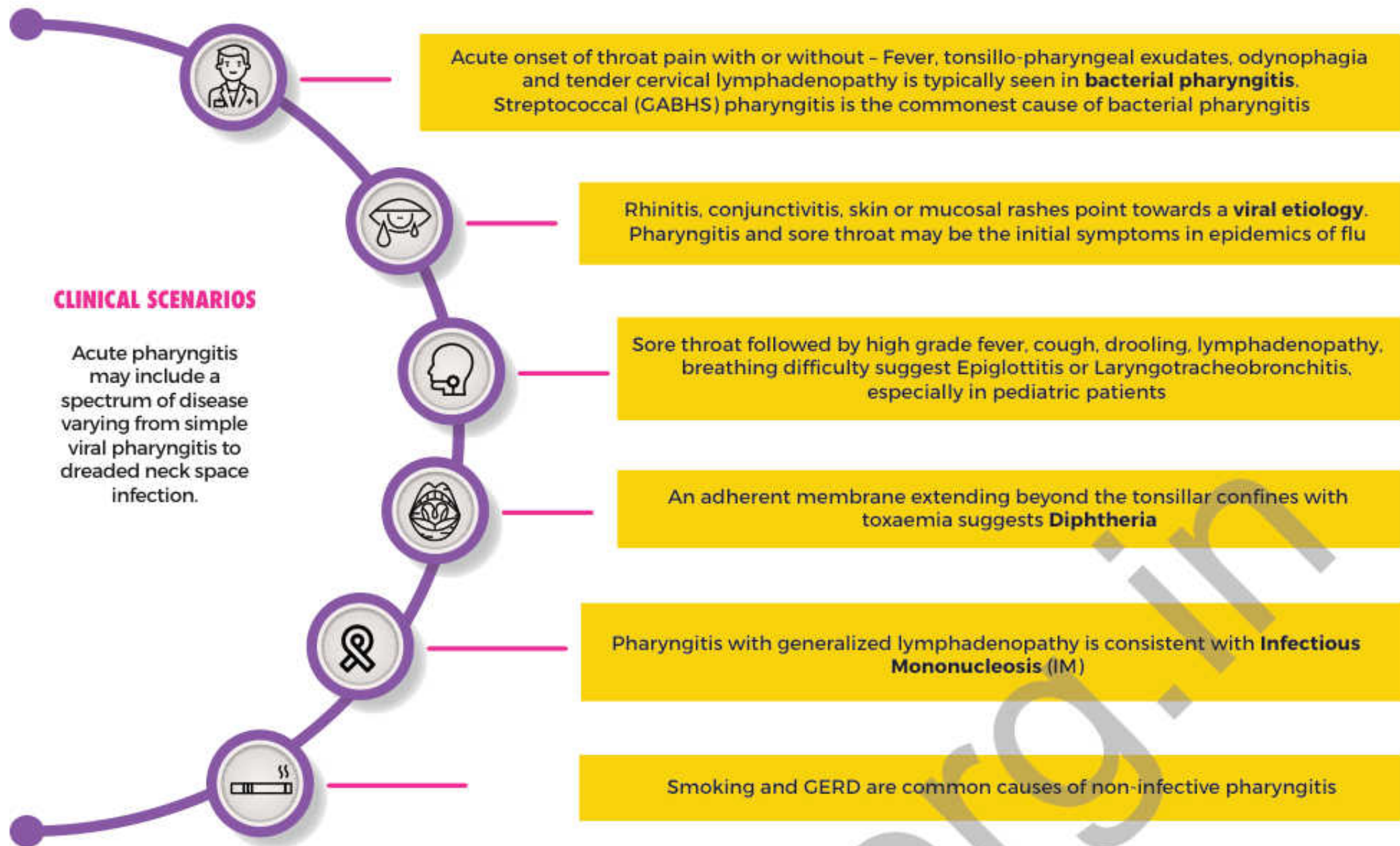


Standard Treatment Workflow (STW) for the Management of PHARYNGITIS AND SORE THROAT

ICD-10-J02



CLINICAL EXAMINATION

PRELIMINARY

- Temperature chart: fever is usually absent or low-grade in viral pharyngitis
- Check for vitals/ signs of dehydration due to compromised oral intake due to odynophagia
- Complete oral and oropharyngeal examination with tongue depressor
- Palpate for cervical and generalized lymphadenopathy
- Rheumatic fever and acute glomerulonephritis are potential systemic complications of streptococcal pharyngitis
- Hepatosplenomegaly can be found in IM
- A sandpapery scarlatiniform rash may be seen in GABHS infection whereas maculopapular rashes are seen with various viral infections and with IM empirically treated with penicillin

DESIRABLE

Assess Centor criteria and ascertain its score

RED FLAGS

- Generalized lymphadenopathy
- Cardiac murmurs
- Purulent productive cough with tachypnea suggestive of LRTI
- Hot potato voice
- Unilateral tonsillar enlargement
- Tonsillar membrane going beyond its confines
- Agranulocytosis
- Epidemic of flu

CLINICAL FEATURES	CENTOR SCORE	UNLIKELY TO HAVE GABHS	LIKELY TO HAVE GABHS	REQUIRE LAB TESTS TO CONFIRM GABHS INFECTION
Fever	1	Score = 0-1	Score = 4	Score = 2-3
Anterior cervical lymphadenopathy	1			
Tonsillar exudate	1			
Absence of cough	1			

INVESTIGATIONS

ESSENTIAL

Throat swab for culture, routine hemogram including total and differential leukocyte counts and peripheral smear to look for atypical lymphocytes (seen in IM).

OPTIONAL

GABHS rapid antigen detection test (RADT)

DESIRABLE

Lab tests to rule out EB Virus, Coxsackie virus, Herpes virus, fungal or Gonococcal pharyngitis

MANAGEMENT

PHC / PRIMARY LEVEL

DISTRICT HOSPITAL

1. Assess the patient for signs of toxicity, epiglottitis or oropharyngeal abscess
2. Ensure vitals/ hydration of the patient
3. Saltwater gargle, warm liquids, and rest may be helpful in relieving symptoms
4. Ibuprofen or Paracetamol is recommended for analgesia
5. Antibiotic therapy:
 - a. Patients positive for all 4 Centor criteria to be treated with antibiotics without waiting for antigen testing or cultures
 - b. Patients with Centor score of 2&3 to be treated with antibiotics only if antigen testing or throat swab culture is positive
 - c. Patients with Centor score of only 1 not to be treated with antibiotics
 - d. Amoxicillin (50 mg/kg/d in 2-3 doses orally) for 10 days is the first choice for GABHS infection. For patients who are sensitive for penicillin group, Erythromycin or Azithromycin is the antibiotics of choice
6. Parenteral antibiotics (Ceftriaxone/ cefotaxime) and steroids are to be started when the airway is compromised due to suspected epiglottitis/ Croup.

Management of complication e.g.

- Deep neck space infection
- Diphtheria
- Epiglottitis
- Croup

FOLLOW UP SERVICES

Recurrent (more than 7 episodes in previous year or 5/year in last two years or 3/year in last 3 years) tonsillitis episodes need to be evaluated for tonsillectomy.

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

ABBREVIATIONS

GABHS: Group A Beta Hemolyticus Streptococcus
GERD: Gastro Esophageal Reflux Disease
LRTI: Lower Respiratory Tract Infection

EB: Epstein Barr
RADT: Rapid Antigen Detection Test

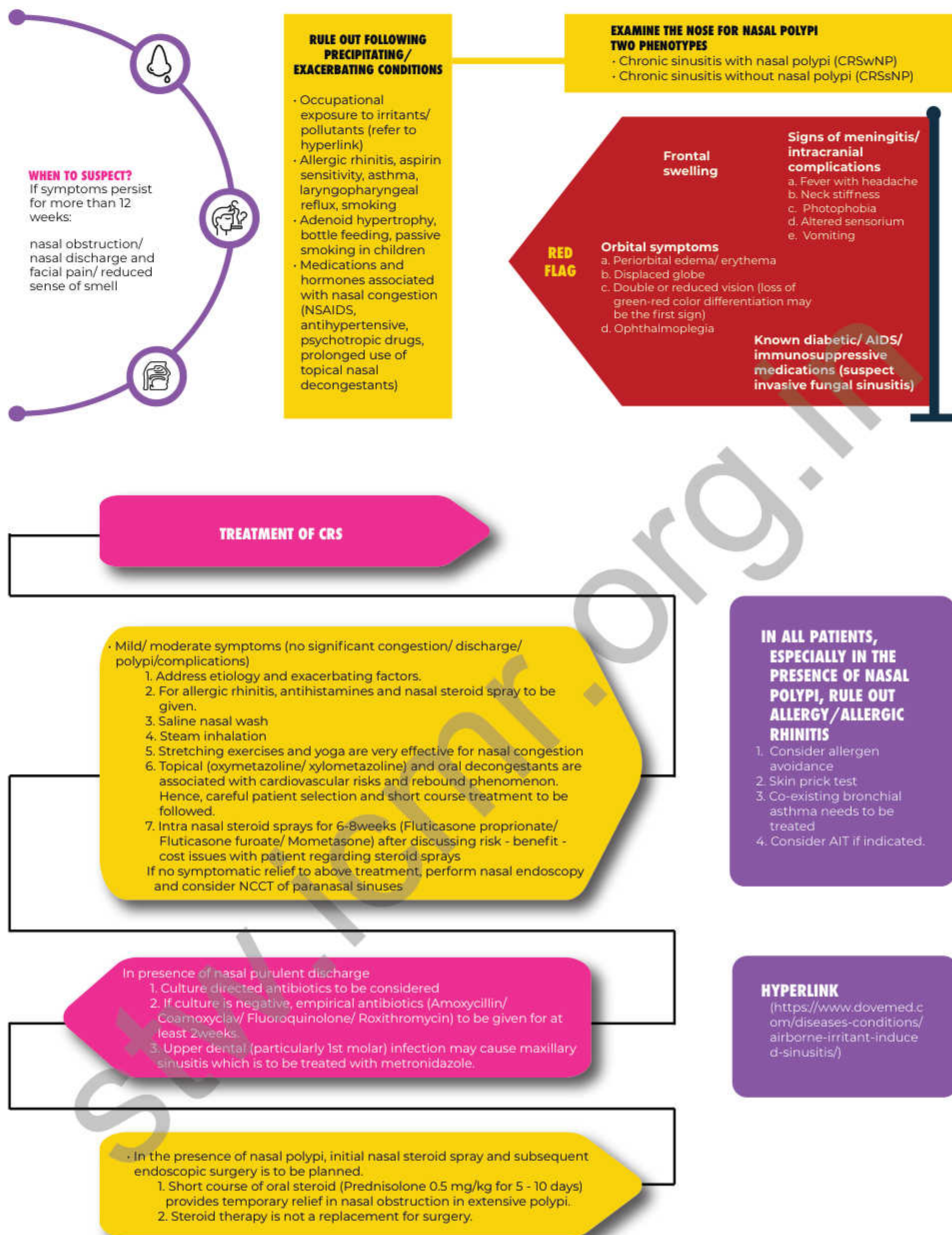
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Standard Treatment Workflow (STW) for the Management of CHRONIC RHINOSINUSITIS ICD 10 - J32.9



1

Identification of precipitating or exacerbating factors is the key to successful treatment outcome.

2

Always rule out DNS/ nasal polypi in CRS, as surgical treatment may be necessary for complete resolution of symptoms.

3

Ensure adherence to nasal saline washes / regular physical activity / medications.

4

Educate patients on correct technique of using steroid nasal sprays and nasal irrigation.

5

Prolonged use of topical nasal decongestant beyond 5-7 days may cause rebound congestion and rhinitis medicamentosa and to be strongly discouraged.

ABBREVIATIONS

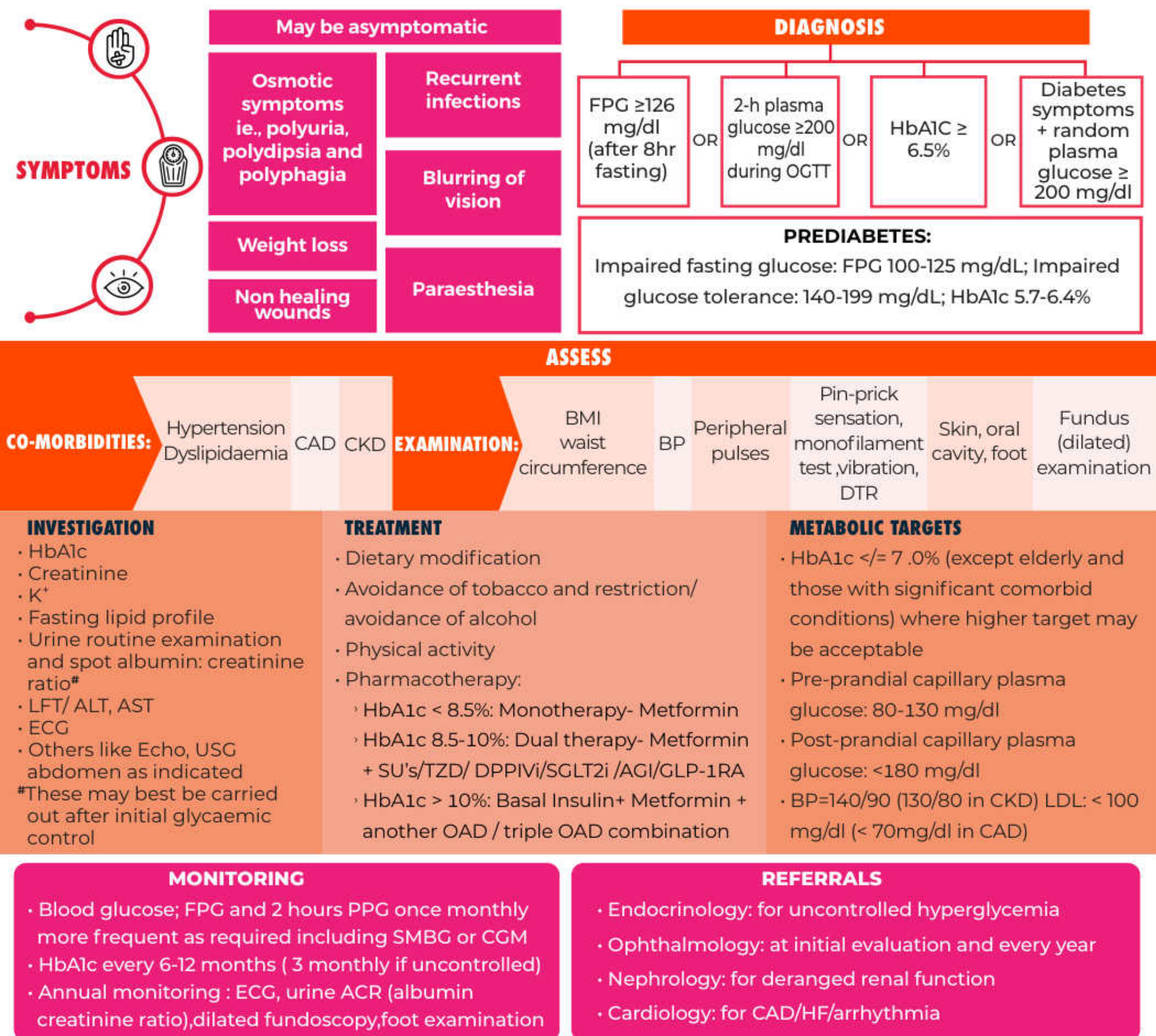
CT: Computerized tomogram

AIT: Allergen immunotherapy

DNS: Deviated Nasal Septum

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**Standard Treatment Workflow (STW)****DIABETES MELLITUS TYPE 2****ICD-10-E11****SCREENING FOR DIABETES MELLITUS****IN AN APPARENTLY NORMAL ADULT**

- In obese or overweight (BMI ≥ 27.5 or ≥ 23 kg/m²) with any of the following risk factors
- First degree relative with diabetes
- History of cardiovascular disease
- BP ($\geq 140/90$ mmHg)
- Dyslipidemia (TG > 250 mg/dL, HDL <40 mg/dl in male, <50 mg/dl in female)
- Physical inactivity
- Polycystic ovary syndrome (PCOS)
- Insulin resistance (acanthosis nigricans)
- Adults > 30 years of age
- Previous history of GDM

IN AN ADULT WITH ILLNESS

- In any adult/adolescent who presents with one of the following illness/complaints
- Osmotic symptoms (polyuria, polydipsia, polyphagia, nocturia)
- Unexplained weight loss
- Unexplained depression or dementia
- Acute coronary syndrome
- Deep seated infections (liver abscess, lower lobe pneumonia, tuberculosis, pyelonephritis, abscesses, septic arthritis, osteomyelitis)
- Recurrent infections (tinea, oral thrush, onychomycosis, cystitis-urinary tract infection, sinusitis, STI, cellulitis, carbuncle)
- Non-healing ulcers (foot ulcers-infected/neuropathic)
- Exogenous/iatrogenic Cushing's syndrome

IN PREGNANCY

- H/O GDM/Pre-existing diabetes
- All pregnant women to be screened in 1st trimester with FPG
- FPG ≥ 126 and/or HbA1c $\geq 6.5\%$ to be considered pre-existing diabetes
- FPG between 92-125 to be considered as GDM
- All those women with normal screening in 1st trimester to get a 75 g-oral glucose tolerance test done at 24-28 weeks
- All GDM women to be tested 6 weeks post-partum and once every 3 years
- PREDIABETES: should be tested yearly

ABBREVIATIONS

ALT: Alanine transaminase
AST: Aspartate aminotransferase
BMI: Body mass index
BP: Blood pressure
CAD: Coronary artery disease

CGM: Continuous glucose monitor
CKD: Chronic kidney disease
DTR: Deep tendon reflex
ECG: Electrocardiogram
FPG: Fasting plasma glucose

GDM: Gestational diabetes mellitus
HDL: High-density lipoprotein
LDL: Low-density lipoprotein
LFT: Liver function test
OAD: Oral antidiabetic drug

OGTT: Oral glucose tolerance test
SMBG: Self-monitoring of blood glucose
TG: Triglyceride

KEEP LOW THRESHOLD FOR DIAGNOSIS. MAKE SURE TO FOLLOW UP TO MEET TARGETS

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Standard Treatment Workflow (STW)

DIABETES MELLITUS TYPE 1

ICD-10-E10



Polydipsia
Polyuria / Nocturia
Polyphagia
Weight loss
Short duration of complaints
Diabetic ketoacidosis as first presentation

DIAGNOSIS
- Diagnosis of diabetes: Fasting plasma glucose ≥ 126 mg%; post-glucose ≥ 200 mg%; HbA1c $\geq 6.5\%$ (all to be re-confirmed); random glucose ≥ 200 mg% with symptoms - Characteristic of T1 diabetes; urine/blood ketones: moderate-large (in $> 50\%$) - Continuous requirement of insulin since diagnosis
INVESTIGATIONS
HbA1c, creatinine, hemoglobin, TSH, tTG (tissue transglutaminase) antibody, lipid profile

AMBULATORY MANAGEMENT

NUTRITION - Calories should be appropriate to the expected body weight, pubertal status, activity - Balanced diet including all food groups - Simple sugars and excessive fats to be avoided - Meals/snacks to be individualized and reflect insulin schedule (usually 3 meals, 2 snacks)	REGULAR EXERCISE - Beneficial and should be encouraged EDUCATION - Emphasize diabetes related education to patient and caregivers	SMBG - Check before each meal and at bedtime - Should be checked more frequently in case A1c is not controlled, frequent hypoglycemia - Glucose at midnight (12.00-2.00 am) occasionally to rule out nocturnal hypoglycemia - Ketones should be checked if blood glucose is > 250 mg/dl TARGET - Pre-meal 80-130 mg% 2 hours post-meal: 120-180 mg%
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INSULIN TREATMENT

Basal and bolus regimen

Insulin administration (0.25 to 1.0U/kg depending on age and pubertal status)	- Basal: glargine or detemir or NPH 40-50% of daily requirement - Bolus: regular or rapid acting 50% of daily requirement/3 injections before each meal	Insulin doses can be adjusted depending upon 1. Pre-meal and post-meal glucose level 2. Carbohydrates in the meal 3. Exercise pattern
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REASONS FOR REFERRAL TO HIGHER CENTRES

Uncontrolled hyperglycemia	For education of patient & family For insulin injection techniques/ SBGM/ identifying hypoglycemia s/s	Recurrent hypoglycemia	Severe diabetic ketoacidosis (altered sensorium, rapid breathing)	Chronic diabetes specific complications
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MONITORING

AT EVERY VISIT - Growth & pubertal development (for children and adolescents) - Dietary and medication compliance - BP, Weight monitoring - Insulin site and injection technique - Review SMBG record - Hypoglycemia	EVERY THREE MONTHS - Glycated hemoglobin (HbA1c) - Target: $<7\%$ (should be individualized)	COMPLICATIONS & COMORBIDITIES (5 YEARS AFTER DIAGNOSIS, THEN ANNUALLY) - Fundus examination (Retinopathy) - Foot examination (Neuropathy) - Urine albumin/creatinine ratio - Other investigations (S-creatinine, TSH), lipid profile
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SICK DAY RULES /DKA

- IN CASE OF SICKNESS / INFECTION**
- Measure glucose frequently, check for urine ketones if glucose >250 mg%
 - Drink plenty of fluids, monitor urine output
 - Eat small light meals 4-5 times/day
 - In addition to usual insulin doses, take extra regular insulin s.c. every 6 hourly (10-15% of total daily insulin dose)
 - If glucose not falling, excess vomiting, low urine output, high or rising ketone, admit the patient

DKA MANAGEMENT

- As per STW on Diabetic Ketoacidosis (DKA)

HYPOGLYCAEMIA

- Symptoms and signs:** Sweating, hunger, tremors, irritability, weakness, drowsiness / seizures / unconsciousness (late stage)
- Diagnosis:** Mild / moderate: glucose <70 mg% with or without symptoms
- Severe hypoglycemia:** coma / seizures / inability to treat oneself
- Treatment:** If glucose <70 mg% take 3 tsf glucose powder or sugar; if severe: caregiver should give inj. glucagon 1 mg s.c./ i.m. OTHERWISE IMMEDIATELY take to hospital for intravenous glucose injection (1-2 ml/kg of 25% dextrose)
- Prevention:** Identify mismatch of food, exercise, insulin

ABBREVIATIONS

BP: Blood pressure
DKA: Diabetic ketoacidosis

SMBG: Self-monitoring of blood glucose
TSH: Thyroid-stimulating hormone
tTG: Tissue transglutaminase

REFERENCES

- American Diabetes Association; Standards of Medical Care in Diabetes—2022 Abridged for Primary Care Providers. Clin Diabetes 1 January 2022; 40 (1): 10–38. <https://doi.org/10.2337/cd22-as01>

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW)

LIVER FAILURE ICD-10 K72.90

ACUTE LIVER FAILURE OR ACUTE ON CHRONIC LIVER FAILURE

ACUTE LIVER FAILURE (ALF)

- Acute liver injury
- No underlying liver disease

ACUTE ON CHRONIC LIVER FAILURE (ACLF)

- Underlying liver disease
- Acute precipitating event

DIAGNOSTIC CRITERIA

- Jaundice < 4 weeks
- Encephalopathy
- Coagulopathy [INR ≥ 1.5]
- No evidence of prior chronic liver disease such as splenomegaly, ascites etc

- Jaundice (Bilirubin $\geq 5\text{mg/dL}$) and coagulopathy (INR ≥ 1.5)
- Ascites/ Hepatic encephalopathy within 4 weeks of onset of jaundice; other organ failure
- Evidence of chronic liver disease

CAUSES

- **Primary liver disease:** Viral hepatitis, Drug induced hepatitis (e.g. ATT), Acute Fatty Liver of Pregnancy /HELLP syndrome, Poisoning
- **Systemic infection with secondary liver involvement:** Malaria, Leptospirosis, Typhoid, Rickettsial disease
Suspect if:
 - Fever is a predominant symptom
 - Rash (Rickettsial)
 - Renal dysfunction
 - Anemia, thrombocytopenia, subconjunctival haemorrhage

- **Acute precipitating event:** Acute hepatitis, sepsis, GI bleeding, alcohol and drugs
- **Chronic liver disease:** Alcohol/ hepatitis B or C/ non-alcoholic fatty liver disease/ autoimmune liver disease/ Wilson's disease
- **Severity assessment of ACLF:** Additional organ failure indicates severe disease

INVESTIGATIONS

ESSENTIAL

- Hemoglobin, Leucocyte count (Total and Differential), Platelet count, Prothrombin time-INR
- Blood Sugar
- Liver function test, Blood Urea, Serum Creatinine, Sodium/Potassium
- Ascitic fluid analysis & culture
- Ultrasound abdomen

DESIRABLE

- Arterial blood gas and pH
- Blood NH_3 levels
- UGIE in ACLF

DIAGNOSTIC INVESTIGATIONS

- Primary liver disease- Serology: HBsAg, IgG Anti HBC, IgM anti-HAV, IgM anti HEV and anti HCV antibodies
- Systemic Infection- Work up for Malaria/ Typhoid/ Leptospira/Rickettsial infection in acute febrile illness

MANAGEMENT

Urgent referral to a higher centre after initial stabilization of patient/ if no improvement/ worsening despite therapy

PRIMARY TREATMENT/STABILIZATION:

- I.V. Fluids: Normal saline/Ringer's lactate (Add 50% dextrose if blood sugar low)
- O_2 supplementation if required
- Secure airway by tracheal intubation if grade 3-4 coma
- Antibiotics/ antimalarials depending on the clinical suspicion after taking blood culture
- Inj. Pantoprazole 40mg IV once a day for stress ulcer prophylaxis
- I.V. mannitol 20%, 100ml SOS for cerebral edema/grade 3-4 coma provided there is no renal failure in (ALF)
- IV infusion N-Acetylcysteine 150mg/kg in drug (induced ALF) over 1 hour
- Loading :150 mg/kg over 1 hour, 50 mg/kg over 4 hours
- Maintenance: 100 mg/kg over 16 hours every day

MANAGEMENT AT HIGHER CENTRE

(In addition to primary treatment)

- Admission in intensive care
- Supportive treatment
 - Prophylactic broad spectrum antibiotics after taking blood culture
 - Correct hypo-/hyper-kalemia
 - No role of prophylactic Fresh Frozen Plasma(FFP) for coagulopathy
- If hepatitis B: Tenofovir or Entecavir
- Acute Fatty Liver of Pregnancy/HELLP: prompt delivery
- Re-investigate to diagnose acute and chronic liver injury

• If GI Bleeding: Refer to STW on GI bleeding

TREATMENT AT HIGHER CENTRE

ORGAN FAILURE

1. Hypotension

- Fluid resuscitation 20ml/kg over 2 hours
- Maintenance fluid guided by hydration status and urine output
- If no response » Vasopressors: Noradrenaline I.V. infusion

2. Respiratory Failure

- O_2 inhalation
- Nebulization if bronchoconstriction
- May require ventilation

3. Acute renal failure

- Maintain fluid and electrolyte balance
- Stop diuretics, No NSAIDs
- In ACLF, Terlipressin: 1mg IV 6 hourly plus 20-40g albumin (20%) over 6-12 hours for volume expansion for suspected hepatorenal syndrome and not acute tubular necrosis
- May require dialysis

SEPSIS

- Fluid resuscitation
- I.V. antibiotics:
 - For unidentified source : Broad spectrum antibiotics within an hour.
 - For SBP : IV Ceftriaxone 1g BD may be tried
- To prevent hepatorenal syndrome: IV Albumin 20-40g over 6-12 hours

• (The choice of antibiotics may vary depending on local sensitivity pattern and availability)

ENCEPHALOPATHY

- Treat the underlying precipitating factor
- Usual care for comatose patient
- Secure airway if grade 3-4 encephalopathy

FOR ACLF

- Syrup Lactulose 20-30ml 6 hourly, titrate dose to produce 3-4 stools/day
- Rifaximin 400mg TDS

ABBREVIATIONS

HELLP: Haemolysis, elevated liver enzymes, low platelet count
IgM anti-HAV: Immunoglobulin M antibody to hepatitis A virus
HBsAg: Hepatitis B virus surface antigen

IgM anti-HBc: Immunoglobulin M antibody to Hepatitis B core antigen
IgM anti- HEV: Immunoglobulin M antibody to hepatitis E virus
ATT: Anti-Tubercular treatment

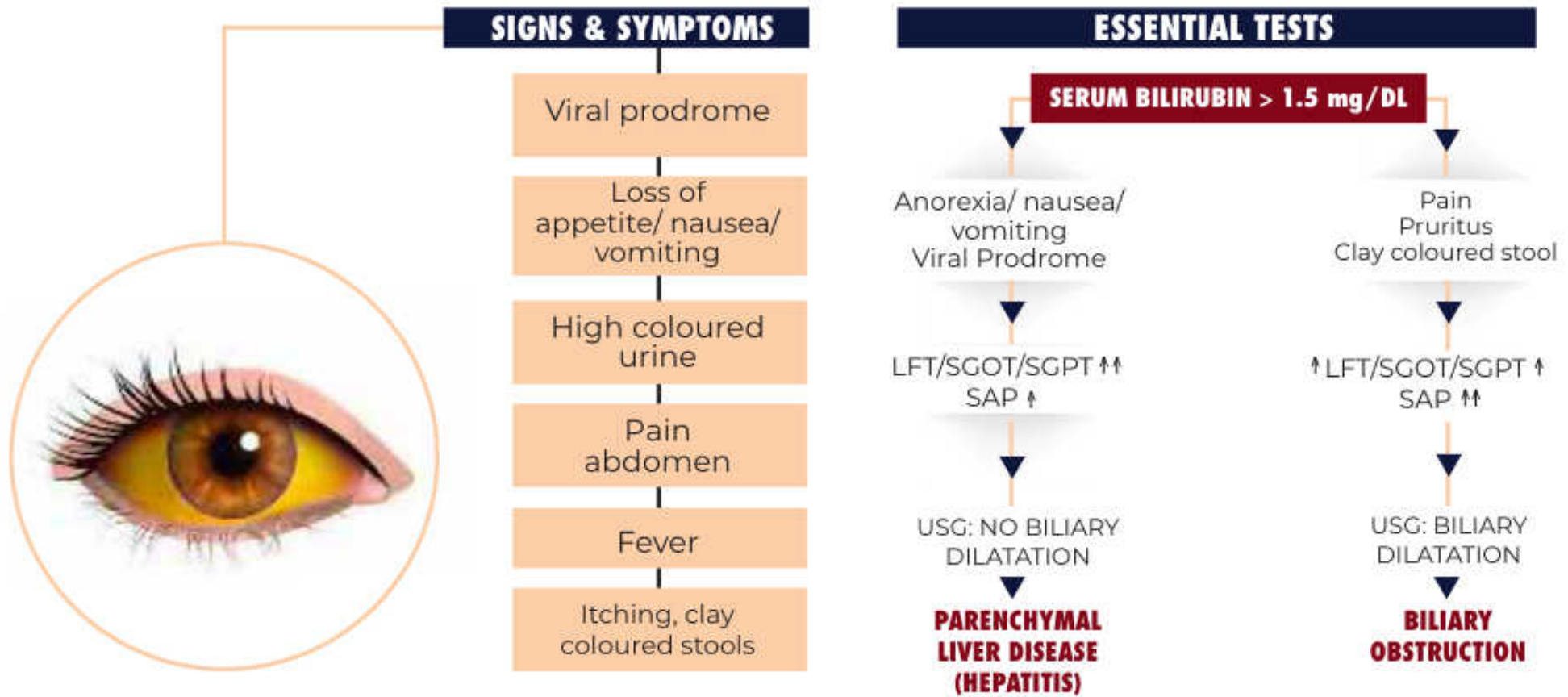
INR: International normalised ratio
UGIE: Upper gastrointestinal endoscopy



Standard Treatment Workflow (STW)

JAUNDICE

ICD-10-R17



DIFFERENTIAL DIAGNOSIS: COMMON CAUSES

JAUNDICE (ISOLATED RAISED BILIRUBIN)

- Hemolytic anaemia
- Congenital hyperbilirubinemia

OBSTRUCTIVE JAUNDICE

Benign:

- Common bile duct stone
- Biliary stricture

Malignant:

- Carcinoma gall bladder
- Carcinoma pancreas
- Peri-ampullary carcinoma
- Cholangiocarcinoma

PARENCHYMAL LIVER DISEASE

- Viral hepatitis
- Alcoholic hepatitis
- Drug induced hepatitis (eg: ATT)
- Autoimmune hepatitis

SYSTEMIC INFECTIONS (USUALLY WITH FEVER)

- Complicated malaria
- Enteric fever
- Dengue fever
- Scrub typhus
- Leptospirosis

SUPPORTIVE LAB EVIDENCE

- Isolated rise in bilirubin (indirect bilirubin > direct bilirubin)
- Normal values of SGOT, SGPT, SAP, GGT
- Normal ultrasonography of liver & biliary system

- Significantly elevated SAP (>4-5 X Upper limit of normal)
- Normal/ mildly elevated SGOT & SGPT
- Imaging show biliary obstruction

- Elevated SGOT & SGPT (usually >5 x Upper limit of normal; < 500 in alcoholic hepatitis)
- Viral markers/history of alcohol/hepatotoxic drugs

- In appropriate clinical setting:**
- Peripheral smear for malarial parasite or blood culture or widal test/ appropriate serology

MANAGEMENT

- **Hemolytic disease:** Start tablet Folic acid 5 mg once a day and refer to a hematologist
- **Congenital hyperbilirubinemia:** Reassurance & refer to higher center for confirmation
- Normal diet

- Start IV antibiotics if patient has fever and/or elevated TLC for suspected cholangitis
- Start IV fluids if patient dehydrated
- Refer to higher centre with facility for CT scan/MRCP for further work up
- Rx: ERCP/PTBD/Surgery
- Normal diet

- Maintain hydration
- Symptomatic Rx eg. antiemetics
- Normal diet
- Treat specific infectious illness
- Thiamine for alcoholic hepatitis
- AVOID ALCOHOL AND ALL NON PRESCRIPTION DRUGS

- Treat specific systemic infection
- Normal diet

REFERRAL TRIGGERS

INR >1.5 or rising INR- may be an early indicator of liver failure	Altered sensorium	Bleeding	Recurrent vomiting with dehydration	Hypotension (systolic BP <90 mmHg)
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ABBREVIATIONS

ATT: Anti tubercular drugs
Bilirubin: Direct=conjugated, indirect=unconjugated
ERCP: Endoscopic retrograde cholangiopancreatography

LFT: Liver function test
GGT: gamma-glutamyl transferase
MRCP: Magnetic resonance cholangiopancreatography
PTBD: Percutaneous transhepatic biliary drainage

SAP: Serum Alkaline Phosphatase
SGOT: Serum Glutamic-Oxaloacetic Transaminase
SGPT: Serum Glutamic Pyruvic Transaminase
TLC: Total Leucocyte Count

Standard Treatment Workflow (STW) ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

ICD-11-BA41.0

CONSIDER ANGINA IF

- Diffuse retrosternal pain, heaviness or constriction
- Radiation to arms or neck or back
- Associated with sweating
- Easily reproduced with post-meal exertion
- Consider atypical presentation: Exertional fatigue or breathlessness or profuse sweating or epigastric discomfort/ syncope

More likelihood if known patient of CAD/ multiple risk factors

ACUTE CORONARY SYNDROME:

1. Angina at rest or lasting more than 20 minutes
2. Recent worsening of stable angina (crescendo) to CCS class III
3. New onset effort angina of less than 1 month in CCS class II/ III
4. Post infarction angina

ECG: If ST Elevation: Follow ST Elevation MI (STEMI) protocol
If no ST Elevation: UA/NSTEMI**ANGINA UNLIKELY IF:**

Variable location or characteristic

Long lasting (hours to days) or short lasting (less than a minute)

Restricted to areas above jaw or below epigastrium

Localized to a point

Pricking or piercing or stabbing type of pain

Precipitated by movement of neck or arms or respiration

LOOK FOR OTHER CAUSES OF CHEST PAIN (ONGOING OR WITHIN 12 HRS)

Unequal or absent peripheral pulses

Dissection of Aorta

Respiratory evaluation

Pleuritis/ Pneumonitis/ embolism/ pneumothorax

Pericardial rub

Neuralgia or herpes

PATIENT WITH STEMI WITHIN 12 HOURS**ECG REVEALS ST ELEVATION MI**

Refer to primary angioplasty/ thrombolysis capable hospital

GENERAL MEASURES

1. Admit in ICU equipped with continuous ECG monitoring & defibrillation
2. Routine bio-chemistry and serial cardiac enzymes (troponin)
3. Pain relief by opioid
4. O₂ if saturation less than 90%
5. Aspirin 325 mg, Clopidogrel 300 mg and Atorvastatin 80 mg/Rosuvastatin 20-40mg
6. Echocardiography, particularly for mechanical complication

PCI CAPABLE HOSPITAL

1. Proceed for PCI
2. Radial route preferred
3. Preferably within 90 minutes

DURING PROCEDURE

1. Use unfractionated heparin
2. No routine thrombosuction
3. Tackle culprit artery only unless shock
4. DES to be preferred

POST PROCEDURE

1. Continue dual antiplatelets for at least 1 year

PCI INCAPABLE CENTRE

- A. Transfer to PCI capable hospital if PCI can be performed within 120 min
- B. If Transfer to PCI incapable hospital not feasible

THROMBOLYSE

1. Within 12 hours of symptom onset, if no contra-indication
2. Preferably with fibrin specific agent Tenecteplase/ TPA/ Reteplase or Streptokinase, if fibrin-specific are unavailable
3. Therapy to be started within 10 min preferably

POST THROMBOLYSIS

1. ECG to be done at 60-90 min after starting thrombolysis to assess whether thrombolysis is successful (>50% ST settlement with pain relief) or not
2. If successful, transfer patient for PCI within 3-24 hours
3. If thrombolysis failed, transfer patient immediately for PCI capable hospital
4. Enoxaparin (preferred over unfractionated heparin) to be continued till PCI OR discharge

PATIENT WITH STEMI IN 12-24 HOURS

Transfer to PCI capable hospital immediately

If ongoing pain, thrombolysis and transfer immediately

PATIENT WITH STEMI AFTER 24 HOURS

Angiography with a view to PCI only if any of following/ Contra indications of angiography:

Recurrent anginal pain not controlled by medical therapy

Cardiogenic shock

Acute LVF

Mechanical complication

Dynamic ST-T changes

Life threatening ventricular arrhythmias

ABSOLUTE CONTRA-INDICATIONS TO THROMBOLYTIC THERAPY:

Previous intra-cerebral hemorrhage or stroke of unknown etiology

Ischemic stroke in last 6 months

CNS neoplasm or AV malformation

Recent (within 1 month) major trauma/ surgery/ head injury

Recent (within 1 month) major GI bleed

Known bleeding tendency (except menstrual bleed)

Aortic dissection

Severe uncontrolled hypertension

DRUGS & DOSAGE**Anti-platelets**

1. Aspirin: Loading dose 325 mg followed by 75 mg OD
2. Clopidogrel: Loading dose 300 mg followed 75 mg OD
3. Prasugrel: Loading dose 60 mg followed by 10 mg OD
4. Ticagralor: Loading dose 180 mg followed by 90 mg BD

Anti-ischemic:

Metoprolol:

Short acting: 25-100 mg BD
Long acting: 25 -100 mg OD

Nitrates:

Isosorbide mono-nitrate 20 to 60 mg in 2 divided dose
Nitroglycerine sustained release 2.6 to 6.5 mg BD
Nitroglycerine IV 5-25 mcg/ min infusion**Lipid lowering agents:**High dose Atorvastatin 80 mg OD
Rosuvastatin 20-40mg OD
Non-statin lipid modifying agents**Ace-inhibitor**Ramipril 2.5 -10 mg OD
Enalapril 2.5 -10mg BD**Oxygen:**

If oxygen saturation below 90%

Morphine:

Titrated in a dose of 2-4 mg IV every 15 minutes

Beta-blocker:

Oral beta-blocker if LVEF is less than 40%

Anti thrombotics:

1. Unfractionated heparin: Bolus of 60 U/Kg (maximum 5000 U) followed by 12 U/Kg hourly infusion to maintain APTT at 50-70 sec
2. Enoxaparin: 1 mg/Kg SC 12 hly

Thrombolytic Therapy:**Tenecteplase**35 mg IV bolus if 60-70 Kg
40 mg IV bolus if 70-80 Kg
45 mg IV bolus if more than 80 Kg**Reteplase**

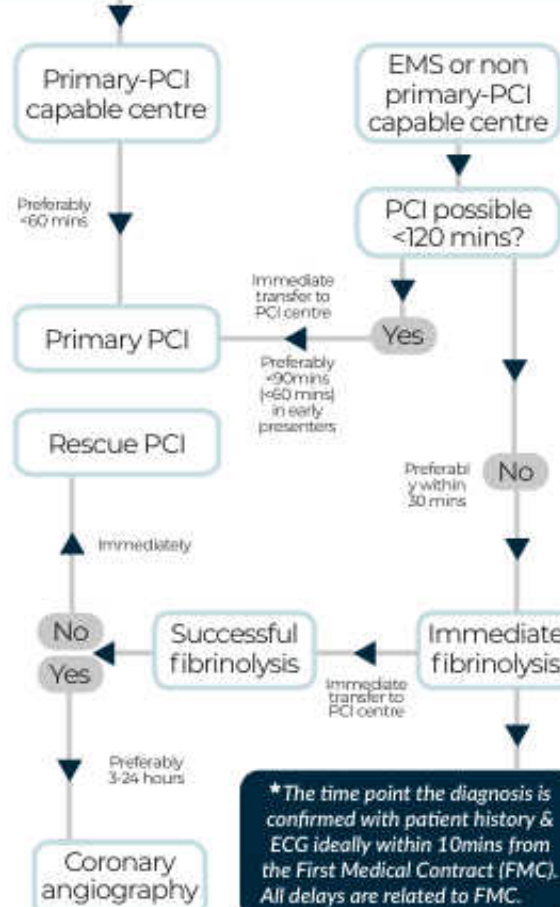
10 mg IV bolus, repeat after 30 min

Alteplase

15 mg IV bolus followed by 0.75 mg/Kg over 30 min upto 50 Kg weight, then 0.5 mg/Kg over 60 min up to 35 mg

Streptokinase

1.5 million units IV over 60 min

STEMI DIAGNOSIS***REFERENCES**

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2. Rao SV et al. 2025 ACC/AHA/ACEP/NAEMSP/SCAI guidelines for the management of acute coronary syndrome. J Am Coll Cardiol(2025) 85, 2135-2237

MISSION: LIFELINE

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Standard Treatment Workflow (STW)

STABLE ANGINA

ICD-11-BA40.1

PATIENT PRESENTING
WITH CHEST PAIN



CONSIDER ANGINA IF

- Diffuse retrosternal pain, heaviness or constriction, radiating to arms or neck or back
- Associated with sweating
- Easily reproduced with post-meal exertion
- Consider atypical presentation: Exertional fatigue or breathlessness or profuse sweating or epigastric discomfort

Likelihood more if known patient of CAD

ANGINA UNLIKELY IF

- Variable location or characteristic
- Long lasting (hours to days) or short lasting (less than a minute)
- Restricted to areas above jaw or below epigastrium
- Localized to a point
- Pricking or piercing or stabbing type of pain
- Precipitated by movement of neck or arms or respiration

CATEGORIZE ANGINA

ACUTE CORONARY SYNDROME

- Angina at rest or lasting more than 20 minutes
- Recent worsening of stable angina (crescendo) to CCS class III
- New onset effort angina of less than 1 month in CCS class II/ III
- Post infarction angina

For management: refer to STEMI/ NSTEMI STW

STABLE ANGINA

Any effort related pain fitting in previous category, relieved by rest or NTG in 1-2 min

STABLE ANGINA: GENERAL MANAGEMENT

1. Manage factors potentaiting angina
 - Anemia, Thyrotoxicosis, Pregnancy, febrille illness
 - Hypertension, Ventricular hypertrophy, CHF
 - Tachy or brady-arrhythmia
 - Drugs : bronchodilators, steroids
2. Risk factor control
3. Other atherosclerotic CV disease : PVD, stroke
4. Secondary prevention : Statins, BB, ACE-I

INVESTIGATIONS

ESSENTIAL INVESTIGATIONS

1. Hemogram
2. Urea, Creatinine, Electrolytes
3. Sugar
4. Lipids
5. ECG

OTHER INVESTIGATIONS

1. Echocardiography
2. Exercise Treadmill Test
3. Thyroid Function Test
4. Iron profile
5. Uric acid
6. HbA1C

OPTIONAL INVESTIGATIONS

1. Stress radionuclide/ echocardiographic imaging
2. CT scan including multi-slice coronary angiography
3. Coronary Angiography
4. Coronary Fractional Flow Reserve
5. Intra-vascular Ultrasound/ OCT

MANAGEMENT

MANAGEMENT AT PHC/CHC LEVEL

1. Control angina: Metoprolol with/without DHP Ca channel blockers
Add nitrates if symptoms not controlled
2. ECG for Q waves, ST - T changes, BBB or chamber enlargement
3. Aspirin & high intensity statins
4. Refer to higher centre electively

MANAGEMENT AT DISTRICT HOSPITAL LEVEL

1. Optimise anti-anginal treatment
2. Echocardiography for LV function or structural heart disease
3. Risk stratify by exercise treadmill test in low, intermediate or high risk (DUKE risk score) for cardio-vascular events , if patient is ambulatory and ECG is interpretable
4. Refer to tertiary centres if:
 - Angina uncontrolled on optimal medical therapy
 - Echo reveals abnormality
 - Non-ambulatory patient or un-interpretable ECG
 - High risk on exercise stress test for possible re-vascularization

MANAGEMENT AT TERTIARY LEVEL

1. Reassess and optimise drug therapy: If uncontrolled choose from trimetazidine, nicorandil and ranolazine
2. Risk stratify with CT coronary angiogram or stress imaging or exercise treadmill test

RISK CATEGORIZATION

Identify high risk patients on non-invasive evaluation

1. Uncontrolled angina
2. Poor LV function
3. Left main/proxi multivessel disease on CT coronary angioplasty
4. Large defect on stress imaging

RISK CATEGORY MANAGEMENT

Low/ Intermediate Risk Group

1. Optimal anti-anginal therapy
2. Follow up 3-6 monthly at primary/ secondary care centre
3. Refer to tertiary centre when change in symptomatic status

High Risk Group

1. Discuss pros and cons of possible revascularization and dual anti-platelet therapy
2. Angiography, if any of following
 - Angina not controlled on optimal medical therapy
 - High risk on non-invasive testing
 - Cardiac arrest survivor or documented VT

DRUGS & DOSAGE

Anti-platelets

- Aspirin 75 mg OD
- Clopidogrel 75 mg OD (if intolerant to aspirin)
- Ticagralor 90 mg BD

Lipid lowering agents

- Atorvastatin: 40-80 mg OD
- Rosuvastatin: 20-40 mg OD
- Non-statin lipid modifying agents

Ace-inhibitor

- Ramipril: 2.5-10 mg OD
- Enalapril: 2.5-10 mg BD

Anti-ischemic:

1. Metoprolol:
 - Short acting: 25-100 mg BD
 - Long acting: 25 -100 mg OD
2. Nitrates:
 - Isosorbide mono-nitare: 20 to 60 mg in 2 devided dose
 - Nitroglycerine sustained release: 2.6 to 6.5 mg BD
3. Calcium channel blockers:
 - Amlodipine 5-10mg OD
 - Verapamil 40-80 mg TDS
 - Diltiazem 30 to 90 mg TDS
4. Nicorandil: 5-10 mg BD
5. Ranolazine: 500 -1000 mg BD
6. Trimetazidine: 20 mg mg TDS

REVASCULARIZATION

1. Revascularize if anatomy is suitable
2. Prefer CABG over PCI in DM with multivessel disease or left main disease
3. Complete re-vascularization is preferable
4. Use invasive functional and imaging modalities (FFR, IVUS, OCT) when indicated
5. Stress on continuing dual anti-platelets at least for six months after PCI

ABBREVIATIONS

CHF: Congestive Heart Failure
FFR: Fractional Flow Reserve

IVUS: Intravascular Ultrasound
OCT: Optical Coherence Tomography
PVD: Peripheral Vascular Disease

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1. Vrints C et al.2024 ESC guidelines for management of chronic coronary syndrome. European Heart J (2024) 44, 3415-3537
2. Virani SS et al. 2023 ACC/AHA/ACCP/ASPC/NLA/PCNA guidelines for the management of chronic coronary diseases, a report of ACC/AHA joint committee on clinical practice guidelines. 2023,doiCIR.000000000000001168

👂 LISTEN TO YOUR HEART: PREDICTABLE PAIN NEEDS PREDICTABLE CARE

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Standard Treatment Workflow (STW) for the Management of ASTHMA ICD-10-J45

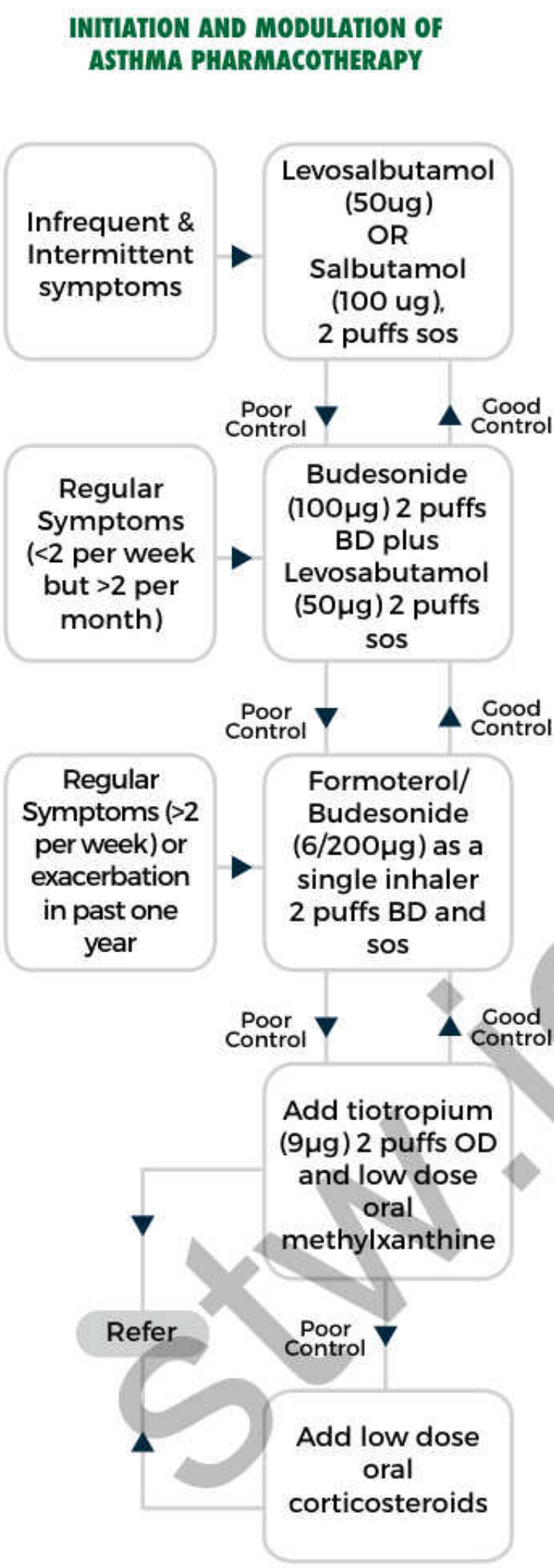
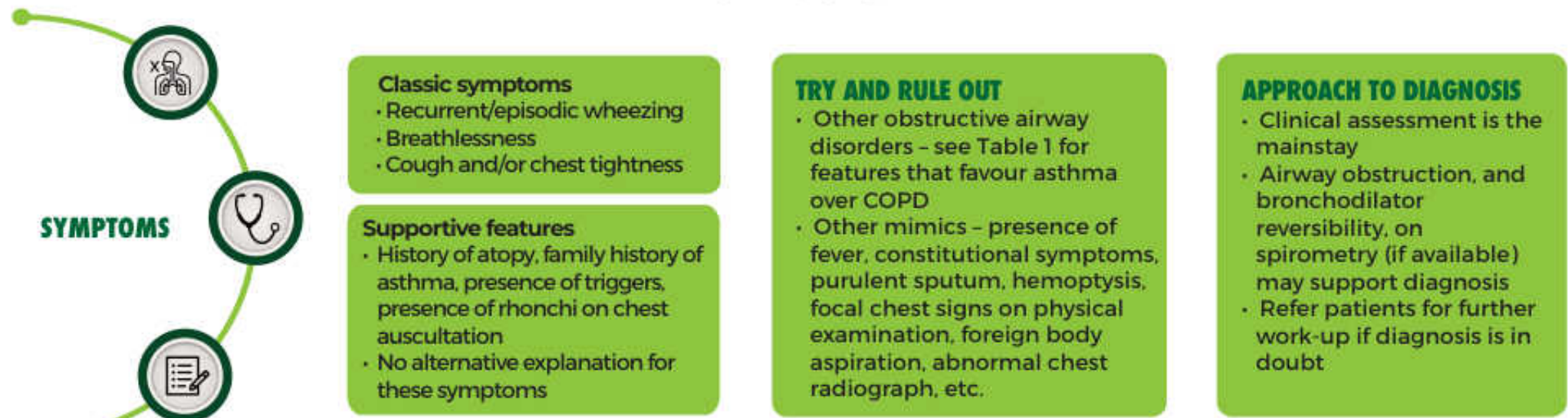


TABLE 1. DIFFERENTIATING BETWEEN ASTHMA AND CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COPD)

	Asthma	COPD
Age of Onset	More often in childhood or early adulthood; variable	Usually later in life (4th or 5th decade)
Course	Episodic	Progressive
Smoking, other	Uncommon	Common
Nasal Symptoms, Atopy	Common	Rare
Family History	Often	Uncommon
Triggers	Often Identified	None
Wheeze	Prominent and almost universal	May or may not be present

TABLE 2. LEVEL OF CURRENT ASTHMA CONTROL (OVER THE PRECEDING FOUR WEEKS)

Components	Inadequately controlled (any one)	Adequately controlled (all should be present)
Daytime symptoms or use of rescue medication	More than twice a week	Twice or less in a week
Night-time symptoms/awakening	Any	None
Limitation of activities	Any	None
Pulmonary function (if available)	FEV1 <80% of predicted or PEF <80% of personal best	FEV1 >80% of predicted or PEF >80% of personal best

FEV1 Forced Expiratory Volume in first second, PEF Peak Expiratory Flow

- GUIDING PRINCIPLES**
- Mainstay of pharmacotherapy: Inhaled drugs
 - Frequency of symptoms determine treatment initiation (see figure 1 for details)
 - Reassess at 3-4 weeks – good response : in favour of asthma diagnosis
 - Patient education for compliance, warning signs, triggers, inhaler technique, PEF monitoring
 - Inhaler technique to be monitored
 - Follow-up at 4-12 weeks, assess diseases control by clinical parameters (see Table 2)
 - Step-up or step-down treatment as per level of asthma control (see figure 1)
 - Follow up three-monthly and modulate treatment as needed
 - Refer for further evaluation and management if asthma remains poorly controlled

DISEASE EXACERBATION

- WHEN TO SUSPECT EXACERBATION**
- Suspect if acute symptomatic worsening , or reduction in PEF to below 80% of personal best , while on continued treatment
 - Take two additional puffs of the inhaler used if symptoms persist, and repeat if needed
 - If no response after 24 hours, or symptomatic worsening, or further reduction in PEF, contact physician
 - Physician to assess severity of exacerbation and manage accordingly

LIFE-THREATENING EXACERBATION
Altered sensorium, orthopnea, cyanosis, paradoxical breathing, hypotension, and/or bradycardia (heart rate <60 bpm) – immediately refer to higher centre with ICU facility

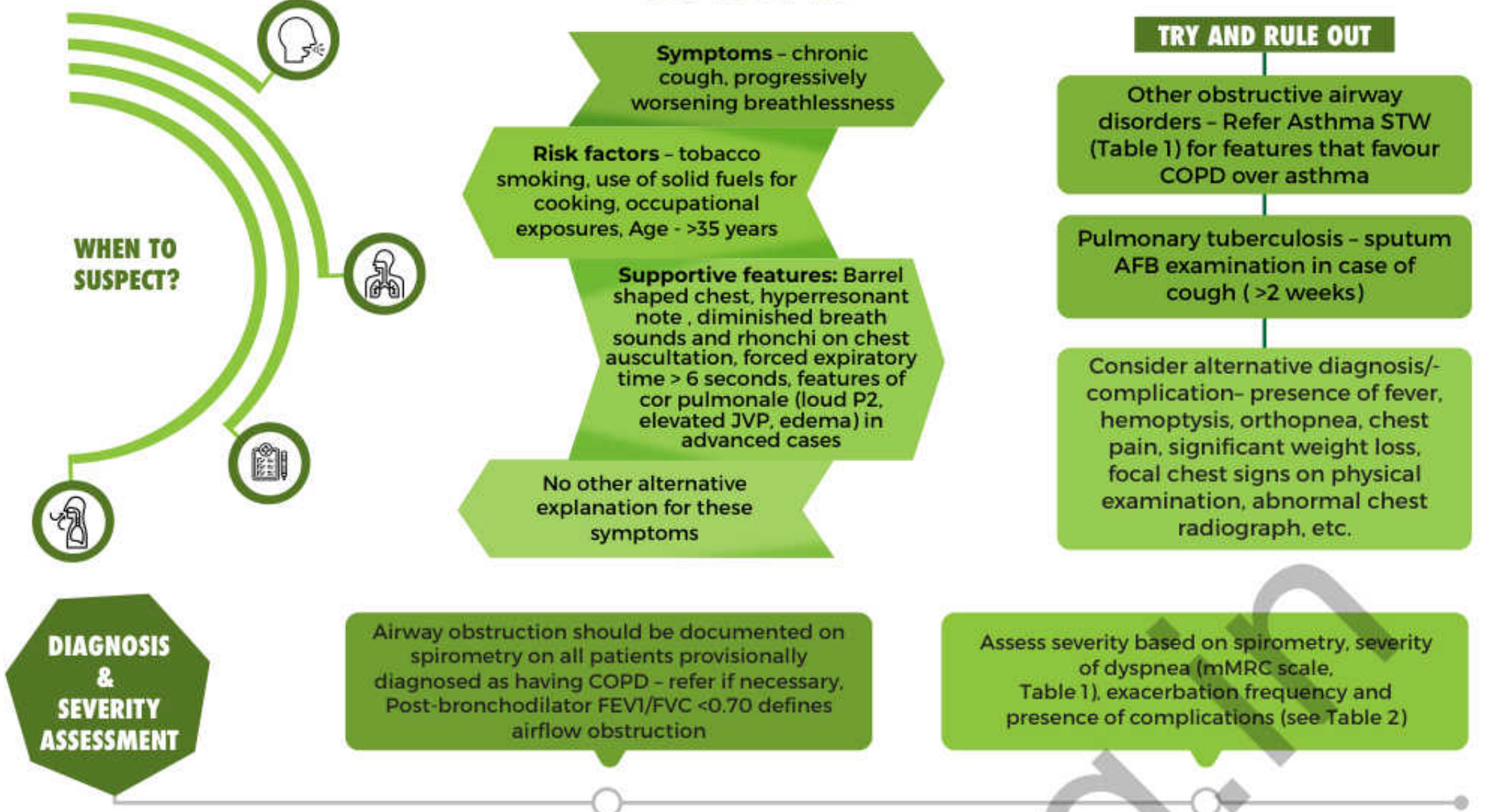
- SEVERE ACUTE ASTHMA (PATIENT TO BE ADMITTED)**
- Inability to complete sentences, agitation, use of accessory muscles, respiratory rate >30/min, heart rate >110/min, pulsus paradoxus >25 mm Hg, silent chest, and/or room air sPo2 <92%
 - Oxygen supplementation to maintain spO2 92-95%
 - Nebulized levosalbutamol/ipratropium (1.25 mg/0.5 mg) three doses at 20-minute interval, then 4-6 hourly or as needed
 - Injection hydrocortisone 200 mg intravenously, then oral prednisolone 0.5 mg/kg daily for five days
 - Refer if no improvement
 - **Discharge** only when symptoms improve, wheezing absent or significantly reduced, heart rate <100 bpm, respiratory rate <30/min, room air sPo2 >94%
 - Schedule follow-up outpatient visit at one week
- NON-SEVERE ACUTE ASTHMA**
- If none of the above features present – manage on outpatient basis
 - Continue additional inhaler doses as needed
 - Oral prednisolone 0.5 mg/kg daily for five days
 - Schedule follow-up outpatient visit at one week

 **KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES**

REFERENCES

1. Agarwal R, et al. Guidelines for diagnosis and management of bronchial asthma: Joint ICS/NCCP(I) recommendations. Lung India 2015;32(Suppl 1):S3-S42.
2. Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. 2018.
3. National Institute for Health and Care Excellence (NICE). Asthma: diagnosis, monitoring and chronic asthma management. 2017.

Standard Treatment Workflow (STW) for the Management of
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
ICD-10-J44.9



TREATMENT

- Advice smoking cessation and counsel for other risk factors
- Inhaled drugs are the mainstay
- Treatment based on severity assessment (See adjacent figure)
- Follow up: Mild to moderate disease - 3 to 6 Months; Severe disease - 1-3 months
- Ensure compliance and proper inhaler technique at each visit.
- If uncontrolled/complications develop, refer to higher center

DISEASE EXACERBATION

Three cardinal symptoms:

- Increase in dyspnea
- Increase in sputum volume and/or
- Increase in sputum purulence

Classify As:

- Mild Exacerbation
- Severe Exacerbation

Features Of Severe Exacerbation:

- Cyanosis
- Respiratory rate >30/min
- Heart rate >110/min
- Systolic blood pressure <90 mm Hg
- SpO2 <90%
- Paradoxical respiratory movements
- Altered sensorium
- Asterixis
- Presence of severe co-morbid conditions (e.g. heart failure, arrhythmia)

MILD EXACERBATION

- Increase dose and/or frequency of levosalbutamol and/or ipratropium inhalation, or nebulized levosalbutamol/ipratropium (1.25 mg/0.5 mg), repeated as needed at 20-minute interval
- Amoxycillin 500 mg TDS/ Azithromycin 500 mg OD/ Doxycycline 100 mg OD (BD on day 1) X 5 Days
- Oral prednisolone 30 mg daily X 5 days

SEVERE EXACERBATION

Treatment as under Mild Exacerbation

+ Supplement oxygen with target spO2 of 92% (if spO2 monitoring available)

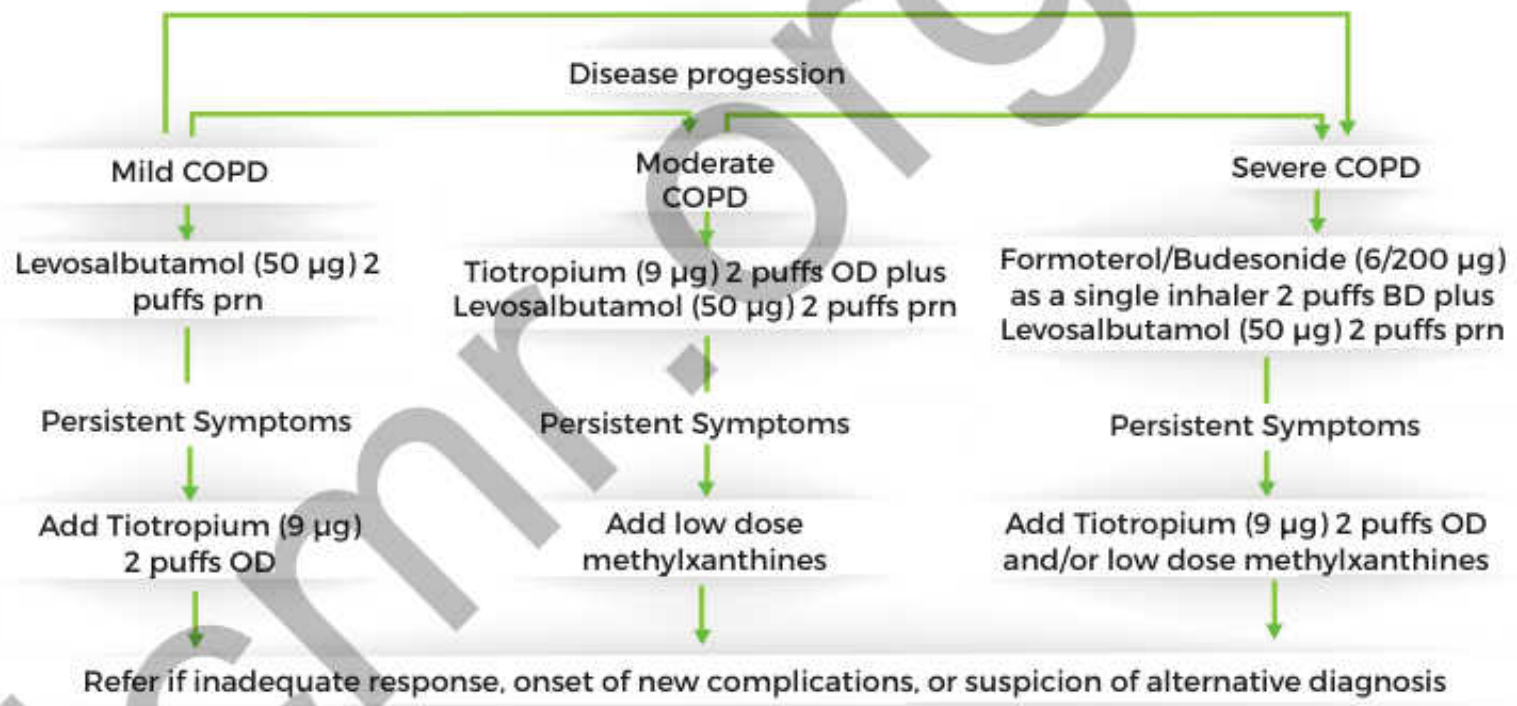


TABLE 1. GRADING OF BREATHLESSNESS USING MODIFIED MEDICAL RESEARCH COUNCIL (MMRC) SCALE.

GRADE	DESCRIPTION OF BREATHLESSNESS
0	I only get breathless with strenuous exercise.
1	I get short of breath when hurrying on level ground or walking up a slight hill.
2	On level ground, I walk slower than people of the same age because of breathlessness or have to stop for breath when walking at my own pace.
3	I stop for breath after walking about 100 yards or after a few minutes on level ground.
4	I am too breathless to leave the house or I am breathless when dressing.

TABLE 2. SEVERITY CLASSIFICATION FOR COPD

SEVERITY	POSTBRONCHODILATOR FEV1 (% PREDICTED)	DYSPNEA (MMRC GRADE)	EXACERBATIONS IN LAST ONE YEAR	COMPLICATIONS*
MILD	≥ 80	<2	<2	NO
MODERATE	50-79	≥ 2	<2	NO
SEVERE	<50	≥ 2	≥ 2	YES

The category with the worst value should be used for severity classification
*Complications include respiratory failure, cor pulmonale, and secondary polycythemia

RED FLAG SIGNS FOR PEOPLE HAVING EXACERBATION

- Altered sensorium
- spO2 <88% despite therapy
- Heart rate >110 bpm
- Systolic blood pressure <90 mm Hg
- High risk comorbid conditions (arrhythmia, congestive cardiac failure, poorly controlled diabetes, renal or liver failure)

Refer to higher centre for further management, and ensure continued supplemental oxygen and nebulization during transfer

SCHEDULE FOLLOW UP VISIT ONE WEEK AFTER DISCHARGE

ADMISSION CRITERIA

1. Severe symptoms; sudden worsening of resting dyspnea.
2. Fall in oxygen saturation, cyanosis, confusion, drowsiness.
3. Failure of an exacerbation to respond to initial medical management.
4. Presence of serious comorbidities (heart failure, newly occurring arrhythmias, etc.)

DISCHARGE CRITERIA

1. Normalization of clinical and laboratory data to pre-admission levels
2. Patient able to follow maintenance therapy
3. Completion of acute medications
4. Adequate control of comorbidities

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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1. Gupta D, et al. Guidelines for diagnosis and management of chronic obstructive pulmonary disease: Joint ICS/NCCP(I) recommendations. Lung India 2013;30:228-67
2. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. 2019 report.
3. National Institute for Health and Care Excellence (NICE). Chronic obstructive pulmonary disease in over 16s: diagnosis and management. 2018.



Standard Treatment Workflow (STW) for BREAST CANCER ICD-10-C 50

SYMPTOMS

- Asymmetry of breast or nipple areola or axilla
- Breast lump, bulge, blood vessels prominent
- Colour change of skin or nipple areola
- Deformed breast / nipple areola (nipple retraction), dimpling of skin, Discharge from nipple, Direct spread-skin (satellite nodule, ulcer, skin oedema), chest wall Distant spread - headache, jaundice, dyspnoea, bone pains, ascites

Evaluation and management by multidisciplinary team (MDT) of oncology experts

SIGNS

- A Breast changes**
- Asymmetry in shape/size of breast or nipple areola complex
 - Breast lump
 - Nipple retraction/ulcer
 - Change in skin - puckering, dimpling, thickening, ulcer, redness, edema & satellite nodules
 - Fixity to underlying muscles or chest wall
- B Lymph node**
- lymph node(s) in axilla or supra-clavicular fossa
- C Systemic changes**
- Enlarged liver, ascites, bony tenderness, dyspnoea, pleural effusion

WORK UP OF A PATIENT WITH SUSPECTED BREAST CANCER- TRIPLE ASSESSMENT

CLINICAL BREAST EXAMINATION

IMAGING

- Bilateral mammogram: for women >30 years
 - Ultrasound: breast and axilla
 - MRI breast in selected cases
- STAGING- T1, T2 N0 N1**
Upto Stage 2A no metastatic work up
Stage 2B upwards
- Chest radiograph
 - Ultrasound whole abdomen
 - Bone scan
 - CECT chest and abdomen
 - PET-CT (optional)

PATHOLOGY

- Core needle biopsy (preferred) for type, grade, ER, PR, HER2/neu, Ki-67
- FISH test if HER-2/neu on IHC-2+/ equivocal

DO NOT

- Ignore any lump or changes in breast & nipple areola complex
- Perform excision biopsy for diagnosis
- Perform FNAC or core needle biopsy before imaging.

MULTIDISCIPLINARY CARE

MANAGEMENT OF BREAST CANCER

Triple assessment (CBE, USG breast and axilla, mammography and core biopsy)

EARLY BREAST CANCER

T1, T2, N0, N1, M0

- Surgery followed by adjuvant therapy
- Metastatic work-up usually not indicated

For breast

Surgery

Primary systemic therapy

Surgery

Discuss adjuvant therapy in MDT

For axilla (clinico-radiological assessment)

Node -ve

Node +ve

SLNB/axillary sampling

-ve

+ve

No ALND

ALND

ADJUVANT THERAPY (AT)

Chemotherapy

- Consider for all patients with pT > 1 cm or node positive disease based on ER/PR/HER2/Ki-67

Radiotherapy

- After breast conservation surgery
- After mastectomy with node-positive disease or pathological T3/T4

Targeted therapy

- All HER-2/neu positive (3+) or FISH HER-2 amplified patients should receive trastuzumab for 12 months
- Shorter schedules: 9 weeks to 6 months acceptable in some patients

Hormone therapy

- All ER and/or PR positive cases
- For premenopausal women tamoxifen and for post menopausal women tamoxifen or aromatase inhibitors are appropriate
- Minimum for 5 years, if high risk of recurrence like node positive, consider for up to 10 years
- If AT is used zoledronic acid or other bisphosphonates can be added

ADVANCED BREAST CANCER

T3, T4, any N Any T, N2, N3

Metastatic work up: Chest X-ray, ultrasound abdomen, bone scan

OR

CECT thorax abdomen, bone scan OR PET-CECT whole body

No metastasis

Locally Advanced Breast Cancer

Intent of treatment: curative

Neoadjuvant systemic therapy

Discuss extent of surgery
MRM or Breast conservation surgery

Adjuvant systemic treatment therapy +RT surgery

methotrexate, etc.

- Sequential single agents preferred over combinations when possible

Hormonal therapy

- Consider - tamoxifen, aromatase inhibitors, fulvestrant, megestrol acetate, CDK 4/6 inhibitors, everolimus
- Ovarian suppression indicated in premenopausal MBC patients, which can be surgical (bilateral oophorectomy) or radiotherapeutic (ovarian radiation) or medical (GnRH analogues)

HER2 targeted therapy

- Consider - trastuzumab, lapatinib, pertuzumab, add trastuzumab-emtansine

Bone targeted therapy

- All patients with bone metastases should receive a bone modifying agent (e.g zoledronic acid) 4-12 weekly

Role of surgery

- It is indicated only for palliation of local tumour symptoms bleeding, fungation, etc
- Insert intercostal drainage tube for malignant pleural effusion and chemical pleurodesis with talcum powder or bleomycin

Role of radiotherapy

- Most effective method for pain relief in bone metastasis
- Is routinely used for brain metastasis: Hemostatic RT used for bleeding ulcer

Pain control and palliative care

Yes metastasis

Metastatic Breast Cancer

Intent of treatment: palliative care

Consider hormone therapy
chemotherapy
targeted therapy
as clinically indicated

Treatment of metastatic breast cancer

Chemotherapy

- Consider - Anthracyclines, taxanes, platinum, capecitabine, cyclophosphamide,

ABBREVIATIONS

ALND: Axillary lymph node dissection

CECT: Contrast-enhanced computed tomography

ER/PR: Estrogen receptor/Progesterone receptor

FISH: Fluorescence in situ hybridization

HER2: Human epidermal growth factor receptor 2

IHC: Immunohistochemistry

MBC: Metastatic breast cancer

PET-CT: Positron emission tomography-computed tomography scan

RT: Radiotherapy

SLNB: Sentinel lymph node biopsy

ENHANCE AWARENESS AND EARLY DETECTION OF BREAST CANCER BY SCREENING AS PER NATIONAL PROGRAMME

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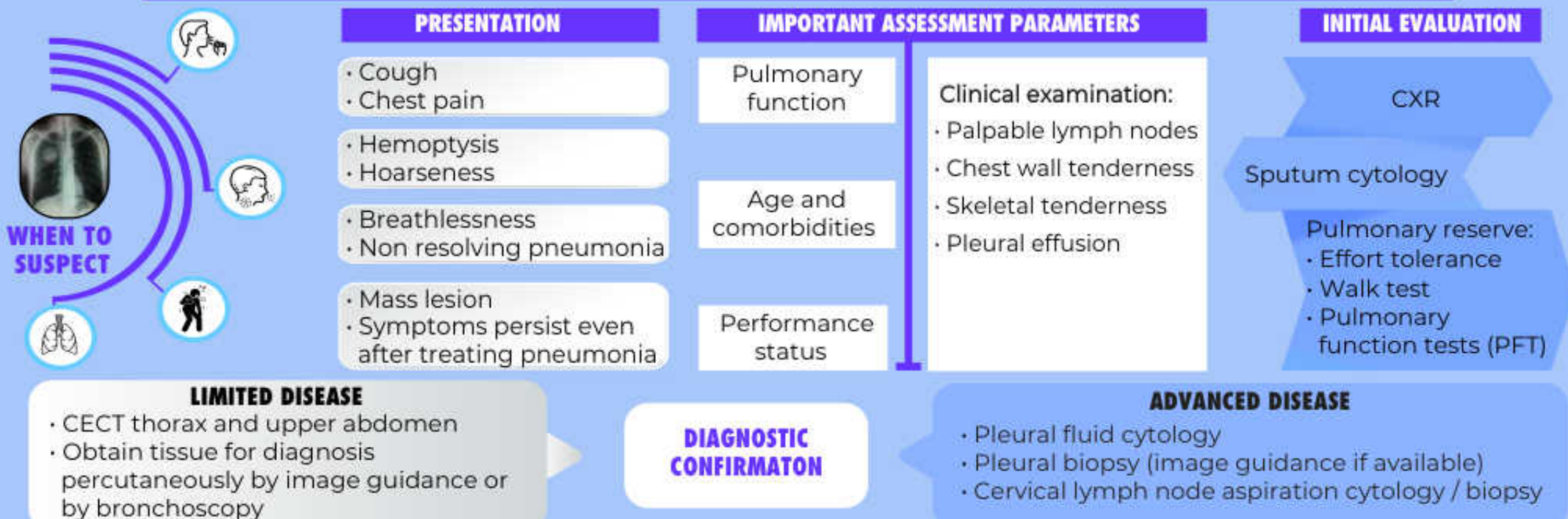


Standard Treatment Workflow (STW)

LUNG CANCER

ICD-10-C34.90

Evaluation and management by multidisciplinary team (MDT) of oncology experts



All lung shadows are not tuberculosis ! Obtain diagnostic investigations before starting empirical ATT !

PATHOLOGY ASSESSMENT

Biopsy/ cell block/ smear

- Histopathology**
adenocarcinoma, squamous carcinoma, poorly differentiated carcinoma, small cell carcinoma
- Immunohistochemistry**
TTF 1, p40, synaptophysin/ chromogranin
- Preserve tissue for molecular analysis**
Molecular tests for adenocarcinoma: EGFR, ALK, ROS-1

SMALL CELL LUNG CARCINOMA

Do CECT thorax and abdomen

- Non metastatic disease** T1-4, N0-3, M0
 - Metastatic work up: PET CT & MRI brain
 - Consider surgery for T1-2, N0
 - Concurrent CT + RT
- Metastatic disease** Any T, any N, M1
 - Prophylactic cranial irradiation
 - Symptomatic & supportive care
 - Palliative chemotherapy carboplatin + etoposide

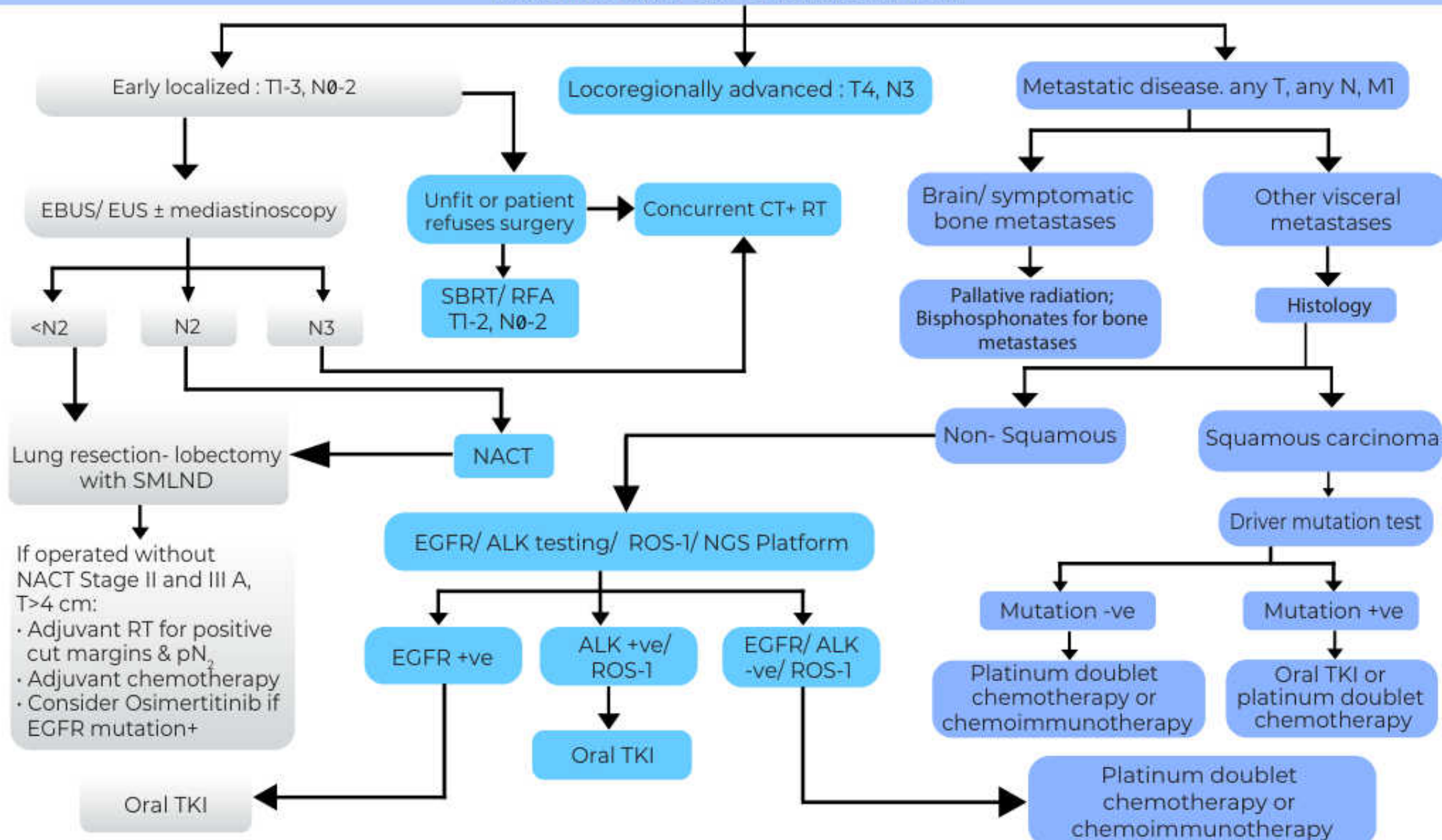
NON SMALL CELL LUNG CARCINOMA

Do CECT thorax and abdomen

- Non metastatic disease:** T1-4, N0-3
 - Metastatic work up: PET CT and MRI brain
- Metastatic disease:** Any T, any N, M1
 - Symptomatic & supportive care
 - Refer to oncology centre
 - Palliative chemotherapy (platinum doublet in fit patients, single agent chemotherapy for PS 2)
 - Oral TKI if target mutation detected
 - Immunotherapy may be an option in some patients

MANAGEMENT OF NSCLC

METASTATIC WORKUP* PET-CT SCAN AND MRI BRAIN



AVAILABLE TREATMENT OPTIONS

- Chemotherapy doublet:
 - Carboplatin or cisplatin with pemetrexed or paclitaxel or gemcitabine or etoposide
- EGFR mutation positive: gefitinib, afatinib, osimertinib, erlotinib, dacomitinib
- Immune checkpoint inhibitors: nivolumab, atezolizumab, pembrolizumab, ipilimumab

PALLIATIVE CARE

- Radiotherapy
- Pain management
 - Opioids: morphine, tramadol, oxycodone
 - Paracetamol, nonsteroidal anti-inflammatory drugs
- Cough suppressants
- Treatment of chronic obstructive pulmonary disease
- Treatment of anemia, anorexia, electrolyte abnormalities

ABBREVIATIONS

ALK: Anaplastic lymphoma kinase
 ATT: Anti tubercular therapy
 CECT: Contrast-enhanced computed tomography
 COPD: Chronic obstructive pulmonary disease
 CT: Computed tomography
 CXR: Chest X Ray

EBUS: Endobronchial ultrasound
 EGFR: Epidermal growth factor receptor
 NACT: Neoadjuvant chemotherapy
 NGS: Next generation sequencing
 NSCLC: Non-small cell lung cancer
 PET CT: Positron emission tomography

PFT: Pulmonary function test
 pN2: Pathological node
 RFA: Radiofrequency ablation
 ROS: Ros proto-oncogene 1
 RT: Radiotherapy
 SBRT: Stereotactic body radiotherapy

SMLND: Systematic lymph node dissection
 T, N, M: Tumour (T), Nodes (N), and Metastases (M)
 TKI: Tyrosine kinase inhibitors

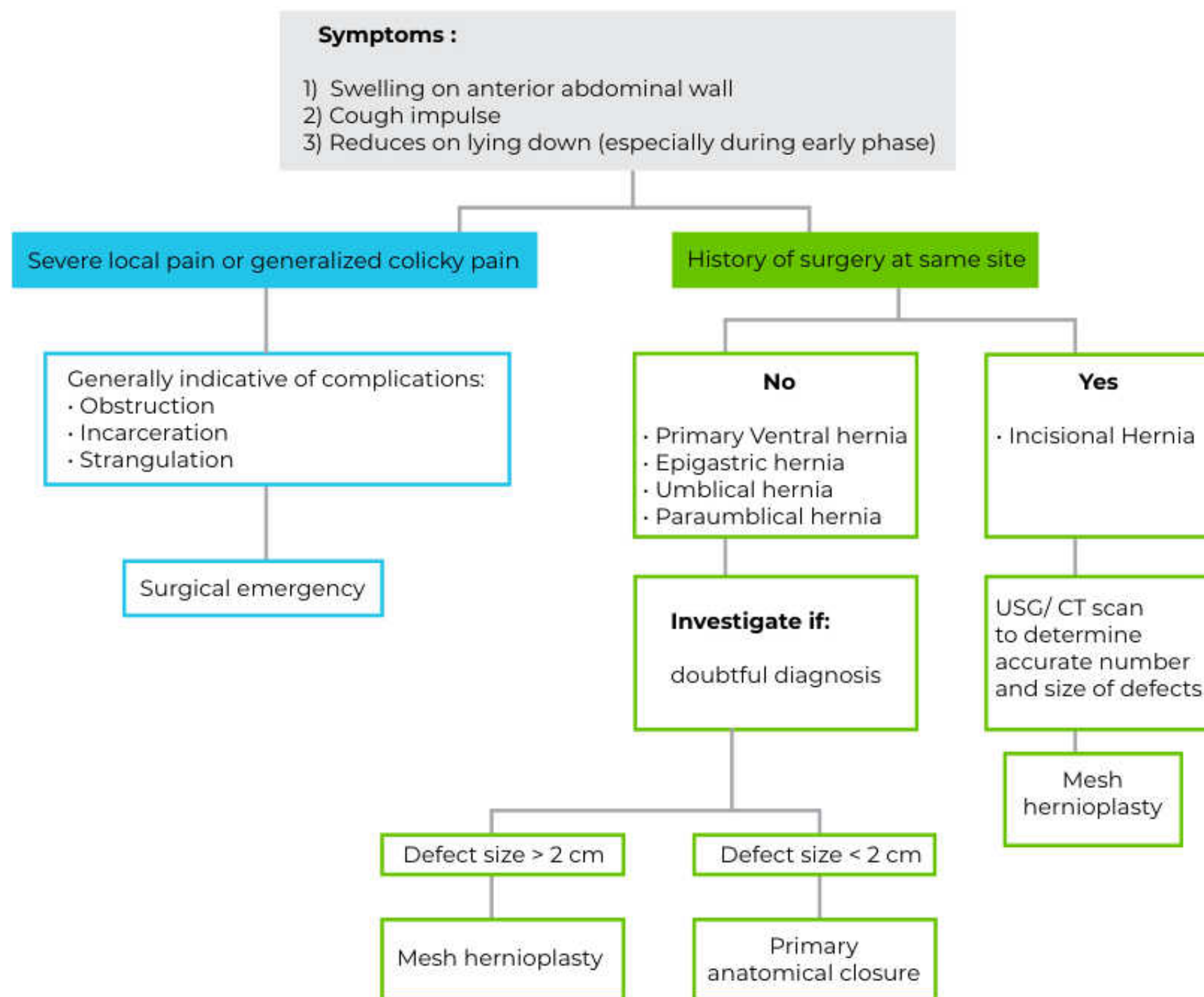
KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES.

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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

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

SYMPTOMATIC

ASYMPTOMATIC

COMPLICATED

1. Acute cholecystitis
2. Empyema
3. Mucocoele
4. Acalculous cholecystitis (critically ill patients – unexplained fever, lack of right upper quadrant tenderness, leukocytosis)
5. Gangrene/ perforation
6. Biliary obstruction
7. Acute pancreatitis

INVESTIGATIONS

Haemogram, RFT, electrolytes, CXR, RBS, ECG (to distinguish from cardiac pain)

• LFT–Serum bilirubin, SGOT/PT, Alkaline Phosphatase
• Amylase, lipase

• USG abdomen–investigation of choice (sensitivity–95%)
1. To look for status of gall bladder and characteristic distal acoustic shadow
2. Status of liver/ CBD/ Intra hepatic biliary radicle dilatation (IHBRD)
3. Other intra abdominal pathology like renal stones, ovarian pathology etc

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

ASYMPTOMATIC

Laparoscopic Cholecystectomy +/-

Absolute indications:

- Suspected malignancy
- GB polyp > 1cm
- Porcelain GB
- Chronic hemolytic anemia
- Transplant patient especially (cardiac transplant)
- Calculi > 3cm
- Multiple small stones
- Paediatric gall stones

Relative Indications:

- Calculi > 2 cm
- Calculi < 3mm, patent cystic duct
- Diabetes mellitus
- Non functioning GB

SYMPTOMATIC

Laparoscopic Cholecystectomy

Acute calculous cholecystitis

Conservative

Gangrene/perforation

Emergency lap/ open cholecystectomy

Mild/ moderate pancreatitis

Lap cholecystectomy within same hospital admission

Acute pancreatitis

Conservative management

Severe pancreatitis

Lap cholecystectomy after 4-6 weeks of resolution of pancreatitis

Acalculous cholecystitis

Conservative management

Unstable

Non resolving symptoms

Cholecystostomy

Lap Cholecystectomy (if required)

Concomitant GSD+ CBD stones

Refer to CBD stones STW

Stable

Conservative management only

Lap cholecystectomy if symptoms persists after resolution of acute phase

NON RESOLVING

Cholecystostomy followed by laparoscopic cholecystectomy by experienced laparoscopic surgeon after 6 weeks

STABLE

Early LC – within 24-72 hours (if expertise available) OR
Delayed LC – after 6 weeks by experienced lap surgeon

MANAGEMENT OF ACUTE CHOLECYSTITIS (CONSERVATIVE)

At PHC level: initial resuscitation, IV antibiotics (3rd generation cephalosporin, metrogyl ± aminoglycosides), analgesics, bowel rest, USG abdomen (if available) and refer to higher centre

At district hospital level: IV hydration, antibiotics (3rd generation cephalosporin, metrogyl ± aminoglycosides), analgesics, bowel rest, USG abdomen, surgical consultation

Tertiary level- Early (if presents within 72 hrs)/ interval laparoscopic cholecystectomy depending on expertise in laparoscopy

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

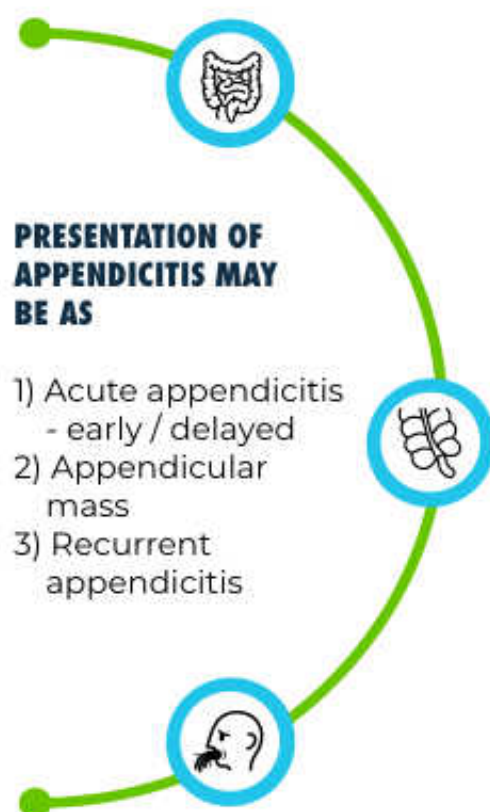
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Standard Treatment Workflow (STW)

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

ACUTE APPENDICITIS
(Late presentation beyond ≥ 72 hours)

NO PALPABLE MASS
Appendicectomy open/ laparoscopic

PALPABLE MASS
Ochsner sherren regimen

S/S Improving conservative treatment continued

S/S Deteriorating asses by USG for pus collection
USG guided aspiration/ open drainage

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

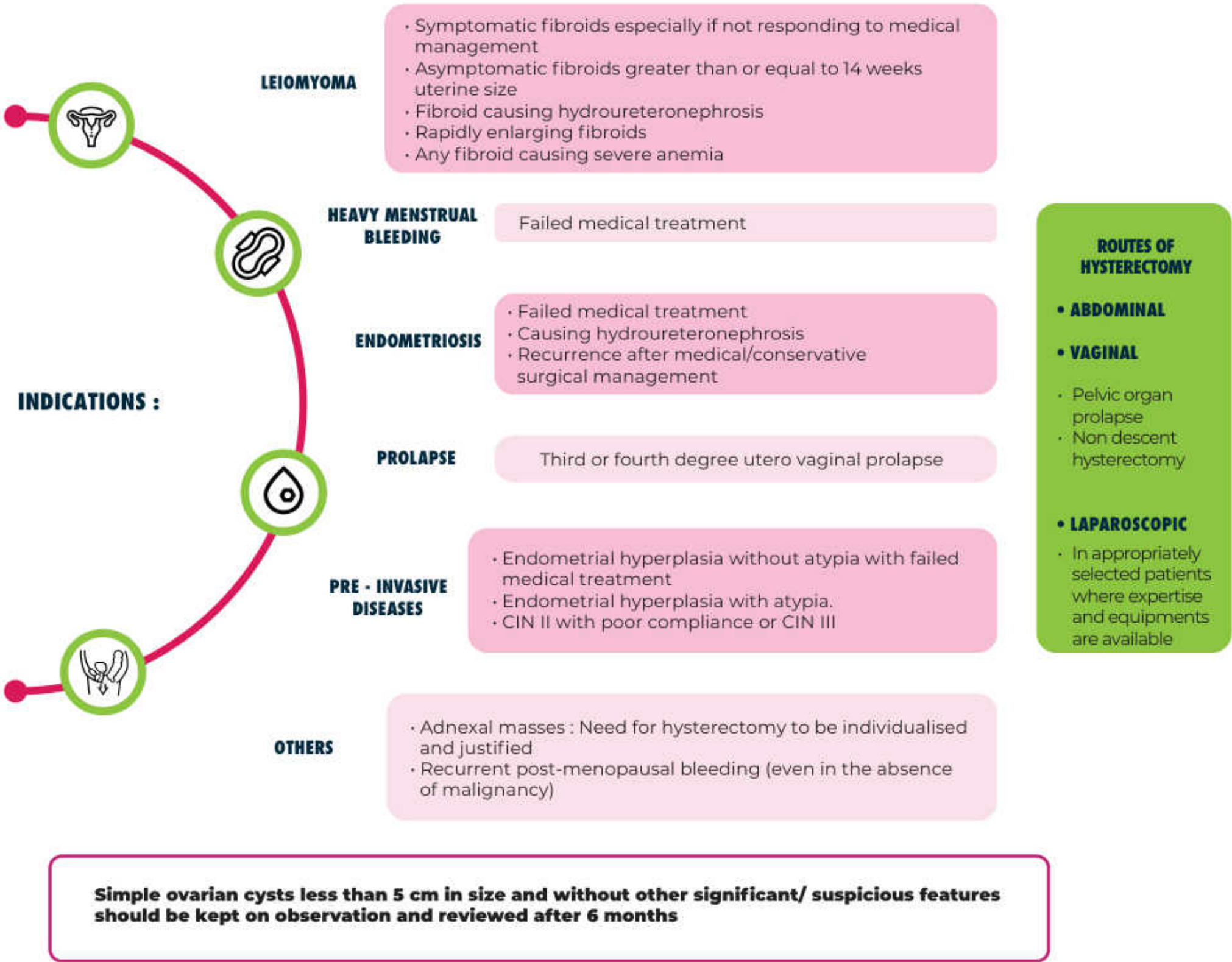
KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES



Standard Treatment Workflow (STW) for HYSTERECTOMY FOR BENIGN GYNAECOLOGICAL CONDITIONS

IN WOMEN AGED LESS THAN 40 AND /OR LOW PARITY IT IS **MANDATORY** TO HAVE A SECOND
OPINION FROM A QUALIFIED GYNAECOLOGIST

**HYSTERECTOMY TO BE CONSIDERED ONLY WHEN CHILD BEARING IS COMPLETED AND IT WILL IMPROVE
QUALITY OF LIFE OF WOMAN**



HYSTERECTOMY SHOULD **NOT** BE DONE FOR

White discharge per vaginum	Cervicitis	Non specific abdominal or pelvic pain	Minor degree of utero vaginal prolapse	Fibroids which are small (less than 5 cm) or Asymptomatic (less than 12 weeks size uterus)	Simple ovarian cyst less than or equal to 5 cm
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COMPONENTS OF PRE OPERATIVE COUNSELLING AND INFORMED CONSENT

- Need for hysterectomy
- Alternative treatment options
- Risks and benefits
- Potential complications of the procedure
- Removal/ conservation of ovaries & tubes
- Route of hysterectomy
- Possible need for post operative Hormone therapy in selected cases

PREOP INVESTIGATIONS

- Complete Blood Count
- Blood grouping & cross matching
- Fasting & Post Prandial Blood Sugar
- Renal Function Test
- Liver Function Test
- Urine Routine & Microscopy
- Electrocardiogram
- X ray chest
- Pre-anesthetic checkup (PAC)

COMPLICATIONS TO BE EXPLAINED

- Risk of Infection
- Bleeding (primary/reactionary/secondary)
- Injury to bladder/bowel/ ureter
- Pain
- Fever
- Hernia (rare and late complication)

FOLLOW UP

- Discharge summary with operative details
- Review for histopathology report
- Report if there is fever, bleeding or any other symptoms
- Avoid lifting heavy weight for 8 weeks
- Abstinence for eight weeks
- Adequate iron and calcium & Vitamin D3 supplements
- Evaluate need for hormone therapy in selected patients

- Ovaries should be preserved in most pre-menopausal women unless diseased or removal specifically indicated
- While doing hysterectomy for benign gynaecological conditions in pre-menopausal women, it is recommended to combine it with bilateral salpingectomy with a view to minimise the risk of subsequent development of ovarian malignancy

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COUNSELLING IS AN IMPORTANT ADJUNCT TO MANAGEMENT

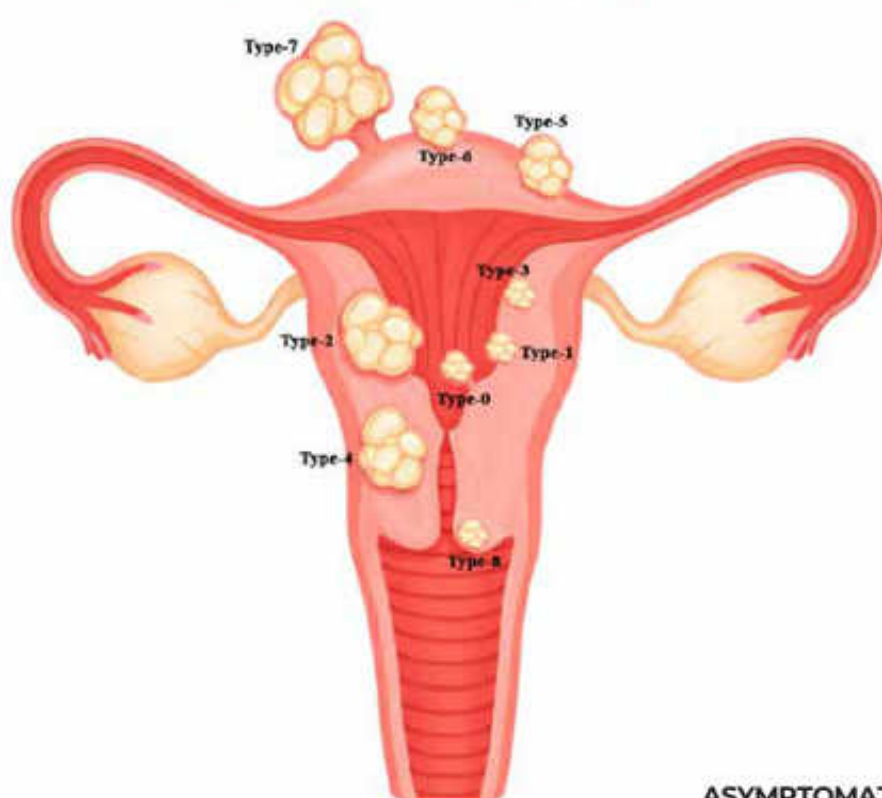
👉 IMPORTANT PROCEDURE IN APPROPRIATELY SELECTED CASES

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Standard Treatment Workflow (STW) UTERINE FIBROIDS AND POLYPS

ICD-11-2E86.0 & 2D70.Z

Uterine fibroids



SYMPTOMS

- Heavy menstrual bleeding/ Irregular bleeding or spotting
- Urinary symptoms
- Heaviness in lower abdomen
- Awareness of mass
- Pain abdomen, dysmenorrhea
- Infertility
- Asymptomatic/ USG diagnosis

FIGO CLASSIFICATION

Submucosal Group

- Type0- Pedunculated , intracavitary
- Type1- <50% intramural
- Type 2- >50% intramural

Other Group

- Type3-100% intramural touching endometrium
- Type4- Intramural
- Type5-subserosal >50% intramural
- Type6 -subserosal <50% intramural
- Type7-subserosal pedunculated
- Type8-Others like cervical, parasitic

RED FLAG SIGNS

- Severe Anemia
- Severe pain eg due to degeneration, torsion
- Excessive bleeding not responding to medical management
- Acute retention of urine

Essential- CBC , Ultrasound

Desirable – TFT

Optional – HIGHER IMAGING LIKE MRI

ASYMPTOMATIC FIBROIDS <5CM DO NOT NEED TO BE TREATED

SUPPORTIVE MEASURES MAY BE REQUIRED

MANAGEMENT

Treatment modality should be individualized to each patient after considering patient's age, parity, severity of symptoms, need for fertility preservation, presence of other gynecological diseases and any other co-morbidity

- **Primary and secondary Care Hospitals:** Initial Detection and Counselling
- **Symptom Management:** Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), iron and folic acid
- **Basic Medical Therapy:** oral contraceptives or progestin for abnormal bleeding.
- **Referral:** Cases requiring definitive diagnosis, specialized treatment, or surgery

Tertiary Care Hospitals

Advanced Diagnostics: Transvaginal ultrasound, saline infusion sonography, MRI, and hysteroscopy

Therapeutic

Surgical Interventions: Myomectomy or hysterectomy

Minimally Invasive Procedures: Laproscopic or hysteroscopic myomectomy and polypectomy

Specialized non-surgical Management: May be considered in specialised situations eg fibroid with subfertility. Uterine artery embolization (UAE), radiofrequency ablation (RFA), and MRI-guided focused ultrasound surgery (FUS) may be considered if facilities are available

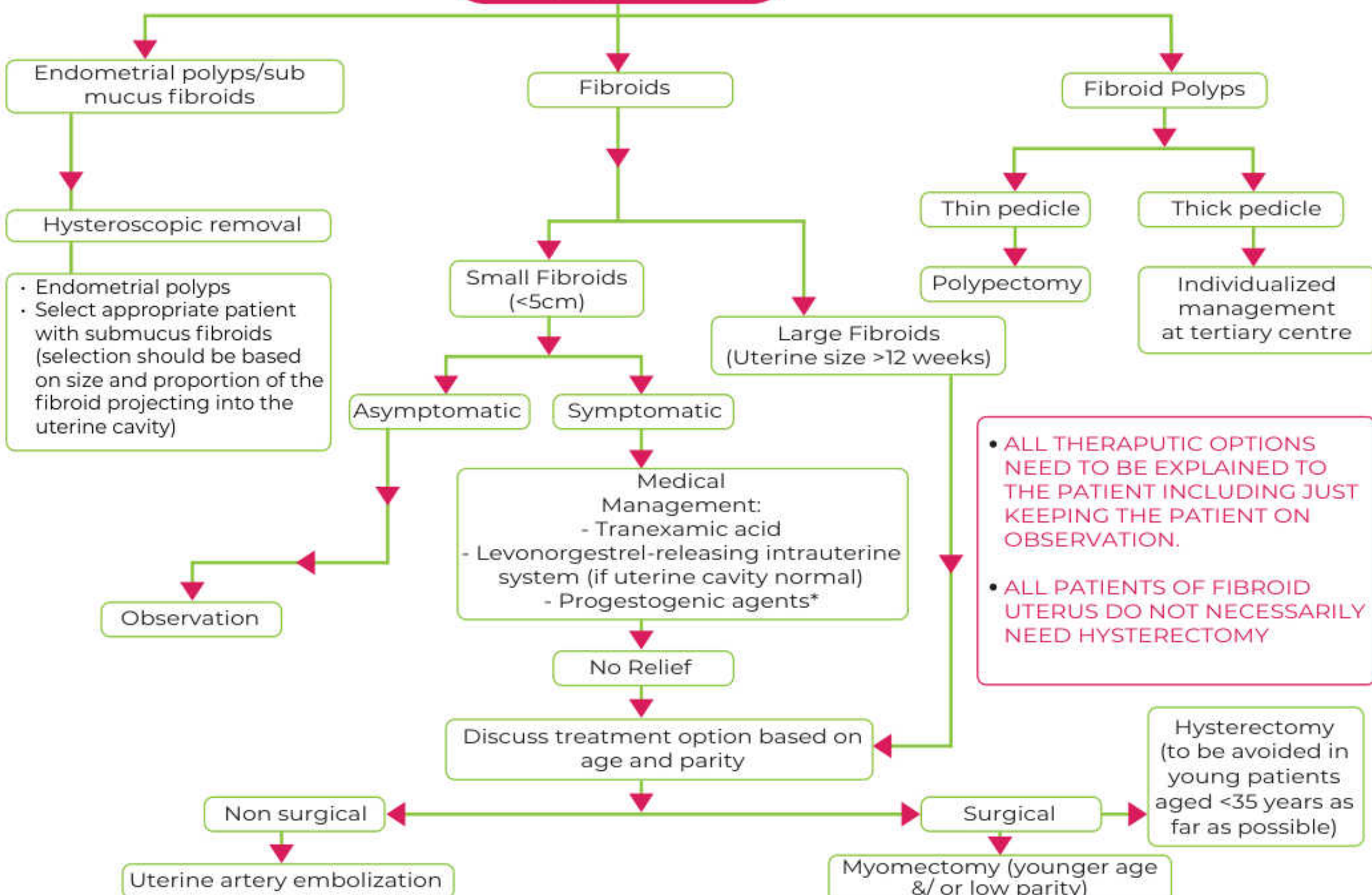
Indications for alternative management strategies

- Patient not desirous of surgery.
- During Pre- operative optimization
- Short term alternative to surgery in perimenopausal women

Counselling + Patient Education

Approximately 80 percent of females will have fibroids in their lifetime
Fibroids are commonest benign uterine tumours and risk of malignancy is very low
Treatments are available for fibroid-related problems like heavy menstrual bleeding, pain or pressure in the pelvis, or problems with pregnancy or infertility
There are chances of recurrence in case of conservative surgical or non-surgical treatments

FIBROIDS & POLYPS



*Norethisterone (max daily dose 40 mg) OR Medroxyprogesterone acetate (max daily dose 40 mg). Any hormone should be given orally daily in divided doses for a duration of three weeks and repeated in a cyclical manner for total of 4-6 cycles of treatment

ABBREVIATIONS

MRI: Magnetic Resonance Imaging

TFT: Thyroid Function Test

USG: Ultra Sonography

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3. Munro MG, Critchley HOD, et al. (FIGO). FIGO Working Group on Menstrual Disorders: Medical management of fibroids—Best Practice Recommendations.International Journal of Gynecology & Obstetrics. 2022;157(2):215-229. DOI: 10.1002/ijgo.14056
4. Uterine Artery Embolisation in the Management of Fibroids: Clinical Recommendations and Evidence Summary. London: RCOG, 2021.

STRUCTURED DECISION MAKING IN MANAGEMENT OF UTERINE FIBROIDS AND POLYPS SHOULD BE THE NORM

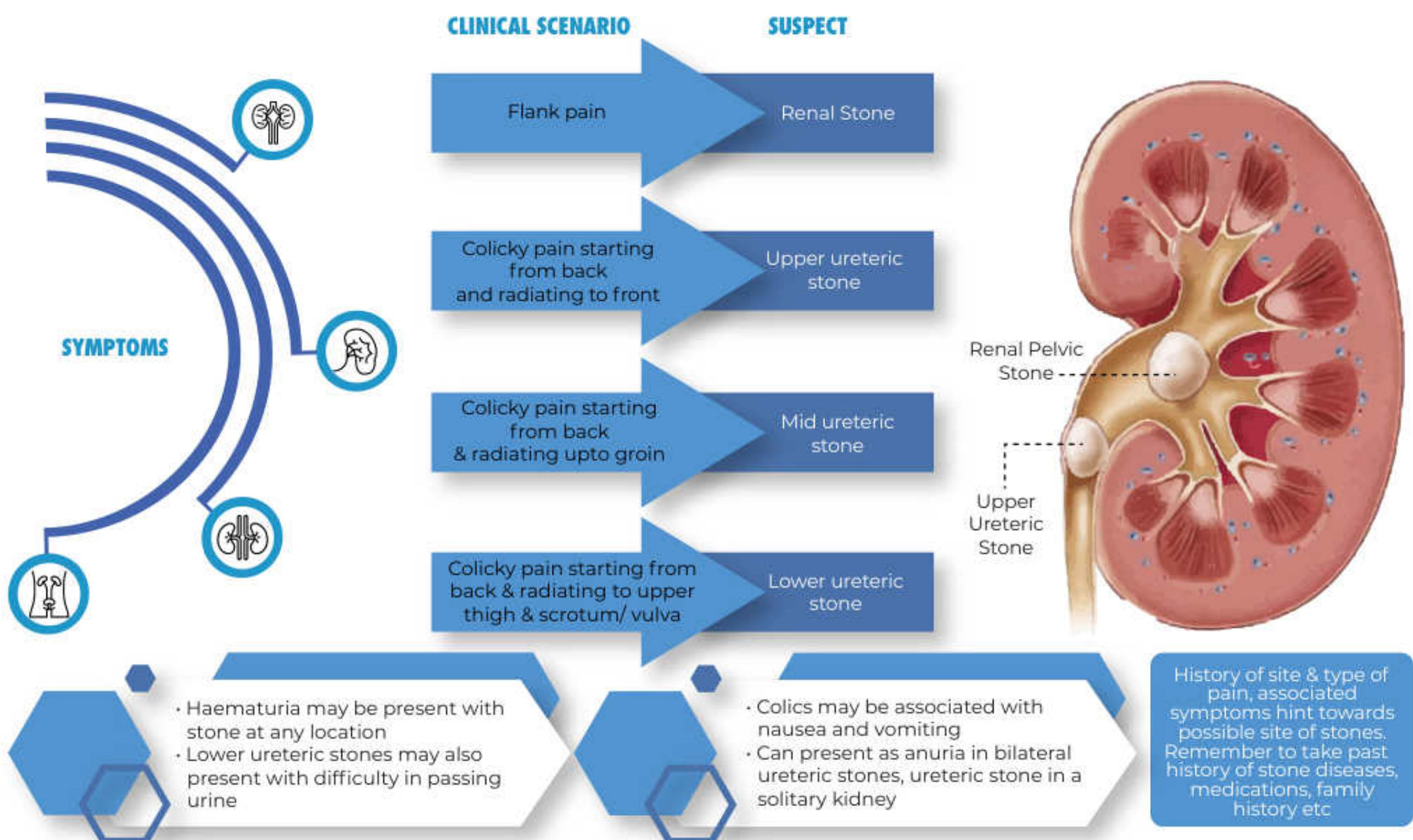
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Standard Treatment Workflow (STW)

RENAL AND URETERIC STONES

ICD-11-GB70

HOW WILL YOUR PATIENT PRESENT AND WHAT TO SUSPECT



Standard Treatment Workflow (STW)

URINARY TRACT INFECTIONS

ICD-11-GC08

TYPES OF UTI
UNCOMPLICATED UTI
Infection confined to urinary bladder in afebrile patients

- At least 3 symptoms - dysuria, frequency, urgency, suprapubic pain

OR

- If less than three symptoms:
 - Dipstick +ve for leukocyte esterase and nitrite **OR**
 - >10 WBC /HPF in centrifuged sample **OR**
 - Urine culture with 10⁵/ml colony count in mid stream urine culture

COMPLICATED UTI/PYELONEPHRITIS
Infection extending beyond bladder or associated with systemic illness.

- Fever
- Flank pain
- Features of sepsis- chills, rigors, hemodynamic instability
- Costovertebral angle tenderness
- Perineal pain and tenderness

WHEN NOT TO DO URINE CULTURE
All uncomplicated UTIs
Asymtomatic urinary catheters

HIGH RISK GROUP FOR COMPLICATED UTI
UTI in presence of:

- Stones
- Urinary tract obstruction
- Congenital anomalies of urinary tract
- Immunosuppression/ immunocompromised individual
- Pregnant individuals
- Chronic kidney disease
- Recent urological instrumentation/procedure

RED FLAG SIGNS

- Fever > 100°F
- Chill and rigors
- Tachycardia
- Tachypnea
- Hypotension
- Costovertebral tenderness
- Obtundation

MANAGEMENT
PRIMARY CARE/SECONDARY CARE HISTORY

- Confirm diagnosis
- Exclude complicated UTI
- Look out for high risk groups

EXAMINATION

- Temperature
- Blood pressure, Pulse
- Respiratory rate
- Renal Angle/costovertebral tenderness
- Perineal tenderness
- Look for red flag signs

TREATMENT

- Nitrofurantoin 100 mg PO BD for 5 - 7 days
- Trimethoprim sulphamethoxazole DS PO tablet BD for 3 -5 days
- Fosfomycin 3 gm single dose, either empty stomach after dinner and passing urine
- Norfloxacin 400 BD or Levofloxacin 250 BD PO for 5 days

SYMPTOMATIC TREATMENT

- Drink Plenty of water
- Urine alkalizer recommended eg citrate based solutions
- Avoid if patient on nitrofurantoin
- Phenazopyridine 200mg tid for 2 days
- Paracetamol for pain

WHEN TO REFER

- Complicated UTI
- Presence of red flag signs
- Recurrent UTI
- UTI after recent instrumentation

TERTIARY LEVEL		
- Send for culture - Imaging necessary - Urology services if obstruction	- Rx - Complicated UTI - Pregnancy UTI	- Prostatitis - Recurrent UTI - Non-resolving UTI

COMPLICATED UTI	PREGNANCY UTI	CAUTI	PROSTATITIS	RECURRENT UTI
Empiric Therapy: - Urine c/s - Blood culture Option 1 - Initial dose of a parenteral agent - Gentamicin 5mg/kg IV/IM one dose OR Amikacin 15 mg/kg IM/IV one dose followed by - Cefurixime 500 PO every 12 hr OR - Trimethoprim Sulfamethoxazole 800-160 mg every 12 hr OR - Ciprofloxacin 500 PO every 12 hr - Levofloxacin 750 mg PO daily Option 2 - Ceftriaxone 1-2 gm IV daily - Cefoperazone Sulbactam 2-4 gm IV daily - Piperacillin Tazobactam 4.5 gm IV every 8 hr - Duration of treatment 7-14 days - Adjust as per culture sensitivity report and local sensitivity patterns	- Screening urine culture in first antenatal visit - Asymptomatic bacteriuria/ Uncomplicated UTI: - Nitrofurantoin 100 mg PO BD for 5 days OR - Amox/Clav 625 PO TDS or Cephalexin 500 mg PO QID OR - TMP/SMX DS Tab PO BD for 5 days - Repeat urine culture after treatment not essential - Recurrent UTI antibiotic prophylaxis till term - Nitrofurantoin 50 mg or Cephalexin 250 mg at bed time	- Do not perform urine analysis/culture in asymptomatic patients - Remove urinary catheters as soon as possible - Replace latex coated every 3-4 weeks or Silicone catheter every 12 weeks - Symptomatic CAUTI: features of Complicated UTI - Change catheter - Rx as complicated UTI - No role of routine antibiotic prophylaxis for prevention	- UTI symptoms+ pelvic pain/ fever - Digital rectal exam- tender prostate - Urine culture - Empirical treatment similar to complicatead UTI - Adjust treatment as per culture report - Duration of treatment 2-4 weeks - Urology evaluation desirable	- Uncomplicated RUTI - Post coital voiding and post coital antibiotic - Single dose cephalexin 250/ Co-trimoxazole (400/80) /Nitrofurantoin 100 mg LONG TERM PROPHYLAXIS - Low dose nitrofurantoin 50 mgX 6 months - Single strength Septran SS/ Co-trimoxazole (400/80) x 6 months - Cephalexin 250mg - Vaginal estrogen cream in post menopausal Complicated RUTI - Urology referral - Cystoscopy - Urodynamics

ASYMPTOMATIC BACTERIURIA

- No symptoms of UTI and Urine culture with > 100000 CFU/ml
- No treatment required
- Treatment indicated
 - Pregnancy
 - Planned urological procedure

CHILDREN
SYMPTOMS

- Neonates and Infants < 1yr- Fever,vomiting, diarrhoea, jaundice, Poor urinary stream
 - Older children same as adults

TREATMENT

- Infants <3months as upper UTI (PN) with IV antibiotics
- Older children
- Upper UTI- IV antibiotics gentamicin, amikacin, ceftriaxone
- Lower UTI- oral cefixime, ofloxacin, ciprofloxacin,

- amoxyclav
- Duration of Rx
 - Upper UTI- 10-14 days
 - Lower UTI 7-10 days

REFER

- Upper UTI(PN), infants with UTI, recurrent UTI
- Bowel bladder Dysfunction and known CAKUT OR VUR
- Further imaging- DMSA+/- MCUG if abnormal USG, recurrent UTI

ABBREVIATIONS	
CAKUT: Congenital Anomalies of the Kidney and Urinary Tract)	MCUG: Micturating Cystourethrogram
CAUTI: Catheter-Associated Urinary Tract Infection	USG: Ultrasonography
DMSA: Dimercaptosuccinic Acid	VUR: Vesicoureteral Reflux
HPF: High-Power Field	WBC: White Blood Cells

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👉 UTI IS A CLINICAL DIAGNOSIS - DO NOT CULTURE ROUTINELY

Standard Treatment Workflow (STW) CHRONIC KIDNEY DISEASE (CKD) ICD-11-GB61

WHAT IS CKD?

Abnormalities of kidney structure or function, present for >3 months, with implications for health

WHEN TO LOOK FOR CKD

- History of long-standing nocturia, or constitutional symptoms
- Edema, hematuria, proteinuria or renal stones
- Long-term intake of painkillers or herbal medicines
- Longstanding diabetes, hypertension, Heart Disease, stroke, PVD, Family history of kidney disease, AKI in the past, Prediabetes, HIV, Recurrent UTI in childhood, Developmental anomalies of the Kidney
- Unexplained Anemia, Growth retardation, rickets
- Systemic diseases (eg. connective tissue disease)

BP CONTROL (TARGET <120/80)

- Restrict dietary salt to <5 g/day
- Use any anti-HT available in local formulary
- BP <90th percentile & <120/80 in Adolescents >13 yrs
- ACE/ARB preferred*
- *Caution if Potassium >5.5 mEq/L

EVALUATION OF NEWLY DIAGNOSED PATIENT WITH CKD

- Serum creatinine, electrolytes, bicarbonate
- Estimate glomerular filtration rate using CKD-EPI equation (>18 yrs) or Modified Schwartz equation (<18 yrs)
- Urinalysis/examine sediment, proteinuria quantitation
- Ultrasound of kidneys and urinary tract
- Calcium, phosphate, alkaline phosphatase, albumin
- CBC including peripheral blood film
- Iron profile – Serum iron, TIBC, TSAT

VACCINATION SCHEDULE FOR NEWLY DIAGNOSED CKD PATIENT

- If HBV –ve: 20 µg IM in each deltoid at 0,1,2 and 6 months
- Pneumococcal, Shingles, Annual Influenza Vaccine
- In children – complete primary vaccination schedule

INITIAL ASSESSMENT FOR

- Confirmation of CKD diagnosis (repeat tests after 3 months)
- Staging and progression rate
- Establishing cause of kidney disease
- Identify and treat reversible factors (hypertension, volume loss, obstruction, infection)
- Look for complications (anemia, bone disease, dys-electrolytemias, CVD)

ANEMIA MANAGEMENT

- Establish iron replete state
- If not iron replete, give oral iron
- Consider IV iron for dialysis patients and those not tolerating orally
- If Iron Replete – start ESAs & titrate to keep Hb 10–11 g/dl

MANAGEMENT OF HYPERPHOSPHATEMIA (PO4>5.5)

- Restrict Phosphate in Diet
- Start with Ca-containing binders
- Non Ca-binders can be used if serum Ca >9 mg/dl, vascular calcification or low iPTH

LIFESTYLE MEASURES FOR ALL CKD PATIENTS

- Weight control/weight gain monitoring in children
- Regular physical activity
- Reduce dietary salt intake to <5 g/day
- Stop tobacco use in all forms
- Stop alcohol use
- Stop using unproven health supplements
- Do not use NSAIDS
- Avoid untested indigenous medicines

DIABETES CONTROL

- Do not use metformin if eGFR <30
- SGLT2i if eGFR >20 ml/min
- Individualize HbA1c target

NUTRITION

- Salt restriction <5 g/day and protein intake 0.8 g/kg/day.
- Do not restrict protein intake unless there is documented high protein consumption (Dairy and white meat are good protein sources; include a variety of dals)
- Restrict potassium and salt substitutes in case of hyperkalemia.
- Avoid fruit juices, coconut water, and carbonated beverages.
- For children: Ensure adequate protein intake appropriate for age, with dietary recommendations as advised by the nephrologist

LOW POTASSIUM FRUITS/VEGETABLES

Apple, pineapple, papaya, pear, tangerine, watermelon, grape, plum, cabbage, carrot, cauliflower, onion, radish, peppers, chillies, brinjal, cucumber, green beans

MINERAL BONE DISEASE

- Measure serum calcium, phosphorus, 25 OH vitamin D, PTH & alkaline phosphatase - if any abnormality, refer to Nephrologist
- Oral sodium bicarbonate if venous bicarbonate <18 mEq/l

MANAGEMENT

PRIMARY CARE

- Detailed history and physical examination
- Identify and correct reversible factors
- Stop nephrotoxic agents
- Referral after stabilization

ADMISSION CRITERIA

- Initial evaluation or when patient presents with specific problems – like acute worsening, development of a new complication
- For creation of vascular access
- For PD catheter placement or initiation
- Initiation on HD and for kidney transplant

TERTIARY CARE

- Detailed history and physical examination
- Investigate to ascertain cause of CKD (imaging/biopsy/genetic studies)
- Tailor treatment to cause
- Identify and manage complications
- Vaccination
- Counseling: nutrition, lifestyle, pregnancy in women of child-bearing age
- Discussion regarding RRT
- Vascular access creation/PD catheter insertion
- Work-up for transplantation
- Send patient back to community with treatment plan

INDICATIONS FOR REFERRAL

- Initial evaluation of all newly diagnosed cases
- Rapid disease progression
- New complication
- Discussion for Renal Replacement Therapy (RRT)

ACEI/ARB, SGLT2i & Non-Steroidal MRAs retard CKD progression & reduce CV events - should be used when possible, with careful monitoring

DISTRICT HOSPITAL

- Detailed history and physical examination
- Investigate to ascertain cause of CKD
- Tailor treatment to cause
- Identify and manage complications
- Vaccination
- Identify and correct acute factors
- Counseling: nutrition, lifestyle, pregnancy in women of child-bearing age
- Discussion regarding RRT
- Vascular access creation or PD Catheter insertion
- Send patient back to community with treatment plan

PREPARATION FOR RENAL REPLACEMENT THERAPY

- eGFR <30: Preserve veins in the non-dominant arm for AV fistula
- eGFR <30: Discuss RRT options
- Counsel for AVF
- Dialysis start: To be decided by Nephrologist based on symptoms and complications of renal failure

CONSERVATIVE CARE

- If life expectancy limited, multiple comorbidities/personal preference
- Decision-making should be shared with patient/family

ABBREVIATIONS

ACEI: Angiotensin Converting Enzyme Inhibitor
AKI: Acute Kidney Injury
ARB: Angiotensin Receptor Blocker
AV Fistula: Arterio-Venous Fistula
BP: Blood Pressure
Ca: Calcium
eGFR: Estimated Glomerular Filtration Rate
ESA: Erythropoiesis Stimulating Agents

Hb: Haemoglobin
HbA1c: Haemoglobin A1c
HBV: Hepatitis B Virus
HIV: Human Immunodeficiency Virus
iPTH: Intact Parathyroid Hormone
IV: Intravenous
NSAIDs: Non-Steroidal Anti-Inflammatory Drugs
PD: Peritoneal Dialysis

PO4: Phosphate
PVD: Peripheral Vascular Disease
RRT: Renal Replacement Therapy
SGLT2i: Sodium Glucose Transporter 2 inhibitor
TIBC: Total Iron Binding Capacity
TSAT: Transferrin Saturation
UTI: Urinary Tract Infection

REFERENCES

- Kidney Disease: Improving Global Outcomes (KDIGO) CKD Work Group. KDIGO 2024 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney Int. 2024 Apr;105(4S):S117–S314. doi: 10.1016/j.kint.2023.10.018. PMID: 38490803

EARLY RECOGNITION. DECISIVE ACTION. PREVENT COMPLICATIONS

This STW has 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) for more information.
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