21.
<https://pubmed.ncbi.nlm.nih.gov/30714696/>
- [26] Sheth KR, Keays M, Grimsby GM, Granberg CF, Menon VS, DaJusta DG, et al. Diagnosing Testicular Torsion before Urological Consultation and Imaging: Validation of the TWIST Score. *J Urol* 2016;195:1870-6.
<https://doi.org/10.1016/j.juro.2016.01.101>
- [27] Kiesling VJ Jr, Schroeder DE, Pauljev P, Hull J. Spermatic cord block and manual reduction: primary treatment for spermatic cord torsion. *J Urol* 1984;132:921-3.
[https://doi.org/10.1016/s0022-5347\(17\)49947-2](https://doi.org/10.1016/s0022-5347(17)49947-2)
- [28] Manivel V, Mirmiran B. Ultrasound-Guided Manual Testicular Detorsion in the Emergency Department. *J Emerg Med* 2020;58:85-92.
<https://doi.org/10.1016/j.jemermed.2019.09.020>