SHORT COMMUNICATION

A patent processus vaginalis is a requirement for a laparoscopic orthotopic staged spermatic vessel-sparing procedure for intra-abdominal undescended testis

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Abstract
Purpose Laparoscopic orthotopic traction orchidopexy is a modification of the Shehata orchidopexy approach. Spermatic cord length is achieved by passing the testis through the inguinal canal, under tension, and securing the testis to the ipsilateral scrotal base. Spermatic vessels are not divided. Following intra-operative review of this technique, we present practical considerations.
Methods We attempted the laparoscopic orthotopic traction approach in a 2-year-old boy presenting with bilateral undescended testes.
Results In the presence of a closed deep inguinal ring, traction of testis into the scrotum is necessarily non-orthotopic and increases risks associated with the procedure.
Conclusion A closed ring should be considered a contra-indication to performing laparoscopic orthotopic traction orchidopexy.

Keywords Laparoscopy · Orchidopexy · Orthotopic · Patent inguinal canal · Undescended testis

Introduction
The current standard of care for undescended testes, i.e., laparoscopic Fowler-Stevens [1, 2] procedure leads to high (> 85%) rates of testicular relocation into the scrotum [3]. However, the rate of testicular atrophy environs 15%, secondary to ligation of testicular vessels [3]. The Shehata approach [4, 5] both spares and lengthens the testicular vessels. In the first stage, the intra-abdominal testis is sutured medial to the contralateral anterior superior iliac spine for 12 weeks. This stretches both peritoneum and spermatic cord vessels [5]. The second stage is similar to a Fowler-Stevens approach, i.e., the testis and spermatic cord are inspected laparoscopically and the viable testis drawn into the scrotum.

David et al. [6] have described a modification to the Shehata approach, i.e., laparoscopic orthotopic staged traction orchidopexy. In this approach, the lengthening is achieved by suturing the testis to the ipsilateral scrotal base. An intra-abdominal suture is passed through the testis. The suture length is then grasped with a Maryland and passed through a patent processus vaginalis and into the scrotum. Applying traction to the suture mobilizes the testis into the inguinal canal as much as possible. Laparoscopic vision is maintained to monitor the tension applied to spermatic vessels. This tension suture is then attached to the dermis of scrotal skin of the ipsilateral hemiscrotum.

This approach presents two advantages. First, the testicular vessels are both spared and lengthened. Second, the lengthening is orthotopic. Indeed, in the case series description [6], the first and third cases had testes located within the inguinal canal at the second stage procedure. For these, manual reduction into the scrotum followed by a suture pexy was sufficient. In the second case described by David et al. [6], the testis was located in the groin at the second stage and required open orchidopexy as a third-stage procedure.
Findings

Our patient presented at 2 years with bilateral impalpable undescended testes. The delay in presentation was initially due to endocrine survey, then prolonged by the coronavirus pandemic. We initially planned to use the David approach [6] (laparoscopic orthotopic traction orchidopexy). This approach would be particularly desirable for this patient to reduce the risk of bilateral atrophy or testicular loss.

Under general anesthesia and using 5 mm scope (30 degrees) and 5 mm instruments, the testes were located within the abdomen. Both testes were identified lying within the pelvis. The testicular vessel sheaths were short bilaterally. Crucially, the deep ring was closed bilaterally. On close inspection there was no obvious processus or plane to safely develop passage into the inguinal canal.

A standard Fowler-Stevens first stage was performed, i.e., ligating testicular vessels. The testes were each sutured to their ipsilateral deep ring to encourage vessel collateralization and aid rapid location at second stage (Fig. 1).

Summary

The feasibility of David approach [6] is entirely dependent on a patent processus vaginalis. Where the deep ring is closed, non-orthotopic passage of testis into scrotum risks bleeding and hematoma from disrupted inferior epigastric, iliac and scrotal vessels, and adhesions. Bladder injuries during first-stage laparoscopic orchidopexy have also been described [6]. The authors have also described the first step in this technique as checking for patency of the process vaginalis. We submit that a closed ring should be considered a contra-indication to performing laparoscopic orthotopic traction orchidopexy.

Financial disclosure None.

Declarations

Conflict of interest Eve Macharia-Coates prepared this short communication and takes responsibility for the content, images, and reporting accuracy. Amulya Saxena was the responsible surgeon.

Permission to publish Consent obtained.

Ethical issues None.

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