STEPS

STANDARIZED TOOLBOX OF EDUCATION FOR PEDIATRIC SURGERY

Cryptorchidism

APSA Education Committee
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History

- 6 month old male presents to outpatient surgery by pediatrician for evaluation of bulge in left groin.
- Born at term, no noted birth defects.

Discussion of History Elements

- When was bulge noticed?
- Is the bulge always present, or does it come and go?
- Does patient seem to have pain?
- Have parents ever noted two testicles in the scrotum?
- Does child have congenital defects or birth defects?

Discussion of History Elements

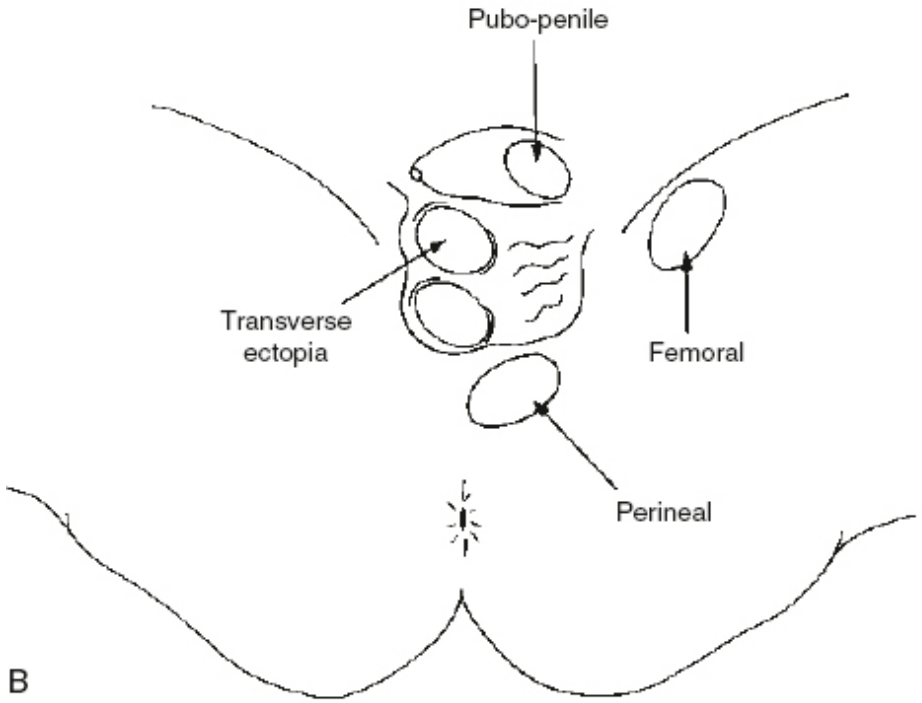
- When was bulge noticed?
- Is the bulge always present, or does it come and go?
  - Differential diagnosis: Inguinal hernia, retractile testes
- Have parents ever noted two testicles in the scrotum?
  - If patient has had two testicles in scrotum at birth, could be ascending or retractile testicle
  - If parents have always noticed 1 testicle, leads down the path of non descended testicle
- Does child have congenital defects or birth defects?
  - Defects in abdominal wall, neural tube, urinary tract defects, and endocrine disorders are associated with undescended testes

Physical Exam

- Vital signs: within normal limits
- Abdomen: soft, non distended
- Left inguinal region noted firm and round bulge which fairly immobile, adjacent to the pubic bone, non tender to palpation
- Scrotum: one palpable testicle noted on the right side and under-developed, empty left side
- Penis: circumcised, no evidence of hypospadias

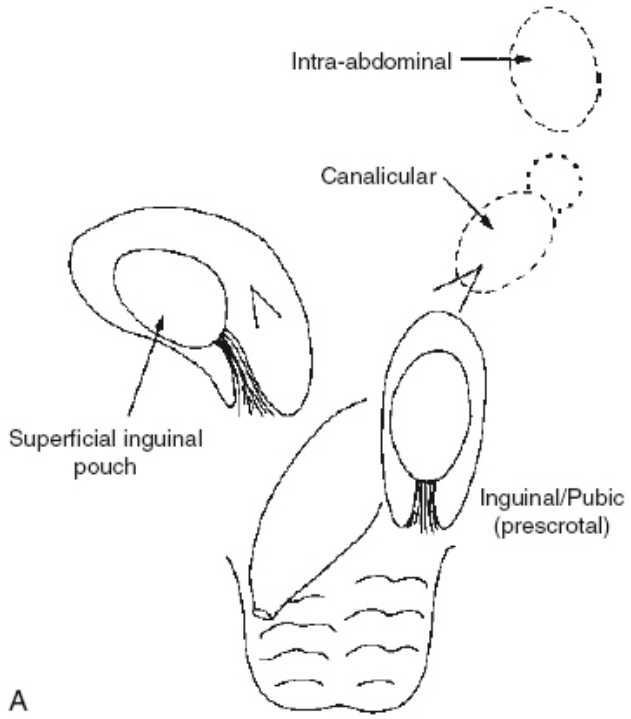
Pitfalls

- Ectopic testes
  - Testes found outside of the line of normal descent
  - Can be found in femoral canal, perineum, contralateral scrotum, above the pubic bone



Pitfalls

- Testes difficult or unable to be identified on physical exam:
  - Intra-abdominal testis
    - Typically 1 cm away from internal ring of inguinal canal
  - Canalicular testis
    - Within inguinal canal, but difficult to palpate due to overlying musculature



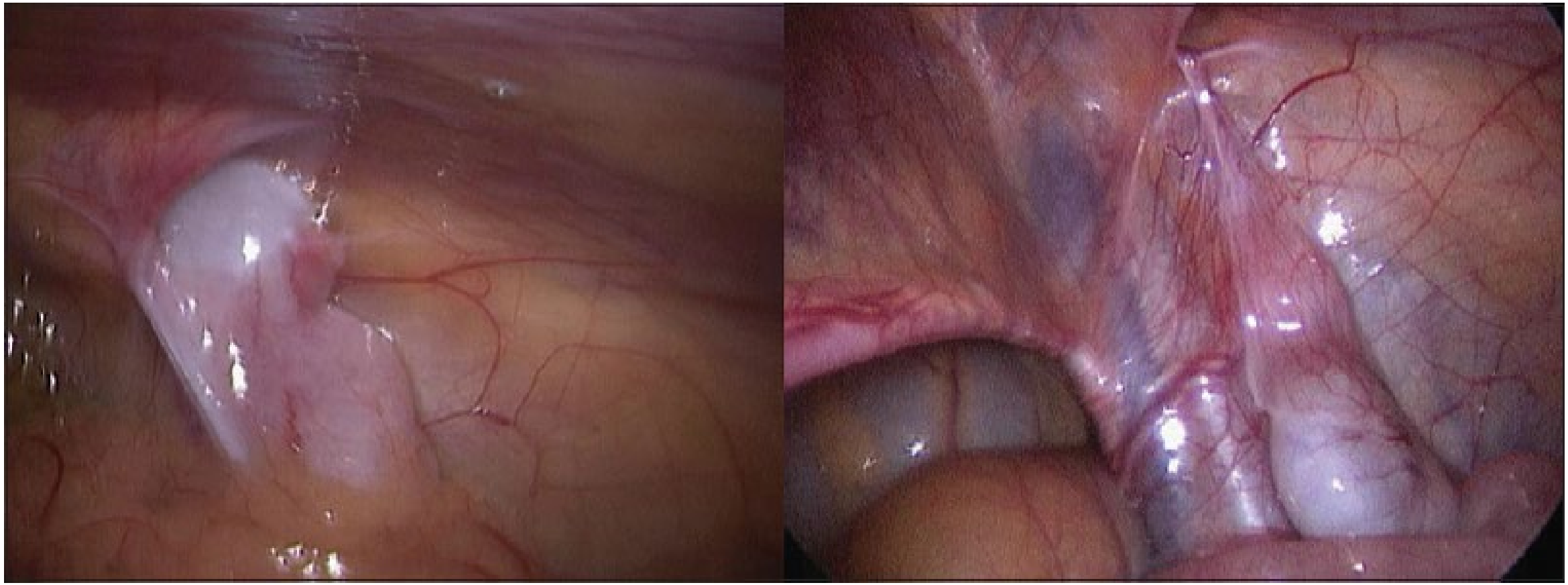
Pitfalls

- Retractile testes
  - Retraction of testicles in response to cold temperatures and protection from trauma
  - Later in childhood
  - Descended testicle found in the inguinal canal secondary to abnormal response to cremasteric muscle contraction
  - Can be brought down into the scrotum during physical examination
- Vanishing Testes
  - Typically result of intrauterine torsion of spermatic cord
  - Contralateral testicle usually enlarged on physical exam

Diagnosis

- Diagnosis is based on clinical exam:
  - Identify bony landmarks of inguinal canal: lateral edge of pubic bone, ASIS
  - Starting ASIS (level of internal ring)– place gentle, flat pressure and move hand medially along inguinal ligament until testicle is palpated.
  - One hand is gently pressing on lateral aspect of testicle, additional hand attempts to grasp testicle through scrotal skin
  - Goal is to identify lowest level testicle can be manipulated into the scrotum without tension or retraction back into inguinal canal
  - If testes cannot be palpated along normal descent, ectopic locations are evaluated.
  - **Diagnostic laparoscopy indicated to evaluate for intra-abdominal testes vs atrophy if truly non-palpable.

Diagnostic Laparoscopy – Picture from Kumar et al.



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Studies (Labs, Imaging)

- What labs are needed?
  - Hormonal studies indicated in patients with bilateral impalpable testes (AMH, FSH, LH, Inhibin-B, etc)
  - Other laboratory studies (karyotype)
- What imaging is needed?
  - Value of imaging studies questionable
  - Ultrasound, CT scan and MRI can be used if needed
    - Ultrasound relatively insensitive/non specific
    - CT scan exposes to unnecessary radiation
    - MRI may help with intra-abdominal testes but may require general anesthesia

Case Discussion

- Diagnosis
  - Patient has left sided cryptorchidism
- Management
  - Preop
    - <6 months of age → monitor for descent
  - Operative
    - Orchiopexy between 6-9 months

Alternatives to Surgery

- Hormonal therapy
  - Testosterone – no longer used due to causing precocious puberty
  - hCG – 6% success rate
  - LHRH – 19% success rate
- Hormonal therapy not recommended by the American Urological Association guidelines due to lack of response and long term efficacy

Operation

- Indications for Surgery:
  - All undescended testes in patients >6 months
    - Undescended testes at risk for:
      - Injury due to direct trauma
      - Epididymo-orchitis from repeated trauma
      - Sterility – 10% risk for unilateral and 38% for bilateral undescended testes
- Operations:
  - Orchiopexy
    - Inguinal approach
    - Scrotal approach
      - Patients with acquired mal-descent
    - Two-stage orchiopexy
      - Used when spermatic cord has insufficient length
    - Fowler-Stephens operation
      - Impalpable testes in inguinal canal and abdomen

Operation

- Should an orchiectomy be considered?
- Indication for consideration:
  - Age
    - Post pubertal with normal contralateral testicle – orchiectomy should be considered
  - Testicle size
    - ½ size of contralateral testicle – any age
    - 2/3 size of contralateral testicle – puberty and beyond
  - Testicle associated with other anomalies

Operation – Orchiopexy (inguinal approach) cont.

- Once under anesthesia, examine inguinal canal and attempt to reduce testicle into scrotum
- Incision over external ring
- Divide Scarpa fascia and external oblique aponeurosis
- Identify and mobilize testis, apply traction medially to reveal distal attachment of the gubernaculum, which is divided
- Dissect off cremaster muscle fibers from vas and testicular vessels
- Identify hernia sac, clamp and divide
- Dissect processus vaginalis from gonadal vessels towards internal ring.
- Transfix and ligate processus vaginalis at internal ring
- Free lateral attachments from gonadal vessels in the retroperitoneal space (used for extra length)

Operation – Orchiopexy (inguinal approach) cont.

- Create pocket for testis within distal inguinal canal into scrotum using blunt finger dissection
- Incise (midline or transverse scrotal skin and enter subdartos space
- Bluntly create subcutaneous pouch in the scrotum via scrotal incision
- Tunnel created with fine artery forceps into the inguinoscrotal fascia through scrotal incision, connecting two incisions
- Forceps grasp testis and pulls down to scrotal incision, ensuring no twisting of the gonadal vessels or cord structures
- +/- anchoring testis to scrotal septum or narrowing the inguinoscrotal fascia buttonhole by fine suture.

(From Spitz L, Coran AG: Pediatric surgery. In Rob and Smith's Operative Surgery, 5th ed. London, Chapman & Hall, 1995.)

Operation – Fowler-Stephens

- Can be performed in a 1 or 2 staged procedure
- Laparoscopic ligation of spermatic vessels close to the kidney vessels
  - Blood supply to the testis based on the vessels of the vas
- For second stage (allows build up of collaterals), patient is brought back and the inguinal mobilization of the testis from the intra-abdominal position is performed.

Post-Operative Management

- Peri-operative
  - Incisional care to be performed
  - Pain control
  - No restrictions
- Long-term
  - Follow up in 1-2 weeks post operatively for incision check
  - Follow up in 6-12 months post operatively to evaluate for atrophy

Complications of Orchiopexy

- Failure of testis to reach the scrotum
- Pexy failure and retraction of testis out of scrotum
- Occlusion of vas deferens → risk of fertility issues
- Bleeding – intra-operative or post operative
  - Inferior epigastric vessel, spermatic vessels
- Wound infection
  - Most common complication
  - Infants highest risk

Question

The most common place for an undescended testis to be found is:

a. Intra-abdominal
b. Contralateral scrotum
c. Palpable within inguinal canal
d. Ectopic location

Question

The most common place for an undescended testis to be found is:

a. Intra-abdominal

b. Contralateral scrotum

c. Palpable within inguinal canal (80%)

d. Ectopic location

Question

At what age should a patient be evaluated for orchiopexy?

a. 1 year old
b. 3 months old
c. When patient hits puberty
d. 6 months old

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Question

Indications for orchiopexy of an undescended testis includes the following except:

a. Patients in their pubescent years with new diagnosis and testicle half the size of the contralateral testis

b. Decrease trauma to the testis

c. Decrease risk of malignancy

d. Decrease risk of infertility

Question

Indications for orchiopexy of an undescended testis includes the following except:

a. Patients in their pubescent years with new diagnosis and testicle half the size of the contralateral testis
    a. Indication for orchiectomy
b. Decrease trauma to the testis
c. Decrease risk of malignancy
d. Decrease risk of infertility

Final Discussion/Review

- Cryptorchidism – consists of all conditions where testis is outside the normal location of scrotum
  - Retractile testis, Ectopic, undescended, entrapped, ascended testis, etc
- Diagnosis of cryptorchidism – physical exam
  - Imaging studies typically un-needed
  - Diagnostic laparoscopy indicated in non palpable cryptorchidism
- Surgery – mainstay of therapy
  - Indicated after 6 months of age
  - Orchiopexy vs Orchiectomy
    - Depends on age, size of testicle, associated anomalies

References

- American Urological Association guidelines: https://www.auanet.org/guidelines/guidelines/cryptorchidism-guideline
- Laparoscopy in the evaluation of impalpable testes and its short-term outcomes: A 7 years' experience. Kumar Rajarshi, Mandal Kartik Chandra, Halder Pankaj, Hadiuzzaman Md., Mukhopadhyay Madhumita, Mukhopadhyay Biswanath. Year : 2017 | Volume: 22 | Issue Number: 4 | Page: 232-236 https://www.jiaps.com/article.asp?issn=0971-9261;year=2017;volume=22;issue=4;spage=232;epage=236;aulast=Kumar
- Pediatric surgery NaT: https://www.pedsurglibrary.com/apsa/view/Pediatric-Surgery-NaT/829144/all/Cryptorchidism#11
- Coran, A. G., Adzick, N. S., & Hutson, J. M.. (2012). In *Pediatric surgery* (7th ed.). essay, Elsevier Mosby

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