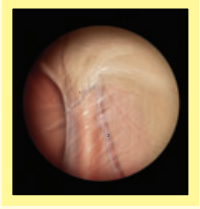
Surgery Illustrated

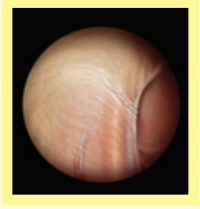
Surgical Atlas

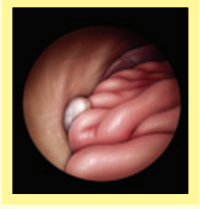
Laparoscopic Orchiopexy

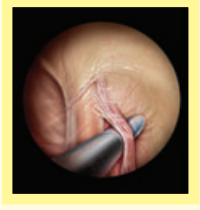
Pasquale Casale and Douglas A. Canning
Division of Urology, The Children's Hospital of Philadelphia, Philadelphia, USA

ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com









INTRODUCTION

Various imaging modalities, i.e. pneumoperitoneography, ultrasonography, CT and MRI, have been used to locate impalpable testes in boys, but none are as accurate as laparoscopy. Laparoscopy was initially used as a diagnostic tool for evaluating patients with impalpable testes until Jordan *et al.* introduced the therapeutic application of laparoscopy in boys with undescended testis [1,2].

Further advancement in laparoscopic instrumentation and refined techniques has allowed laparoscopic orchidopexy to become the treatment of choice for impalpable testes. Many investigators have reported their success rate in placing the testis into the scrotum by laparoscopic procedures. One of the largest series by Chang *et al.* had an excellent outcome with an overall success rate of 85% and a 96% success rate on testes that had no previous surgery [3].

PLANNING AND PREPARATION

1. Indications: Impalpable Testis
2. Patient Selection:
   a. Impalpable Testis
   b. Any age group
3. Specific equipment
   a. 3 mm laparoscopic instrument set including cautery scissors
   b. 11 blade scalpel
   c. One 3 mm trocar
   d. Laparoscopic insufflation tubing
   e. Laparoscopic video tower
   f. Electrocautery generator
   g. Zero degree 3 mm camera
   h. Urethral catheter
4. Patient preparation
   a. Consent
      i. Family must be aware of possible loss or atrophy of testis.
      ii. The necessity of a secondary procedure if a Fowler-Stevens staged procedure is necessary
5. Patient positioning
   a. Supine
   b. Bladder drainage prior to abdominal entry

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3 mm
11 blade scalpel

SURGICAL STEPS

Figure 1

1. Trocar placement
   a. Right side:
      i. 3 mm umbilical trocar for camera and insufflation.
      ii. 11 blade scalpel for stab entry into peritoneal cavity lateral to the right rectus muscle at the level of the umbilicus and lateral to the left rectus muscle at the level of the anterior superior iliac spine.
   b. Left side: mirror image of right.
   c. Bilateral:
      i. Umbilical trocar unchanged
      ii. Both stab entry sites are now lateral to each rectus muscle at the level of the anterior superior iliac spine.

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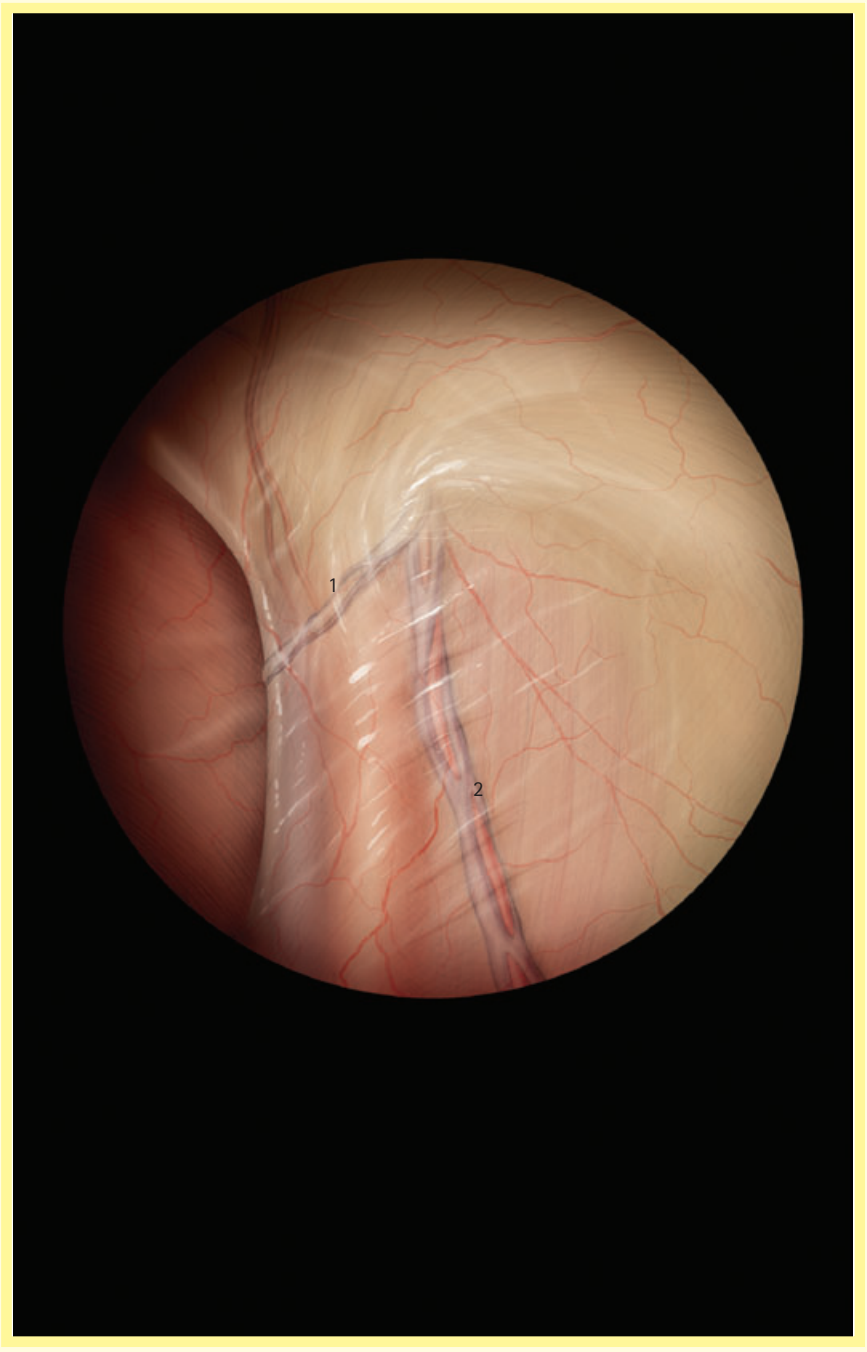
Figure 2

2. Visualization of internal ring
   a. Closed ring with vessels visualized (right side shown). Inguinal exploration would be the next step.
      1 Vas deferens
      2 Testicular vessels



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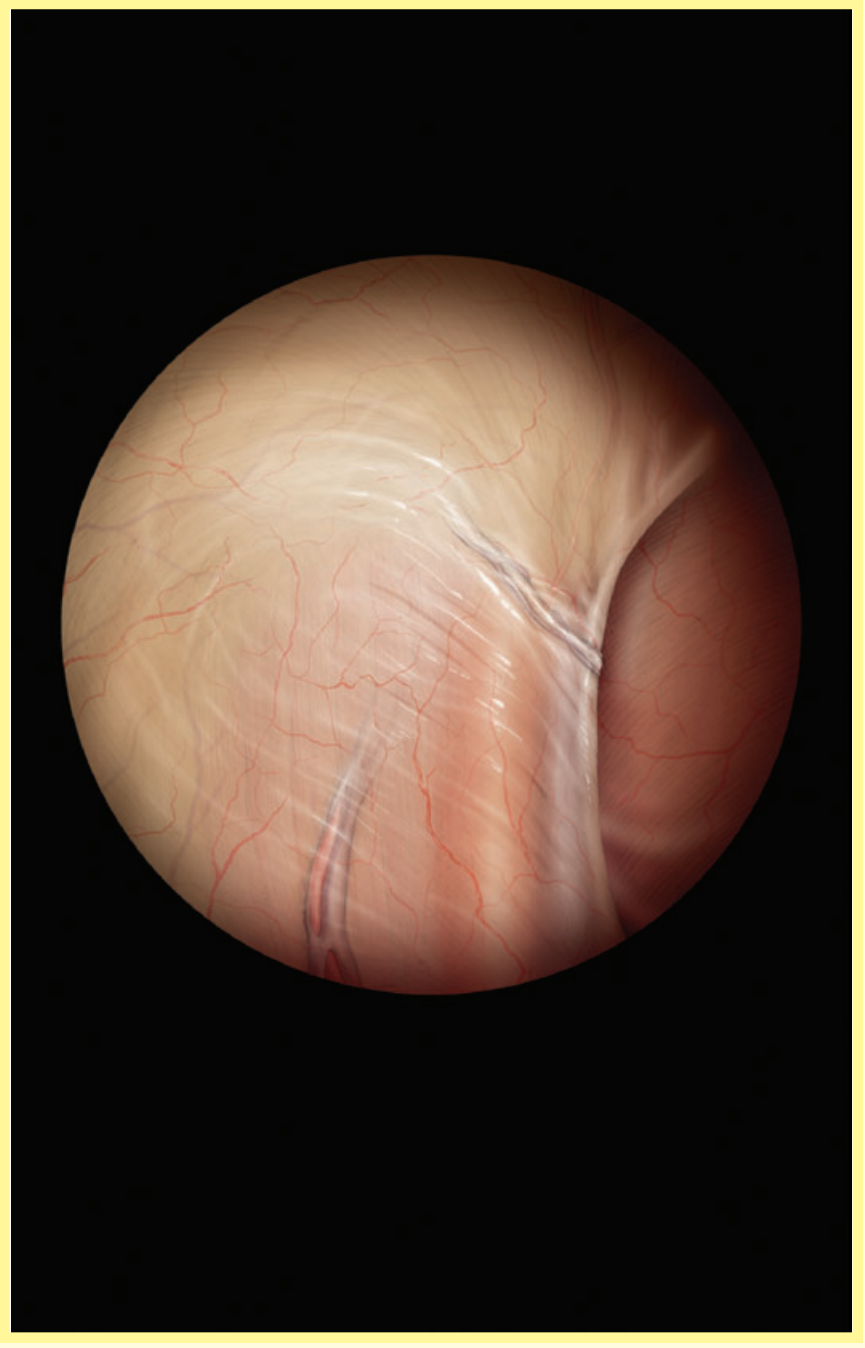

Figure 3

b. Closed ring with vanishing vessels (left side shown). Testis can safely be deemed absent.

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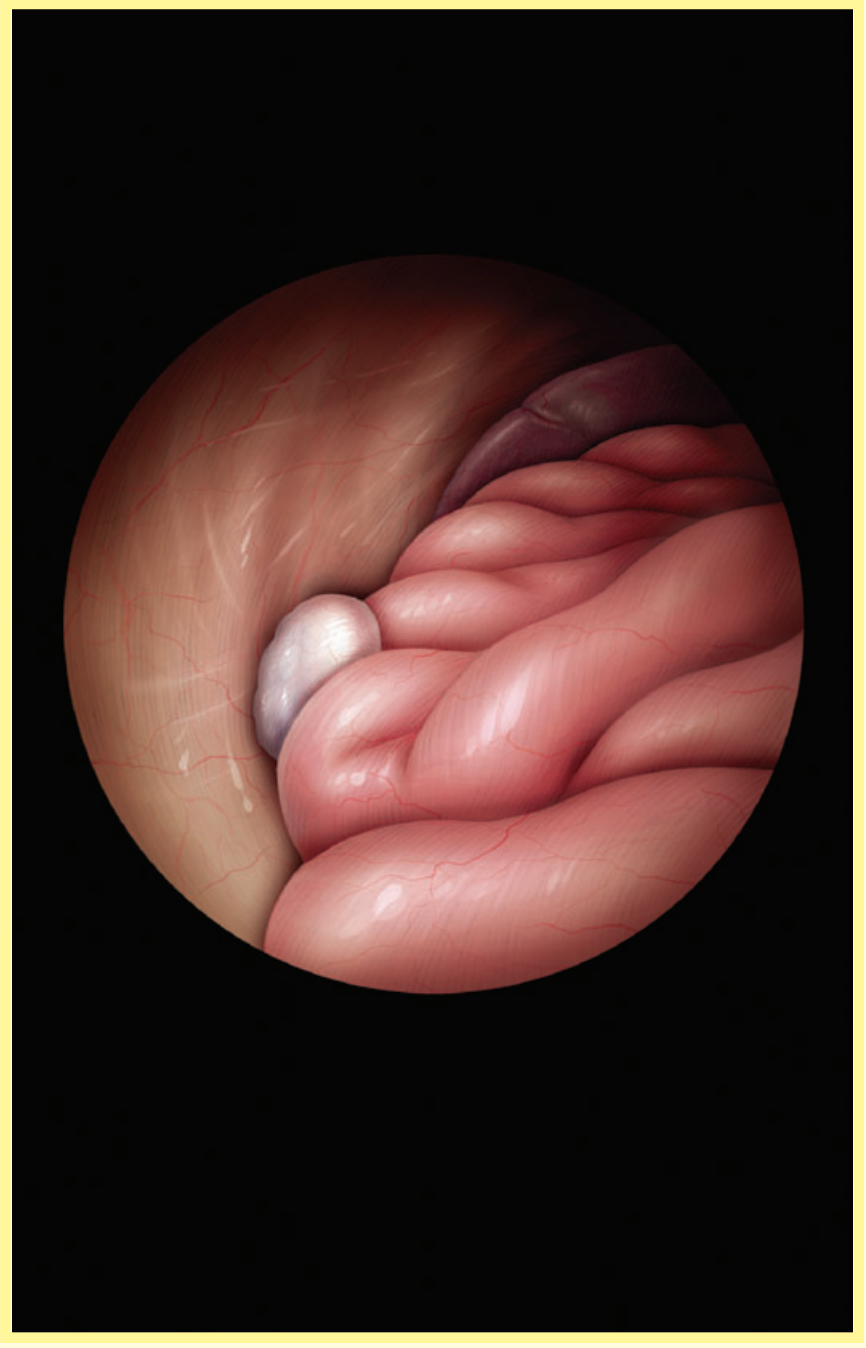
Figure 4

c. If vessels are not visualized then look along the colonic gutter. Testis may be as high as the kidney.



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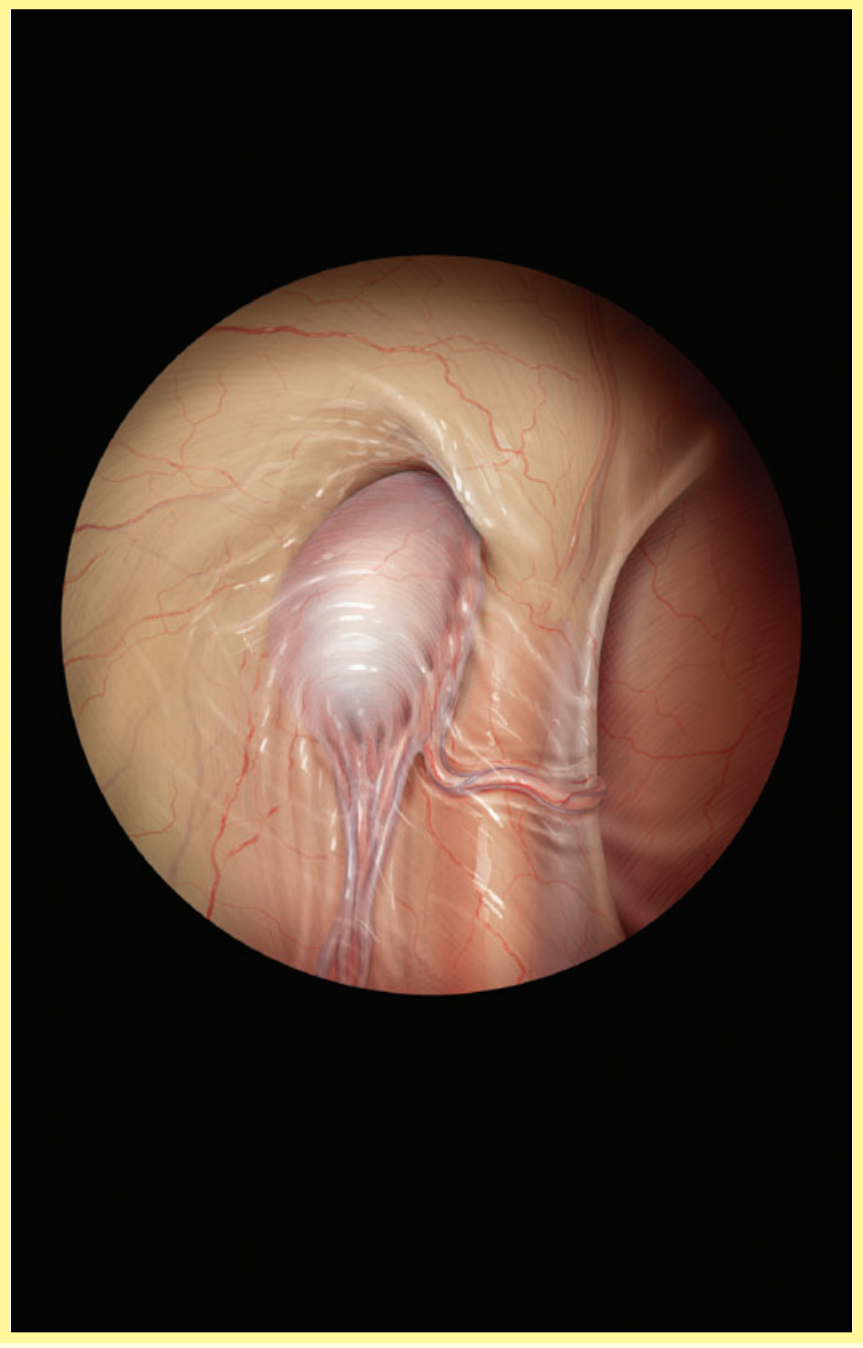

Figure 5

d. Testis noted at internal ring (left side shown).

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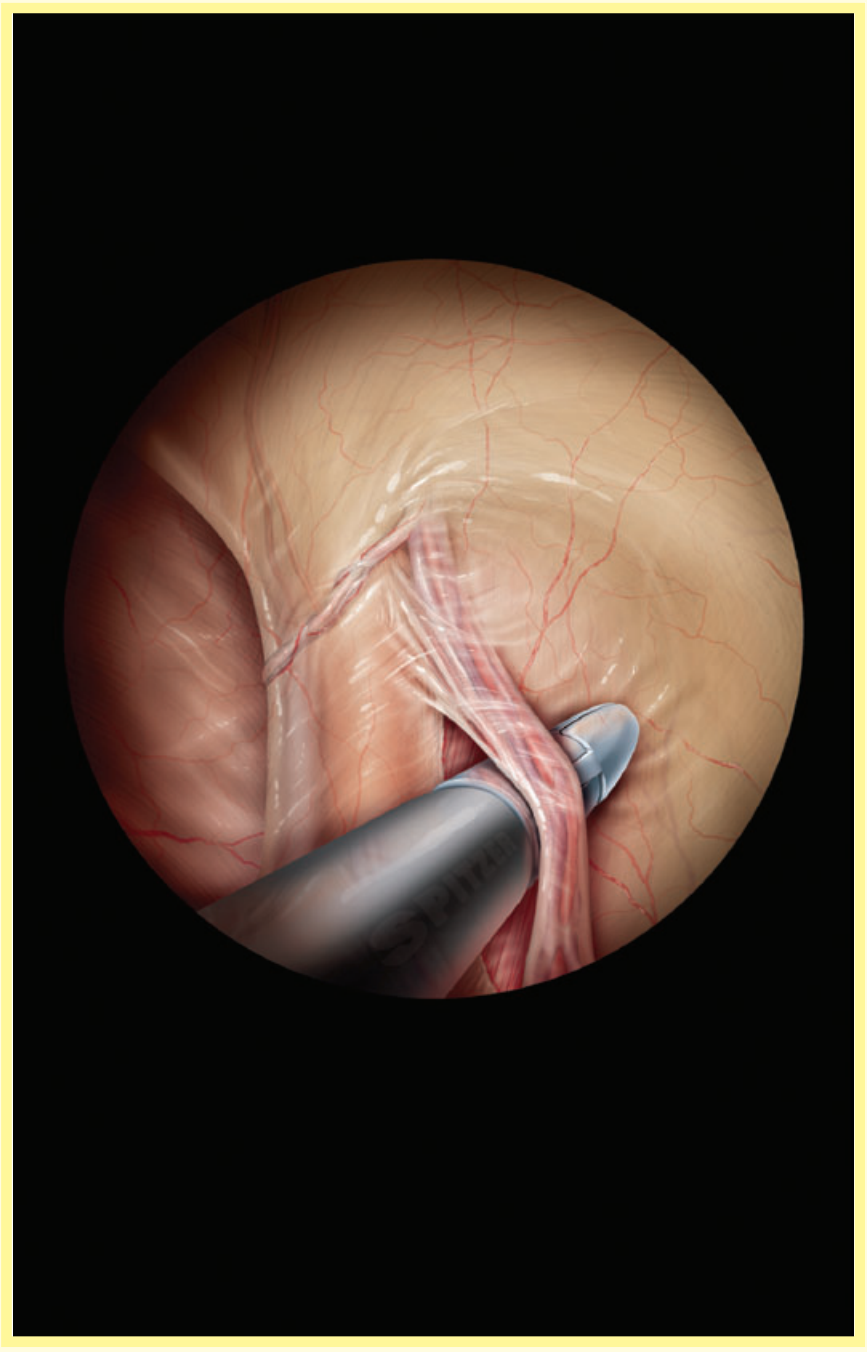
Figure 6

3. Mobilization of vessels
   a. Open peritoneal reflection and begin retroperitoneal dissection (right side shown).



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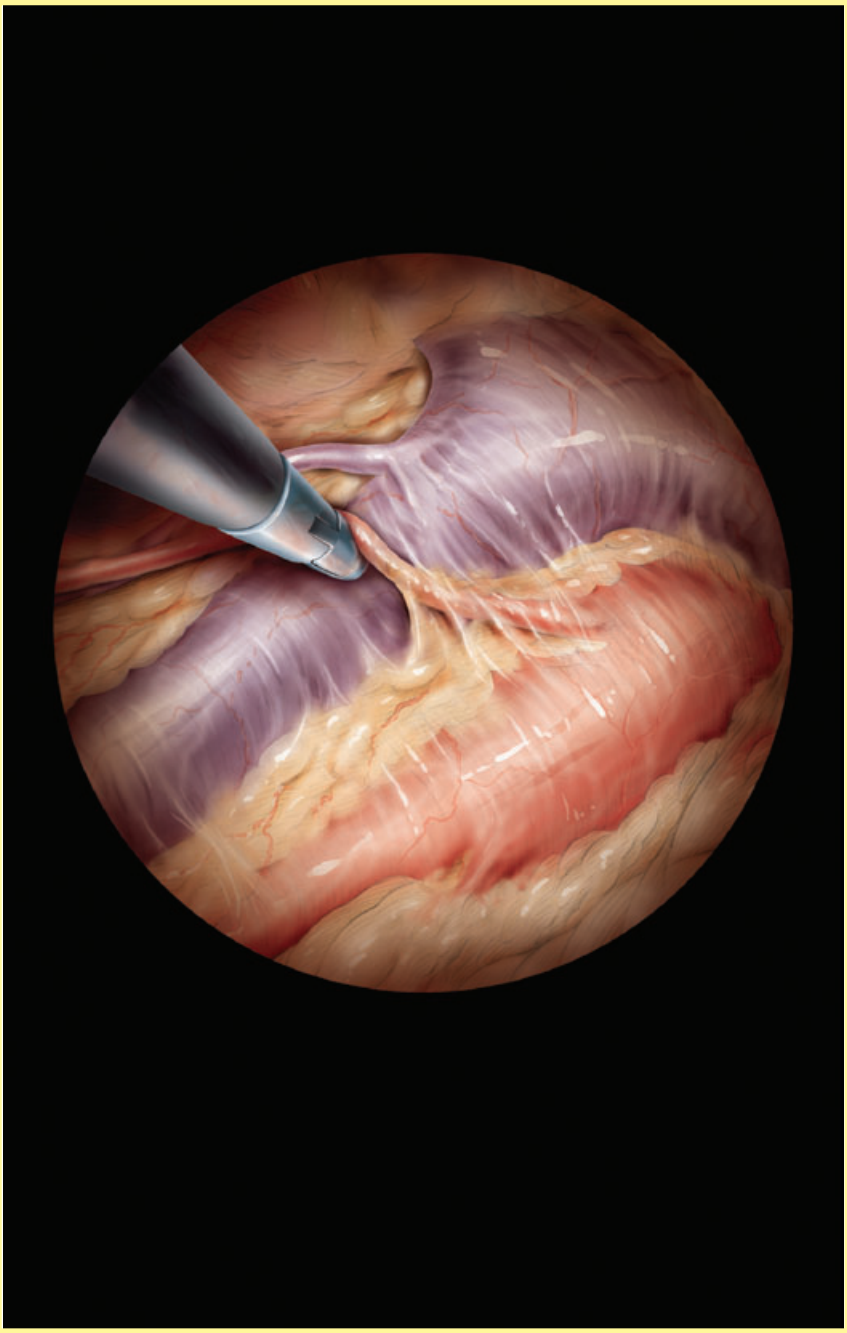

Figure 7

b. Vessels can be mobilized to their origins. The mastery of this step will avoid the use of a Fowler-Stephens approach. If one wishes to proceed with a Fowler-Stephens, then the vessels should be ligated with nonabsorbable 3-0 suture at the level of the internal ring after the previous dissection.

4. Mobilization of vas deferens
   a. Not to be performed in a Fowler-Stephens approach.
   b. If there is adequate length on the vessels, then the vas deferens can be mobilized to gain length.
5. Full mobilization and length are achieved once the testis can be laparoscopically manipulated to the contralateral inguinal ring.

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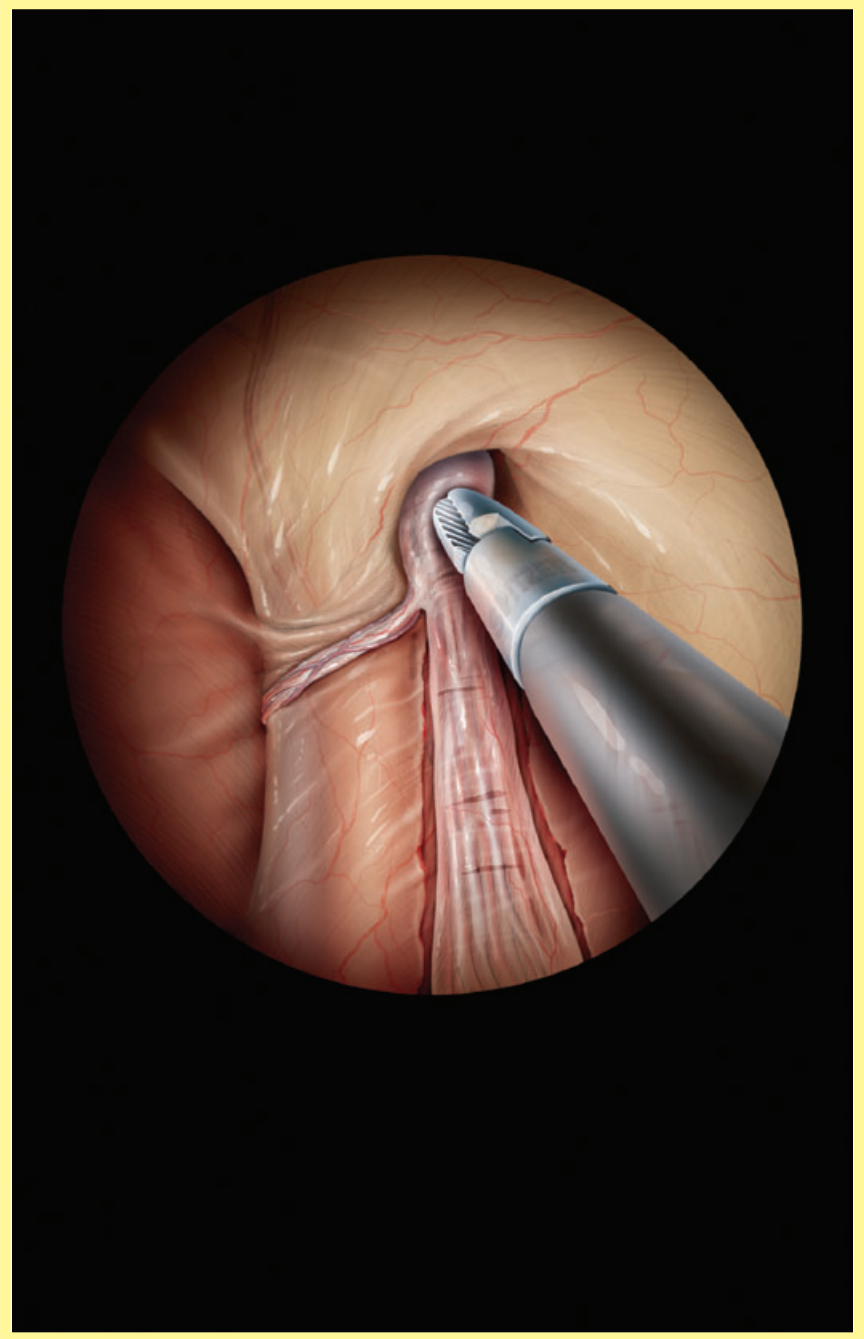
Figure 8

6. Once adequate length is confirmed, the testis is then brought through the inguinal ring down to the scrotum, as one would perform in a standard inguinal orchiopexy. The hernia can be closed laparoscopically or through an inguinal incision. The authors prefer a laparoscopic approach since laparoscopy has already been instituted. (Right side shown.)



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POSTOPERATIVE CARE

1. Either adhesive strips or surgical glue can be applied.
2. No bathing for 24 hours.
3. No straddle activity for two weeks.
4. For the older child, no heavy lifting for two weeks. Nothing heavier than 5 kg.

FROM SURGEON TO SURGEON

1. The more difficult cases are a very high testis, i.e. above the pelvic brim or the solitary testis. In the case of the solitary impalpable testis, the authors do not advocate a laparoscopic Fowler-Stephens. We recommend a very high dissection of the cord structures and bring the testis as far down as possible. If the procedure then needs to be staged, return after 6 months to complete the orchiopexy.
2. Things to make life easier:
   a. Convert to 3 mm torcars for the working ports instead of stab incisions if there are multiple instrument exchanges at the onset of the procedure.
   b. In infants, use only 8 to 10 mm Hg insufflation pressure as the infants have a tremendous physiologic response to high pressures and elevated CO2 levels. The rule should be enough pressure to visualize and the further below venous pressure the better for all patients at any age.
3. One difficult case is the one pictured in Figure 4. This patient had a solitary right testis that was at the level of the right kidney. We mobilized the vessels laparoscopically to their origins. The testis could only be brought down to the right pubic tubercle. A second procedure was only successful to the penoscrotal junction (high in the right hemiscortum). I am continuing to monitor that child closely. A third procedure at this time is unwarranted since the testis is readily palpable and in the scrotum, although somewhat high.
4. The single most helpful aspect to the laparoscopic approach for testis surgery is the mastery of vessel mobilization. We find that if one can dissect the vessels high, especially to their origins, the need for a Fowler-Stephens approach might be avoided. We have yet required at our institution a Fowler-Stephens approach since the inception of this technique, and have only staged one over the past three years laparoscopically.
5. Intra-operative problems:
   c. Injury to testicular vessels:
      i. Ligate the vessels at the site of injury.
      ii. Do not mobilize the vas deferens.
      iii. Perform a staged Fowler-Stephens
   d. Testicular avulsion:
      i. Control and ligate cord
      ii. Place the testis in an ice water bath and consider auto-transplantation to the ipsilateral inferior epigastrics especially in cases of a solitary testis.
      iii. Fixation of contralateral testis might be performed after discussion with family regarding risks and benefits of contralateral septopexy.
   e. Intestinal injury
      i. Laparoscopic repair or open conversion
   f. Vascular injury
      i. Laparoscopic repair or open conversion.

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Correspondence: Pasquale Casale, Division of Urology, The Children's Hospital of Philadelphia, 34th Street and Civic Center Boulevard, Philadelphia, PA 19104-4399, USA.
e-mail: casale@email.chop.edu

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