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Original Article

Testicular torsion in undescended testis: A persistent challenge

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Abstract *Objective:* To evaluate the management and outcomes of patients who presented with torsion of an undescended testis and review the reported series in the literature.
Methods: The case records of 13 patients operated for testicular torsion involving undescended testis were retrospectively reviewed. The medical records included age at presentation, medical history, physical examination, operative findings and the results of follow-up. The diagnosis of torsion of undescended testis was made clinically and confirmed by inguinal exploration.
Results: In six cases the testis was preserved and orchiopexy was performed, while in seven cases orchidectomy was performed due to testicular gangrene in six patients and testicular tumor discovered peroperatively in one case. Mean duration of symptoms at time of surgery in the orchiopexy group was 6.5 h and in the orchidectomy group was 21.2 h. From six patients treated by orchiopexy, two patients suffered from testicular atrophy at a mean of 24 months.
Conclusion: Testicular torsion in undescended testis is still diagnosed with delay which may affect testicular salvage. The importance of examination of external genital organs is highlighted which should be routinely included by emergency physicians in physical examination for abdominal or groin pain.

1. Introduction

Cryptorchidism or undescended testis (UDT) is one of the most common pediatric disorders of the male endocrine glands and the most common genital disorder identified at birth. The incidence of cryptorchidism is 1%–4% in full-term newborns and in up to 45% of preterm male babies [1]. The literature concerning UDT mainly concentrates on the increased risks of infertility and germ cell tumor

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development as the primary sequelae of this condition. The UDT is also at higher risk for torsion [2—5]; misdiagnosis or delayed diagnosis of testicular torsion with subsequent testicular loss is a relatively common subject of litigation. Only a few cases of torsion in UDT have been reported in the current literature and are mostly limited to case reports [6]. The aim of this study was to evaluate the management and outcomes of patients who presented with torsion of a UDT and review the reported series in the literature.

2. Materials and methods

We reviewed and analyzed 13 cases of testicular torsion involving UDT operated at our Department of Urology, from January 1999 to January 2015. The medical records included age at presentation, medical history, physical examination, operative findings and the results of follow-up. The diagnosis of torsion of UDT was made clinically and confirmed by inguinal canal exploration. Color-Doppler ultrasound (CDU) was performed before surgery in only one case. Immediate CDU examination was not available for the other cases and it was thought to delay surgery. Surgical exploration was carried out through inguinal incision. In all cases immediate detorsion of the spermatic cord was performed. If the testis remained vital after manual detorsion, orchiopexy and fixation of the testis in a dartos pouch were performed. If the testis remained dark it was wrapped with warm saline-soaked towels for at least 5 min. Subsequently, if no recovery in the color of the testicle was seen, the tunica albuginea was incised. When no bleeding was detected after 10 min, an orchidectomy was performed. All removed testes underwent histopathological examination.

The patients were followed up at 1, 3 and 12 months postoperatively, and then examined once a year. Ultrasonography was performed 3 and 12 months after surgery to assess testicular volume. The latter was calculated using the formula 0.52 $\times$ length $\times$ width $\times$ thickness of the testicular ellipsoid. Testicular atrophy was defined as a difference $>$50% between the affected and the contralateral testes. Testicular hypotrophy was defined as a difference $>$20%.

3. Results

Patient age ranged from 1 to 49 years (median 10.8 years). Twelve patients were children, one patient was 49 years old. Torsion affected the left side in seven cases and the right side in six cases. Physical examination showed bilateral cryptorchidism in three patients with unilateral testicular torsion; associated contralateral inguinal hernia was noted in one case. No patient had a significant past medical history. Clinical symptoms mainly included the appearance of inguinal swelling with firm mass palpated in the groin region in 11 cases, erythematic in two cases. Periumbilical and right iliac fossa pain was reported in the adult patient mimicking appendicitis. Inconsolable crying was noted in a one-year-old patient. Symptoms were accompanied by nausea and vomiting in three patients. Only four patients (30.7%) were admitted to the hospital within 6 h after symptoms appearance. Unfortunately, nine patients were referred to our department 6—48 h after the onset of symptoms. Two children were initially admitted in surgical department due to misdiagnosis of incarcerated inguinal hernia; scrotum was not examined by physician in the emergency room. Surgery was performed after unsuccessful attempts of manual reduction and the diagnosis of testicular torsion was made peroperatively. Mean duration of symptoms at time of surgery in the orchiopexy group was 6.5 h (range 3—12 h) and in the orchidectomy group was 21.2 h (range 8—48 h). On physical examination, painful inguinal mass with empty ipsilateral hemiscrotum was identified in 12 patients. Tenderness on palpation of the right iliac fossa was noted in the adult patient with not palpable testis and empty ipsilateral hemiscrotum. Contralateral testis was palpable in the inguinal canal in three cases. Five patients had a fever. CDU was performed before surgical exploration in one case showing no vascular flow within the UDT with surrounding hyperemia. Patients' characteristics and operative findings are presented in Table 1. Exploration was universally performed through an inguinal approach. In six patients with apparently long-standing necrosis, orchiectomy was performed because no testicular viability was observed despite appropriate salvage attempts. In one patient (the adult patient) orchiectomy was performed because of associated suspected testicular mass discovered peroperatively. The six remaining patients (46.15%) initially exhibited ischemic effects but achieved some improvement in testicular color following detorsion and warming of the tissue. In these cases the testes were preserved and one-stage orchiopexy was performed. Concomitantly contralateral orchiopexy was performed in 10 patients with unilateral cryptorchidism. In the three cases of bilateral cryptorchidism, contralateral orchiopexy was performed, via inguinal approach, at the same time of initial surgery. Diagnosis of testicular hemorrhagic infarction and necrosis was confirmed on histological examination of the six excised testes. In the adult patient, a limited pure seminoma was revealed without vascular invasion. Patients were followed up for a mean of 33.8 months. From six patients treated by orchiopexy, two patients suffered from testicular atrophy at a mean of 24 months. Three patients had testicular hypotrophy at a mean of 8 months. In one case, the testis was normal in size 4 years postoperatively.

4. Discussion

Testicular torsion is a well known urologic emergency that needs to be diagnosed and treated rapidly for the salvage of testis. It was first described in 1840 by Delasiauve, and this happened to be in a 15-year-old boy with UDT [4].

A UDT may be located in the abdomen, the inguinal canal, the superficial inguinal pouch, and the upper scrotum. Approximately 70% of UDT are palpable. For testes that are not palpable, approximately 30% will be found in the inguinal-scrotal area, 55% will be intra-abdominal, and 15% will be absent or vanishing [7]. The most serious complications of cryptorchidism are a high rate of infertility and a high incidence of testicular cancer [8]. Orchiopexy is ideally performed prior to the first year of age with the