Trauma and Reconstruction

Testicular Dislocation After Scrotal Trauma: A Case Report and Brief Literature Review

Nick Zavras a,⁎, Argyrios Siatelis b, Evangelos Misiakos a, George Bagias a, Vassilios Papachristos c, Anastasios Machairas a

a Third Department of General Surgery, “ATTIKON” University Hospital, National and Kapodistrian University of Athens, Athens, Greece
b Second Department of Urology, “ATTIKON” University Hospital, National and Kapodistrian University of Athens, Athens, Greece
c Second Department of Pediatric Surgery, “P&A Kyriakou” Children’s Hospital, Athens, Greece

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ABSTRACT
Traumatic dislocation of the testis is a rare event after blunt trauma of the scrotum or abdominopelvic injury. The diagnosis may be overlooked because of associated major injuries. In this study, we report on an adult who presented with a left traumatic dislocation of the testis after a falling astride injury. A brief literature review is also cited.

Introduction
Traumatic dislocation of the testis (TDT) is an uncommon sequel of scrotal trauma, occurring after direct pressure on the scrotum and dislocating the testis outside its normal position to the surrounding tissue, usually the inguinal region.1,2 TDT may be a singular event1 or associated with blunt abdominopelvic trauma.3 Although TDT occurs more often at the time of injury,2 in a few cases, a TDT has been recognized as a later event.1 Ultrasound (U/S), color-flow Doppler U/S, and computed tomography (CT) are the main diagnostic tools of this condition.4 Early diagnosis and treatment are recommended to preserve testicular function and to avoid the risk of malignant transformation.1 In this study, we report on a case of TDT in an adult, with a brief review of this rare condition.

Case presentation
A 27-year-old man was admitted to our Department 3 days after an injury from falling astride on a crossbar. The patient subsequently noted that the left testis was moved to the left inguinal region. There was not a history of undescendent or retractile testis in the past. On physical examination, his perineum and penoscrotum region had small abrasions, whereas the left scrotum was empty without hematoma. The testis was palpable in the left inguinal region (Fig. 1). The rectal tone was normal. A urine sample showed no blood. A color Doppler U/S revealed that the left testis was located in the inguinal canal, with normal size, and adequate blood supply of the testis (Fig. 2). A left-sided inguinal operation was performed, which revealed an apparently healthy testis. The testis was pushed in the scrotum without tension, and through a transverse scrotal incision, fixation of the testis to the scrotum was performed. The patient had an uneventful recovery and was discharged on the first post-operative day.

Discussion
TDT, also referred as traumatic luxation of the testis as first reported by Clauby in 18185 when a victim had been run over by a wagon wheel. The exact incidence of TDT is not known, as the condition may be underreported or misdiagnosed.1 We performed a search in PubMed and Google Scholar for articles published in the English language literature with the key words traumatic testicular
dislocation or testicular dislocation. The results showed 47 reports (101 patients) published between 1965 and the present (Table 1). Most of them were case reports with brief review, and only 2 were retrospective studies (reports 25, 31). In most cases (80.2%), a TDT occurred after a motorcycle accident (Table 1). The mean age of the patient was 25.09 years (standard deviation 10.52), with a range from 6 to 62 years. Of note, only 2 patients were children (reports 31, 47). The percentage of unilateral TDTs vs bilateral TDTs was almost equal (49.5% vs 50.5%, respectively). This finding was in contrast to other studies, in which the referred percentage of unilateral TDTs was almost 3 times that of bilateral.

The main mechanism of TDT is a direct force propelling the testis out of the scrotum, after rupture of the fasciae (external, cremasteric, and internal) of the spermatic cord. Predisposing factors include a cremasteric muscle reflex, a widely open superficial inguinal ring, and the presence of indirect inguinal hernia and an atrophic testis.

The most common site of dislocation is the superficial inguinal pouch (almost 50% of all cases). Other less common sites of TDT are

Table 1
List of the reported traumatic testicular dislocations in the English language literature between 1965 and present

| Report | Author(s)/Journal Number of Patients | Age, y | Mechanism of Injury | Unilateral/Bilateral | Localization | Treatment |
|--------|-------------------------------------|--------|---------------------|----------------------|-------------|-----------|
| 1      | Morgan, Br J Surg 1965; 52: 669     | 4      | 9-20                | Unilateral: 4        | SIP: 4      | CR: 1, operation: 3 |
| 2      | Neistadt, J Urol 1967; 97: 1057     | 1      | 15                  | MA                   | Bilateral: Pubic Cr | CR       |
| 3      | Sethi, J Urol 1967; 98: 501        | 1      | 34                  | Run over a bullock cart | Unilateral: Prepuce | Operation |
| 4      | Boardman, Injury 1975; 7: 44       | 1      | 17                  | Fall                 | Bilateral: SIP | Operation |
| 5      | Goulding, J Trauma 1976; 16: 1000  | 1      | 22                  | MA                   | Unilateral: SIP | Operation |
| 6      | Edson, J Urol 1979; 122: 419-420   | 1      | 20                  | MA                   | Unilateral: SIP | Operation |
| 7      | Kauder, J Urol 1980; 123: 606      | 1      | 23                  | MA                   | Bilateral: SIP | Operation |
| 8      | Foster, J Urol 1981; 126: 708      | 1      | 28                  | MA                   | Unilateral: SIP | Operation |
| 9      | Pollen, J Trauma 1982; 22: 247     | 1      | 22                  | MA                   | Bilateral: SIP | Operation |
| 10     | Nakarajan, Urology 1983; 22: 521  | 3      | 22-25               | MA: 3                | Bilateral: 1 | Operation: 3 |
| 11     | O'Connell, Br Med J 1984; 77: 107  | 1      | 39                  | Fall                 | Unilateral: SIP | Operation |
| 12     | Koga, Urol Int 1990; 45: 310       | 1      | 17                  | MA                   | Bilateral: McBurry's point: [R] | Operation |
| 13     | Singer, Urology 1990; 35: 310      | 1      | 19                  | MA                   | Unilateral: Inguinal region: [L] | CR |
| 14     | Feder, Am J Emerg Medicine 1991; 9: 40 | 1      | 20                  | Hit during sexual relations | Unilateral: Abdomen | CR |
| 15     | Lee, Urology 1992; 506             | 1      | 23                  | MA                   | Unilateral: SIP | Operation |
| 16     | Wright, Injury 1993; 24: 129       | 1      | 35                  | MA                   | Unilateral: SIP | Operation |
| 17     | Madden, Acad Emerg Med 1994; 1: 272 | 1      | 35                  | MA                   | Unilateral: SIP | CR |

(continued on next page)
as follows: pubic (18%), penile (8%), canalicul (8%), truly abdominal (6%), perineal (4%), acetabular (4%), and crural (2%).

Physical examination reveals a palpable mass consistent with a dislocated testis and an empty hemiscrotum. However, the diagnosis of a TDT may be initially overlooked because of the coexistence of other severe injuries. A history of retractile testis or unrecognized cryptorchidism should be excluded.

A preoperative U/S and color Doppler U/S are usually the first line methods to evaluate a TDT. Color U/S is not only useful for the diagnosis of a TDT, but also in determining the blood flow of the testis. Abdominal and pelvic CT scans are helpful in the cases of intra-abdominal dislocation or the presence of associated pelvic and scrotal trauma.

Manual reduction or surgical exploration is the treatment of choice in the case of a TDT. An attempt for manual reduction may be considered in the first 3–4 days after dislocation when edema has subsided and before adhesions formation. However, manual reduction is believed to be successful in only 15% of the cases. Reasons for that include the small size of the defect in the spermatic cord layers, the presence of edema, the possibility of further injury of the testis because of the force needed for restoration, and the risk of a future dislocation or torsion. On the basis of these assumptions, a manual reduction was not performed in our case. Surgical exploration is advised as the proposed treatment, as it is relatively minor, carries low morbidity, and may reveal an underlying testicular torsion or a coexistence of testicular trauma. Nevertheless the treatment of choice, an early intervention is recommended as biopsies in the case of a delayed reposition of dislocated testes beyond 4 months have shown histologic changes, including absence of spermatids, decreased spermatogonia, the presence of germ cells, and an increase in alternative germ cells. However, an improvement of spermatogenesis after treatment as long as 15 years after a TDT has also been reported.

Conclusion

Testicular dislocation is a rare complication of blunt scrotal trauma, usually occurring after motorcycle accident. A meticulous examination of the scrotum is recommended especially in the presence of multiple injuries. U/S and color Doppler U/S are the most useful tools in evaluation of a TDT, whereas a CT scan may be useful in the case of a complex trauma. As TDT is not a lethal condition, a careful plan of restoration of the testis is advised.

Table 1 (continued)

| No. | Report | Author(s)/Journal | Number of Patients | Age, y | Mechanism of Injury | Unilateral/Bilateral | Localization | Treatment |
|-----|--------|-------------------|--------------------|-------|---------------------|----------------------|-------------|-----------|
| 18  | Schwartz, Urology 1994; 43: 743 | 1 | 38 | Pedestrian-MVA | Unilateral | SIP | Operation |
| 19  | Toranj, Abdom Imaging 1994; 9: 379 | 1 | 19 | MA | Unilateral | AAW | Operation |
| 20  | Hayami, Urol Int 1996; 56: 129 | 1 | 17 | Car collision | Unilateral | SIP | Operation |
| 21  | O’Donnell, Br J Urol 1998; 82: 768 | 1 | 18 | MA: 2 | Bilateral: 1 | SIP: [R], Internal ring: [L] | Operation |
|     |                   | 1 | 20 | Unilateral: 1 | Right hemiscrotum: SIP: 3 | Operation: 3, CR: 1 |
| 22  | Tan, Ann Acad Med Singapore 1998; 27: 269 | 3 | 18-20 | MA: 3 | Unilateral: 2, Bilateral: 1 | SIP | Operation |
| 23  | Yagi, Urol Internat 1999; 62: 188 | 1 | 25 | Accident | Unilateral | Left thigh | Operation |
| 24  | Shefi, Urology 1999; 54: 744 | 1 | 22 | MA | Unilateral | SIP | Operation |
| 25  | Kochakarn W, J Med Assoc Thai 2000; 83: 208 | 36 | 18-38 | MA: 35 | Bilateral: 30 | SIP: 34 (64 testis) | Operation: 1, Orchiectomy: 1 |
|     |                   | 6 | 18-38 | Run over by truck: 1 | Unilateral: 6 | Perineum: 1, Acetabular area: 1 | Operation: 1, Orchiectomy: 1 |
| 26  | Yoshimura, J Urol 2002; 167: 1649 | 1 | 30 | MA | Bilateral | SIP | Operation |
| 27  | Bromberg, J Trauma 2003; 54: 1009 | 1 | 33 | MA | Bilateral | SIP | CR: [R], Operation: [L] |
| 28  | Blake, Emerg Med J 2003; 20: 567 | 1 | 21 | MA | Bilateral | SIP | Operation |
| 29  | Chang, Am J Emerg Med 2003; 21: 247 | 1 | 18 | MA | Unilateral | SIP | Operation |
| 30  | O’Brien, J Urol 2004; 171: 798 | 1 | 37 | MA | Bilateral | Retirovesical [R], SIP [L] | Operation |
| 31  | Ko, An Emerg Med 2004; 49: 371 | 9 | 6-53 | MA: 7, Explosive: 1, Seat belt: 1 | Bilateral: 2, Unilateral: 7 | Pubic: 5 | CR: 3, Operation: 5, Orchiectomy: 1 |
| 32  | Wu, J Chin Med Assoc 2004; 67: 311 | 1 | 40 | MA | Bilateral | SIP | Operation |
| 33  | Bedir, J Trauma 2005; 58: 404 | 1 | 23 | MA | Unilateral | Perineum | Operation |
| 34  | Vijayan, Indian J Urol 2006; 22: 71 | 1 | 18 | RTA | Unilateral | SIP | CR |
| 35  | Sakamoto, Fertil Steril 2008; 90: E9 | 1 | 33 | MA | Bilateral | SIP | Operation |
| 36  | Ezra, Abdom Imaging 2009; 34: 541 | 1 | 26 | MA (FTI) | Bilateral | SIP | Operation |
| 37  | Kilian, J Ultrasound 2009; 28: 549 | 1 | 22 | SI | Bilateral | SIP | Operation |
| 38  | Aslam, Can Urol Assoc J 2009; 3: E1 | 1 | 22 | MA | Unilateral | Ingual canal | Operation |
| 39  | Vasudeva, J Emerg Trauma Shock 2010; 3: 418 | 1 | 17 | MA | Bilateral | SIP | Operation |
| 40  | Phuwaprasissarn, J Med Assoc Thai 2010; 93: 1 | 1 | 27 | MA | Unilateral | SIP | Operation |
| 41  | Perera, J Clin Imag Sci 2011; 1: 17 | 1 | 30 | MA | Unilateral | SIP | Operation |
| 42  | Tsurukin, Abdom Imaging 2011; 19: 379 | 1 | 32 | MA | Bilateral | Perineum | Operation |
| 43  | Naseer, Ann R Coll Surg Engl 2012; 94: e109 | 1 | 53 | MA | Unilateral | SIP | Operation |
| 44  | Smith, J Surg Orthop Adv 2012; 21: 162 | 1 | 23 | MA | Bilateral | SIP | Operation |
| 45  | Sinasi, Hong Kong J Emerg Med 2012; 19: 295 | 1 | 26 | MA | Unilateral | SIP | CR |
| 46  | Boudissa, Orth Traum Surg Res 2013; 99: 485 | 1 | 62 | MA | Unilateral | Intrapelvic (R) Ingualcanal cyst (L) | Operation |

AAW, anterior abdominal wall; CR, closed reduction; FTI, fuel tank injury; L, left; MA, motorcycle accident; MVA, motor vehicle accident; NR, nonreported; PTT, partial testicular torsion; R, right; RA, road accident; RHN, right inguinal hernia; RTA, road traffic accident; SI, straddle injury; SIP, superficial inguinal canal.
Conflict of interest
The authors have no conflicts of interest.

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