

Laparoscopy and Transseptal Orchiopexy in the Management of Transverse Testicular Ectopia

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Abstract Transverse testicular ectopia (TTE) is a rare congenital anomaly in which both testes descend through the same inguinal canal. The most frequent clinical presentation is undescended testis (UDT) with ipsilateral inguinal hernia and contralateral non-palpable testis. This condition is often diagnosed during surgery and is frequently associated with other anomalies. There is controversy in the surgical management of TTE. Considerations for TTE repair include avoiding damage to the testes or vas deferens and detection of other congenital anomalies. Frequently, the vas deferens and testicular tissues are joined, and dissection of these structures can cause damage. In this article, we report four patients with TTE, describe the surgical approach made in each case, and provide a review of the literature.

Keywords Transverse testicular ectopia · Undescended testis · Inguinal hernia · Laparoscopy

Introduction

Transverse testicular ectopia (TTE) or crossed testicular ectopia was first described by Von Lenhossek in 1886, and since then,

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around 100 cases have been reported. TTE is a congenital anomaly in which one testicle migrates to the contralateral side. This ectopic testis may lie in the opposite hemiscrotum, inguinal canal, or deep inguinal ring [1]. The most frequent clinical presentation is undescended testis (UDT) with ipsilateral inguinal hernia and contralateral non-palpable testis [2, 3]. TTE often coexists with other anomalies such as inguinal hernia, hydrocele, persistent Müllerian duct syndrome (PMDS), disorders of sex development, and karyotype anomalies [2–5].

Different approaches have been described for the treatment of TTE, including separation of both spermatic cords and descending each spermatic cord and testis through the ipsilateral inguinal canal, or descending both spermatic cords and testes through the same inguinal canal and then perform a transseptal orchiopexy. We described our experience in the surgical management of patients with TTE.

Case Presentation 1

A 2-month-old presented to our office with a diagnosis of a left non-palpable testis. On physical examination, the left scrotum was empty, right inguinal hernia was diagnosed, and after reduction, a mass was palpated in the right groin. Ultrasound (US) was performed and showed both testes in the right inguinal canal, with adequate size and echogenicity (Fig. 1). During laparoscopy, a left to right TTE was confirmed. After freeing enough length of the left spermatic vessel, we realized the vas deferens of both testes were joined; therefore, we could not bring the left testis (LT) toward the left inguinal canal. Consequently, both testes were brought down sequentially into the right hemiscrotum. After making an opening in the scrotal septum, a transseptal orchiopexy was done. The right inguinal hernia was repaired. Fourteen months after surgery both testes were in orthotopic position and were equal in size.



Fig. 1 Right inguinal US, showing both testes in the inguinal canal with normal homogenous echogenicity

Case Presentation 2

A 19-month-old was referred to our service for UDT. On physical examination, the left hemiscrotum was empty and both testes were palpable at the level of the right inguinal canal. US was performed, showing both testes in the right inguinal canal with normal homogenous echogenicity and size; right inguinal hernia was also noticed. After ligating the hernia sac, both testes were brought down to the right hemiscrotum and transseptal orchiopexy was performed (Figs. 2, 3, and 4). One month after surgery, both testes were in orthotopic position and equal size.

Case Presentation 3

A 7-month-old patient referred to our department for UDT. Physical examinations showed a high left UDT and right non-palpable testis. At age of 10 months, diagnostic laparoscopy showed the right testis (RT) in the right pelvic area about 2 cm from the internal inguinal ring. The gonadal vessels on right side were short, and there was a mesenchymal structure that went from the internal inguinal ring on the right side, identified as the gubernaculum, crossing over to the midline

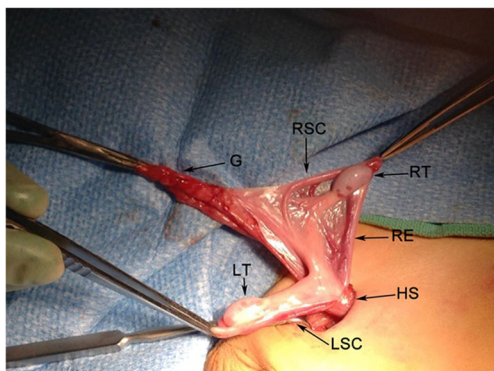


Fig. 2 Right groin incision showing the left spermatic cord (LSC) and the right spermatic cord (RSC) join. In addition, the gubernaculum (G), left testis (LT), right testis (RT), and abnormal right epididymis (RE) are seen. Location of the hernia sac (HS) is also seen

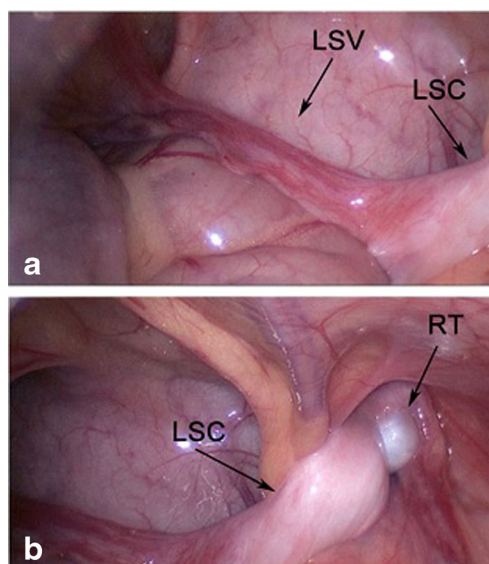


Fig. 3 Laparoscopy showing a) the left spermatic vessels (LSV) going to the upper left internal ring and the left spermatic cord (LSC) and b) the LSC and the right testis (RT) together in the right internal ring

entering the contralateral open internal inguinal ring. Also the right vas deferens crossed from the right to left inguinal ring and joined the left vas. The spermatic vessels on right side were short, so a right first-stage Fowler-Stephens orchiopexy was done. Left groin incision was done and the hernia sac was dissected. It was difficult to separate the sac from the cord, and in the process of separating the sac, the RT was moving toward the left side. This portion of the procedure was aborted, and without ligating the left hernia sac, the LT was brought to left scrotum.

Ten months later, a right laparoscopic second-stage Fowler-Stephens orchiopexy was performed. A biopsy of the mesenchymal-like tissue was taken, confirming the diagnosis of PMDS. Six months after surgery, both testes are orthotopic in the scrotum.

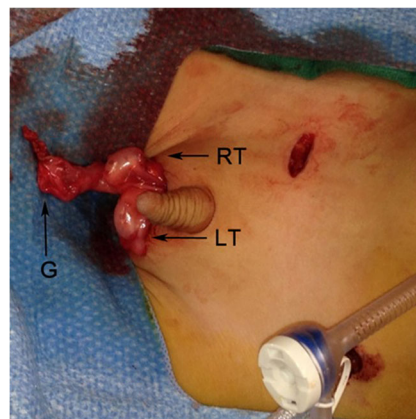


Fig. 4 Right scrotal insertion showing the left testis (LT) and right testis (RT) in the right hemiscrotum, before the transseptal orchiopexy was done. Gubernaculum (G)

Case Presentation 4

A 17-month-old presented with non-palpable LT and right inguinal hernia. During a diagnostic laparoscopy, no testis was found. A right inguinal incision revealed both testes in the hernia sac. Gonads were biopsied and brought to the right hemiscrotum. Pathology demonstrated normal testicular histology with a 46,XY karyotype. Fourteen months later, a transseptal orchiopexy was performed. Six months after the second procedure, both testes are in orthotropic position and of normal size.

Discussion

Normal testicular descent involves a transabdominal and inguinoscrotal phase, which starts in the 7th week of gestation and is completed by the 35th week [6]. The mechanisms of the pathological descent in TTE remains unclear, but there are some hypotheses that may help to explain the pathophysiology. Kimura suggests that both testes originate in different sides, but during fetal development, an error occurs and both testicles descend through the same canal [7]. Gupta hypothesizes that early adherence and fusion of the Wolffian ducts forces descent of both testes on one side [8]. Berg suggests that both testes arise from the same germinal ridge [9].

TTE is classified according to the associated anomalies. Type 1 is accompanied only by inguinal hernia (40–50 %). Type 2 is accompanied by persistent or rudimentary Müllerian duct structures (30 %). Type 3 is accompanied by other anomalies such as sexual differentiation disorders, hypospadias, and scrotal abnormalities (20 %) [1, 6, 10].

In the majority of patients, the diagnosis occurs during early childhood, with an average age of 4 years. In most cases, TTE is diagnosed during surgery because patients usually present with UDT or symptomatic inguinal hernia. Occasionally, two masses are palpable in the same inguinal canal with ipsilateral inguinal hernia and contralateral non-palpable testis. An US can assist in diagnosis, and when sonographic findings are inconclusive, magnetic resonance imaging (MRI) can be considered for localization of the testis. However, in the reported literature and in our experience, laparoscopy is sufficient for diagnosis, evaluation, and treatment. The main differential diagnosis of TTE is polyorchidism [11].

There is controversy in the surgical management of TTE. Surgical considerations during repair of TTE include avoiding damage to the testes or vas deferens and detection of other congenital anomalies. Frequently, the vas deferens and other testicular tissues are joined, and dissection of these structures can cause cord and testicular damage. In our experience, the preferred surgical approach is transseptal orchiopexy, a technique where both testes are brought down sequentially through the ipsilateral scrotum, without separation of joined

cord structures; then after doing a transseptal incision, testes are fixed in the right and left hemiscrotum, as we report in three of our cases. If there is no possibility to separate the cord structures, both testes can be left in the same hemiscrotum [1, 12].

Simple orchiopexy can be considered when the spermatic cord and testis can be dissected without harming the structures and if there is adequate length, as described in case 3. Orchiectomy is reserved for cases in which there is no possibility to position the testes in the scrotum or when ectopic testis is atrophic or dysmorphic [13].

Conclusion

TTE is a rare congenital anomaly that usually presents as UDT with ipsilateral inguinal hernia and contralateral non-palpable testis. Preoperative diagnosis requires a high level of suspicion. While imaging studies such as US and MRI may be helpful, laparoscopy is sufficient for diagnosis, evaluation, and treatment. A transseptal orchiopexy approach is safe and effective in descending both testes in the scrotal area and preserving spermatic cord structures.

Compliance with Ethics Guidelines

Conflict of Interest Ruben Blachman-Braun, Alireza Alamsahebpour, Angela Gupta, Miguel Castellán, and Jose' Campos S each declare no potential conflicts of interest.

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