

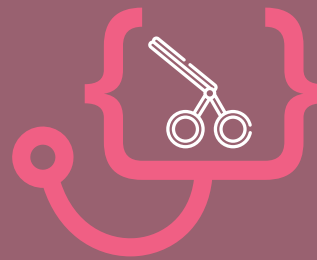


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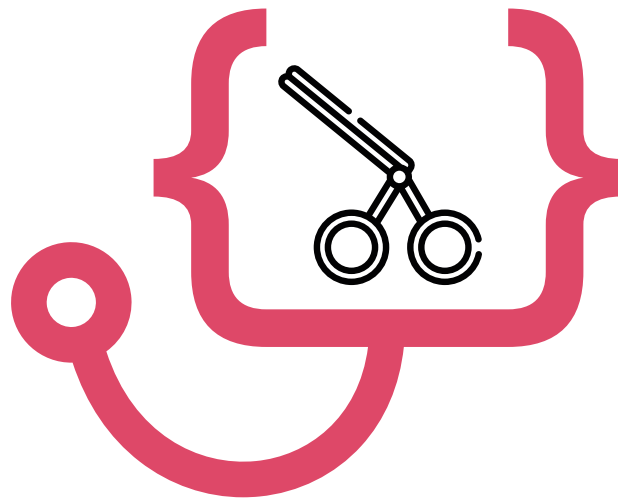


2022 Edition, Vol.III

# 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

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- SPECIALITIES COVERED IN THIS EDITION

- **General Surgery**

- Appendicitis
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- Diabetic Foot
- Gall Stone Disease
- Ventral Hernia



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# INTRODUCTION

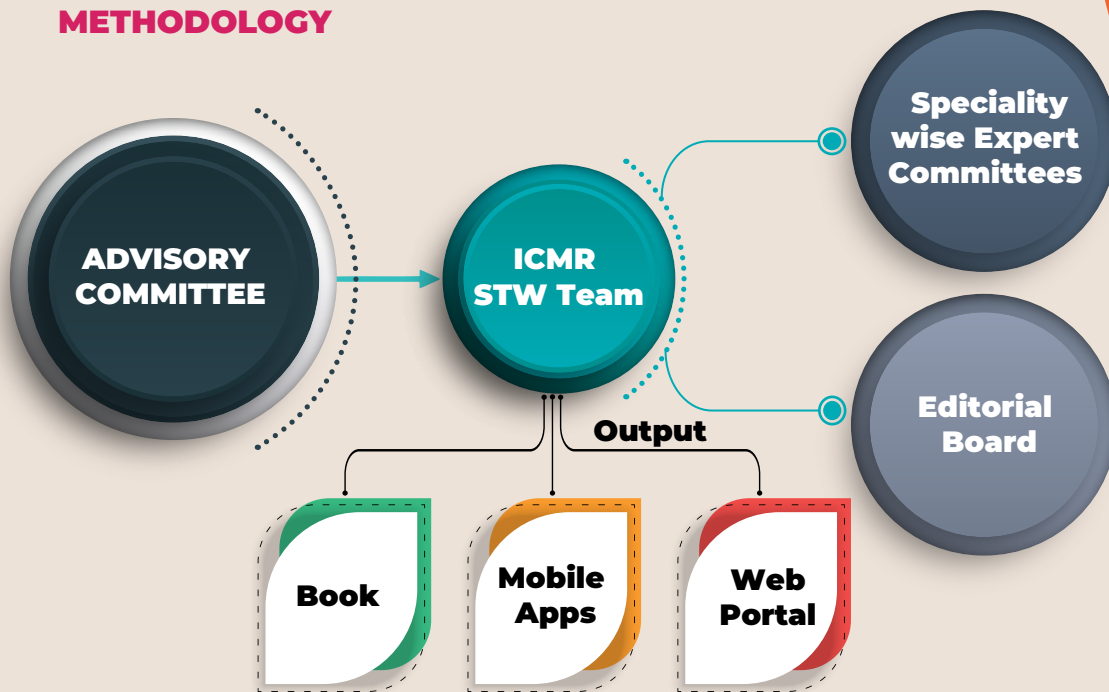
## GOAL

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.

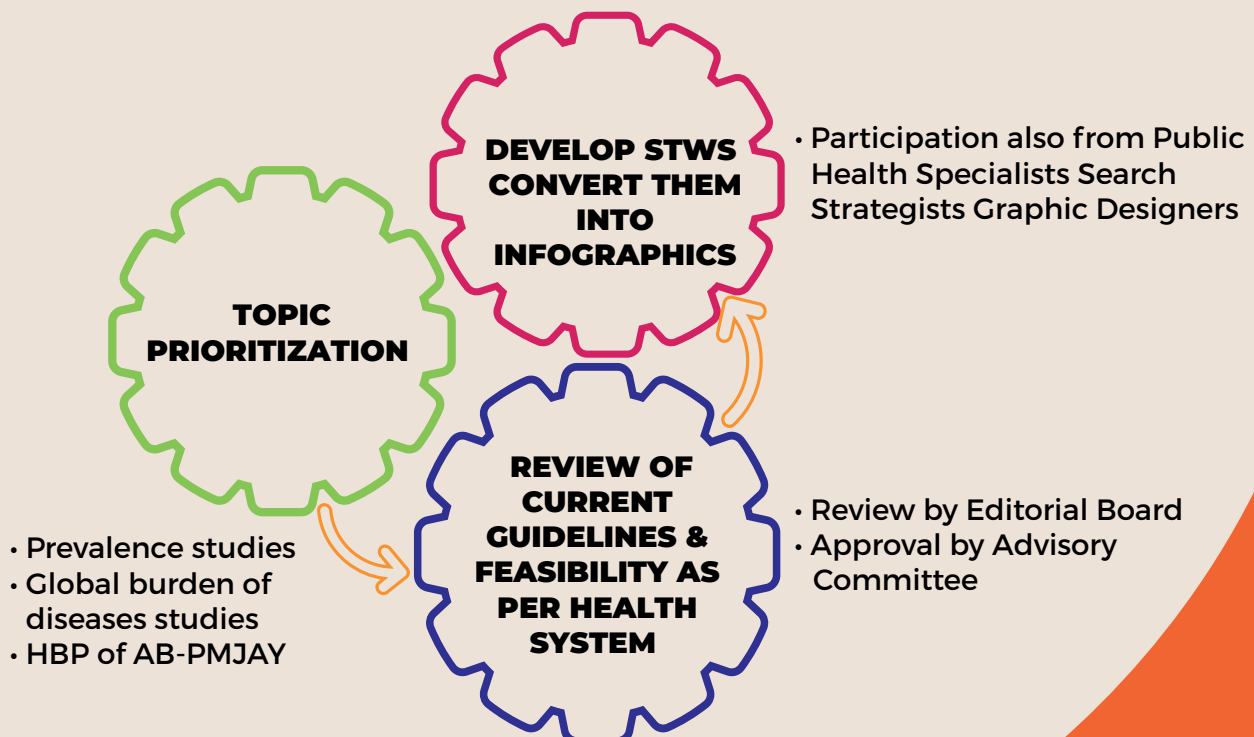
## OBJECTIVES

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



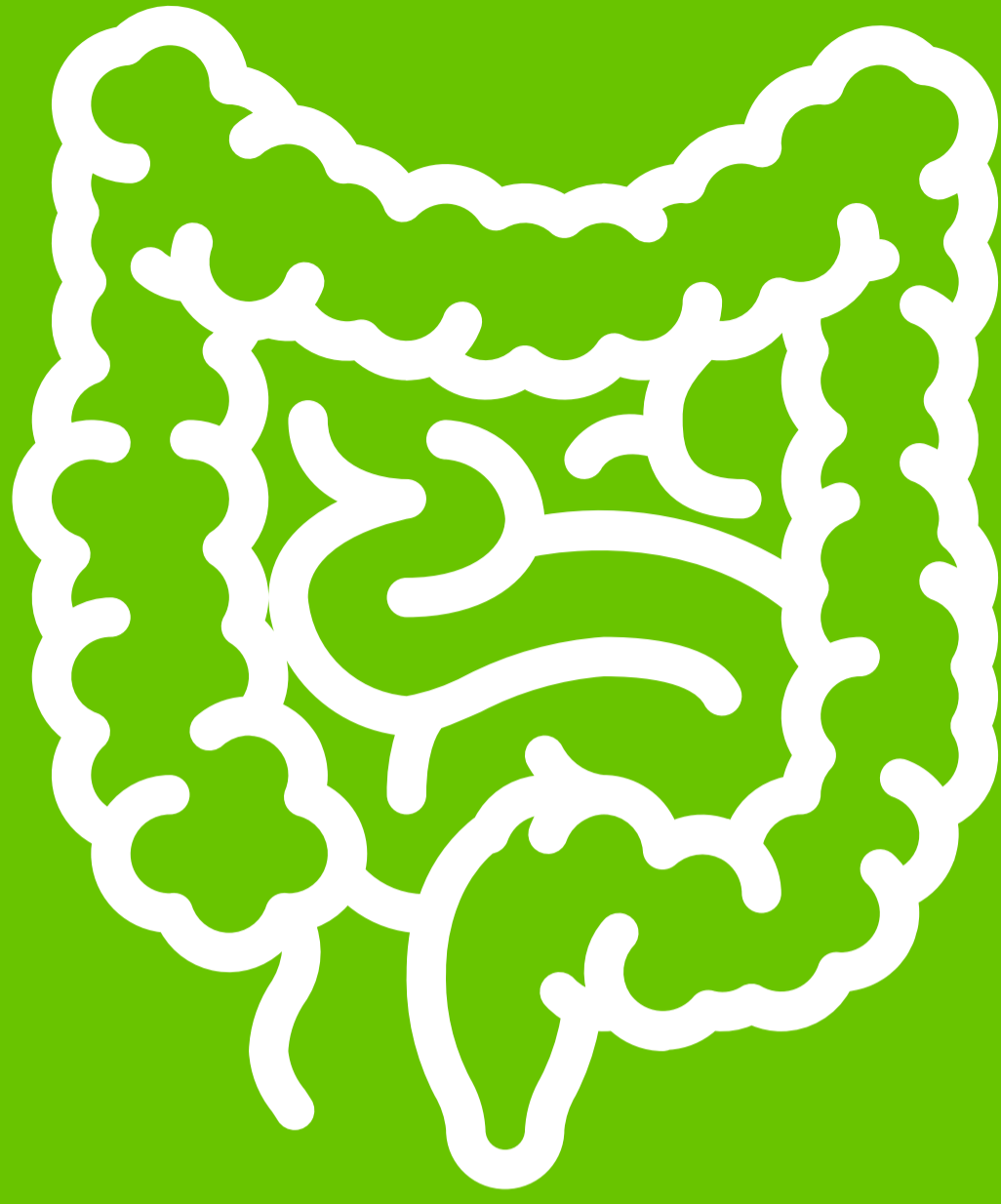
## PROCESS OVERVIEW



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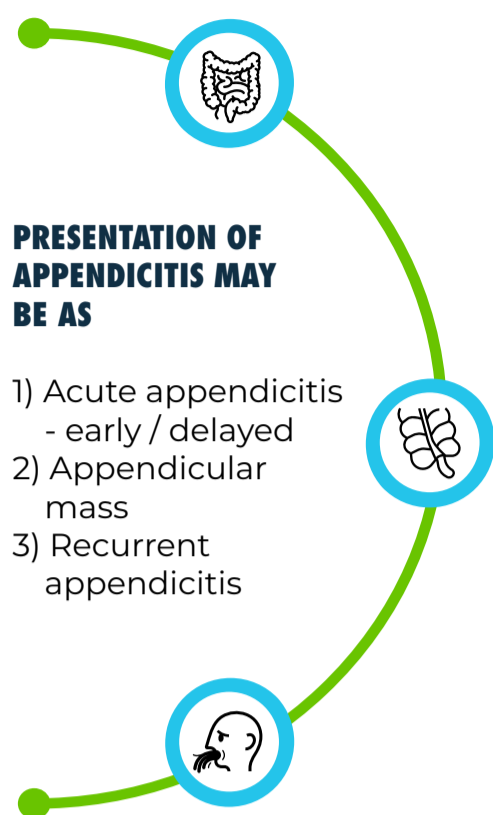


# **GENERAL SURGERY**



## Standard Treatment Workflow (STW)

### APPENDICITIS ICD-10-K35



#### ACUTE APPENDICITIS

(Early presentation within 72 hours)

##### SYMPTOMS OF ACUTE APPENDICITIS

- 1) Pain
    - a) Periumbilical or epigastric colic (in nonobstructive type the pain may start at RIF)
    - b) Shifting of pain from periumbilical region or begins from this site
  - 2) Nausea/ vomiting
  - 3) Pyrexia (usually absent in first 6 hours)
  - 4) Loss of appetite
- NB:**
- a) Pain always precedes vomiting (Murphy). Onset of symptom is more acute and abrupt in acute obstructive appendicitis
  - b) If the patient has rigor and high fever within 24hrs of the onset of pain, appendicitis is most unlikely

##### SIGNS OF ACUTE APPENDICITIS

1. Pointing sign – The patient points with the index finger the site of maximum pain at region of Mc Burney's point
  2. Cough test – C/O pain at right iliac fossa on coughing
  3. Tenderness at Mc Burney's point
  4. Muscle guard at right iliac fossa (RIF)
  5. Rovsing's sign – pain at RIF with sudden thrust of palpation at left flank of abdomen
  6. Rebound tenderness – pain at RIF with sudden withdrawal of the maintained pressure with hand
  7. Generalised rigidity is a sign of generalized peritonitis; it is less marked if obese, emaciated, extremes of age
- NB:**
- a) When appendix is retrocaecal the signs of appendicitis may be masked
  - b) Inflamed pelvic type of appendix in contact with urinary bladder or rectum may produce features of cystitis or tenesmus
  - c) Post ileal appendix may cause diarrhoea and marked retching.
  - d) With progress of pregnancy, appendicular pain may be up at right flank of abdomen as the caecum and appendix are pushed up
  - e) Females with inflammatory pelvic organ disease e.g, salpingitis may have history of dysmenorrhoea and purulent vaginal discharge

##### FACTORS FOR PREPONDENCE COMPLICATIONS

1. Extremes of age
2. Immunosuppression
3. Diabetes Mellitus
4. Faecolith obstruction of appendicular lumen
5. Previous abdominal surgery

##### INVESTIGATIONS

The diagnosis of acute appendicitis is essentially clinical. The investigations include:

1. Full blood count – usually shows leucocytosis with raised polymorphs
2. Urinalysis to exclude urinary tract infection
3. Ultrasonography – often very helpful to confirm diagnosis and identifying periappendicular collection of exudate or abscess
4. Plain X-ray abdomen – to rule out ureteric calculus or peptic perforation
5. CT scan of abdomen – useful in special situation of uncertain diagnosis of appendicitis

##### TREATMENT

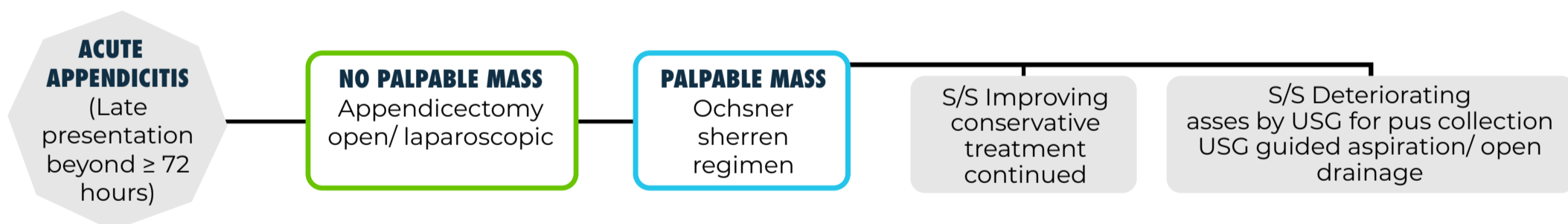
- 1) Treatment of a diagnosed case of acute appendicitis is appendicectomy except in special situations where surgical facility could not be provided or the patient presented late with appendicular mass. The essential preoperative investigations including routine blood sugar, urea, creatinine, Hb%, chest X-ray and ECG in all elderly patients. Intravenous fluid and broad-spectrum antibiotics to be started on admission
- 2) Acute appendicitis should be recognized early before it is allowed to reach the stage of peritonitis or an abscess formation. Clinical state and experience of the clinician should guide when to operate and when not to operate

##### APPENDICECTOMY MAY BE

- 1) Conventional open surgery
- 2) Laparoscopic appendectomy

##### CHECKLIST FOR AN UNWELL PATIENT (HAVING FEVER, ANOREXIA ETC) FOLLOWING APPENDICECTOMY

- 1) Examine the operation wound for induration, collection or purulent discharge
- 2) Consider residual abscess (pelvis, RIF or Hepatorenal pouch of Morrison)
- 3) Examine lungs for pneumonia or collapse
- 4) Thrombophlebitis
- 5) Any jaundice or enlarged liver
- 6) Urinary tract infection if any



#### APPENDICULAR MASS

##### OCHSNER-SHERREN CONSERVATIVE TREATMENT

(In the presence of appendicular mass, surgery may cause more bleeding, injury to caecum and ileum; faecal fistula may develop). Conservative treatment includes

- IV fluid:
- Broad spectrum antibiotics
- Vitamins
- **No purgative**
- **No Enema**

##### SIGNS OF IMPROVEMENT IN PRESENCE OF APPENDICULAR MASS

- Reduced pain
- Patient feeling better
- Appetite improves
- Tenderness diminishes

##### CRITERIA FOR STOPPING THE CONSERVATIVE TREATMENT

- A rising pulse and body temperature
- Increasing intensity and spreading abdominal tenderness
- Increasing size of the mass
- Vomiting or copious gastric aspirate

**NB: OPERATION FOR APPENDICULAR MASS IF INDICATED SHOULD ALWAYS BE DONE AT HIGHER CENTRE AND PERFORMED BY AN EXPERIENCED SURGEON.**

#### RECURRENT APPENDICITIS



Diagnosis is mainly clinical. Usually a past history suggestive of acute appendicitis is present and latter shows a history of recurrent acute pain at RIF or it may follow a chronic course. Signs of indigestion, flatulence may be present. Mc Burney's point tender. Ultrasonography often compliment the clinical diagnosis. CT-Scan and barium follow through X-ray are often required to confirm the diagnosis. Treatment is appendicectomy - open or laparoscopic

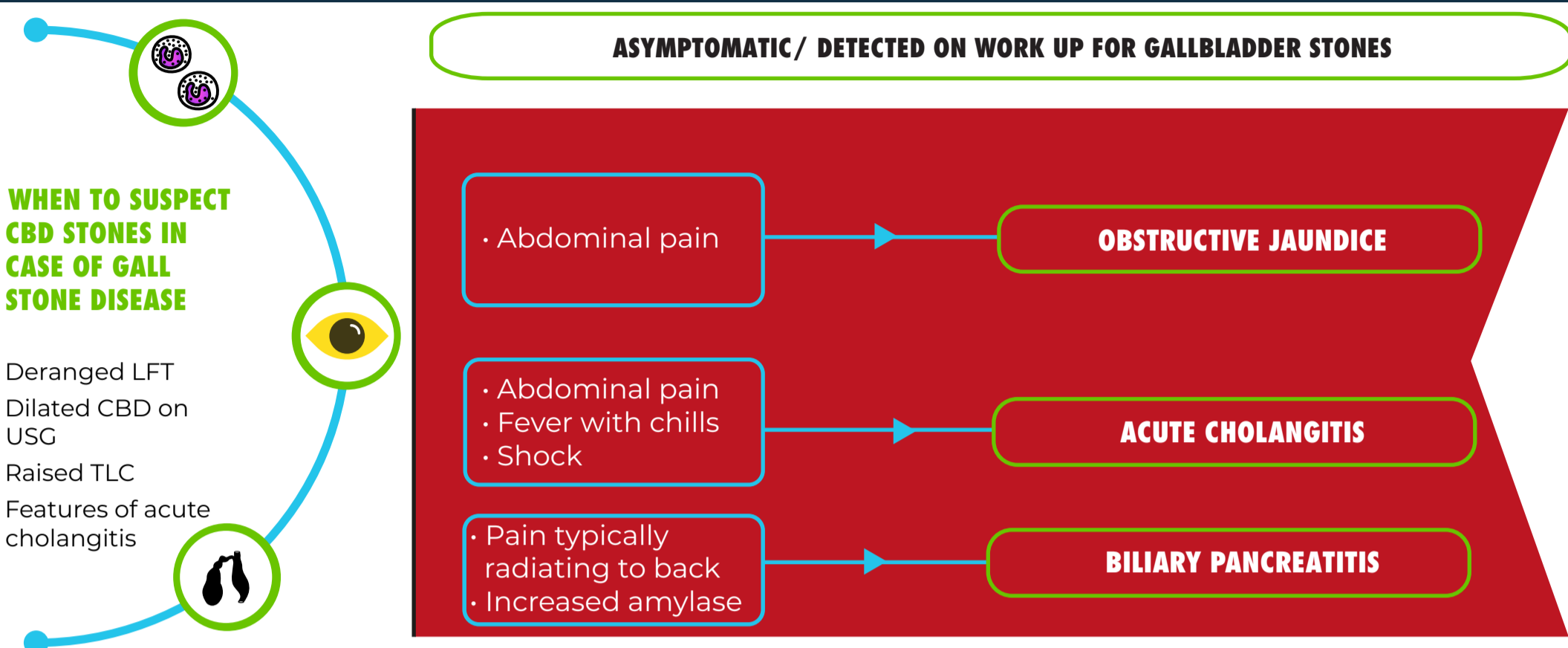
**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**





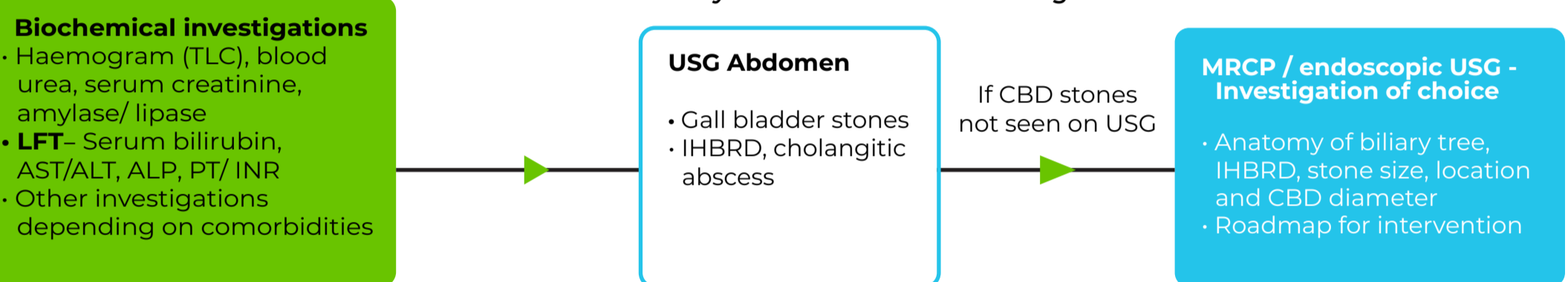
# Standard Treatment Workflow (STW) COMMON BILE DUCT STONE ICD-10-K 80.5

## CLINICAL PRESENTATION OF CBD STONES

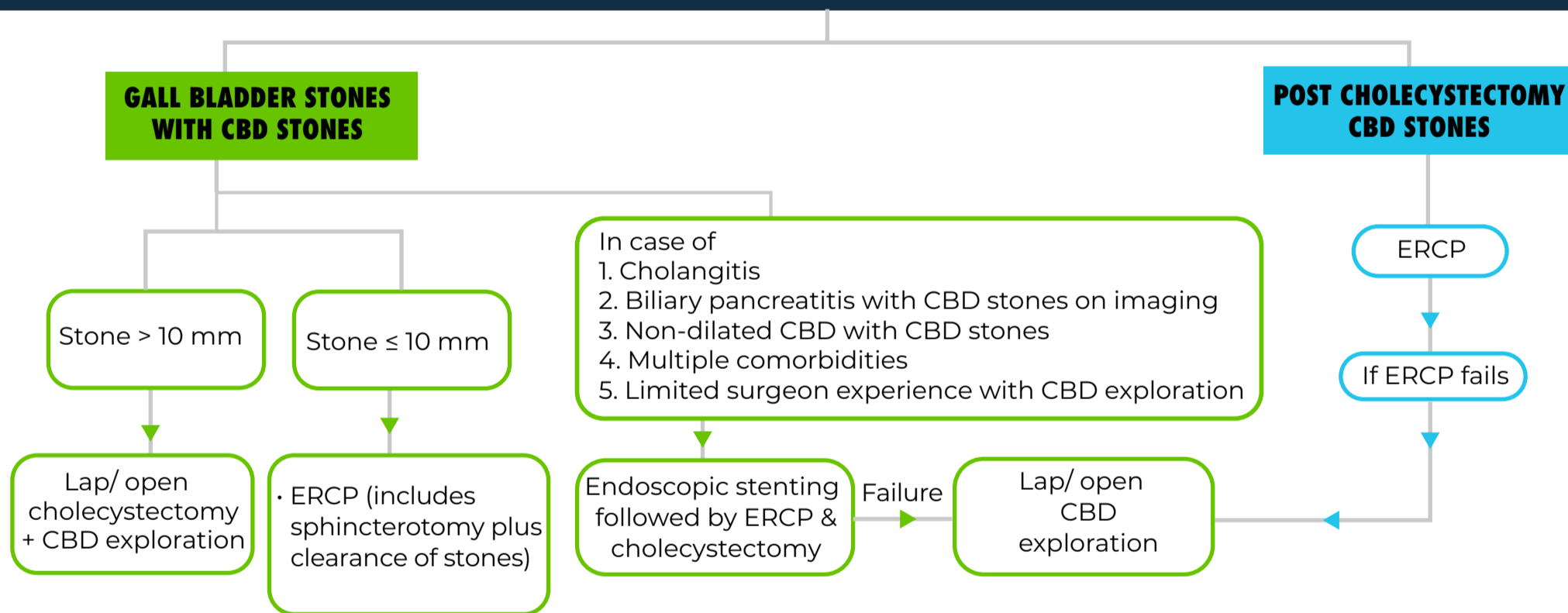


## WORK UP OF A PATIENT WITH SUSPECTED CBD STONES

*Palpable Gall bladder with jaundice may be due to malignancy and grossly dilated CBD may be due to choledochal cyst- should be referred to higher centers*



## MANAGEMENT OPTIONS (PREFERABLY AT TERTIARY CARE CENTER)





# Standard Treatment Workflow (STW)

## DIABETIC FOOT

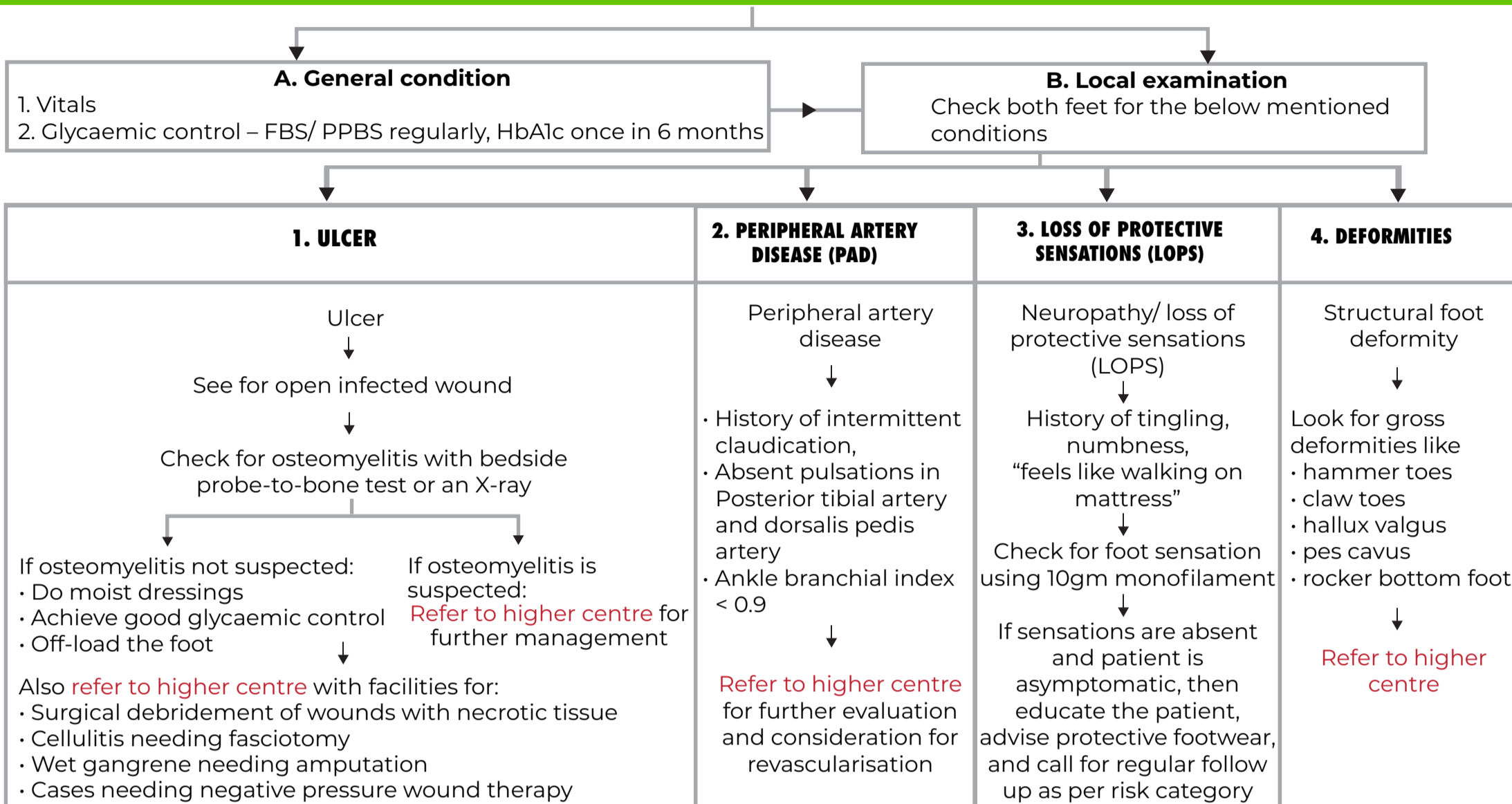
ICD-10-Z86.31

**RED FLAG SIGNS**

**SYSTEMIC:** Sick look, drowsy, abnormal breathing, abnormal pulse, fever  
**LOCAL:** Claudication/ rest pain, gangrene, osteomyelitis, acute charcot's foot

Refer to higher centre

### EVALUATION OF PATIENT WITH DIABETIC FOOT



### PREDISPOSING FACTORS FOR DIABETIC FOOT ULCER

**General conditions**

- Older age
- Uncontrolled hyperglycemia
- Duration of diabetes mellitus
- Peripheral artery disease
- Visual impairment
- Chronic kidney disease



**Local conditions**

- Loss of peripheral sensations
- Structural foot deformity
- Limited joint mobility
- Improperly fitting footwear
- Callus
- History of ulcer/ amputation

### RISK ASSESSMENT & FREQUENCY OF FOLLOW UP

Risk category	Parameters	Follow up
Low	Callus alone, No LOPS, No PAD	Once a year
Medium	Deformity with LOPS or PAD	Once in 6 months
High	Previous amputation or ulceration & any two of – Deformity/ LOPS/ PAD	Once in 3 months

### WOUND CARE

**DO:**

- Moist dressings
- Change dressings daily for dirty wounds and on alternate days for clean wounds

**DON'T USE:**

- Hydrogen peroxide, EUSOL, povidone iodine, chlorhexidine etc
- Hyperbaric oxygen, antimicrobial dressings and stem cell therapy has insufficient evidence to be recommended

### INFECTION AND ANTIBIOTICS GUIDANCE

(Note: - Antibiotics are insufficient unless combined with appropriate wound care)

**NON INFECTED WOUND**

No antibiotics

**MILD INFECTION**

- At least two of:
- Swelling/ induration
  - Pain/ tenderness
  - Warmth, redness (0.5-2cm)
  - Purulent discharge

Give oral antibiotics for 1-2 weeks  
(Target only aerobic gram-positive cocci)

**MODERATE INFECTION**

- Redness
- Deep tissues affected (abscess, osteomyelitis, fasciitis, septic arthritis)
- No systemic signs

**SEVERE INFECTION**

- Local findings + systemic findings of SIRS (at least two of)
- Temperature >38°C or <36°C,
  - Heart rate > 90/min,
  - Respiratory rate > 20/min or PaCO<sub>2</sub> <32 mm Hg,
  - WBC >12000 or < 4000 or immature bands >10%

Refer to higher centre

### MANAGEMENT OF OTHER RELATED FOOT CONDITIONS/ COMPLICATIONS

<p><b>Corns/callusity</b></p> <p>↓</p> <p>Scaling in OPD Footwear modification</p>	<p><b>Web space fungal infection</b></p> <p>↓</p> <p>Topical antifungals Maintain local hygiene</p>	<p><b>In-growing toe nails</b></p> <p>↓</p> <p>Regular nail trimming</p>	<p><b>Charcot's foot</b></p> <p>↓</p> <p><b>Refer to higher centre</b></p>
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### PATIENT EDUCATION

**DO:**

- Daily self inspection of foot
- Wear comfortable proper fitting footwear
- Cut toe nails straight
- Keep blood sugars controlled
- Regular foot check up with your doctor

**DON'T:**

- Walk barefoot, even at home
- Remove calluses/ corns at home
- Smoking: delays healing

### ABBREVIATIONS

**EUSOL:** Edinburgh university solution of lime  
**FBS:** Fasting blood sugar  
**LOPS:** Diabetic peripheral neuropathy with loss of protective sensation

**PAD:** Peripheral arterial disease  
**PPBS:** Post prandial blood sugar  
**SIRS:** Systemic inflammatory response syndrome

**ALWAYS KEEP A LOW THRESHOLD FOR REFERRAL TO HIGHER CENTRE**



# Standard Treatment Workflow (STW)

## GALL STONE DISEASE

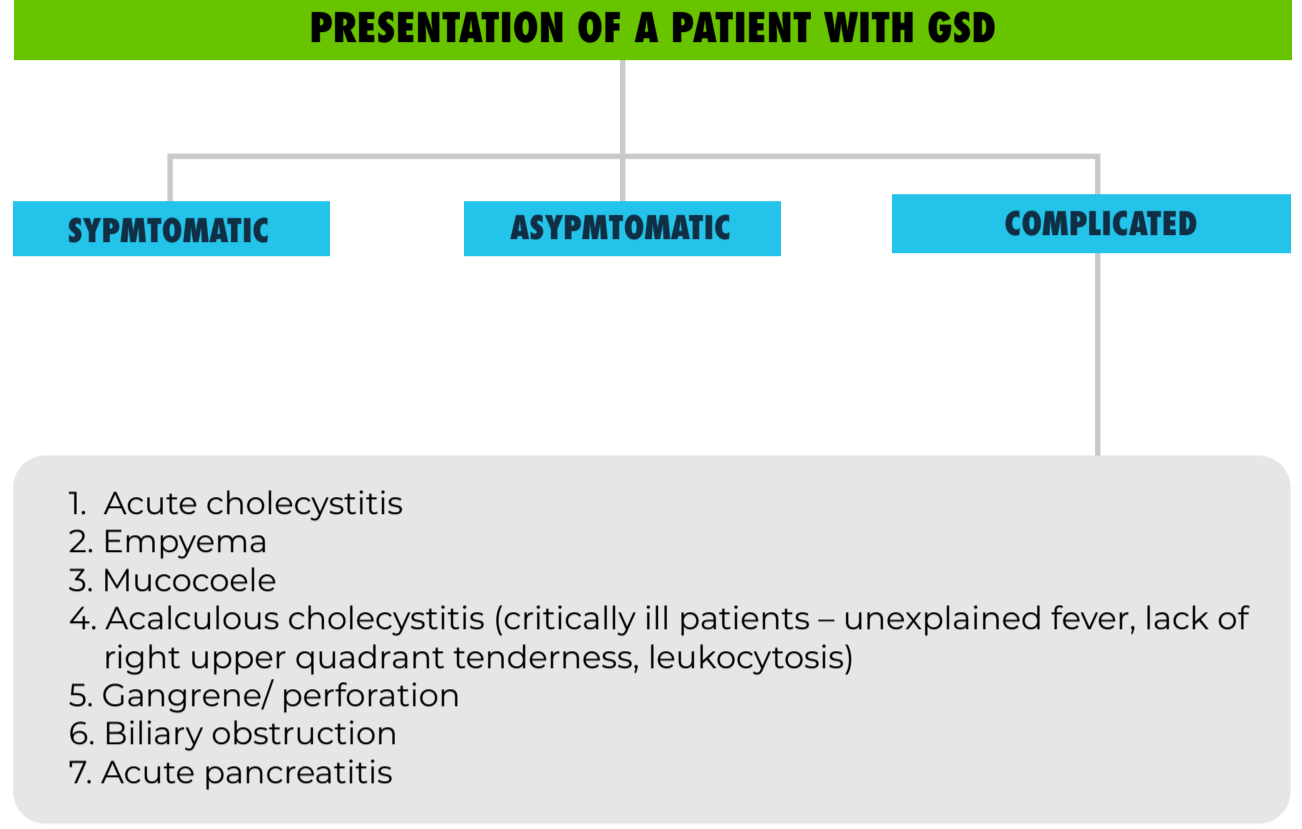
ICD-10-K80.20

### SYMPTOMS

- 1) Pain
  - A) Biliary colic- slowly progressive, constant pain in right upper quadrant or mid - epigastrium, crescendo-decrescendo pattern
  - B) Acute cholecystitis - prolonged pain more than biliary colic, (> 24 hrs) associated with fever
- 2) Nausea or vomiting
- 3) Dyspepsia
- 4) Flatulence
- 5) Food intolerance
- 6) Jaundice - GB stone impacted at the neck or hartmann's pouch that compresses CBD
- 7) Acute cholangitis – pain, fever, jaundice



### PRESENTATION OF A PATIENT WITH GSD



### INVESTIGATIONS

Haemogram, RFT, electrolytes, CXR, RBS, ECG (to distinguish from cardiac pain)	<ul style="list-style-type: none"> <li>LFT–Serum bilirubin, SGOT/PT, Alkaline Phosphatase</li> <li>Amylase, lipase</li> </ul>	<ul style="list-style-type: none"> <li>USG abdomen–investigation of choice (sensitivity–95%)</li> <li>1. To look for status of gall bladder and characteristic distal acoustic shadow</li> <li>2. Status of liver/ CBD/ Intra hepatic biliary radicle dilatation (IHBRD)</li> <li>3. Other intra abdominal pathology like renal stones, ovarian pathology etc</li> </ul>
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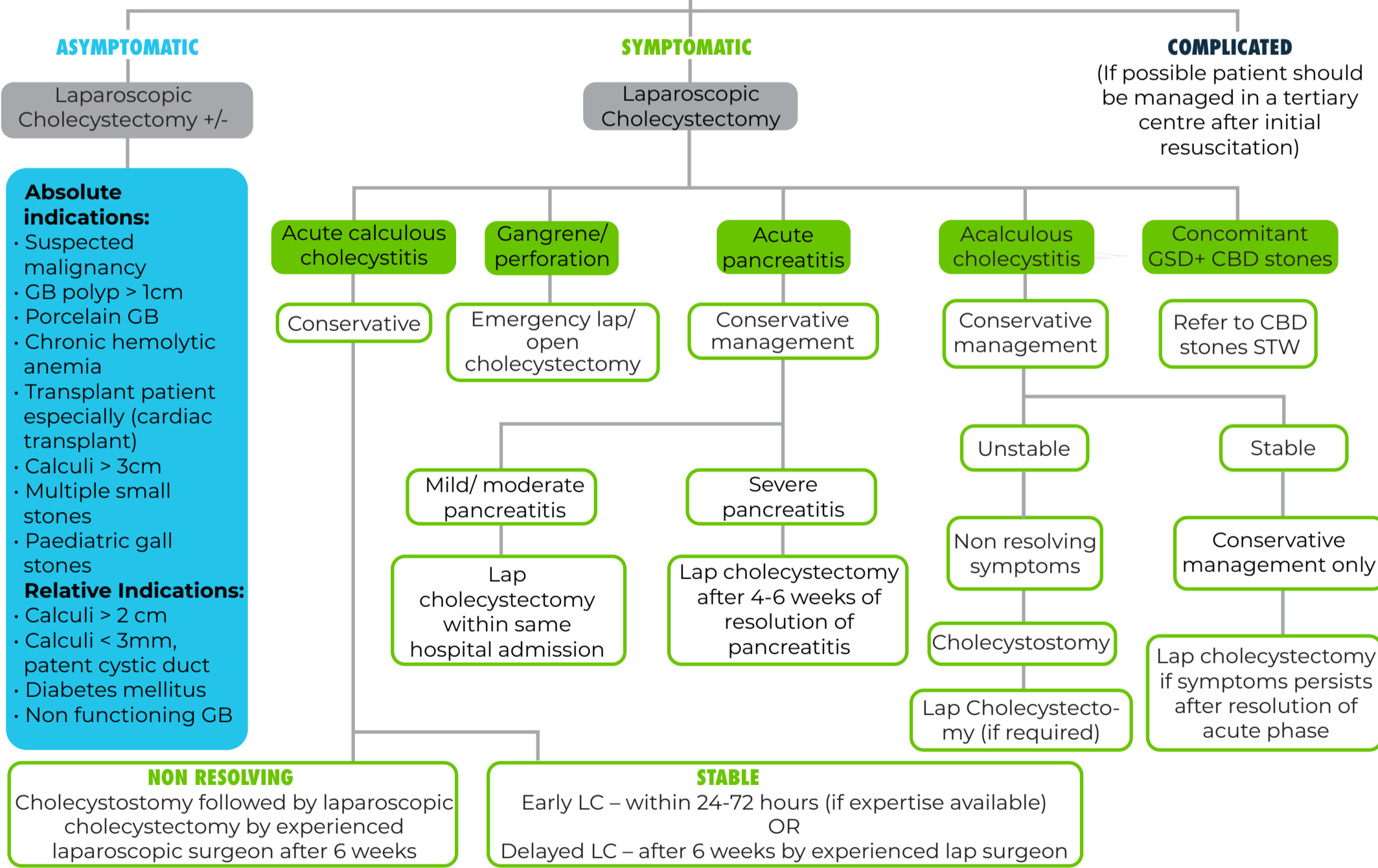
### MRCP

Indications- jaundice, high ALP, dilated CBD (on USG), suspected CBD stones or mirizzi's syndrome (CBD obstruction caused by extrinsic compression from an impacted stone in cystic duct or Hartmann's pouch)

### EVALUATION OF COMORBIDITIES

- DM – fasting & post prandial blood sugar, HbA1c, sugar charting
- Cardiac evaluation – ECHO and other as required
- COPD patient – PFT
- Coagulation profile - PT/ INR
- Thyroid function test

### MANAGEMENT



### MANAGEMENT OF ACUTE CHOLECYSTITIS (CONSERVATIVE)

<b>At PHC level:</b> initial resuscitation, IV antibiotics (3rd generation cephalosporin, metrogyl ± aminoglycosides), analgesics, bowel rest, USG abdomen (if available) and refer to higher centre	<b>At district hospital level:</b> IV hydration, antibiotics (3rd generation cephalosporin, metrogyl ± aminoglycosides), analgesics, bowel rest, USG abdomen, surgical consultation	<b>Tertiary level-</b> Early (if presents within 72 hrs)/ interval laparoscopic cholecystectomy depending on expertise in laparoscopy
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### POST LAP CHOLECYSTECTOMY COMPLICATIONS

- Patient not looking well, non ambulatory, not tolerating orally
- Pain out of proportion / not explained / not responding to analgesics
- Tachycardia, Fall in BP
- Abdominal distention, bile/ blood in drain

### FOLLOW UP

- Suture removal after 1 week, HPE report
- Continue antibiotics – if mucocoele, empyema, diabetic

CONVERT EARLY IN CASE OF DOUBT IN LAP CHOLECYSTECTOMY

REFER PATIENT EARLY IN CASE OF ANY DOUBT IN POST OP

### ABBREVIATIONS

**CBD:** Common biles ducts  
**GSD:** Gall stone disease

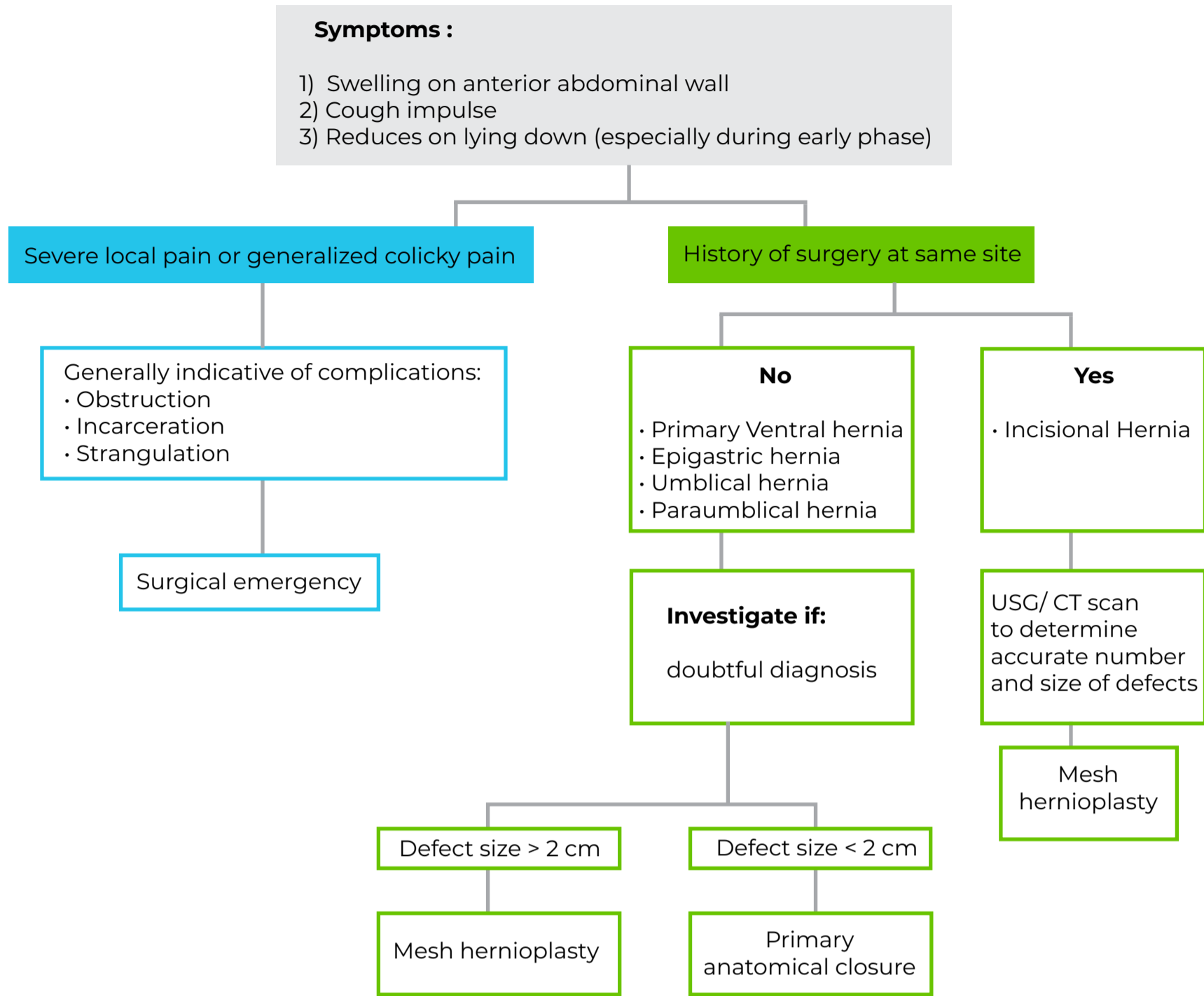
**HPE:** Histopathological examination  
**LC:** Laparoscopic cholecystectomy

**MRCP:** Magnetic resonance cholangiopancreatography

**KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**



# Standard Treatment Workflow (STW) INCISIONAL/ VENTRAL HERNIA ICD-10-K43.9



	RED FLAG SIGNS NEEDING REFERRAL TO HIGHER CENTRE	POST OP COMPLICATIONS
1)	Large hernias (>8-10cm), requiring component separation	Seroma
2)	Parastomal hernias	Infection, including mesh infection
3)	Comorbidities	Skin necrosis
4)	Loss of domain	Recurrence
5)	Non availability of mesh, for hernias >2cm in size - to be checked	

Mesh placement: sublay manner preferred. Drains recommended

### CLINICAL EVALUATION

1. Swelling on anterior abdominal wall
2. Cough impulse +
3. Reduces on lying down
4. Severe local pain or generalized colicky pain or fever: generally sign of complications
  - Colicky abdominal pain and irreducible hernia: intestinal obstruction. Immediate surgery for relief of obstruction. Hernia repair may or may not be done at same time
  - Local redness and severe pain with fever: strangulation. Immediate surgery is needed, and the hernia repair should be deferred for a later date
5. Rule out other diseases or complications on history, particularly related to respiratory system (as raised intra-abdominal pressure can worsen the respiratory condition)
6. Features of swelling: Reducibility of hernia, size and number of defects

### MANAGEMENT

- In general, ventral hernias should be repaired, as untreated hernias are at risk of life threatening complications.
- Exceptions: untreated ascites especially with portal hypertension, severe comorbidities precluding safe surgery, large hernias where repair may cause more morbidity such as bowel injury.
- Small midline primary hernias less than 2cm diameter may be closed primarily (anatomical repair). Larger hernias and all incisional hernias should undergo mesh reinforcement

CHOICE OF REPAIR	
DEFECT SIZE	PROCEDURE
< 2cm	Anatomical repair, IPOM (Open Intraperitoneal onlay mesh)
2-4 cm	IPOM, open sublay repair, onlay repair
4-8 cm	IPOM plus, open sublay repair, onlay repair
More than 8 cm	Component separation will be required. Can be anterior component separation or posterior component separation, depending on available expertise. Botox can be used as an adjunct in case of loss of domain
Subxiphoid hernias	Mesh overlap will extend below diaphragm in case of IPOM or extraperitoneal repairs
Suprapubic hernias	Mesh should extend behind pubic bones in case of extraperitoneal repair. IPOM should be done after dividing peritoneum so that lower end of mesh is in retropubic space
Parastomal hernia	If stoma can be closed, then perform delayed repair, In case of permanent stoma, a 'Sugarbaker' technique is generally advisable

- Refer to higher centre
  - if defect size > 6 cms as it might need component separation
  - uncommon site, eg subxiphoid, suprapubic, large lateral hernias
  - loss of domain
- Laparoscopic hernia repair suitable for
  - defect size <6 cms
  - absence of skin complications

### KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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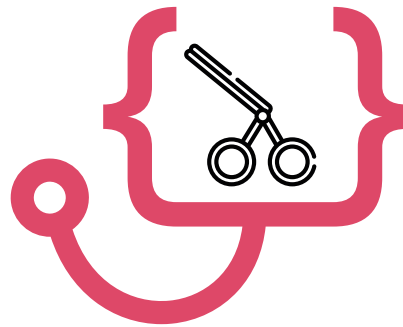
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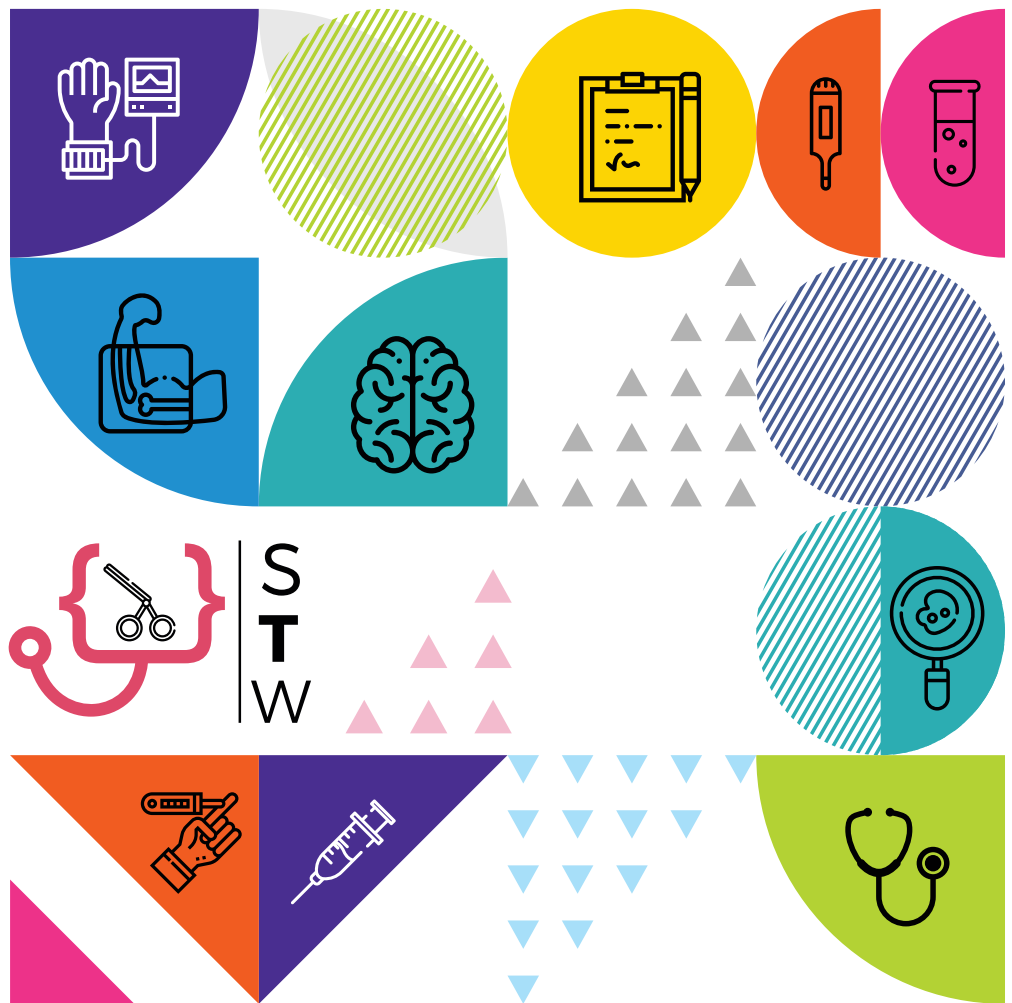


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PARTNERS



2022 EDITION  
VOLUME III