Laparoscopic Management of Intra-abdominal Testis (Shehata Technique)

37

Sameh Shehata

37.1 Indications for Laparoscopic Approach to Intra-abdominal Testis (Shehata Technique)

The indications include all cases of Intra-abdominal testis (IAT) confirmed by laparoscopy, the majority of IAT lie within 3 cm from the deep ring and should be amenable to the ***Shehata technique***. The exceptions are the two extremes; the testis which can reach the contralateral deep inguinal ring without any tension (which will be amenable to one stage lap assisted orchiopexy) this is around 10% of all IAT, the other is the exceptionally high IAT (more than 3 cm above the deep ring) or subrenal testis which will require two stage Fowler Stephens approach (around 5–10% of all cases of IAT) (Shehata and Shalaby).

37.2 Preoperative Workup and Considerations

The clinical diagnosis is based on failure to palpate the testis in the scrotum or in possible sites of ectopia, this needs to be confirmed under anesthesia. Imaging studies are generally unreliable and are not needed for the true abdominal testis, sonography can used for the undescended testis within the inguinal canal especially in the obese and uncooperative child. It helpful to have empty bladder by urination or Credé's maneuver just before surgery and an empty colon and rectum by using Bisacodyl suppositories 12 and six hours before surgery.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/978-3-030-58043-8_37. The videos can be accessed individually by clicking the DOI link in the accompanying figure caption or by scanning this link with the SN More Media App.

S. Shehata (✉)
Pediatric Surgery Department, Alexandria University, Alexandria, Egypt

37.3 Anesthetic Considerations

The laparoscopic Shehata technique is typically performed under general anesthesia and endotracheal intubation. The preferred age for the operation is between 6 and 12 months. A naso- or orogastric tube is placed to decompress the stomach for the duration of the procedure.

37.4 Operative Technique

37.4.1 Equipment

- 5 mm optical trocar
- Atraumatic grasper
- Needle holder
- Monopolar hook (right angle)
- Non-absorbable 2-0 nonabsorbable, braided, Poly (ethylene terephthalate) for Anchoring stitch
- 3-0 polyglycolic acid suture for closure of umbilical port

37.4.2 Positioning

Supine position with the arms by the sides and the legs slightly spread apart. The head of the patient is located at the edge of the table and the monitor at the feet. The surgeon is standing at the head and the cameraman at the side contralateral to the testis side, scrub nurse on the other side. Trendelenburg position is adjusted after insertion of all trocars (Fig. 37.1).

37.4.3 Trocar Placement

A 3 or 5 mm 30° is inserted through the umbilicus and pneumoperitoneum is established according to the patients age. Two working trocars 3 or 5 mm are inserted in the flanks

M. Lacher, O. Muensterer (eds.), *Video Atlas of Pediatric Endosurgery (VAPE)*, https://doi.org/10.1007/978-3-030-58043-8_37

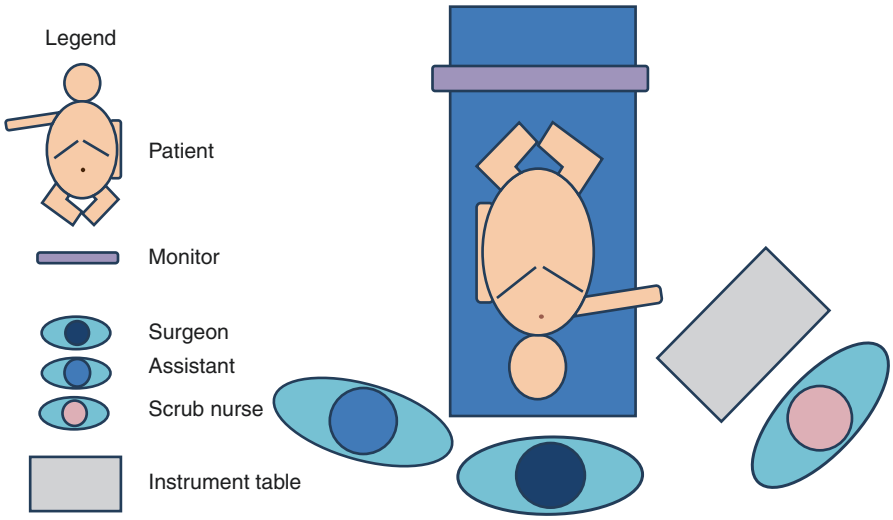

Fig. 37.1 Positioning of patient, surgeons and monitors

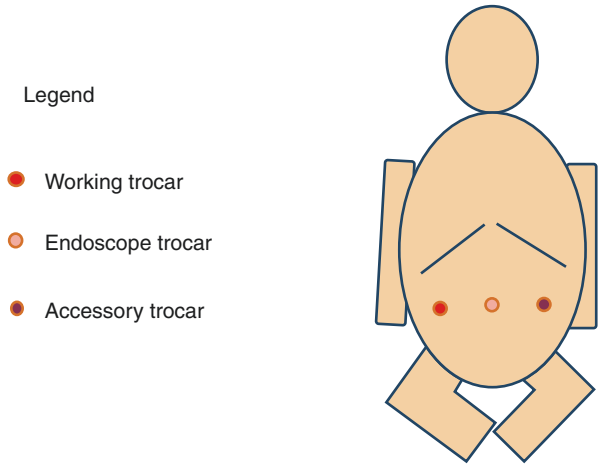

Fig. 37.2 Trocars sites

lateral to the rectus muscle at the level of the umbilicus or lower in older children (Fig. 37.2).

37.4.4 Operative Milestones

37.4.4.1 First Stage

Division of the Gubernaculum

The operation begins with looking at the deep inguinal ring on both sides (Fig. 37.3). The items to look at includes: the patency of the processus vaginalis, the position and size of the testis, the vas deferens (VD) and testicular vessels (TV). When the testis is found, the first step is a careful division of the gubernaculum. The gubernaculum is divided by the hook using monopolar cutting current while pulling the gubernaculum in a cranial direction.

The testis now is held in the direction of the contralateral deep ring and the peritoneum lateral to the testicular vessels is divided easily using monopolar hook diathermy with cutting current until the testis reach at or near the contralateral deep ring.

The Measuring Test and Decision Making

If the testis reaches the contralateral deep ring without any degree of tension (and stays there after releasing the grasper) then this testis is suitable for one stage lap assisted orchiopexy without vessel interruption. However, this was found in less than 10% of cases of IAT. In the majority of cases, the testis reaches this measuring point with moderate degree of tension (it recoils back after releasing the grasper) and this will be suitable for using the Shehata technique.

Mobilization and Fixation

A non-absorbable 2-0 nonabsorbable, braided suture on round needle is passed from the outside through a small nick in the skin exactly one inch above and lateral to anterior superior iliac spine (ASIS) on the contralateral side. The end of the suture is held outside on a hemostat. The needle is held with a needle holder and a single stitch is taken in the lower pole of the testis, broad and superficial to incorporate the tunica albuginea (Fig. 37.4). During placement of the anchoring stitch, the testis is supported carefully with a fenestrated atraumatic grasper without completely closing the handles. The needle is exteriorized near the point of entry in the abdominal wall to ensure a good distance of the abdominal wall around 1 cm between entry and exit points to avoid slipping.

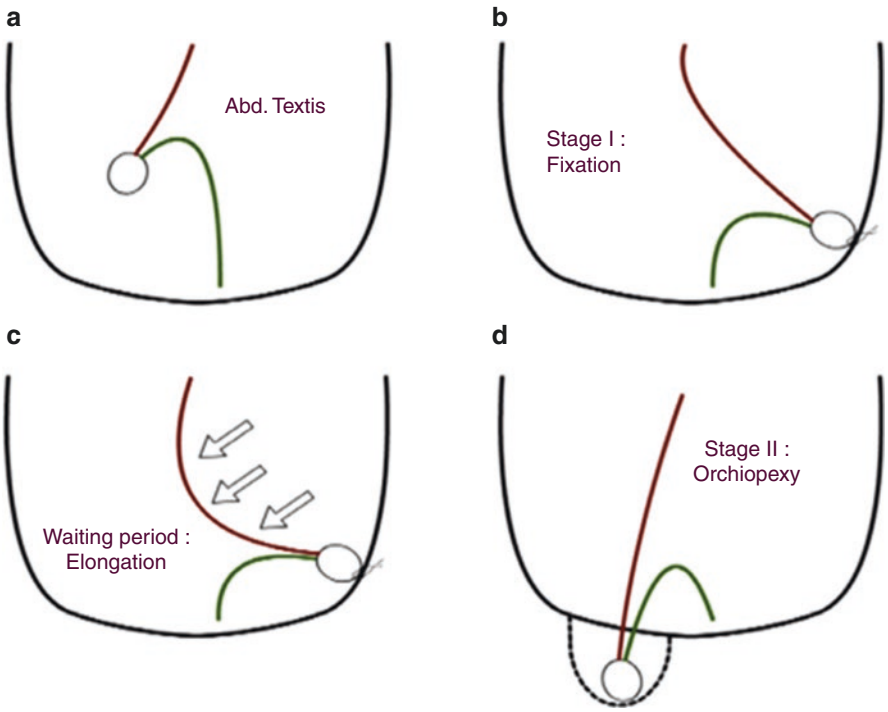

Fig. 37.3 Essential steps of the procedure. Reproduced from: Shehata S, Shalaby R, Ismail M, Abouheba M, Elrouby A. Staged laparoscopic traction-orchiopexy for intraabdominal testis (Shehata technique): Stretching the limits for preservation of testicular vasculature. J Pediatr Surg. 2016;51(2):211–5

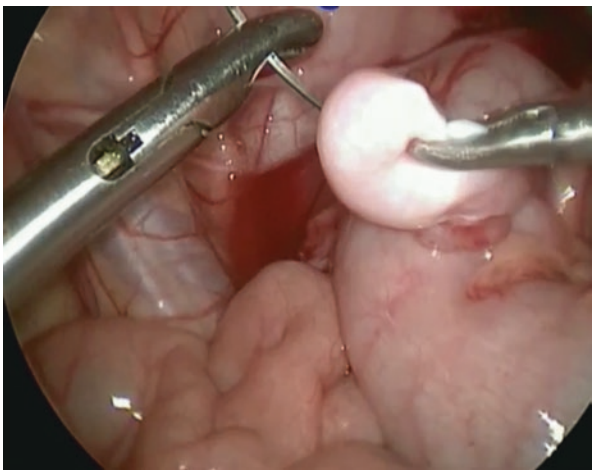

Fig. 37.4 Passing the stitch through Lower pole of the testis

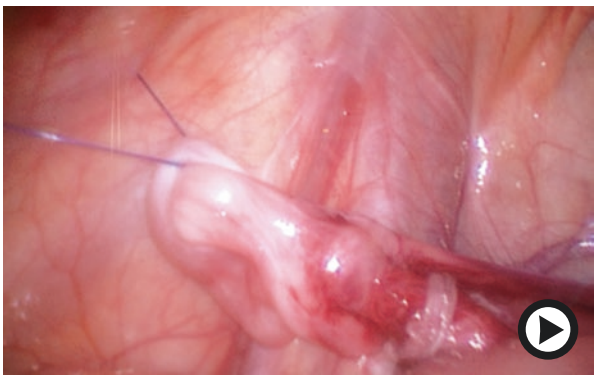

Fig. 37.5 Position of the testis before tying the stitch (Video 37.1 Shehata Technique (Essential Steps)). (▶ https://doi.org/10.1007/000-2w0)

At this stage the testis is usually around 1–2 cm from the abdominal wall, gentle pressure from the outside will facilitate the abdominal wall to reach the testis. The suture is tied carefully on the outside and the knot is buried under the skin (Fig. 37.5).

37.4.4.2 Postoperative Care and Waiting Period

The patient is allowed a liquid diet 4 h after recovery and is sent home the same day. No special analgesia or activity restriction is required. The waiting period is 12 weeks and the preoperative preparation for the second stage is the same as the first stage.

37.4.4.3 Second Stage

Assessment and Division of the Fixation Stitch

The position and trocar sites correspond to the first stage. The site of fixation and the condition of the testis is explored. Usually there are no adhesions at the operative site. Internal herniation never occurred in over 12 years of experience. The laxity of the testicular vessels can be assessed by passing a grasper behind the middle of TV and pushing them towards the anterior abdominal wall (usually it reaches far towards the anterior abdominal wall compared to the first stage indicating significant lengthening). The fixation stitch is easily divided with scissors.

Delivery in the Scrotum

A scrotal incision is made and subdartos pouch is developed. A long curved clamp is inserted in the scrotum and introduced in the abdominal cavity under laparoscopic vision. (Fig. 37.6). The new deep ring is near the pubic tubercle (Prentiss maneuver). The testis is held from the gubernaculum side and delivered into the scrotum without twisting. The testis is secured in the subdartos pouch (Fig. 37.7).

In older and obese children it is preferable to make a small inguinal incision, open the inguinal canal and deliver the testis to the inguinal incision before putting in the scrotum to avoid forcible pulling through the thick muscular abdominal wall.

Fig. 37.6 Curved clamp creating the new deep ring

Fig. 37.7 Well vascularized testis reaching the scrotum without tension

37.4.4.4 Postoperative Care

Corresponds to the first stage. The patient will come for clinical and sonographic assessment at 3, 6 and 12 months after surgery.

37.5 Pearls/Tips & Tricks

1. The testis is slippery and difficult to hold with laparoscopic instruments; it is better to hold the gubernaculum rather than the testis to avoid its injury.
2. An easy way to get the needle and the thread out of the abdominal wall is to use the port closing instrument to grab the suture 3 cm away from the needle or using a loop of nonabsorbable polypropylene suture on a wide bore needle.
3. In bilateral IAT it is recommended to perform the procedure in three stages to avoid possible adhesions in case of bilateral simultaneous Shehata technique is performed.
   (1. first stage on the Right/2. second stage on the right + first stage on the Left/3. second stage on the Left)

37.6 Pitfalls & Ways to Avoid

1. *Twisting of the pedicle*; in order to avoid twisting of the pedicle, the bites in the testis should be adjusted with entry and exit points on the abdominal wall.
2. *Narrow exit;* The exit point through the abdominal wall should be enlarged by spreading the hemostat to avoid forcible traction on the testis.
3. *Cutting through testis*; the testis tissue is fragile, care must be taken when taking the bite in the testis to follow the curvature of the needle and to have enough length of the thread inside the abdomen before taking the bite.
4. *Injury of the vas*; In low lying IAT (within 2 cm from the deep ring) the VD is usually looping down in the deep ring. Extreme care is required while dividing the gubernaculum using monopolar hook diathermy with cutting current in short buzzes and under vision while pulling the gubernaculum upwards.
5. *Injury bladder and inferior epigastric vessels*; care must be taken during creating the new deep ring under vision to avoid injury of these two structures (Video 37.1).

Selected References

1. Abouheba MAS, Younis W, Elsokary A, Roshdy W, Waheeb S. Early clinical outcome of staged laparoscopic traction orchidopexy for abdominal testes. J Laparoendosc Adv Surg Tech A. 2019;29(4):531–7.

2. Shehata S, Shalaby R, Ismail M, Abouheba M, Elrouby A. Staged laparoscopic traction-orchiopexy for intraabdominal testis (Shehata technique): Stretching the limits for preservation of testicular vasculature. J Pediatr Surg. 2016;51(2):211–5.
3. Shehata SM. Laparoscopically assisted gradual controlled traction on the testicular vessels: a new concept in the management of abdominal testis. A preliminary report. Eur J Pediatr Surg. 2008;18(6):402–6.
4. Elsherbeny M, Abdallah A, Abouzeid A, Ghanem W, Zaki A. Staged laparoscopic traction orchiopexy for intra-abdominal testis: Is it always feasible? J Pediatr Urol. 2018;14(3):267.e1–4. https://doi.org/10.1016/j.jpurol.2018.01.021.
5. Canning DA. Re: Staged laparoscopic traction-orchiopexy for intraabdominal testis (Shehata technique): stretching the limits for preservation of testicular vasculature. J Urol. 2017;197(6):1563.