

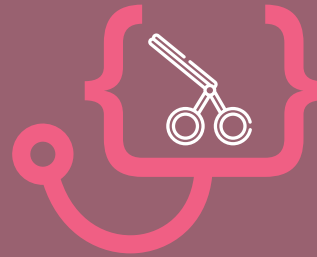


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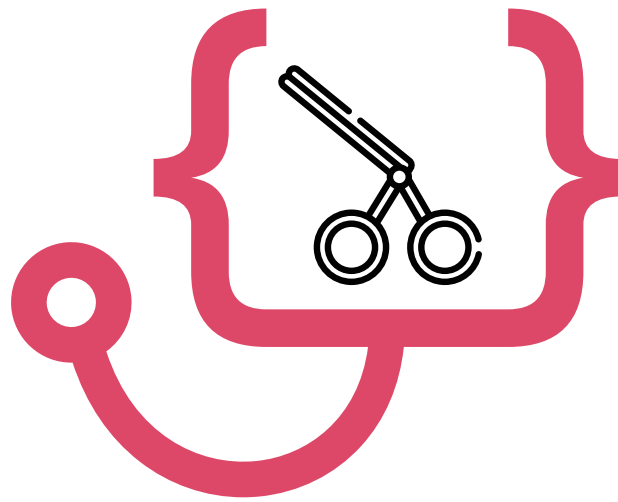


2022 Edition, Vol.III

# STANDARD TREATMENT WORKFLOWS *of India*

**PARTNERS**





STANDARD  
**TREATMENT**  
WORKFLOWS  
*of India*



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These STWs have been prepared by national experts of India with feasibility considerations for various levels of healthcare system in the country. These broad guidelines are advisory, and are based on expert opinions and available scientific evidence. There may be variations in the management of an individual patient based on his/her specific condition, as decided by the treating physician. There will be no indemnity for direct or indirect consequences. Kindly visit our web portal ([stw.icmr.org.in](http://stw.icmr.org.in)) for more information.

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Printed in India

# CONTENTS

- INTRODUCTION
- SPECIALITIES COVERED IN THIS EDITION

- **Paediatric Surgery**

- Acute Scrotum

- Constipation

- Empyema

- Hernia in children/ Congenital Hernia

- Undescended Testes



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# INTRODUCTION

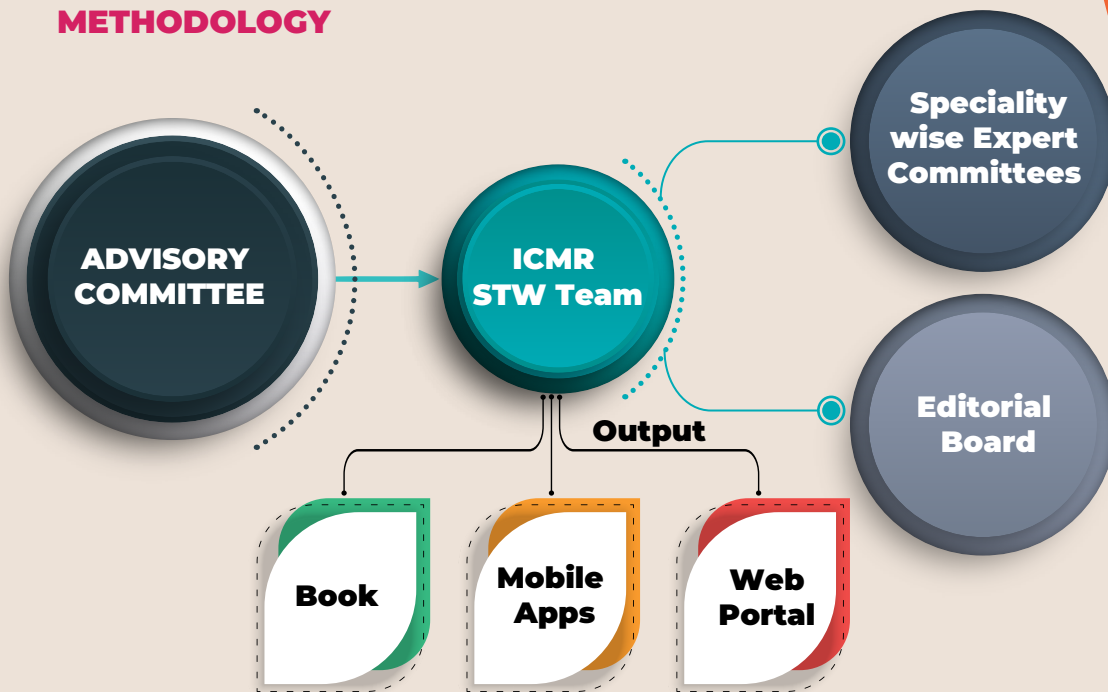
## GOAL

To empower the primary, secondary and tertiary health care physicians/surgeons towards achieving the overall goal of Universal Health Coverage with disease management protocols and pre-defined referral mechanisms by decoding complex guidelines.

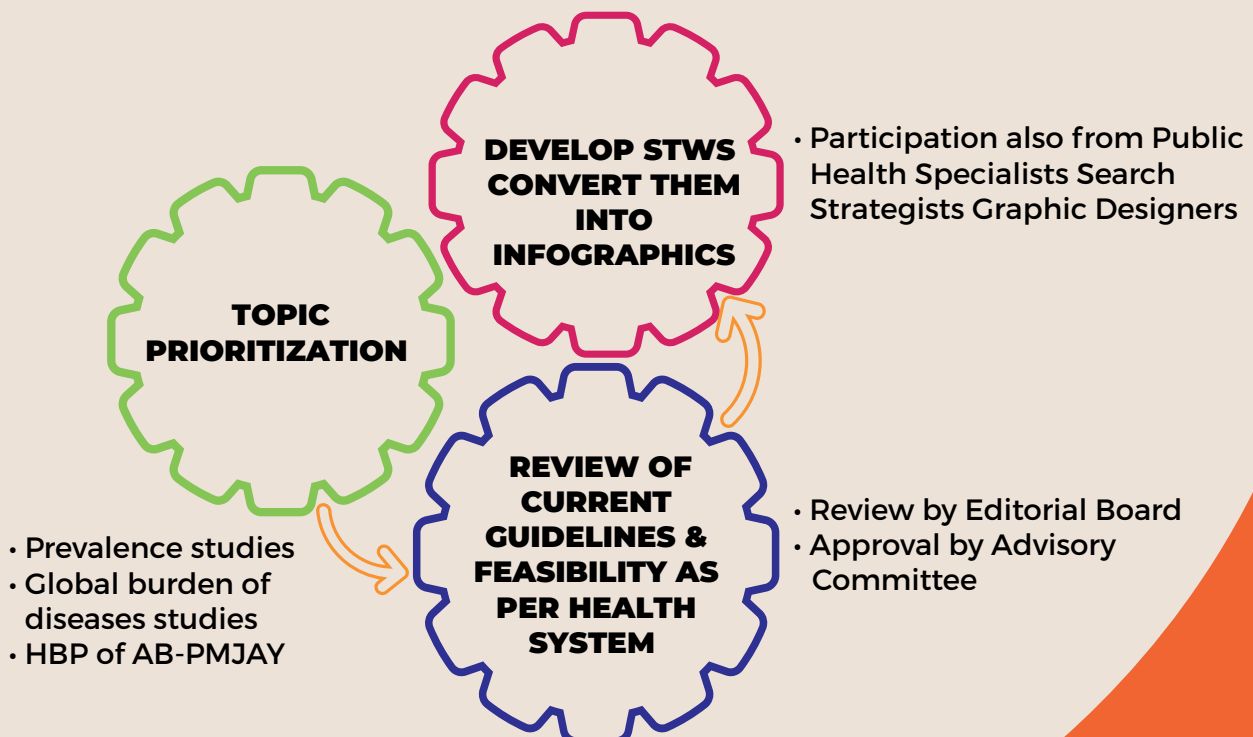
## OBJECTIVES

To formulate treatment algorithms for common and serious medical & surgical conditions for both outdoor & indoor patient management at primary, secondary and tertiary levels of India's healthcare system that are scientific, robust and locally contextual.

## METHODOLOGY



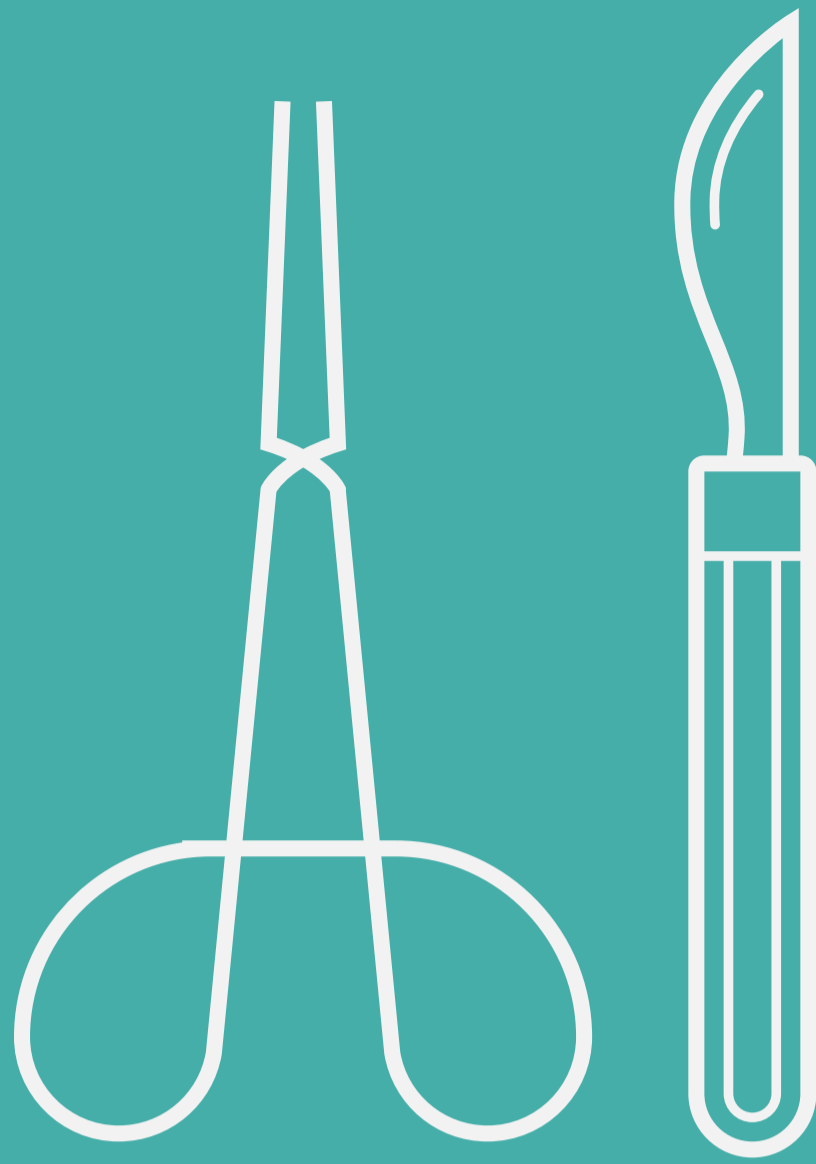
## PROCESS OVERVIEW



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# **PAEDIATRIC SURGERY**



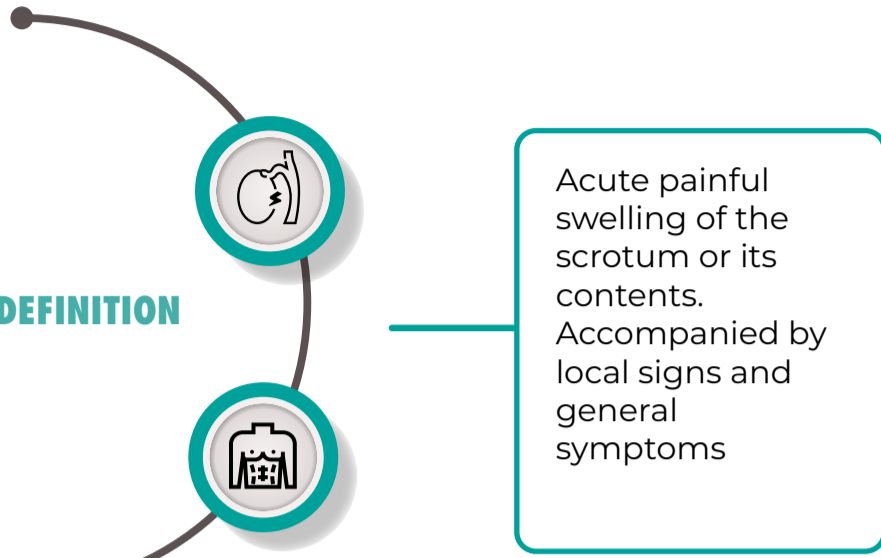
# Standard Treatment Workflow (STW) ACUTE SCROTUM IN CHILDREN

## ICD-10-N50.8

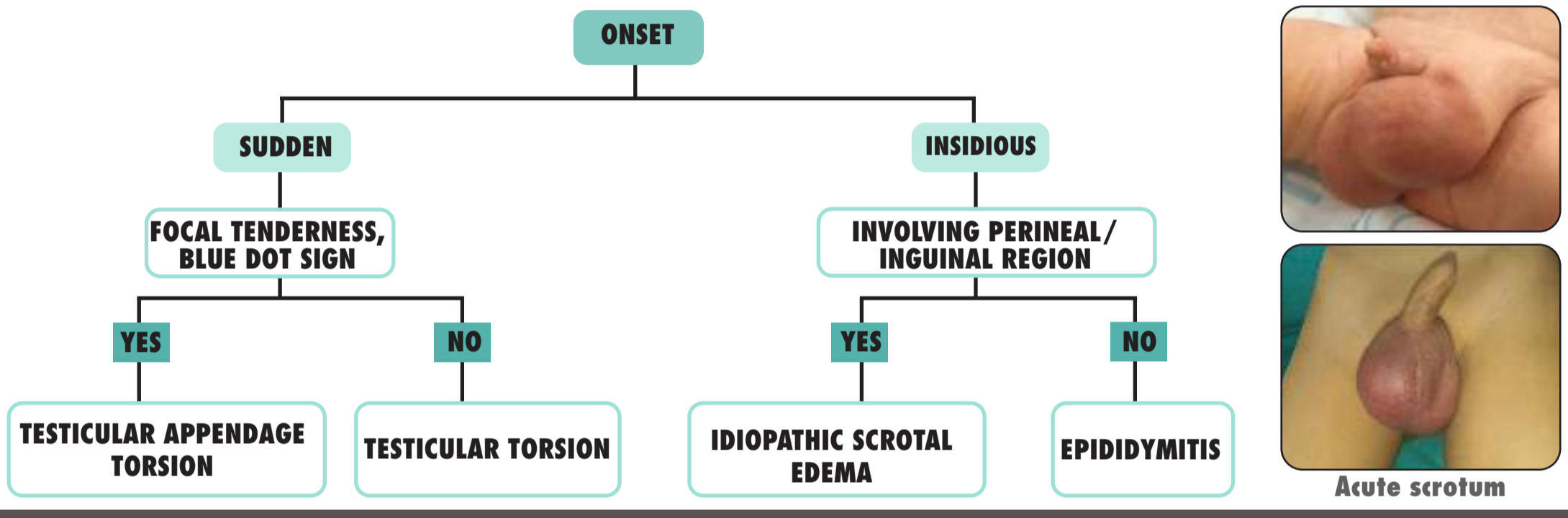
### DIFFERENTIAL DIAGNOSIS OF ACUTE SCROTUM

| PATHOLOGY                           | FREQUENCY   | AGE AT REPRESENTATION       |
|-------------------------------------|-------------|-----------------------------|
| Extravaginal torsion of testis      | Uncommon    | Perinatal period            |
| Intravaginal torsion of testis      | Common      | Anytime, peak at 13-16 yrs  |
| Testicular appendage torsion        | Very Common | Anytime, peak at 11 yrs     |
| Epididymitis/<br>Epididymo-orchitis | Rare        | 0-6 months                  |
| Mumps orchitis                      | Uncommon    | Only after puberty          |
| Idiopathic scrotal edema            | Uncommon    | 0-5 yrs                     |
| Fat necrosis of scrotum             | Rare        | 5-15 yrs                    |
| Henoch Schonlein Purpura            | Rare        | 4-10 yrs                    |
| Testicular Trauma                   | Uncommon    | Anytime, common in 5-15 yrs |

### DEFINITION



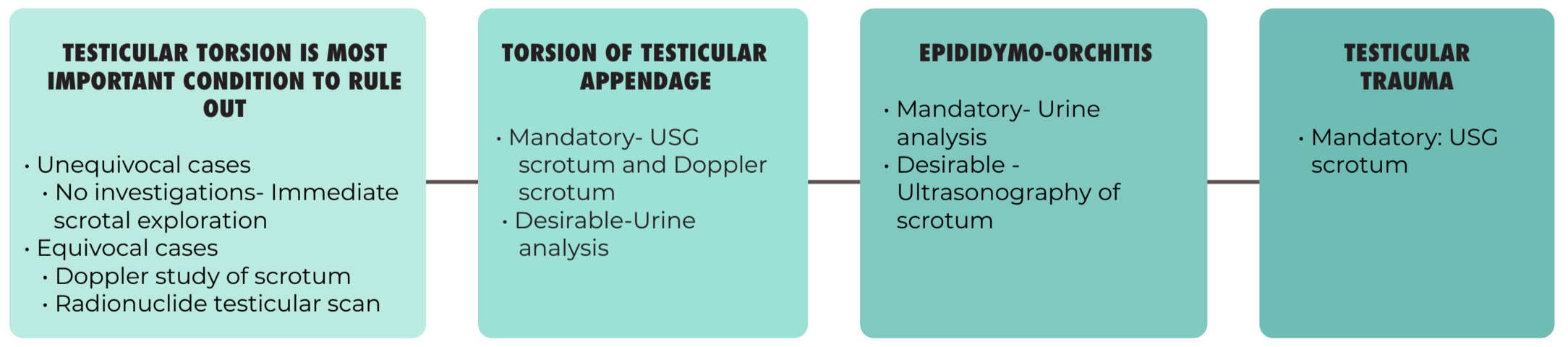
### PAINFUL SCROTAL SWELLING - DECISION TREE



### DIFFERENTIATING CLINICAL FEATURES

|  |   |   |   |
|--|---|---|---|
| <b>TORSION TESTIS</b> <ul style="list-style-type: none"> <li>Sudden onset of pain in testis, lower abdomen or groin</li> <li>Associated with nausea and vomiting</li> <li>Local palpation – Very painful</li> <li>Hemiscrotum - Red and edematous, bluish discoloration (Infarction of testis)</li> <li>Transverse lie of testis</li> <li>Absent cremasteric reflex</li> </ul> | <b>TORSION OF TESTICULAR APPENDAGE</b> <ul style="list-style-type: none"> <li>Sudden onset pain but of less severe degree.</li> <li>A bluish black spot (blue-dot) seen at the upper pole of the testis through the skin</li> <li>Palpation of the testis less painful</li> </ul>                   | <b>EPIDIDYMITIS/EPIDIDYMO-ORCHITIS</b> <ul style="list-style-type: none"> <li>Inflammatory condition of the scrotum</li> <li>Epididymis alone is usually affected before puberty (0-6 months)</li> <li>Epididymo-orchitis is more common after puberty</li> <li>History suggestive of -Urinary tract abnormalities or urethral instrumentation</li> <li>Infecting organism - Usually <i>Escherichia coli</i></li> </ul> |   |
| <b>MUMPS ORCHITIS</b> <ul style="list-style-type: none"> <li>Affects post-pubertal testis</li> </ul>   | <b>IDIOPATHIC SCROTAL EDEMA</b> <ul style="list-style-type: none"> <li>Confused with torsion of testis or its appendages</li> <li>Edema of scrotum with spread to or from inguinal region, penis, or perineum</li> <li>Cause of edema - may be bacterial cellulitis or a topical allergy</li> </ul> | <b>FAT NECROSIS</b> <ul style="list-style-type: none"> <li>Sudden appearance of tender bilateral lumps in scrotal skin</li> <li>Affected boys are often obese</li> <li>History of swimming in cold water</li> </ul>   | <b>HENOCH SCHONLEIN PURPURA</b> <ul style="list-style-type: none"> <li>Present with signs of acute scrotal swelling</li> <li>Before or after other systemic signs and symptoms</li> <li>Most commonly bilateral and rarely painful</li> </ul> |

### INVESTIGATIONS



### TREATMENT

|  |  |   |   |  |
|--|--|---|---|--|
| <b>TESTICULAR TORSION</b> <ul style="list-style-type: none"> <li>Immediate scrotal exploration in golden window of 4-8 hours if investigative facilities not available</li> <li>Clinical exploration if bell clapper deformity seen</li> <li>Contralateral orchiopexy if bell clapper anomaly on affected side</li> <li>Orchidectomy preferable in older children if other testis is normal</li> <li>Refer if no surgical facility available</li> <li>Testicular prosthesis at a later date</li> </ul> | <b>TORSION OF TESTICULAR APPENDAGE</b> <ul style="list-style-type: none"> <li>Restricted activity</li> <li>Warm compression</li> <li>Anti inflammatory drugs</li> <li>If not differentiable from torsion testis- Exploration and excision of necrotic appendage</li> </ul> | <b>IDIOPATHIC SCROTAL EDEMA</b> <ul style="list-style-type: none"> <li>Anti-histaminics</li> <li>Topical corticosteroids</li> </ul> | <b>HENOCH-SCHONLEIN PURPURA</b> <ul style="list-style-type: none"> <li>Supportive treatment</li> <li>Rarely systemic corticosteroids</li> </ul> | <b>TESTICULAR INJURY</b> <ul style="list-style-type: none"> <li>Mostly supportive</li> <li>Surgery if large hematoma/ tunica albuginea rupture on USG</li> </ul> |
|--|--|---|---|--|

### REFERENCES

- Cavusoglu YH, et al. Acute scrotum - etiology and management. Ind J Pediatr 2005;72:201.
- McAndrew HF et al. The incidence and investigation of acute scrotal problems in children. Pediatr Surg Int 2002;18:435.
- Tekgul S, Dogan HS, Hoebeke P et al. EAU guidelines on Pediatric Urol. 2016;3.4:19-21.

### KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES





## Standard Treatment Workflow (STW) CONSTIPATION

### ICD 10- K59.0

#### WHAT IS CONSTIPATION?

- Decreased frequency of bowel motions (<3 per week)
- Passage of hard or large stools
- Painful bowel motions with difficulty in pushing out



#### CONSTIPATION IN < 1 YEAR OLDS.

- Not passing stools with abdominal distension
- Associated vomiting
- Absent or ectopic anal opening
- Changes in infant formula, weaning, insufficient fluid intake

#### CONSTIPATION IN CHILD OLDER THAN 1 YEAR

- Starts after a few weeks of life
- Bottle fed or change of diet
- Fissures, timing of potty/toilet training
- Generally weight and height within normal limits
- History of poor fibre diet and/or insufficient fluid intake

#### RED FLAG SIGNS

- Constipation reported from birth or first few weeks of life
- Failure to pass meconium/delay (more than 48 hours after birth in term baby)
- All abnormal location or calibre of anal opening
- 'Ribbon stools' (more likely in <1 year olds)
- Previously unknown/undiagnosed weakness in legs, locomotor delay, signs of hypothyroidism
- Abdominal distension with vomiting

#### BRISTOL STOOL FORM SCALE

|  |               |  |                     |
|--|---------------|--|---------------------|
|  | <b>Type 1</b> | Separate hard lumps.                       | Severe constipation |
|  | <b>Type 2</b> | Lumpy and sausage like                     | Mild constipation   |
|  | <b>Type 3</b> | A sausage shape with cracks in the surface | Normal              |
|  | <b>Type 4</b> | Like a smooth, soft sausage or snake       | Normal              |
|  | <b>Type 5</b> | Soft blobs with clear-cut edges            | Lacking Fibre       |
|  | <b>Type 6</b> | Mushy consistency with ragged edges        | Mild diarrhea       |
|  | <b>Type 7</b> | Liquid consistency with no solid pieces    | Severe diarrhea     |

#### HISTORY

| KEY COMPONENT                             | LESS THAN 1 YEAR   | MORE THAN 1 YEAR   |
|---|--|--|
| <b>STOOL PATTERNS</b>                     | Fewer than three complete stools per week (Type 3 or 4) (Exclude exclusively breast fed babies older than 6 months)  | Fewer than three complete stools per week (Type 3 or 4)<br>Overflow soiling (Loose, Smelly), Thick, Sticky or Dry  |
| <b>SYMPTOMS ASSOCIATED WITH DEFECTION</b> | Hard Large Stools<br>Rabbit Droppings (Type 1)<br>Distress on stooling (Bleeding, Straining)<br>Previous episode of constipation<br>Previous or current anal fissure | Rabbit Droppings (Type 1)<br>Large infrequent stools that can block toilet<br>Poor appetite improves with passage of stools<br>Waxing and waning of abdominal pain with passage of stools<br>Retentive posturing, straight legged, tiptoed, anal pain, Straining |

#### PHYSICAL EXAMINATION

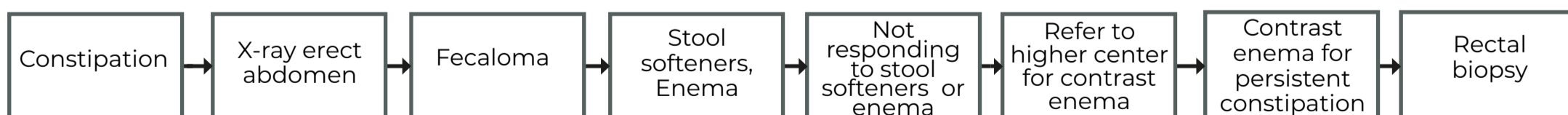
|  | IDIOPATHIC CONSTIPATION  | PATHOLOGICAL DISEASE  |
|--|--|---|
| <b>INSPECTION OF PERINEAL AREA</b>   | Normal   | Abnormal- appearance, position, patency   |
| <b>ABDOMINAL EXAMINATION</b>   | Soft, Flat or Distension can be explained because of age or excess fat | Gross distension  |
| <b>SPINE/ LUMBOSACRAL/ GLUTEAL</b>   | Normal appearance  | Abnormal- asymmetry or flatening, sacral agenesis, discoloured skin, naevi or sinus, hairy patch, lipoma, central pit |
| <b>LOWER LIMB NEUROMUSCULAR EXAMINATION</b>  | Normal gait, tone and strength   | Deformity in lower limb such as talipes. Abnormal neuromuscular signs   |
| <b>REFLEXES ( WHEN RED FLAGS (+) IN HISTORY ) OR NEW ONSET NEUROLOGICAL IMPAIRMENT</b> | Reflexes present   | Abnormal  |

#### INVESTIGATIONS

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li>Abdominal and rectal examination</li> <li>Serum T3, T4, TSH</li> <li>X-ray erect abdomen</li> </ul> | <ul style="list-style-type: none"> <li>X-ray spine: AP and Lateral</li> <li>Contrast enema</li> </ul> | <ul style="list-style-type: none"> <li>Anorectal manometry</li> <li>Rectal biopsy</li> </ul> |
|--|---|--|

#### MEDICAL MANAGEMENT

- |  |   |  |
|--|---|--|
| <ul style="list-style-type: none"> <li><b>Disimpaction of stools:</b> manual or with retention enemas</li> </ul> | <ul style="list-style-type: none"> <li><b>Laxatives:</b> Sodium picosulfate, Bisacodyl, Polyethylene glycol, Lactulose, Senna, Docusate sodium</li> </ul> | <ul style="list-style-type: none"> <li><b>Dietary modifications:</b> proper weaning, no dilution of milk, reduce milk and increase roughage</li> </ul> |
|--|---|--|



#### INDICATIONS FOR RECTAL BIOPSY

- Persistent constipation
- Contrast enema showing transitional zone
- Absent ano-rectal reflex on manometry
- Positive acetylcholinesterase fibers in rectal biopsy
- Biopsy showing absent ganglion cells

↓  
Colostomy

Definitive pullthrough surgery (Duhamel's, Scott Boley or Swensons pull through) OR single stage pullthrough in neonates and infants after adequate decompression

#### MANAGEMENT

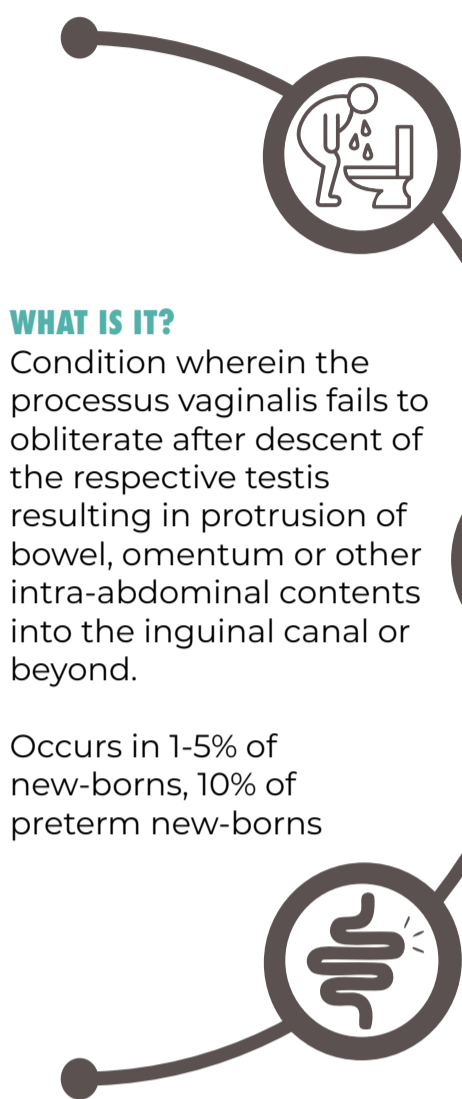
- Proper toilet training
- Adequate liquids and fibre in diet
- Biofeedback
- Laxatives
- Suppositories
- Evacuant enema
- Surgical intervention

👉 **KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**



# Standard Treatment Workflow (STW) CONGENITAL INGUINAL HERNIAS

ICD-10-K46



**WHAT IS IT?**

Condition wherein the processus vaginalis fails to obliterate after descent of the respective testis resulting in protrusion of bowel, omentum or other intra-abdominal contents into the inguinal canal or beyond.

Occurs in 1-5% of new-borns, 10% of preterm new-borns

**PRESENTATION**

**SWELLING:** Located in groin, labia, scrotum or inguino-scrotal, intermittent, reducible or irreducible, more prominent upon straining or crying

**ABDOMINAL DISTENTION, OBSTIPATION OR VOMITING (BILIOUS OR NON-BILIOUS):** When the hernia is obstructed or incarcerated

**CONSTITUTIONAL SYMPTOMS:** When the hernia is incarcerated, and the bowel perforated



Obstructive inguinal hernia

**EXAMINATION**

**SWELLING:** Inguinal or inguinoscrotal (inguinolabial), reducible (with or without gurgling sound) or irreducible, cough impulse

**SILK GLOVE SIGN:** Palpable silky thickening of cord

**CONTRALATERAL INGUINAL HERNIA:** Upto 20% of patients may have synchronous contralateral inguinal hernia

**AGGRAVATING FACTORS:** In males with bilateral inguinal hernia (especially if associated with umbilical hernia), lower urinary tract outflow obstruction must be ruled out; connective tissue disorders, etc

**CONTENT OF SWELLING:** Usually only bowel and omentum, ovary (and/ or fallopian tube) in females and testis in boys with associated cryptorchidism; torsion of gonad to be ruled out

**LOOK FOR DANGER SIGNS**

**DANGER SIGNS**

- Irreducibility of swelling in isolation or associated with:
- Irritable, inconsolable child
  - Distention of abdomen and obstipation
  - Bilious vomiting
  - Unilateral, swollen and erythematous labia: may suggest torsion of ovary
  - Peritonitis

**INVESTIGATION**

**PRE-ANAESTHESIA ASSESSMENT**

**ESSENTIAL:** Hemogram, serum electrolytes, other blood investigations depending upon general condition of patient and co-morbidities as per anaesthetist

**DESIRABLE:** Ultrasonography & Karyotype (in all female inguinal hernias) to rule out complete androgen insensitivity syndrome

**TREATMENT (SURGERY)**

**TREATMENT OF CHOICE:** Inguinal herniotomy or laparoscopic repair under general anaesthesia

- Complicated hernias may need additional manoeuvres: simple reduction or laposcopic reduction for irreducible hernias, bowel repair/ resection-anastomosis for vascular compromise of bowel
- In female hernia, the sac should be opened and inspected for presence of fallopian tube which must be preserved.
- It is recommended that the surgery be carried out by a paediatric surgeon and that anaesthetist should be experienced in paediatric and neonatal anaesthesia

**MANDATORY FACILITIES IN THE CENTER**

- Term neonate or pre-term neonate (less than 60 weeks post-conception age): dedicated Surgical NICU managed by pediatric surgeon or NICU managed by neonatologist
- Older kids: round-the-clock paediatrician or paediatric surgeon for post-operative monitoring
- The primary/ community/ district health centre should make the diagnosis, explain the danger signs to the parents and refer the patient to a higher centre with defined infrastructure
- Children with complicated hernia without peritonitis: Should attempt reduction without sedation. With peritonitis: Insert NG and initiate reduction and refer to higher facility immediately

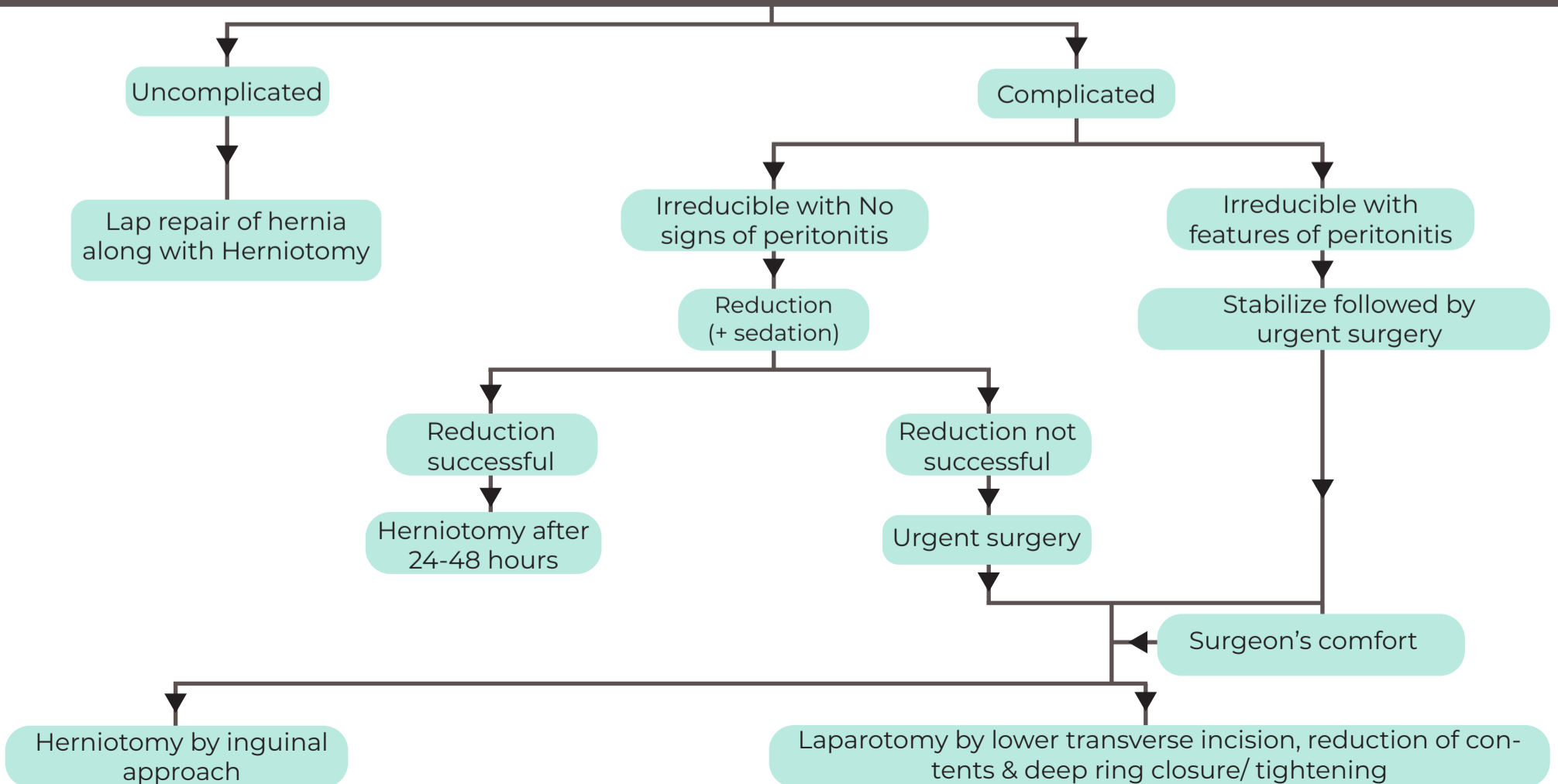
**TIMING AND PLACE OF SURGERY**

As early as possible but not a dire emergency. Danger signs should be explained to the parents at the time of making the diagnosis itself Surgical NICU managed by Pediatric Surgeon or NICU managed by neonatologist  
In inborn neonates who are diagnosed with inguinal hernia, surgery should preferably be performed prior to discharge

**FOLLOW-UP: WITH WHOM?**

- The first follow-up after discharge should be with the operating surgeon.
- Subsequent follow-up may be with the primary health centre close to the residence of the patient subject to approval by the operative surgeon

**INGUINAL HERNIA DECISION TREE**



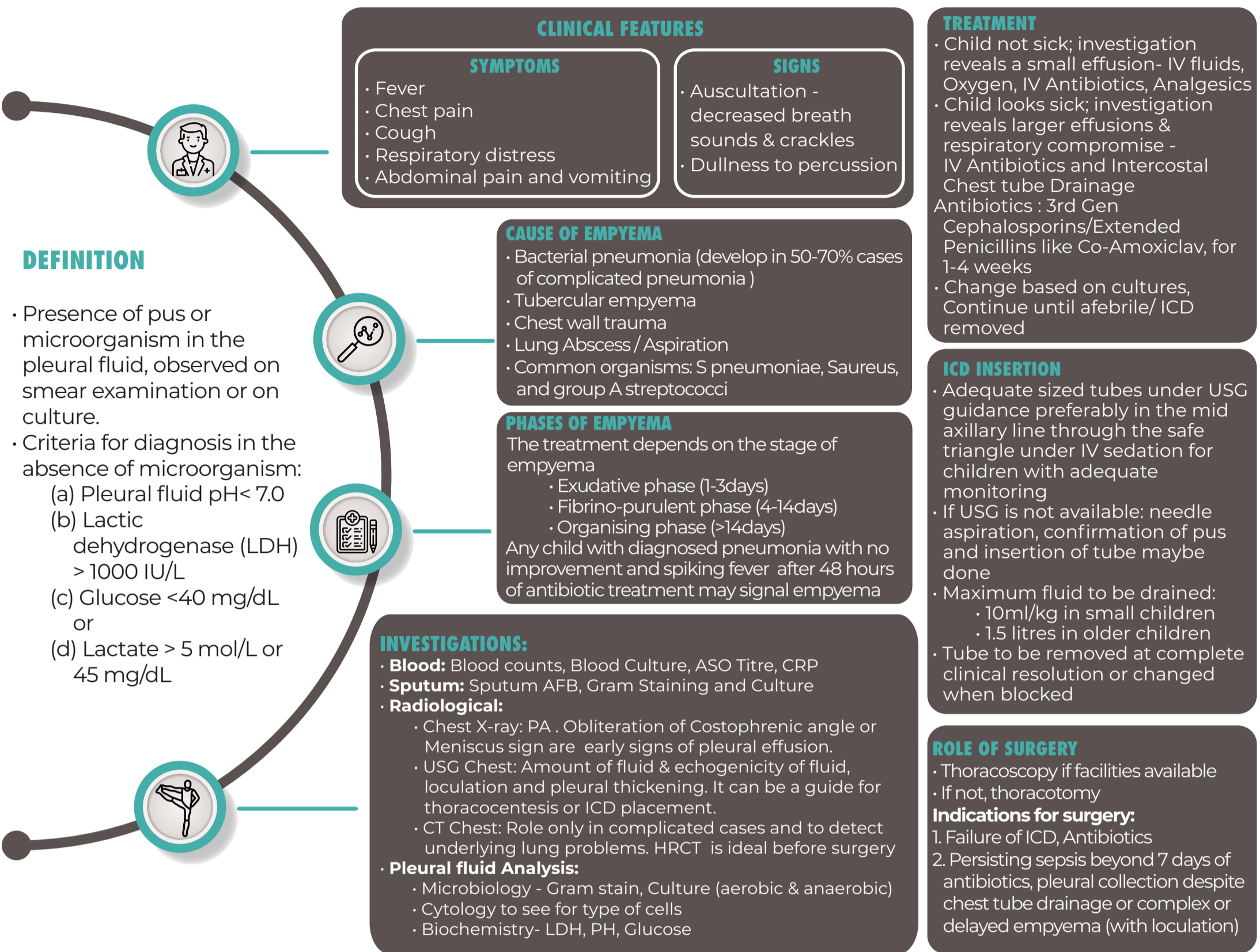
**Note:** Few scenarios like doubtful contralateral hernia, patients with conditions like exstrophic bladder may require bilateral exploration

**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**





## Standard Treatment Workflow (STW) EMPYEMA THORACIS IN CHILDREN ICD-10-J86



### THORACOSCOPY VS THORACOTOMY

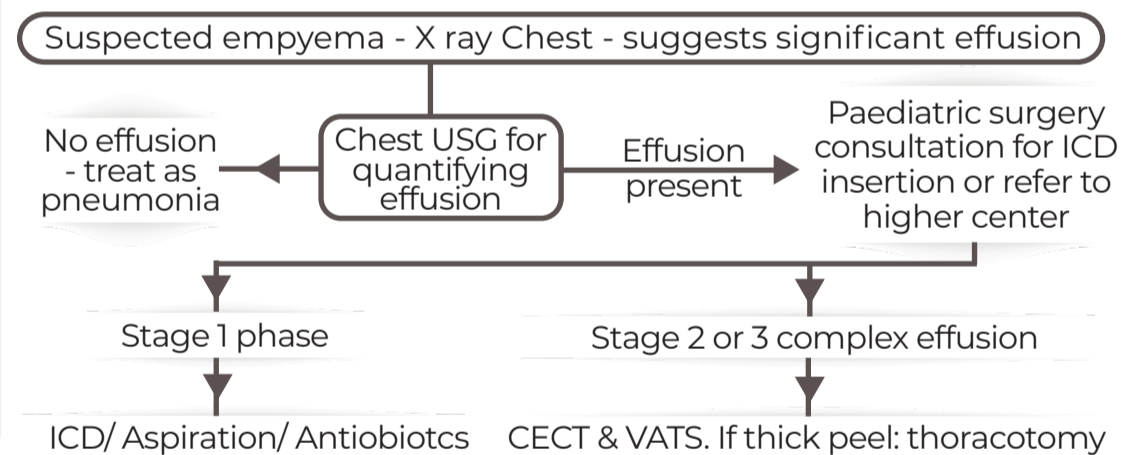
#### THORACOSCOPY

- Preferred in early empyema
- Breakdown of loculi
- Complete pus drainage
- Debridement under vision
- Full lung expansion
- If peel is very thick and not amenable for removal, should be converted to thoracotomy

#### THORACOTOMY

- Formal Thoracotomy and Decortication indicated in Stage 3 and delayed cases where there is
  - Thick peel
  - Thick pyogenic material
  - Inability to develop a pleural window
  - Complex and chronic empyema
  - Underlying diseased lung

### ALGORITHM OF MANAGEMENT OF CHILDHOOD EMPYEMA



### FIBRINOLYTICS IN STAGE II EMPYEMA

- Safe and cost effective treatment modality that avoids surgery

#### Indications

- Within 2 weeks duration
- Preferably no ICD has been placed
- Imaging shows echogenic collection with septation
- Fluid analysis shows frank pus/exudative effusion



Empyema

#### CONTRAINDICATIONS

- Bleeding diathesis
- Suspected TB
- Hypersensitivity to fibrinolytic
- Complicated pneumonia/ lung abscess
- Air leak on insertion of ICD

#### PROCEDURE

- 16/18 size ICD tube inserted under sedation with local anesthesia, towards marked point of maximal collection and connected to underwater seal without any suction
- Assessed after 24 hours, no further intervention if afebrile, without distress and effusion cleared on Xray

### DRUG AND METHODS

- Urokinase:
  - Dose: Twice daily for a maximum of three days (6 instillations)
  - **Age** <1 year 10000 IU diluted in 10 mL NS
  - **Age** >1 year 40000IU diluted in 40 mL NS
- Instilled through the ICD and kept blocked for 30 minutes (ICD reconnected after 30 minutes)
- Children are encouraged to change their positions

### MONITORING

- Resolution of clinical symptoms: fever, tachypnoea
- Drain output: Daily USG & X-ray

**ICD is removed:** drain output is <10mL/kg/day, chest X-ray shows good expansion

- Discharged with standard antibiotic cover of 1-2 weeks

### Failure/ Indication for Surgery

- Persistence of collection on x-ray/ ultrasound after 3 days
- Clinical/Radiological worsening during therapy

### REFERENCES

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2. IAPS guidelines for treatment of Empyema in Children. 2018. www.iapsonline.org
3. Balfour-Lynn I. BTS guidelines for the management of pleural infection in children. Thorax. 2005;60(suppl\_1): i1-i21.
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### KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES



# Standard Treatment Workflow (STW) UNDESCENDED TESTIS (CRYPTORCHIDISM) ICD-10-Q53.9

## WHAT IS CRYPTORCHIDISM?

- Absence of one or both testis in the scrotum
- Cryptorchidism can be:
  - True undescended testis arrested along normal line of descent
  - Ectopic Testis: arrested outside line of normal descent

## WHAT TO ASK?

Testis are absent in scrotum since birth or present initially and later disappeared

Any history of torsion-redness/ pain or bulge in the inguinal region/ lower abdomen

## WHAT TO SEE?

• Testis palpable anywhere along normal line of descent:

- Superficial inguinal ring, Inguinal canal, Deep inguinal ring

• Testis palpable outside the normal line of descent:

- Pubic tubercle, Perineum, Thigh, Opposite scrotum, Penis

• Testis not palpable (impalpable undescended testis)

• Associated anomalies: hernia, hydrocele, hypospadias, ambiguous genitalia, poorly developed ipsilateral scrotum, contralateral testicular hypertrophy

• Rule out retractile testis (which does not require surgery): If testis manoeuvrable into the scrotum and stays there by itself. Needs regular follow up to confirm continuing descended position of testis

## RED FLAGS REQUIRING SPECIAL MANAGEMENT

Possibility of Disorders of Sexual Differentiation (DSD) to be considered if:

- Bilateral undescended testis with hypospadias
- Unilateral undescended testis with severe hypospadias

Undescended testis with torsion – red painful lump in the undescended testis

Undescended testis with large inguinal hernia

## INVESTIGATIONS

### ESSENTIAL INVESTIGATIONS

- No investigation is essential for diagnosis or localisation of testis.
- Routine blood and urine investigations required for anaesthetic fitness

### OPTIONAL INVESTIGATIONS

- Hormonal test (HCG stimulation test for bilateral undescended testis)
- MRI scan in cases suspected to be DSD
- Diagnostic laparoscopy in impalpable UDT (can be combined with therapeutic procedure)

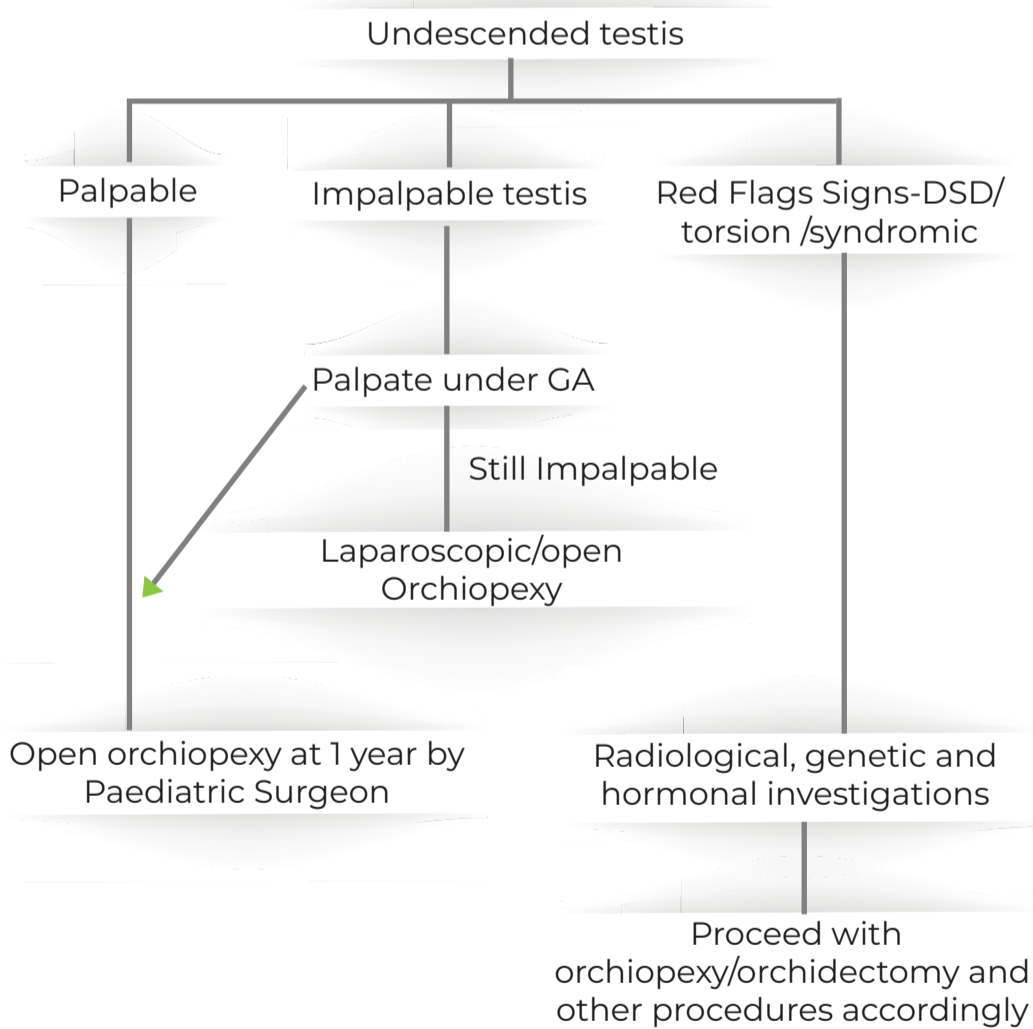
### SPECIAL SITUATIONS

- DSD: hormonal assay, USG, genitogram, karyotyping
- Syndromic child: genetic assessment, karyotyping, hormonal assays
- Undescended testis with torsion: USG Doppler

## MANAGEMENT

**Guiding Principle: Diagnosis made at birth and reconfirmed at 3 and 6 months. Further management if descent has not occurred.**

## UNDESCENDED TESTIS MANAGEMENT FLOWCHART



Surgery (orchiopexy) between 6 months- 1 year (mostly at 1 year)

Palpable testis – open orchiopexy under general anaesthesia (may be done as day care procedure)

Impalpable: Diagnostic laparoscopy: Absent testis- no intervention; Atrophic testis: orchidectomy; if vas and vessels going into the deep inguinal ring: inguinal exploration; intra- abdominal tests: single or two stage orchidopexy. Inguinal exploration if access to laparoscopy is not available

## MANAGEMENT AT

### PHC/ DISTRICT HOSPITAL

- Diagnose in newborn and reconfirm at 3 and 6 months:
  - If uncomplicated, counsel regarding timing of surgery and red flags
  - Basic lab investigations for anaesthesia fitness
  - Refer to centre with paediatric surgeon and paediatric anaesthesia facilities for surgery between 6m-1 yr
- Assess for special situations – if present, refer immediately to centre with paediatric surgeon
- After surgery follow-up at 1 month, 3 month, 1 year and annually till puberty

### TERTIARY CARE HOSPITAL

- Diagnose or confirm diagnosis (if referred) early
- Carry out open orchiopexy for palpable testis and laparoscopic exploration for impalpable testis under general anaesthesia at appropriate age
- Identify red flag situations and investigate, counsel and operate accordingly
- Follow-up- immediate and first week follow up

## SPECIAL SITUATIONS

DSD- needs complete evaluation and treatment planning based on genotype, phenotype and psychological counselling

Undescended testis with torsion – needs immediate exploration and orchiopexy/orchidectomy

Undescended testis with large inguinal hernia- needs early surgery before waiting for 6 months due to the risk of obstructed hernia

## FOLLOW UP

Open orchiopexy- Discharge same evening/ next day

Laparoscopic orchiopexy- Discharge within 24-48 hours

Further FU

- 1st week- local edema/ hematoma/ tenderness
- 1st, 3rd month- ensure testis position in scrotum and normal size
- Annual examination – ensure position and adequate growth till adulthood
- Adult FU for fertility status

## ABBREVIATIONS

UDT: Undescended testes

DSD: Disorders of sexual differentiation

FU: Follow up

GA: General anaesthesia

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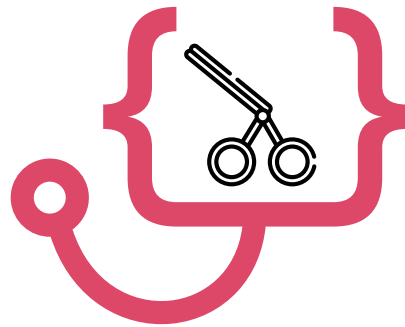
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