



Laparoscopic 1st stage orchiopexy using antiadherent sheet for high abdominal testis

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ARTICLE INFO

Keywords:

Cryptorchidism
Laparoscopy
Pediatrics
Prune-belly syndrome
Orchiopexy
Spermatic vessels

ABSTRACT

High undescended testes with short spermatic vessels are not treated with standard orchiopexy and are currently brought to scrotum prevalently after the section of spermatic vessels, according to the Fowler-Stephens procedure. The ischemic risk of that method is elevated and becomes unbearable in bilateral cases.

In 2009 an original staged orchiopexy technique was proposed to elongate the whole cord with anti-adherent sheet preserving the spermatic vessels by which a normal scrotal position was successfully gained without any testis loss. Both stages were performed through inguinoscopy.

In the present article the successful procedure is updated with implementation of laparoscopy in the first stage in a case of extremely high bilateral 4a type abdominal testis.

Laparoscopic access was confirmed as valuable both in terms of extended mobilization and coverage of the entire testis vascular supply.

The method of progressive cord elongation by using an anti-adherent sheet avoids the excessive atrophy hazard deriving from the Fowler-Stephens procedure in bilateral high abdominal 4a type testes; based on our findings, the latter can benefit also of a laparoscopic approach in the first stage.

1. Background

At the end of their migrating process testes are non-palpable in as much as 20% of all boys over 1 year of age [1]. Often the reason for this problem, occurring in 1%–3.5% of all children with undescended testes, is the high abdominal position with shortness of vessels [2].

For this group of affected children, standard orchiopexy cannot be effective and some technical adjustments have been proposed through time, also thanks to advantages given by laparoscopic access; unfortunately so far the most practiced surgery is still the single or staged Fowler-Stephens (F-S) procedure that involves the section of spermatic vessels [3] causing a major hazard of ischemic atrophy especially in bilateral cases [4–7].

In 2009 our surgical team proposed an original staged technique for selected patients with short spermatic vessels. It was based on the smooth and long lasting traction exerted by a scrotal orchiopexy on the entirely preserved cord wrapped in an anti-adherent sheet inside the inguinal channel. As a result, no gonadal loss was reported in a series of 45 testes including 7 bilateral cases [8]. Both stages of the latter

technique were carried out through inguinoscopy, by which the requested retroperitoneal dissection was always adequately performed.

The aim of the present report is to update this successful procedure also in the case of extremely high 4a abdominal testis in which both the mobilization of the cord elements and the wrap arranging had the advantage to be performed laparoscopically, as occurred in the case of a young patient with Prune-Belly syndrome harboring bilateral extremely high testes [9].

2. Case report

A 3-year old child with Prune-Belly syndrome underwent laparoscopic exploration for bilateral unpalpable testes and a negative ultrasound study.

First stage: Laparoscopic exploration showed both testes had remained in the abdomen so high they could painfully attain the inner inguinal ring under heavy traction, therefore they were classified as a 4a type [10] (Fig. 1).

We decided to apply the described staged orchiopexy [8], carrying

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<https://doi.org/10.1016/j.epsc.2020.101545>

Received 5 June 2020; Received in revised form 20 June 2020; Accepted 22 June 2020

Available online 27 June 2020

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out the first stage laparoscopically on one testicle, planning the treatment of the other one consequently. Both blood supply lines of the left testis were widely mobilized through endoscopic surgery from the retroperitoneal space after Prentiss [11], gaining enough length to pull the testis just outside the internal ring through the usual inguinal incision (Fig. 2). The anti-adherent PTFE sheet (Gore-Tex Preclude) was tailored as a tube with separated stitches on one extremity to be fitted to the patient (Fig. 3). The tube was wrapped all around the testis and cord and slid through the internal ring into the retroperitoneal space where laparoscopically it was tensed to cover the maximum length of spermatic and deferential divergent vessels (Fig. 4). The PTFE tube was trimmed distally at the proper length and secured to the testis, leaving uncovered the lower pole of the gonad that was anchored to the scrotum folded inward for the traction (Fig. 5). No surgical difficulties related to the abdominal wall slackness arose [12,13]; the child was safely dismissed and no trouble was observed at regular outpatient follow-up.

Second stage: Twelve months after the surgery the anti-adherent protection was removed through the same inguinal incision. Testis lower pole was stuck outside the external ring but the cord was loose, free from adhesions and allowed testis repositioning in a satisfactory scrotal position.(Fig. 6).

At follow up, 6 months after the second stage, testis maintained its volume and a good Doppler signal was detected from the spermatic cord. No postoperative complications occurred and, as already noted for standard laparoscopic orchiopepy [14], no signs of herniation through the internal ring were reported, even after the passage of the Gore-Tex tube.

3. Discussion

Surgical treatment of cryptorchidism with very short spermatic vessels is challenging and frequently debated by pediatric surgeons. In these cases the most recurrent technique used is to move the cryptorchid testis to a satisfactory scrotal position preserving only the deferential vessels as described in the F-S method [3]. This approach, no matter if carried out in 1 or 2 stages in open or endoscopic surgery, implies a significant risk of testicular ischemic atrophy. In children with bilateral abdominal testes such a procedure might pose an increased risk as it can endanger both gonads, therefore in this kind of pediatric patients any effort should be done to preserve the whole testis vascular supply.

More than 10 years ago we proposed a two-stage alternative to the F-S procedure, that could ensure to high undescended testes a scrotal position and an adequate blood supply through an open inguotomy [8].

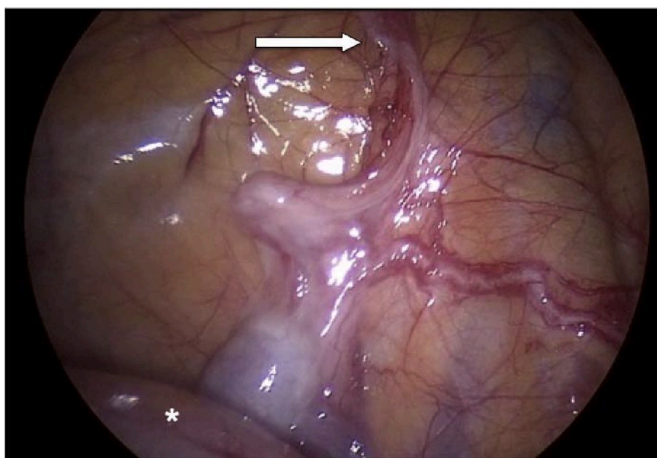


Fig. 1. Laparoscopic view of abdominal left testis with very short spermatic vessels (4a type). Arrow = the internal ring; * = sigmoid.

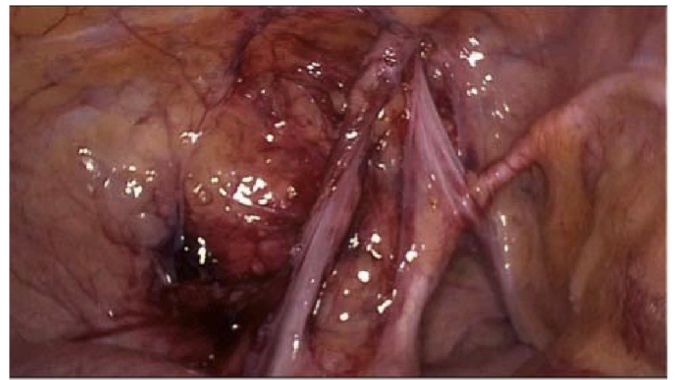


Fig. 2. After extended mobilization of both blood supplies the testis is pulled outside the internal ring.



Fig. 3. The PTFE tube tailored in running suture and separated stitches to be wrapped and trimmed around the testis and cord.

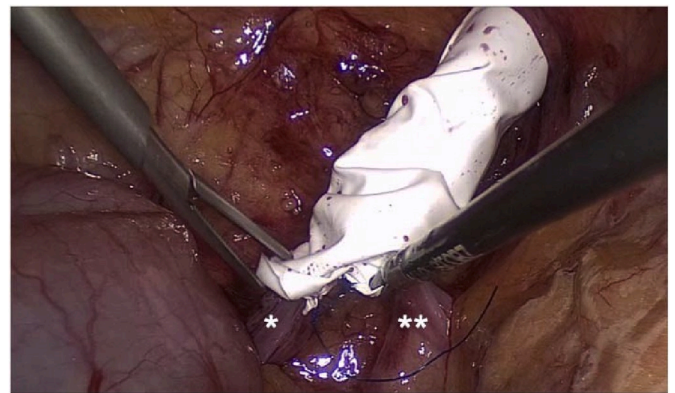


Fig. 4. Laparoscopy showing the PTFE tube is passed through the internal ring tensed to cover as much as possible both testis vascular pedicles (* = spermatic; ** = deferential).

We updated that technique through laparoscopy implementation in the first stage as needed in a patient carrying a Prune-Belly syndrome whose testes were retained very high in the abdomen, defined as the most unfavorable 4a type testicles.

Laparoscopic access, still unreported for this orchiopepy method, proved effective both to mobilize extensively the whole testis vascular supply preserving the short spermatic vessels and to enable its maximal coverage by the anti-adherent PTFE tube drawn inside the abdomen.

After the removal of the sleeve during the second stage surgery, the testis with its entire blood supply reached a satisfactory scrotal position hardly achievable with other treatments that relied only on traction

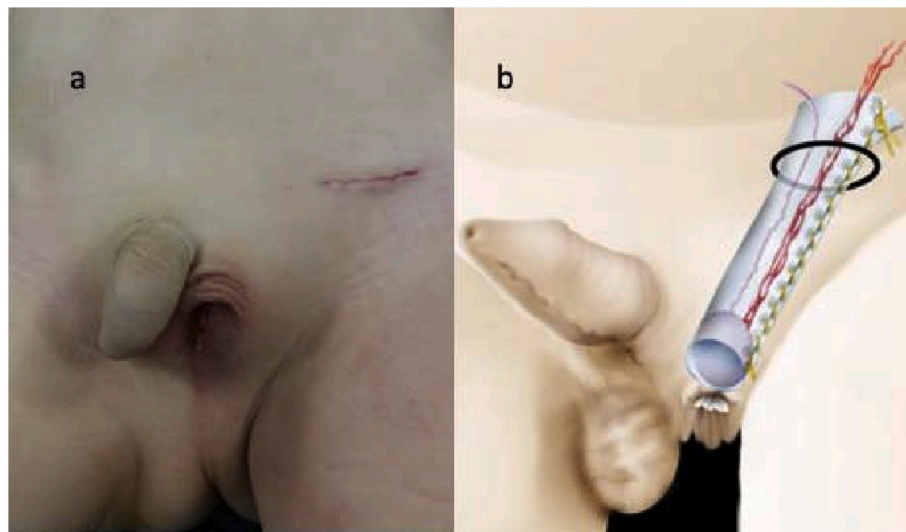


Fig. 5. a) After the first stage the testis is located high in the inguinal channel anchored to the scrotum that is folded inward for the traction. b) Conceptual scheme.

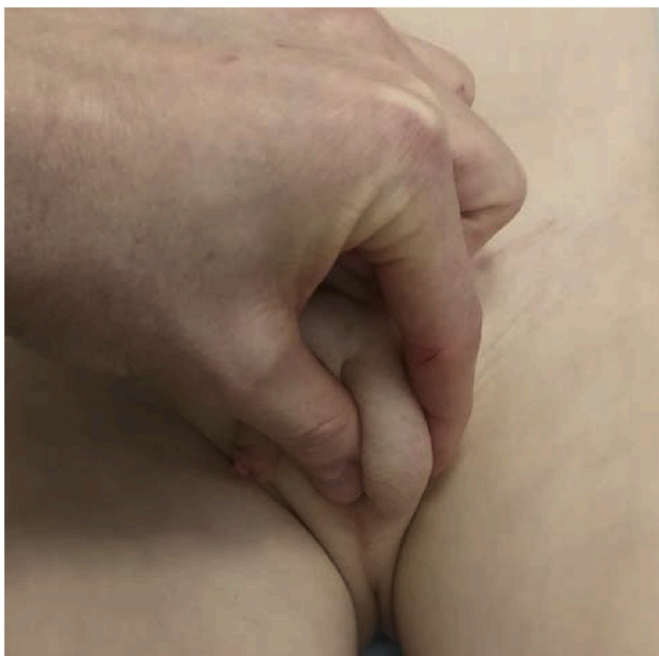


Fig. 6. After the second stage the testis is located in a normal scrotal position.

[15].

The method of progressive cord elongation obtained with an anti-adherent sheet avoids the excessive atrophy hazard of F-S procedure in bilateral cryptorchidism, and confirms to be suitable also in 4a type testes requiring a high intra-abdominal procedure that can benefit from a laparoscopic approach.

Patient consent: Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Funding

No funding or grant support.

Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

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