Complications of staged laparoscopic traction-orchiopexy for intra abdominal testis

Original Article

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ABSTRACT

Aim: To assess the complications of first-stage laparoscopic traction and early complications of second-stage orchiopexy for intra-abdominal testis.

Patients and Methods: A total of 78 boys were included in this study in the period from (February 2019 to April 2021) with age ranged from 6 months to 10 years; Doppler ultrasound (US) was done for ipsilateral and contralateral testis. First-stage traction was done and the testis was fixed to the anterior abdominal wall about 1 inch above and medial to the contralateral anterior superior iliac spine. Three months later second-stage laparoscopic orchiopexy was done.

Results: Total 78 cryptoid boys, Doppler ultrasound revealed (27 testes were detected, 21 were extra abdominal atrophic, and 32 testes were absent), but first-stage laparoscopic exploration revealed 34 testes were present in 32 boys with 2 cases bilateral undescended testis. In 46 boys, testes were absent (25 boys had blind-ended vas and vessels, and 21 boys had extra abdominal atrophic testis). Failed traction was detected in 5 (14.7%) cases due to slippage of the stitch. Retraction was done for 3 (9%) cases only; in the other 2 cases the testicular artery was long enough for doing the orchiopexy without re-traction. 12 weeks later, second-stage orchiopexy was done with testicular fixation in the sub-dartous pouch. Testicular ascent was detected in 3 (9%) cases. Testicular atrophy was not detected in this study.

Conclusion: Staged laparoscopic traction orchiopexy for intra-abdominal testes (Shehata technique) is safe and easy technique with minimal complications and good results. This technique is a good alternative for Stephen- Fowler staged orchiopexy that carries higher incidence of testicular atrophy.

Key Words: Orchiopexy, shehata technique, undescended testes.

Received: 30 April 2024, **Accepted:** 18 May 2024, **Published:** 4 October2024

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ISSN: 1110-1121, October 2024, Vol. 43, No. 4: 1330-1334, © The Egyptian Journal of Surgery

INTRODUCTION

In preterm infants, the incidence of undescended testis (UDT) varied from 10 to 30%, but in full-term infants, it varied from 3 to 6%[1]. The testes do not descend from the abdomen to the scrotum, which is the primary cause of this disorder[2,3]. Clinically, UDT is classified as either impalpable or palpable based on where the testes are located[2,4]. About 20% of testes that have not descended can be impalpable, meaning they may be intra-abdominal testis (IAT). Forty percent of IAT are of a normal size, with the remaining testes being atrophic or 'vanished'[1,5]. Laparoscopic exploration is still a crucial technique for the diagnosis and management of IAT, even if MRI and ultrasound can assist in the diagnosis of UDT[6].

The testes are difficult to be pushed into the scrotum because of the short testicular blood vessels, making laparoscopic treatment of high IAT problematic[7]. The earliest report of single-stage fixing of testis following spermatic vascular transection was made in 1959 by Fowler and Stephens[8,9]. The testes are positioned in the abdominal cavity in situ without any therapy following the ligation of the spermatic arteries, and staged surgery is then carried out. Furthermore, Shehata initially described a form of laparoscopic testicular traction and fixation for the management of elevated IAT in 2008[10]. With this technique, the testicular blood vessels are softly and continuously pulled by the intestine's gravity, eliminating the need to cut the spermatic cord blood vessels. Whether Shehata surgery is superior to folwer stephens surgery is still up for discussion, though[11,12].

This is a retrospective study conducted to evaluate staged laparoscopic traction-orchiopexy for IAT.

PATIENTS AND METHODS:

Seventy eight boys were included in this retrospective study in Mansoura University Children Hospital in the period from (February 2019 to April 2021) with age ranged from 6 months to 10 years; Doppler ultrasound (US) was done for ipsilateral and contralateral testis. First stage traction was done with dissection of testicular artery and vas

DOI: 10.21608/EJSUR.2024.286312.1060

difference. Then, testis was fixed to the anterior abdominal wall about 1 inch above and medial to the contralateral anterior superior iliac spine with non-absorbable sutures. 3 months later second stage laparoscopic orchiopexy was done.

Operative technique

The patient was placed in a Trendelenburg position with the ipsilateral side raised to move the bowel out of the surgery field. By the open method, a 5 mm telescope was put via the umbilical port, and if the testis was found, two more 5 mm working ports were implanted in the midclavicular lines at the level of the umbilicus. To determine the location and size of the testis, the peritoneal cavity and inguinal area were examined. After that, the testis' motility and distance from the contralateral internal inguinal ring were assessed.

In the laparoscopic traction (Shehata) technique, the gubernaculum was divided as far as possible from the testis using a hook on monopolar diathermy and maintaining the gonadal vascular pedicle (Fig. 1). Once properly mobilized, it reached toward the contralateral anterior abdominal wall without exerting excessive force.

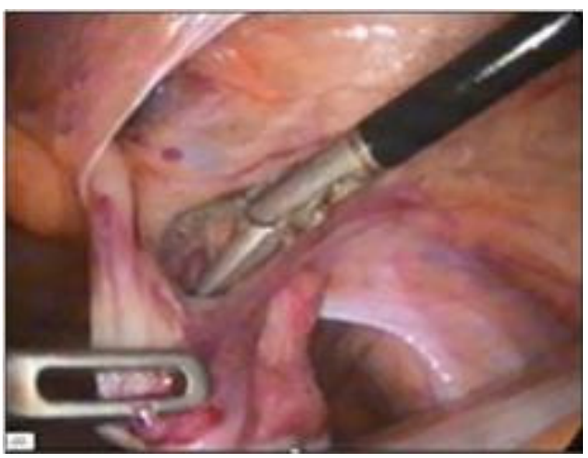

Fig. 1: Mobilization of the testis.

The testis was then fixed medially to the contralateral anterior-superior iliac spine and one inch above the anterior abdominal wall. Under laparoscopic vision, a tiny 2 mm incision was created with a number-11 blade, and a 5 mm needle holder was used to push a 2/0 nonabsorbable suture (proline) through the abdominal wall. To guarantee that the testis was not under excessive tension inside the abdominal cavity, the stitch was passed through the lower pole of the testis and then returned through the abdominal wall using the same incision (Fig. 2). The suture was then tied outside. The wound was closed and this traction knot was hidden behind the skin.

Fig. 2: Fixation of the testis to the anterior abdominal wall.

A second-stage laparoscopic-assisted orchiopexy was scheduled after 12 weeks. Any adhesions, suture slippage, or internal herniation within the abdominal cavity (bowel weight over the gonadal vessels causes gradual extension of the vessels). After that, any adhesions were split and the fixation stitch was divided with scissors. The testis was examined for descent to the bottom of the scrotum by laying it on the opposing internal ring. There was no need for additional dissection at step two. To fix the testis in the scrotum at a dartous pouch.

Exclusion criteria were:

(a) Vanished testis.

(b) Testes with long vessels that can reach the contralateral ring without tension.

(c) Testes with very short vessels that cannot be mobilized toward the contralateral ring.

In this study, we discuss age, duration of surgery, first-stage laparoscopic traction complications, and early complications from second-stage orchiopexy for IAT.

RESULTS:

Total 78 cryptorchid boys were included in the study, their ages ranged from 6 months to 10 year (mean age 5.25 years). Doppler U.S revealed 27 testes were detected (79.4%) of the already present testis that were detected by the laparoscope, 21 were extra abdominal atrophic, and 32 testes were absent, but first-stage laparoscopic exploration revealed 34 (42.5%) testes were present in 32 boys with 2 cases bilateral UDT. In 46 (57.6%) boys, testes were absent (25 boys had blind ended vas and vessels, and 21 boys had extra abdominal atrophic testis).

Thirty (88.2%) testes were less than 2 cm distance from internal ring and four (11.8%) testes were greater than 2 cm distance from internal ring. operative time for first-

stage traction ranged from 42 to 68 m with mean operative time 55 m. operative time for second-stage orchiopexy ranged from 39 to 55 m with a mean operative time of 55 m. There were no intraoperative complications (bleeding or organ injury). Postoperative hospital stay was ranging from 6 to 24 h for both stages (Table 1).

Thirty failed traction (traction-suture slippage) was detected in 5 (14.7%) cases due to slippage of the stitch. Re-traction was done for 3 (9%) cases only; in the other 2 cases the testicular artery was long enough for doing the orchiopexy without re-traction. 12 weeks later, the second-stage orchiopexy was done with testicular fixation in the sub-dartous pouch. Testicular ascent was detected in 3 (9%)cases and testis became fixed to the scrotal neck that was accepted and nothing was done. Testicular size is evaluated by palpation comparing it with the contralateral side, testicular atrophy was not detected in this study (Table 2). Postoperative ileus occurred in one (3%) case after first-stage traction and was managed conservatively. adhesions between both pedicles occurred in 1 (3%) case, when we were performing bilateral traction at the same time and was managed by laparoscopic dissection. there were herniation or volvulus.

Table 1: Operative data and post-operative complications

First-stage laparoscopic exploration for 80 non palp UDT *(78 cases)*.	34 (42.5%) testes were present, 46 (57.7%) testes were absent
Site of 34 intra-abdominal testes.	30 (88.2%) testes were less than 2 cm distance from internal ring and 4 (11.7%) testes were greater than 2 cm distance.
Operative time	For first-stage traction 42–68 m with a mean operative time 55 m. for second-stage orchiopexy ranged from 39 to 55m with mean operative time of 47 m
Intra-operative complications (bleeding or organ injury).	0%
Postoperative hospital stay	From 6–24 h for both stages
Failed traction (traction-suture slippage)	**5** (**14.7%**) cases
Testicular ascent	3 (9%) cases
Testicular atrophy	0%
Postoperative ileus	1 (3%) case
Adhesions between both pedicles	1 (3%) case
Herniation	0%
Volvulus	0%

Table 2: Postoperative testicular examination

Initial testicular position, *n* (%)	
Low scrotum	29 (85.3)
Mid scrotum	5 (14.7)
Testicular position 12 m, *n* (%)	
Low scrotum	26 (76.5)
Mid scrotum°	4 (11.8)
High scrotum	4 (11.8)
Testicular consistency	
Soft	25 (73.5)
Firm	9 (26.5)
Testicular size n (%)	
Normal	22 (64.7)
Small	12 (35.3)
Atrophic	0

DISCUSSION

Over the course of the 12-week traction period, the testicular arteries gradually elongate, contributing to the traction approach's success. Testicular vascular-pedicle elongation is most likely caused by the stretch caused by the intestinal weight and the frequent movement of the abdominal wall during breathing. In comparison to the FSLO, testicular atrophy may be less likely to occur if the testicular arteries are preserved, hence preserving the viability of the relocated testis.

Because of the short testicular vessels, surgical treatment of impalpable testis is difficult, yet, laparoscopy is the gold-standard procedure for treating IAT. Many surgical methods have been reported, such as laparoscopic single or staged orchiopexy[10] using multiple or single ports[13], or microvascular procedures[14]. Testicular atrophy and testicular ascent are the most prevalent side effects of laparoscopic orchiopexy[15,16].

In the current study, postoperative ileus and adhesions occurred in 1 (3%) case after first-stage traction and there were no herniation or volvulus, yet Colon injury, ileus, volvulus, infection, and herniation have all been documented as side effects of laparoscopic orchiopexy[17]. In addition, according to certain research, bladder injury occurs in 3% of instances during the formation of a transperitoneal tunnel[18]. Because the patent processus vaginalis is not ligated in the laparoscopic method, the probability of an indirect inguinal hernia has been reported to be 1%[19].

Because the primary testicular artery is ligated in FSLO, the gubernaculum, vas, and cremasteric arteries can all provide more collateral blood flow. After the second stage, up to 20% of the testes atrophy because the gubernaculum separates and the testis is moved into the scrotum via vas veins[20]. For this reason, numerous research have described the gubernaculum-sparing techniques[9]. There have been reports of a 66.7–92% success rate for FSLO[21,22].

FSLO has an overall success rate of 85%, according to a systematic study[23]. However, as compared with the contralateral, typically descending testis, several investigations have found considerably reduced postoperative testicular sizes[24].

The current study found that 5 (14.7%) cases had failed traction (traction-suture slippage) as a result of stitch slippage, which could be attributed to the technique's learning curve. Only 3 (9% of the total) cases required retraction; in the other two, the testicular artery was sufficiently long to allow for orchiopexy without the need for retraction. Shehata *et al*[27]. and Elsherbeny *et al*[28]. reported a traction-suture slippage rate of 11% in a cohort of 140 cases undergoing staged laparoscopic-traction orchiopexy (SLTO) for IAT. Abouheba *et al*.[11] reported that in their study, three (9%) of 34 testicles in older boys occasionally experienced testicular slippage after traction and fixation.

In current study there was no postoperative testicular atrophy like other studies, at the follow-up, Doppler US revealed that 100% of the fixed testes were effectively vascularized[25]. Suture slippage was found to be 9% (repeated data) in certain investigations, with 0% atrophy[11].

Although Esposito *et al*.[24] used ultrasound for volumetric measurement of the testis and Radmayr *et al*.[25] used Doppler flow, Sijstermans *et al*.[26], who documented a strong correlation between ultrasound measurements of the testis and palpation, support the value of clinical assessment in the judgment of testicular size.

Our study's retrospective component has a number of drawbacks, one of which is that the surgeon's subjective estimation of the testicular size was used to compare it to the contralateral side. A more appropriate outcome measure would have been to assess the change in testicular size. Moreover, the study is limited because of the small sample size.

CONCLUSION

Staged laparoscopic traction-orchiopexy for IAT (Shehata technique) is a safe and easy technique with minimal complications and good results. Shehata surgery completely protected and prolonged the spermatic cord vessels and reduced the possibility of testicular atrophy, so this technique is a good alternative for Stephen- Fowler staged orchiopexy that carries higher incidence of testicular atrophy.

CONFLICT OF INTEREST

There are no conflicts of interest.

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