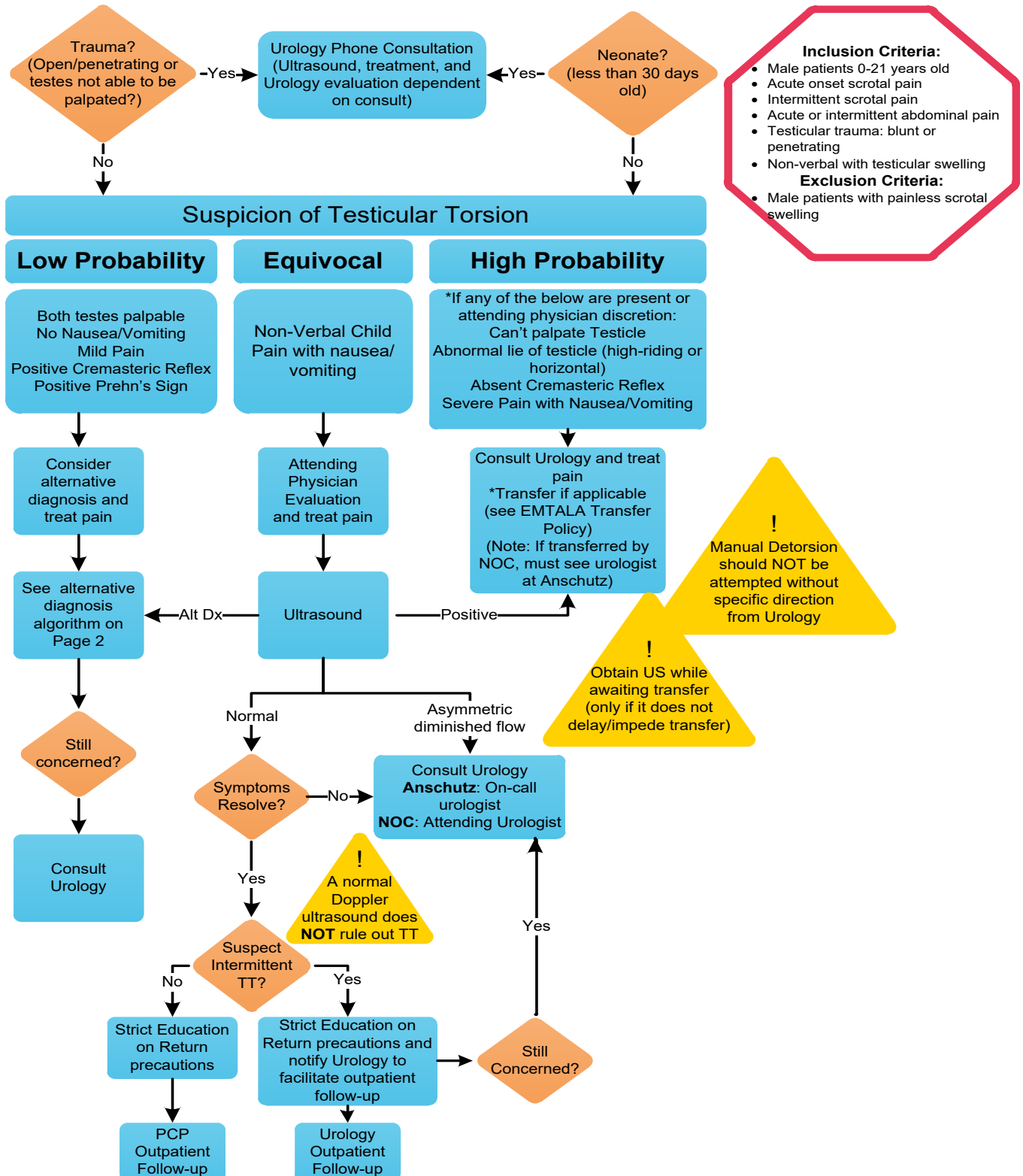


ACUTE PAINFUL SCROTUM

ALGORITHM- Suspicion for Testicular Torsion



ALGORITHM- Alternative Diagnosis

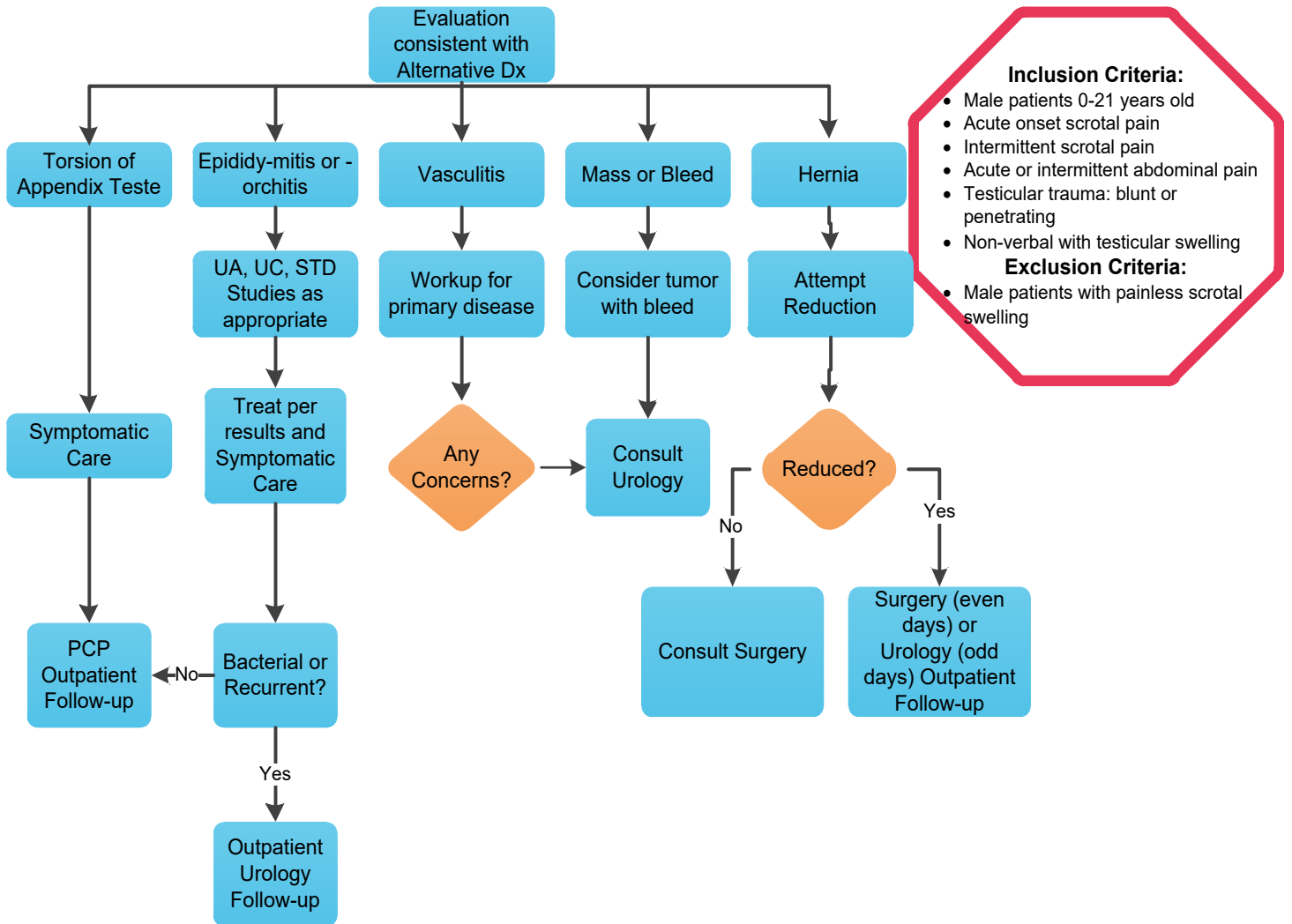


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TARGET POPULATION

Inclusion Criteria

- Male patients 0-21 years old
- Acute onset scrotal pain
- Intermittent scrotal pain
- Acute or intermittent abdominal pain
- Testicular trauma: blunt or penetrating
- Non-verbal with testicular swelling

Exclusion Criteria

- Male patients with painless scrotal swelling

BACKGROUND | DEFINITIONS

Table 1. Common causes of scrotal swelling by age

Infancy	Childhood	Adolescence
Hydrocele	Hernia	Epididymitis
Hernia	Torsion appendage testis	Torsion appendage testis
Testicular Torsion (TT)	Testicular torsion(TT)	Testicular torsion(TT)
	Trauma	Trauma

Table 2. Painful vs. Painless causes of acute scrotal swelling

<u>Painful Scrotal Swelling</u>	<u>Painless Scrotal Swelling</u>
Torsion of testis	Hydrocele
Torsion of appendage of testis	Hernia
Trauma: hematocele, hematoma, epididymitis, testicular rupture	Varicocele
Epididymitis	Spermatocele
Orchitis	Idiopathic scrotal edema
Hernia – incarcerated	Henoch-Schonlein purpura
Tumor with acute hemorrhage	Kawasaki disease
Scrotal fat necrosis	Testis tumor
Infarcted omentum in inguinal hernia	Antenatal torsion of testis

INITIAL EVALUATION

Telephone Triage

- Activate EMS (911): Painful hemiscrotum with diffuse tenderness and color changes associated with nausea and/or vomiting
- ED Visit (immediate): Acute onset of painful scrotum
- Office Visit same day: Intermittent scrotal pain
- Phone contact with PCP: Painless swelling of the scrotum

Initial Triage

- Obtain brief history of presenting conditions and past medical history
- Obtain all pertinent patient history, including onset and duration of symptoms

A thorough history and physical examination are crucial in distinguishing various causes of an acute scrotum

History

- Timing and duration of signs and symptoms
- Swelling and/or color changes
- Pain (onset, duration, location, radiation)
- Associated Symptoms(nausea, vomiting, dysuria, abdominal pain, fever)
- Trauma (penetrating, blunt, straddle)
- Sexual Activity
- Physical Activity
- History of similar episodes

Physical Examination

Scrotum and contents - careful evaluation to identify:

- Presence or absence of a palpable testis
- Presence or absence of pain
- Position of testicle in the scrotum
- Skin changes (swelling, scrotal wall edema)

- Color changes
- Cremasteric reflex: present or absent
- Prehn’s sign: positive or negative

Inguinal canal

- Presence of hernia

Lower abdomen

- Because the pain of TT may be referred to the abdomen, the genitalia should be carefully examined in all children with abdominal pain

CAUSES OF PAINFUL SCROTAL SWELLING

Torsion of the Testis (TT):

Testicular torsion is the most significant condition causing acute scrotal pain and is a TRUE SURGICAL EMERGENCY! TT is a clinical diagnosis and usually no studies are required.

- Best chance of testicular recovery is surgical detorsion within 6 hours following the onset of pain.

Table 3: Testicular salvage based on time to surgical detorsion

<u>Time to Surgical Detorsion</u>	<u>% Testicular Salvage</u>
6 hours	90%
12 hours	50%
24 hours	10%
More than 24 hours	0%

Physiology

Torsion results from inadequate fixation of the testis to intra-scrotal subcutaneous tissue which results in the “bell-clapper” deformity, where the testis is free floating in the tunica vaginalis only attached to the spermatic cord. As the testis rotates it causes torsion of the spermatic cord, venous engorgement of the testis and eventual arterial infarction.

Risk Factors

- Newborn and early stages of puberty most common
- Increased risk in undescended testis (e.g. Trisomy 21)
- Previous episodes of intermittent torsion without surgical repair

History

- Acute onset of severe hemi scrotal pain
- Radiation of pain to the abdomen
- Nausea and vomiting

Physical

- Affected testis (usually unilateral but bilateral in 2%)
- Erythema scrotal skin
- Acutely swollen (edema may confound the exam)
- Diffusely tender
- Lies higher in scrotum than non-affected testis: “High riding,” “Horizontal,” or “Transverse” lie

- Cremasteric Reflex (retraction of testis with stroking inner thigh) usually absent in torsion or in children under the age of 30 months. This reflex may be present with early or incomplete torsion but usually is absent.
- Prehn's sign : a positive sign is symptomatic pain relief with manual elevation of the testis; this sign is negative in testicular torsion while positive in epididymitis
- Inguinal bulge with empty scrotum

Evaluation

- UA: negative
- Testicular Color Doppler Flow Sonography (TCDFS): Assesses anatomy and blood flow and can be a helpful adjunct in confirming the diagnosis, but should not delay urology consultation, surgical exploration, or clinical judgment. Some limitations include:
 - Operator dependent
 - Low flow in pre-pubertal testis
 - Incomplete or Intermittent torsion may reveal normal, increased or decreased flow
 - **A normal study doesn't rule out torsion**

Management: based on degree of suspicion for testicular torsion

- ALL PATIENTS WITH SUSPECTED TT MUST BE EVALUATED BY THE EMERGENCY MEDICINE ATTENDING or UROLOGY

High suspicion

- Consult Emergency Medicine(EM) Attending or Urology
- Notify Urology regarding OR (goal ≤ 4 hours from onset pain)
 - Need for TCDFS per Urology
 - Surgical exploration, detorsion and fixation of both torsed and contralateral testis
 - Nonviable testis: orchiectomy (to prevent infection) and fixation of contralateral testis
- Treat Pain, obtain IV access if needed, treat nausea/vomiting
- Consider Manual detorsion only with specific direction from Urology

Equivocal suspicion

- Consult Emergency Medicine(EM) Attending or Urology
- Obtain TCDFS if EM attending in agreement
- If there is any concern regarding the diagnosis, evaluation or need for radiology studies consult Urology
- Treat Pain, obtain IV access if needed, treat nausea/vomiting

Low Suspicion

- Consult Emergency Medicine Attending or Urology
- Evaluation based on symptoms
- Consider alternative diagnoses
- Treat for pain and nausea/vomiting

Intermittent Torsion of the Testis:

- On occasion testicular torsion can resolve spontaneously reflecting intermittent torsion and detorsion.
- History and physical are identical to testicular torsion but with spontaneous resolution of pain. Patient may report prior similar episodes.

Evaluation

- Testicular Color Doppler Flow Sonography (TCDFS) if felt necessary after evaluation by EM attending
 - Results of TCDFS are usually normal

Management

- If symptoms persist, consult Urology
- If symptoms resolve no further evaluation is necessary

Follow-up:

- Strict return precautions
- Outpatient Urology follow-up

Torsion of Testicular Appendage:

Etiology

- Vestigial embryonic remnant attached to testis or epididymis twists around base resulting in venous engorgement, enlargement and eventual infarction
- Most common age 7 to 12 years but can occur at any age

History

- Acute onset of hemi scrotal pain, less severe and more indolent than with testicular torsion
- Occasionally associated with nausea, vomiting or diaphoresis, but less common than with testicular torsion

Physical

- **Early:** swelling localized to site of twisted appendage; usually superior lateral aspect of testis, the “ Blue Dot Sign”, where the torted appendage is visible through a thin, translucent hemiscrotal wall
- **Late:** With onset of scrotal wall edema, the exam becomes more difficult and less informative
- Cremasteric reflex intact

Evaluation

- Testicular Color Doppler Flow Sonography (TCDFS) if felt necessary after evaluation by EM attending
- Increased or normal flow to affected testis and epididymis as compared to opposite side due to inflammation. Can be a helpful adjunct in ruling out testicular torsion.

Management

- Consult Urology if there is any concern regarding the diagnosis, evaluation or need for radiology studies
- Rest
- Scrotal support
- Treatment with analgesics \ NSAIDS
- Occasionally surgical exploration required to rule out torsion or removal of appendage for ongoing pain

Follow-up:

- PCP
- Urology for ongoing pain or other concerns

Epididymitis | Orchitis:

Epididymitis- the infection or inflammation of the epididymis, common in adolescents and less common in pre-pubertal males where it is usually associated with a UTI related to structural anomalies.

Orchitis- the infection or inflammation of the testis resulting from the extension of process from epididymis or (rarely) hematogenous spread of systemic bacterial infection

Etiology

- Bacterial (N. gonorrhea, C. trachomatis E. coli, Mycobacterium)
- Viral (Mumps, Adenovirus, Epstein Barr, Coxsackie, Echo)
- Trauma
- Association with torsion appendix testis or appendix epididymis

History

- Gradual onset of increasing hemi scrotal pain
- Occasionally associated with dysuria, fever, penile discharge

Physical

Affected testis is:

- Enlarged and tender to palpation
- Cremasteric reflex present
- Prehn's sign : a positive sign is symptomatic pain relief with manual elevation of the testis; this sign is positive in epididymitis while negative in testicular torsion
- Scrotal wall edema may confound the exam

Evaluation

- UA: Useful adjunct in differentiating between bacterial and non-bacterial epididymitis
- Urine culture
- Sexually active patients: Urine PCR for N. Gonorrhea and C. trachomatis
- Testicular Color Doppler Flow Sonography can be a helpful adjunct in ruling out testicular torsion and in making or confirming the diagnosis

Management

- Consult Urology if there is any concern regarding the diagnosis, evaluation or need for radiology studies
- Antibiotics appropriate for organism and/or STD
- Analgesia
- Scrotal support and elevation
- Bed rest

Follow-up:

- Urology: Bacterial epididymitis, (+) UC, or recurrent
- All others PCP

Trauma:

Etiology

- Blunt compression of testicle against pubic bone
 - Straddle injury
- Penetrating (less common)
- Hematocele results from blood within the tunica vaginalis

Physical

- Carefully palpate scrotum to evaluate for presence or absence of testis
- Ecchymosis of scrotal wall suggests hematocele
 - Ranges from mild scrotal swelling to tense blood filled scrotum

Evaluation

- Testicular Color Doppler Flow Sonography (TCDF): Useful adjunct in differentiating testis rupture, hematocele, intra-testicular laceration or hematoma, traumatic epididymitis

Management

- Urgent Urology consultation unless a normal palpable testis present
- Surgical exploration if any question of testicular rupture
- Surgical exploration to drain large hematocele
- Surgical exploration for testis laceration
- Symptomatic care for traumatic epididymitis
- Suture closure of simple scrotal lacerations

Incarcerated Hernia:

Etiology

- An indirect inguinal hernia refers to the presence of omentum or bowel within the inguinal canal

Physical

- Mild inguinoscrotal discomfort
- Inguinoscrotal swelling

Management

- The hernia usually reduces spontaneously, but may require manual reduction.
- If the hernia cannot be reduced (**incarcerated inguinal hernia**), consult Surgery

Vasculitis

Etiology

- Henoch Schoenlein Purpura (HSP)
- Kawasaki Disease (KD)

Physical

Consistent with specific vasculitis

- Mild scrotal pain

Management

- Workup focused on primary disease
- Consult Urology if there is any concern regarding the diagnosis, evaluation or need for radiology studies

Laboratory Studies | Imaging

Diagnostic tests are only indicated if they will change outcome

Imaging

Indications for Obtaining Imaging Studies

- Clinical Suspicion Testicular Torsion
- Acute scrotal pain and absence of palpable testis
- Open or penetrating scrotal trauma
- Scrotal trauma with absent palpable normal testis
- After consultation with Urology if diagnosis uncertain

Imaging Modalities

Testicular Color Doppler Flow Sonography (TCDFS)

- Assesses anatomy and blood flow and can be a helpful adjunct in confirming the diagnosis, but should not delay urology consultation, surgical exploration, or clinical judgment

Limitations

- Operator dependent
- Low flow in pre-pubertal testis
- Incomplete or Intermittent torsion may reveal normal, increased or decreased flow
- **A normal study does not rule out torsion**

Laboratory

Laboratory Studies

Suspected Epididymitis

- UA
- Urine Culture
- Urine PCR for *N. Gonorrhoea* and *C. Trachomatis* in sexually active patients

Urology Consultation

Indications for Urology Consultation

- Clinical Suspicion Testicular Torsion
- Acute scrotal pain and absence of palpable testis
- Open or penetrating scrotal trauma
- Scrotal trauma with absent palpable normal testis
- Any questions regarding diagnosis or management

Indications for Outpatient Urology Management

- Suspicion of intermittent Testicular Torsion
- Torsion of testicular appendage (if ongoing pain)
- Epididymitis/orchitis (bacterial, positive urine culture, or re-current)

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 Pharmacy & Therapeutics Committee – N/A

MANUAL/DEPARTMENT	Clinical Care Guidelines/Quality
ORIGINATION DATE	September 21, 2011
LAST DATE OF REVIEW OR REVISION	September 27, 2016
APPROVED BY	 Lalit Bajaj, MD, MPH Medical Director, Clinical Effectiveness

REVIEW/REVISION SCHEDULE

Scheduled for full review on September 27, 2020

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