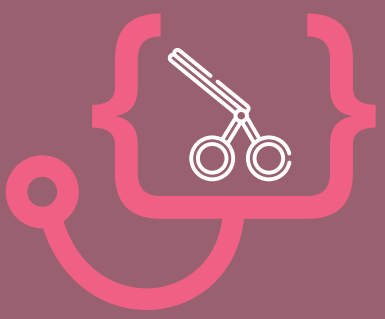
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Department of Health Research

Ministry of Health and Family Welfare, Government of India

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2019 Edition, Vol. I

STANDARD TREATMENT WORKFLOWS

of India

PARTNERS

national health authority

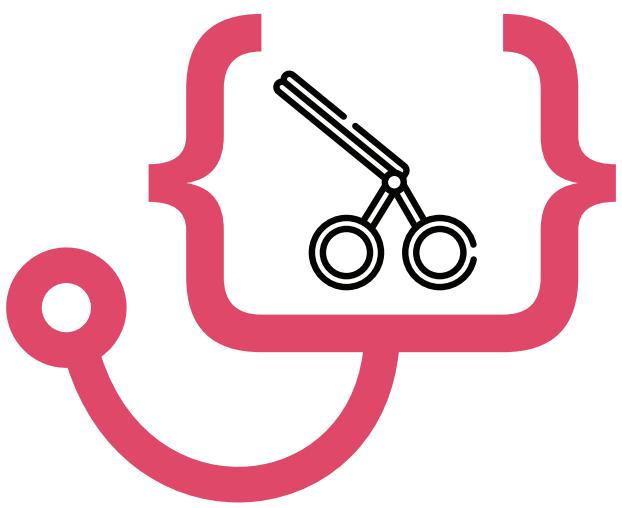
World Health Organization

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Printed in India



STANDARD TREATMENT WORKFLOWS of India

सत्यमेव जयते

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सबका साथ, सबका विकास, सबका विश्वास
Sabka Saath, Sabka Vikas, Sabka Vishwas

सत्यमेव जयते

डॉ हर्ष वर्धन
Dr Harsh Vardhan
स्वास्थ्य एवं परिवार कल्याण, विज्ञान और प्रौद्योगिकी
व पृथ्वी विज्ञान मंत्री, भारत सरकार
Union Minister for Health & Family Welfare
Science & Technology and Earth Sciences
Government of India



FOREWORD

As per National Health Policy 2017, Health for all which is equitable, accessible and affordable is a priority for Government of India. The health sector in the country is working hard towards achieving Universal Health Coverage and Sustainable Development Goals. As the transition to value-based care moves forward, the focus in patient care is shifting to both quality and quantity.

2. Providing quality healthcare is a key focus area. I congratulate Department of Health Research and Indian Council of Medical Research for addressing this issue through the development of Standard Treatment Workflow that are evidence based as well as locally contextual with the aim of guiding decisions and criteria regarding diagnosis, management, and treatment of common diseases. These workflows will play a pivotal role in realizing the dream of Universal Health Coverage with equitable health systems.

3. I am happy to state that within a year of initiating this ambitious activity, the first volume is ready to be released. I am confident that all stakeholders contributing towards healthcare in the Country will benefit from these workflows.

Congratulations to the Team!

(Dr. Harsh Vardhan)

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स्वास्थ्य एवं परिवार कल्याण मंत्रालय एवं
महानिदेशक, आई सी एम आर

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Secretary to the Government of India
Department of Health Research
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Director-General, ICMR

भारतीय आयुर्विज्ञान अनुसंधान परिषद
स्वास्थ्य अनुसंधान विभाग
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New Delhi - 110 029



Preface

To revive clinical medicine and encourage rational use of drugs , diagnostics and other healthcare services, we embarked upon this ambitious initiative of developing standard treatment workflows for common and serious diseases encountered by the treating doctors at all levels of health system.

In addition, we also wanted to create a robust pre-defined referral mechanism to decongest the tertiary centres and revitalize the primary and secondary health facilities.

I hope these resource stratified treatment workflows would be useful to doctors working at primary, secondary as well as tertiary levels and help in optimal utilization of resources not only in our country but also other countries like ours where the resources are limited and demands on the health system are high.

Balram Bhargava

(Balram Bhargava)

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Department of Health Research
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INDIAN COUNCIL OF MEDICAL RESEARCH

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  - RENAL AND URETRIC STONES
  - SCROTAL SWELLING

- **CONTRIBUTORS**

INTRODUCTION

Department of Health Research
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GOAL

To empower the primary, secondary and tertiary 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

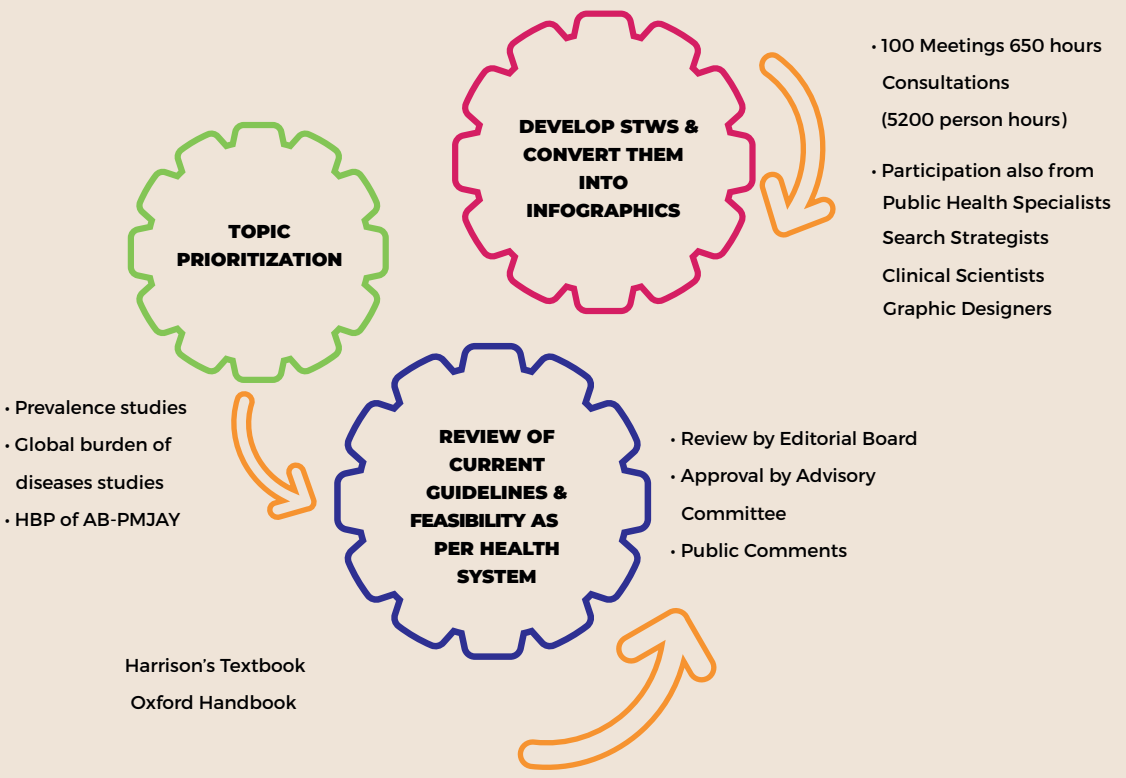
Primary Objective:
To formulate clinical decision making protocols for common and serious medical/ surgical conditions for both OPD and IPD management at primary, secondary and tertiary levels of healthcare system for equitable access and delivery of health services which are locally contextual

Secondary Objective:
To facilitate PMJAY arm of Ayushman Bharat with secondary and tertiary level management of all surgical and medical conditions covered under the scheme.

METHODOLOGY



PROCESS OVERVIEW



CARDIOLOGY

December/ 2025

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Standard Treatment Workflow (STW)

ATRIAL FIBRILLATION

ICD-11-BC81.31

WHEN TO SUSPECT ?

SYMPTOMS
- Rapid rate palpitations with or without
  - General fatigue or weakness or exhaustion
  - Dizziness, near syncope or syncope
  - Shortness of breath
  - Chest pain
- More marked on exertion

SIGNS
- Irregularly irregular pulse
- Variable heart sound

LOOK FOR RISK FACTORS
- Prior valvular heart disease or CHF or MI
- Prior TIA or stroke or embolic episode
- Hypertension, DM, COPD,CKD, Obesity

LOOK FOR PRECIPITATING FACTORS
- Post (cardiac) surgery
- Alcoholism or binge drinking
- Myo-pericarditis or ACS
- Pneumonitis or pulmonary embolism
- Sepsis, hyperthyroidism

MANAGEMENT PRINCIPLES
- Categorize AF
- Look for immediate intervention indicators
- Assess stroke risk & need for anti-coagulation
- Assess bleeding risk
- Need for rate control
- Consideration for rhythm control

CATEGORIZE AF
- Paroxysmal AF: Episodes of AF for less than 7 days
- Persistent AF: AF lasing from 7 days to 1 year
- Long standing perssistent AF: AF lasting for > 1 year
- Permanent AF: AF with heart rate control as only option

LOOK FOR IMMEDIATE INTERVENTION INDICATORS
- Systolic BP 90 mmHg, HR > 150 or <50/min
- Ongoing Angina
- CHF or TIA or stroke
- Major bleed on Oral Anti-coagulants

STROKE RISK SCORE

CHA_2DS_2-VAS_c	SCORE
- Congestive heart failure/LV dysfunction	1
- Hypertension	1
- Aged ≥ 75 years	2
- Diabetes mellitus	1
- Stroke/ TIA/ TE	2
- Vascular disease [prior MI, PAD or aortic plaque]	1
- Aged 65-74 years	1
Maximum Score	9

OAC if score >1

BLEEDING RISK SCORE

HAS-BLED	SCORE
- Hypertension i.e. uncontrolled BP	1
- Abnormal renal/ liver function	1 or 2
- Stroke	1
- Bleeding tendency or predisposition	1
- Labile INR	1
- Age (e.g. >65)	1
- Drugs (e.g. concomitant aspirin or NSAIDSs or alcohol	1
	9

Bleeding Risk High in score >3

CHOICE OF ANTI-COAGULATION
- Direct oral anticoagulants (DOAC)
  - Aim for INR 2-3
  - Assess risk of bleeding
  - Take measures to reduce/ modify risk of bleeding
  - VKA only if severe M.S or metallic valve

MEASURES TO REDUCE HIGH BLEEDING RISK
- Control SBP to less than 140 mmHg
- Avoid dietary indiscretions
- Avoid concomitant aspirin, anti platelets, NSAIDs
- Avoid alcohol
- Correct anemia

HEART RATE CONTROL

In all patients except hemodynamic instability	Beta blocker or calcium blocker or combination	BB ± digoxin in HF	Rate aim to be less than 110/ min

CONVERSION TO NSR

Hemodynamic instability	Uncontrolled symptoms despite HR control	Unacceptable rate control drug side effects	Patients' preference

MANAGEMENT

AT PHC/CHC
- Detailed clinical evaluation
- Basic investigations
- Careful ECG evaluation
- Start OAC
- Start Metoprolol/Diltiazem/Verapamil if HR >110/min & no evidence of CHF
- Refer if indicators for early intervention

AT DISTRICT HOSPITAL
- Admit if indicators of early interventions
- Immediate cardioversion after heparinization,if hemodynamic instability
- Manage precipitating factors if any
- Assess stroke, bleeding risk & coagulation parameters
- Detailed echocardiogram
- Start OAC (Oral Anticoagulant)
- Control HR by single drug or combination of BB & Ca Blocker

Refer HR uncontrolled or CHF or angina

AT TERTIARY CENTRE
- Re-assess clinical status, need and adequacy of OAC
- Start NOAC (Non-Vitamin K antagonist Oral Anticoagulants)
- Optimise management of underlying cardiac disease
- Stress life style and AF risk factor modification
- Assess need for rhythm control and discuss pros & cons
- Consider RFA in select patient

INVESTIGATIONS

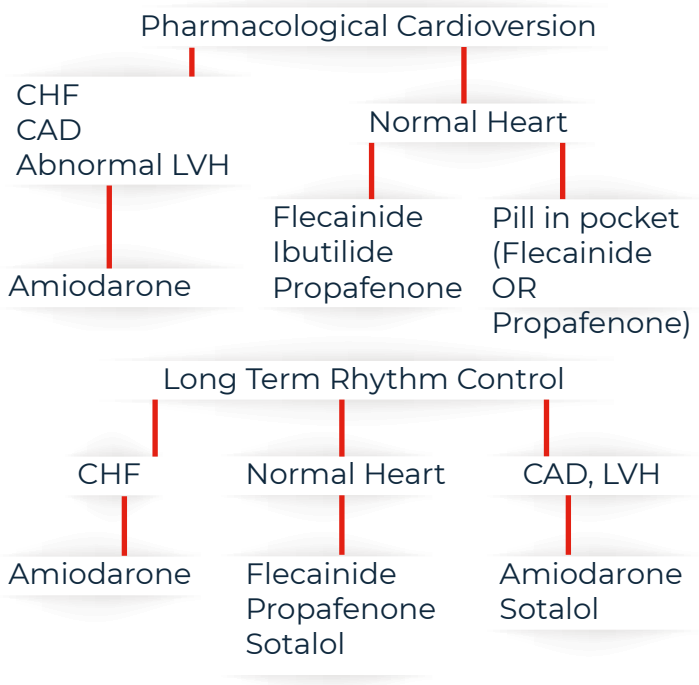
BASIC INVESTIGATIONS
- Hemograms
- Blood sugar, Creatinine
- Electrolytes
- 12 lead ECG

DESIRABLE INVESTIGATIONS
- Plain X-ray chest
- Thyroid evaluation
- Liver function test
- Troponins
- Prothrombin time, INR (Coagulation profile)
- Echocardiography

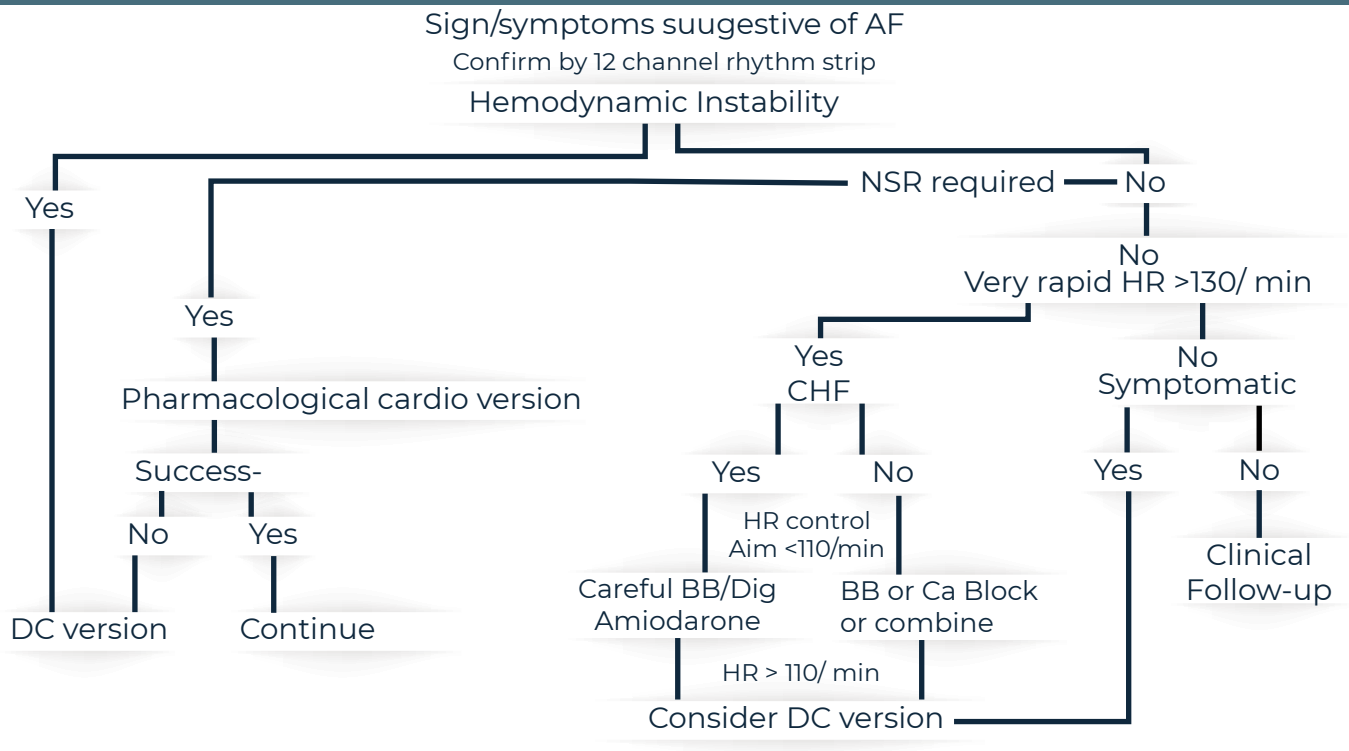
OPTIONAL INVESTIGATIONS
- Prolonged ECG monitoring
- Trans-esophagial echocardiography
- Exercise Stress Test
- CT scan
- MRI
- EP study
- Coronary angiography

WHAT TO LOOK FOR IN ECG ?
- Ventricular rate
- Chamber enlargement
- Pre-excitation
- Prior MI
- Bundle branch block
- QT interval

RHYTHM CONTROL



MANAGEMENT ALGORITHM





Anti-coagulants in all Except
- Limited period with reversible etiology
- Score <2

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2. VanGelder et al. 2024 ESC guidelines for the management of AF developed in collaboration with EACTS. European Heart J.2024:45,3314-3414

RESTORING RHYTHM, RESTORING FREEDOM

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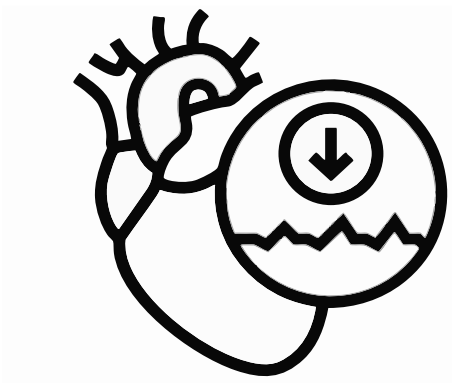
Standard Treatment Workflow (STW)

BRADYARRTHYMIAS IN SYMPTOMATIC PATIENTS

ICD-11-MC81.1

WHEN TO SUSPECT

Patient with any of the following symptoms, AND a pulse rate < 50bpm: (persis-tent)



- Syncope/ presyncope/ dizziness
- Lethargy/ fatigue
- Breathlessness/ chest pain on exertion

BASIC EVALUATION

HISTORY

- Syncope/presyncope: frequency, associated fall/ injury/incontinence
- Exertional angina or known coronary artery diseas
- Look for reversible cause like drugs (Beta-blockers, Calcium Channel Blockers or digoxin)
- Known hypothyroidism or kidney disease
- .. Sleep aponea
- Patient with an implanted pacemaker or other device

EXAMINATION

- Drowsiness/ impaired consciousness
- Pulse, BP

TESTS TO BE DONE

Patient presenting to PHC/CHC:

- 12-lead ECG
- Blood urea, serum creatinine
- Electrolytes
- Blood sugar
- TSH

EVALUATION AND TREATMENT OF UNSTABLE PATIENTS

1. TREATMENT OF ASSOCIATED CONDITIONS
   - **Suspected drug (BB or CCB) overdose:**
     - Withhold the drug
   - **Hyperkalemia(serum K+>6meq/l orwith ECG chages of hyperkalemia)**
     1. Stop exogenous potassium, K sparing diuretics, NSAID, RAAS inhibitors
     2. 10 ml of 10% calcium gluconate over 10 mins
     3. IV insulin with glucose
     4. IV sodabicarb
     5. Salbutamol inhalation/ loop diuretics/ potassium binders
2. TEMPORARY PACEMAKER INSERTION
   (iv dopamine or isopranaline may be given till the time TPI can be placed)

EVALUATION AND MANAGEMENT OF STABLE PATIENTS

Findings on 12-lead ECG

- Atrioventricular block
- Sinus node dysfunction
- Bundle branch blocks, tri-fascicular blocks
- AF with CHB

INDICATIONS FOR URGENT TREATMENT/REFERRAL

- Hypotension (SBP <90 mmHg), impaired consciousness or ongoing chest pain
- Recurrent or ongoing syncope/presyncope
- Associated headache with or without neurologic deficit (suspect intracranial event)
- Patient with a pre-existing device
- If ECG available, evidence of any of the following
  - Complete heart block
  - Sinus node disease with pauses >3 s long
  - Bradycardia (HR < 50 bpm)

GENERAL APPROACH TO PATIENTS WITH SYMPTOMATIC BRADYCARDIA

1. Rule out **associated conditions**
   Drug toxicity (BB, CCB, clonidine, Lithium)
   Renal dysfunction, hyperkalemia
   Sleep apnea
2. Transthoracic echocardiography

INDICATIONS FOR PERMANENT PACING

AV CONDUCTION DISEASE

- Complete heart block, advanced AV block, or Mobitz Type II block
- Associated neuromuscular disease

SINUS NODE DYSFUNCTION

- Symptomatic patients with sinus pauses > 3s long with symptom correlation or heart rate <40/min during awake hours

OTHER CONDUCTION DISORDERS WITH 1:1 AV CONDUCTION

- Unexplained syncope in a patient with BBB or documented transient high grade AV block with no reversible cause identified
- Others (alternating BBB, infiltrative/ neuromuscular disease)

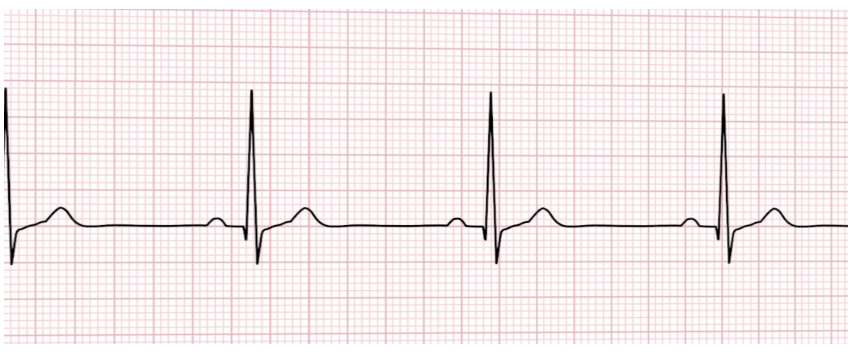
RECOMMENDED PACING MODES

1. **SND with intact AV conduction**
   - Atrial-based single or dual chamber pacing
   - VVI pacing is reasonable if symptoms are infrequent
2. **AV Conduction disease**
   - VVI/Dual chamber pacing in patients with LVEF >50%
   - CRT/LBBA pacing system pacing in patients with LVEF <40%

ADDITIONAL TESTING

1. **Advanced imaging** (cMRI) may be needed if infiltrative disease is suspected
2. **Ambulatory ECG** may be needed
   - In patients with first or second degree AV block for symptom correlation
   - In patients with suspected sinus node disease for detection of pauses and symptom correlation
   - In symptomatic patients with LBBB or bifascicular block
3. **Implantable Loop Recorder and EPS** (consult published society guidelines)

ECG: SINUS BRADYCARDIA



ECG: THIRD DEGREE HEART BLOCK



ABBREVIATIONS

BB: Beta Blocker
CCB: Calcium Channel Blockers
CMRI: Cardiac Magnetic Resonance Imaging
CRT: Cardiac Resynchronization Therapy
ECG: Electrocardiogram
LVEF: Left Ventricular Ejection Fraction
VVI: Velocity Vector Imaging
LBBA: Left Bundle Branch Area

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2. Glikson M et al. 2021 ESC guidelines on cardiac pacing and cardiac resynchronization therapy. European Heart J (2021)00,1-94

BRADYARRHYTHMIA MANAGEMENT: RESTORING LIFE'S NATURAL RHYTHM

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Standard Treatment Workflow (STW)

HEART FAILURE: A BREATHLESS PATIENT

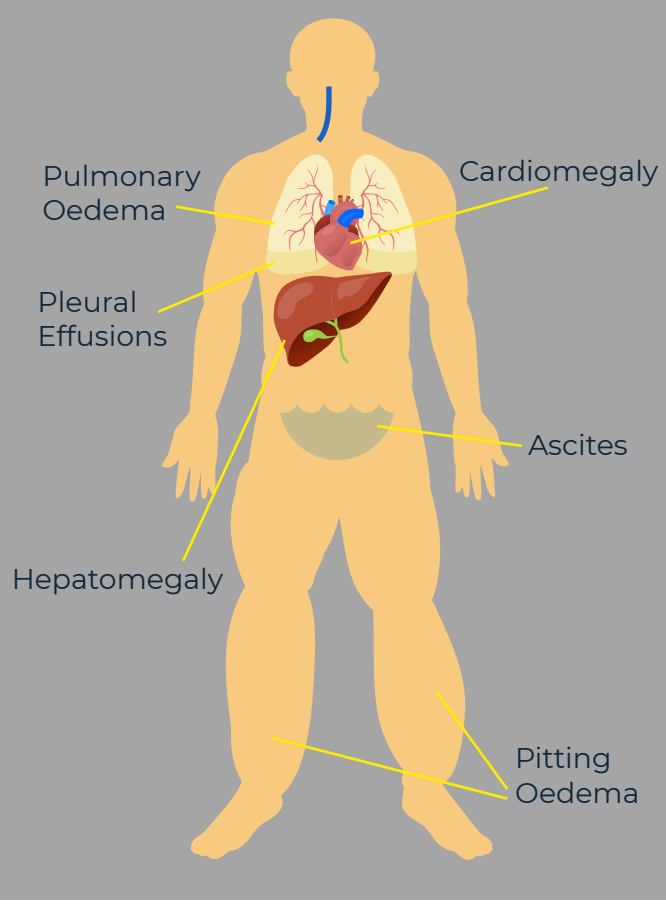
ICD-11-BD10-BD1Z

SYMPTOMS

1. Dyspnea/ orthopnea/PND
2. Pink frothy sputum
3. Pitting oedema
4. Recent weight gain
5. Easy fatiguability
6. H/o CHF/ MI

SIGNS

1. Tachypnoea
2. Tachycardia or irregular pulse
3. Raised JVP
4. Basal crepitations
5. Cardiomegaly
6. Presence of murmurs
7. Systemic desaturation



ADDITIONAL INFORMATION

- Prior history of respiratory illness like asthma or COPD
- Known patient of anemia, CHF similar illness in past with response to therapy
- Prior history of RHD, CAD, pregnancy, cancer chemotherapy
- Risk factors: HT, DM, smoking, hyperlipidemia or premature CAD in first degree relatives

COMMON ETIOLOGY AND INDICATORS

1. Ischemic cardiomyopathy: past MI
2. Diabetic/hypertensive heart disease (cardiomyopathy)
3. RHD: existing valvular disease
4. Post-viral: acute onset breathlessness within last 3 months
5. Peri-partum cardiomyopathy-onset in last trimester or after delivery
6. Idiopathic cardiomyopathy
7. Post-cancer chemotherapy

MANAGEMENT AT PHC

- Rule out respiratory cause: Breathlessness with fever, cough and expectoration or known patient of asthma or COPD
- Likely CHF: Decongest with furosemide

REFER IF FOLLOWING:

- BP < 90 mmHg or > 200 mmHg
- Heart rate < 50/min or > 120/min
- Respiratory rate > 30/min or cyanosis
- Oliguria
- Altered sensorium

→ **REFER TO COMMUNITY HEALTH CENTRE**

MANAGEMENT AT CHC

- Admit and stabilize
- Send for routine investigations
- ECG: Rule out acute ST-Elevation MI, tachyarrhythmia
- X-ray chest: Rule out respiratory etiology
- Decongest with intravenous furosemide
- O2 therapy if systemic saturation < 90%
- Start ARNI and spironolactone orally
- Consider β blockers after decongestion
- SGLT2 inhibitors

REFER IF FOLLOWING

- Low oxygen saturation
- Low BP and high/low heart rate
- Abnormal electrolytes and renal parameters

→ **REFER TO A DISTRICT HOSPITAL**

MANAGEMENT AT DISTRICT HOSPITAL

- Admit and re-assess
- Optimise therapy with furosemide/ARNI/ spironolactone/ O2 and stabilize
- Consider non-invasive ventilation if marked respiratory distress and O2 saturation < 90%
- Echocardiography: confirm diagnosis of HFrEF: LV ejection fraction < 35%
- Search for etiological diagnosis
- Consider β blockers after decongestion
- Refer back to CHC/ PHC after stabilization

REFER TO TERTIARY CARE IF

- CHF uncontrolled,
- Unstable hemodynamics
- Suspected ongoing ischemia
- Abnormal electrolytes
- Abnormal renal functions
- Structural heart disease
- Unclear etiology

MANAGEMENT AT TERTIARY HOSPITAL

1. Re-assess and confirm diagnosis of HF
2. Categorize acute (< 3 months) vs chronic (> 3 months) and HFrEF (EF 35%) vs HFpEF (EF 35-50%)
3. Optimize therapy with furosemide, ARNI, β blockers (HFrEF, HFMrEF, HFpEF) spironolactone and O2
4. Consider ivabradine, vericiguat and lanoxin
5. Pneumococcal and influenza vaccines
6. Investigate for etiology and manage
7. Consider non-pharmacological invasive therapy
   a. ICD: In selected patients (Ref Arrhythmia STW)
   b. BiV: Consider in NYHA class II/ III Symptomatic patient, EF <35%, QRS >150msec in sinus rhythm with LBBB morphology and optimal medical therapy of >3 months
8. Etiology based Interventions
   a. Valvular intervention
   b. PCI/CABG
   c. Tachyarrhythmia management

CONSIDER AT ALL LEVELS

Smoking Cessation | Salt restriction | Physical activity | Weight Reduction | Moderation of alcohol | Control of DM/ HTN/ Lipids | Secondary CVD prevention with aspirin and statins

INVESTIGATIONS:

BASIC INVESTIGATIONS

- Hemogram, ESR
- Blood sugar
- Urine examination
- Urea/ Creatinine
- Sodium/ Potassium
- ECG
- Chest X-ray PA view

WHAT TO LOOK FOR IN X RAY

- Cardiomegaly
- Pulmonary venous congestion
- Pneumonia or other lung pathology

WHAT TO LOOK FOR IN AN ECG?

- Pathological Q wave
- Conduction abnormalities, especially LBBB
- Chamber enlargement
- Atrial fibrillation

Note: If ST elevation present, manage as STEMI

DESIRABLE INVESTIGATIONS

- 2D Echocardiography
- BNP/NT pro-BNP
- Troponin
- Lipid profile
- Thyroid function test
- Iron profile

OPTIONAL INVESTIGATION

- Prolonged ECG monitoring
- Coronary angiography
- Radionuclide imaging
- CT scan
- MRI
- PET
- Myocardial biopsy
- Electrophysiological study

COMMON DRUGS AND DOSAGE FOR CHF

FUROSEMIDE

- Dose 20-80 mg daily PO
- Intravenous 10-80 mg SOS in acute stage
- Change to oral when symptoms subside
- Monitor serum electrolytes, creatinine and uric acid on therapy

SPIRONOLACTONE

- Dose 25-50 mg once daily PO
- Keep watch on serum potassium and creatinine every 2-4 weekly

- **CARVEDILOL** Dose 3.125 to 25 mg twice daily PO
- **METOPROLOL** 12.5-50mg twice daily PO
- **BISOPROLOL** 1.25-10mg once a day PO

PRECAUTIONS

- Start after decongestion with low dose with BP > 100 mmHg and HR >60/min
- Uptitrate dose 1-2 weekly till maximum tolerable dose
- Keep watch on BP, heart rate and recipitation of CHF symptoms
- Increase diuretics and reduce carvedilol to manage reappearance of CHF

ARNI

- Dose 50 to 200 mg twice daily PO
- Start with low dose with BP >100 mmHg, normal electrolyte and creatinine less than 2.5 mg/dl
- Uptitrate dose 1-2 weekly till maximum tolerable dose
- Keep watch on BP and electrolytes before every increment and on follow-up

ABBREVIATIONS

ICD: Implantable Cardioverter defibrillator
BiV: Bi-Ventricular Pacing
PND: Paroxysmal Nocturnal Dyspnea
HFMREF: Heart Failure with Mid-Range Ejection Fraction
PCI: Percutaneous Coronary Intervention
CABG: Coronary Artery Bypass Graft
CVD: Cardiovascular Diseases
RHD: Rheumatic Heart Disease
CAD: Coronary Artery Disease
HFrEF: Heart Failure with reduced Ejection Fraction
HFpEF: Heart Failure with preserved Ejection Fraction
STEMI: ST elevation Myocardial Infarction
LV: Left Ventricle
COPD: Chronic Obstructive Pulmonary Disease

REFERENCES

1. *2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) With the special contribution of the Heart Failure Association (HFA) of the ESC*
2. *Heart failure guidelines 2025 by Heart Failure Association of India. Heart Failure Journal of India ¦ Volume 3 ¦ Supplement 1 ¦ January 2025."*

MONITOR, MANAGE, AND MAINTAIN HEART HEALTH

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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

REFERENCES

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.0000000000000001168

LISTEN TO YOUR HEART: PREDICTABLE PAIN NEEDS PREDICTABLE CARE

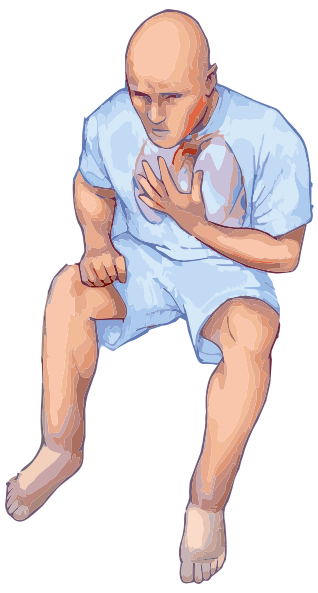
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Standard Treatment Workflow (STW)
UNSTABLE ANGINA/NSTEMI
ICD-11-BA40.0



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

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) STW
- If no ST Elavation: UA/NSTEMI

RED FLAG SIGNS
- Pain lasting for more than 20 minutes
- Recurrent or ongoing pain or rest pain
- Associated breathlessness, profuse sweating or syncope
- Hemodynamic instability

Refer as emergency to nearest Primary PCI/Thrombolysis capable centre

Rest pain beyond 24hrs or without above features may be referred early for further evaluation

LOOK FOR OTHER CAUSES OF PROLONGED CHEST PAIN
- Dissection of aorta (unequal/ absent peripheral pulses)
- Respiratory Evaluation: Pleuritis/ pneumonitis/ embolism/ pneumothorax
- Pericardial rub
- Neuralgia or herpes

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 epigatrium	Localized to a point	Pricking or piercing or stabbing type of pain	Precipitated by movement of neck or arms or respiration

MANAGEMENT

PHC/CHC LEVEL
1, ECG, Troponin.
2. Start
-Aspirin, Clopidogrel in loading dose
-Heparin/ LMWH
-High dose statin
-Metoprolol
3. Risk stratify GRACE score or TIMI score
- Refer High/ Intermediate risk to PCI capable centre
- Refer Low risk for further evaluation to DH
4. Refer to PCI capable centre if:
- Acute LVF
- Hypotension
- Systolic murmur
- Arrythmia

DISTRICT HOSPITAL
1.Admit in ICU equipped with ECG monitoring and defibrillator
2.Troponin & bio-chemistry if not done
3.Serial ECG & echocardiography
4.Continue Aspirin, Clopidogrel, Heparin & Metoprolol
5.Add nitrates if needed
6.Management for different risk categories:
-Very high,High or Intermediate risk or LVEF <40%: Refer for revascularization
-Low risk patients: Conservative management
Life style modification
Risk factor control
Secondary prevention

TERTIARY CENTRE
1. Admit, reassess clinically and monitor in ICCU
2. Continue aspirin and heparin
3. Load with clopidogrel or prasugrel or ticagralor if not already done
4. Optimal medical therapy to continue (BB, high dose atorvastatin, ACE-inhibitors, intra-venous nitrates if ongoing pain, severe MR or LVF)
5. Detailed echocardiography
6. Low risk patients may undergo non-invasive risk stratification with exercise stress test, CT coronary angiography or stress imaging
7. Very high risk, high risk and intermediate risk patients may be subjected to coronary revascularization

Revascularization:
1. Discuss pros & cons of re-vascularization and prolonged dual anti-platelet therapy
2. Revascularize if anatomy is suitable
3. Prefer CABG over PCI in DM with multivessel disease or left main disease

Revascularization strategy:
1. Very High risk: Urgent re-vacsularization (within few hours) after loading preferably with Ticagrelor or prasugrel if PCI is planned
2. High risk patients: Early revascularization (within 24 hours)
3. Intermeditae risk patients: Revascularization (within 72 hours)
4. Continue Dual anti-platelets in patients undergoing PCI for atleast 12 months in DES and for 3 months in BMS

1. GRACE SCORE:

Killip Class	Points	SBP1 mm Hg	Points	Heart rate Beats/ min	Points	Age. y	Points	Creatinine Level, mg/ dL	Points	**Other risk factors**	Points
I	0	<80	58	≤50	0	≤30	0	0-0.39	1	• Cardiac arrest at admission	39
II	20	80-99	53	50-69	3	30-39	8	0.40-0.79	4	• ST-Segment Deviation	28
III	39	100-119	43	70-89	9	40-49	25	0.80-1.19	7	• Elevated Cardiac Enzyme Levels	14
IV	59	120-139	34	90-109	15	50-59	41	1.20-1.59	10		
		140-159	24	110-149	24	60-69	58	1.60-1.99	13		
		160-199	10	150-199	38	70-79	75	2.00-3.99	21		
		≥200	0	≥200	46	80-89	91	>4.0	28		
						≥90	100			Sum Total= GRACE score of patient	

2. TIMI SCORE:
One point for each of following
1. Age >65 yrs
2. More than 3 risk factors
3. Known CAD (>50% lesion)
4. Recurrence of angina in 24 hrs
5. Aspirin use within 7 days
6. ST deviation >0.5 mV
7. Raised cardiac markerss
Sum total = TIMI score of patient

UNSTABLE ANGINA OR NSTEMI DIAGNOSIS

- Very high risk: Clinical instability → Immediate invasive <2 h
- High risk: GRACE > 140, TIMI ≥4 → Early invasive 2-24 h
- Intermediate risk: GRACE 109-140, TIMI2-3 → Delayed invasive 25-72 h
- Low risk: GRACE <109, TIMI ≤1 → Medical/ non-invasive strategy

If at non-PCI-capable hospital
Very high risk: Immediate transfer to PCI-capable hospital
High risk: same-day transfer
Intermediate risk: transfer for PCI withing 72 h
Low risk: transfer if pursuing invasive treatment

Clinical instability. rise in cTn, or ECG changes

Invasive evaluation + Non-invasive ischaemic testing

INVESTIGATIONS

ESSENTIAL INVESTIGATIONS
1. Hemogram
2. Creatinine
3. Sugar, HbA1C
4. Fasting lipids
6. ECG
7. Troponin T/ Troponin I
8. Plain X-ray chest
9. Echocardiography

OPTIONAL INVESTIGATIONS
1. Coronary Angiography
2. CT scan including coronary angiography
3. Stress Radionuclide/ echocardiographic imaging
4. MRI
5. Coronary Fractional Flow Reserve
5. Intra-vascular Ultrasound

UA/NSTEMI: RISK CATEGORIZATION:
Based on clinical features, GRACE score & TIMI score
A).Very high risk:
-Acute LVF
-Hypotension
-Uncontrolled Ventricular arrhythmia
-Severe MR
B. High Risk:
-GRACE score > 140 or TIMI score >4
C. Intermediate Risk:
-GRACE score 109-140 or TIMI score 2-3
D. Low Risk:
-Grace score <108 or TIMI score 0-1

UA/NSTEMI: RISK CATEGORY MANAGEMENT:
A)Low risk:
1.Conservative management: Aspirin, clopidogrel, BB and statin
2. CT coronary angiography/TMT within a week to risk stratify
3.Refer low risk for re-vascularization if
-Recurrent pain
-Hemodynamic deterioration
-New ECG change

B. Intermediate/ Very High/ High risk:
Re-vascularization

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

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
Nitroglycerine IV 5-25 mcg/min infusion

Statins:
High dose Atorvastatin 80 mg OD or Rosuvastatin 20-40 mg OD

REFERENCES

1. Byrne RA et al. 2023ESC guidelines for the management of acute coronary syndrome. European Heart J (2024) 44, 3720-3826
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

ASSESS SWIFTLY, TREAT PRECISELY

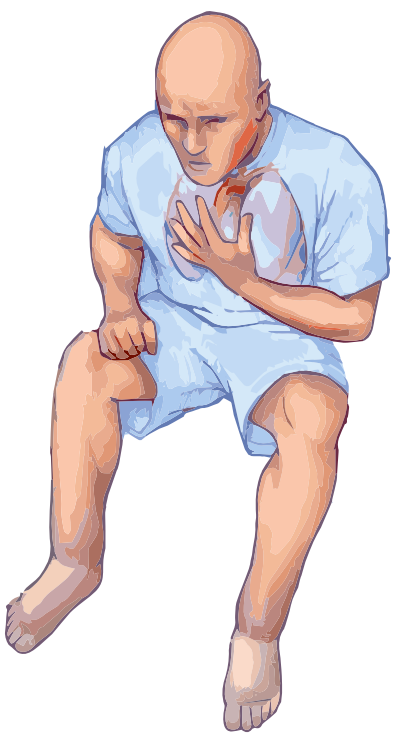
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Standard Treatment Workflow (STW)
ST ELEVATION MYOCARDIAL INFARCTION (STEMI)
ICD-11-BA41.0



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 Elavation: 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 epigatrium	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. Tranfer 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
- Mecahnical complication
- Dynamic ST-T changes
- Life threatening ventricular arrhythmias

ABSOLUTE CONTRA-INDICATIONS TO THROMBOLYIC 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/ surgey/ 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-nitare 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 hrly

Thrombolyic Therapy:

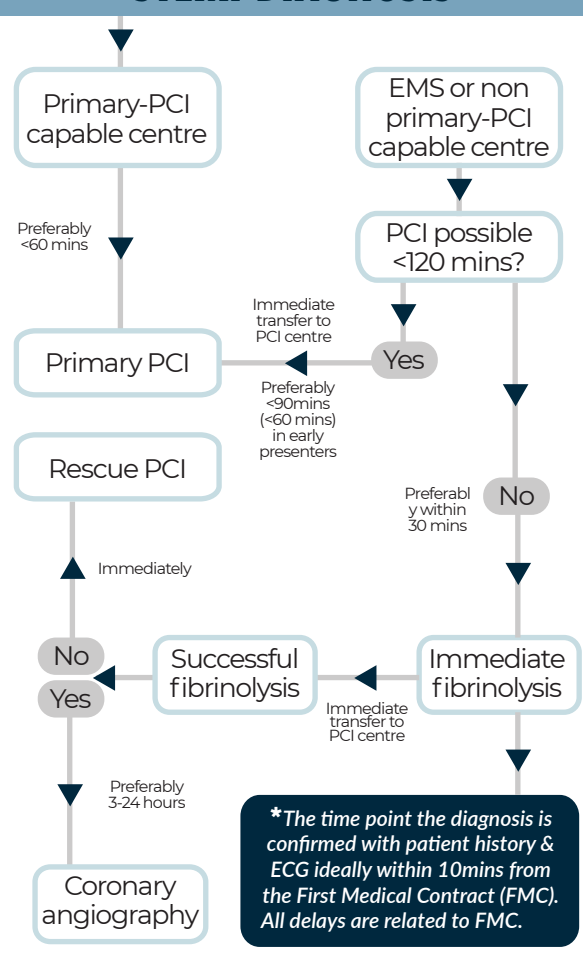
Tenecteplase
35 mg IV bolus if 60-70 Kg
40 mg IV bolus if 70-80 Kg
45 mg IV bolus if more than 80 Kg

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

1. 1. Byrne RA et al. 2023ESC guidelines for the management of acute coronary syndrome. European Heart J (2024) 44, 3720-3826
2. 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)

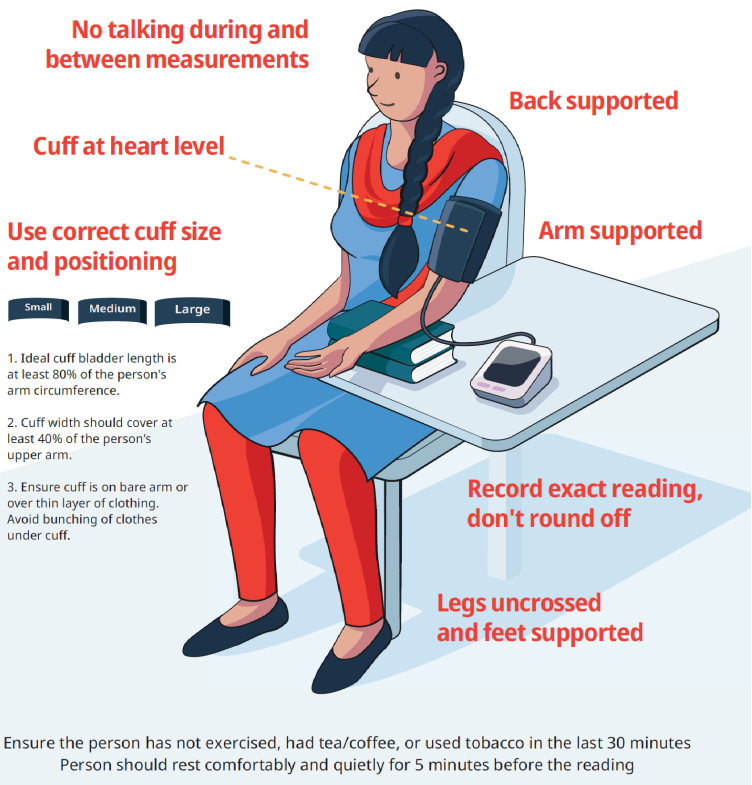
HYPERTENSION IN ADULTS

ICD-11 BA00

Hypertension is a SILENT KILLER
as the majority of patients with high BP are asymptomatic!
Only way to know if BP is high is to measure it accurately!

BP Measurement Checklist

Measure blood pressure of all adults ≥ 30 years



Ensure the person has not exercised, had tea/coffee, or used tobacco in the last 30 minutes
Person should rest comfortably and quietly for 5 minutes before the reading

RISK FACTORS

- High salt intake
- Sedentary behavior
- Tobacco and alcohol consumption
- Obesity

CLASSIFICATION	BLOOD PRESSURE LEVELS	ACTION
Normal	Systolic <120 AND Diastolic<80	Reassure and encourage healthy lifestyle
Elevated BP	Systolic 120-139 AND/ OR Diastolic 80-89	Lifestyle modification
Hypertension Grade 1	Systolic 140-159 AND/ OR Diastolic 90-99	Pharmacological management+ Lifestyle modification
Hypertension Grade 2	Systolic 160-179 AND/ OR Diastolic 100-109	
Hypertension Grade 3	Systolic ≥ 180 AND/ OR Diastolic ≥ 110	

DIAGNOSIS OF HYPERTENSION

- Systolic BP ≥140 AND/OR Diastolic BP ≥ 90 mmHg on two different clinic visits
- Population screening BP reading may count as the first reading
- Use the higher category if only Systolic or Diastolic BP is high, manage based on the higher value
- If Systolic BP is ≥160 AND/OR Diastolic BP ≥100 measurement of one clinic visit is sufficient for diagnosing hypertension

BLOOD PRESSURE CONTROL TARGETS

- All adults: SBP <140 and DBP <90 mmHg
- Diabetes mellitus, CKD, or established CVD: SBP <130 and DBP <80 mmHg (optimal target if tolerated)
- Age ≥80 years: SBP <150 and DBP <90 mmHg
- Assess orthostatic BP at every visit of adults ≥ 65 years

MANAGEMENT OF HYPERTENSION

PHARMACOTHERAPY

DRUG CLASS	DRUG	DOSES	CONTRAINDICATIONS	SIDE EFFECTS
CCB	Amlodipine	2.5–10 mg OD	Heart failure	Pedal edema, constipation
ACE inhibitors	Enalapril	5–40 mg OD or BD	Pregnancy, Women planning pregnancy, prior angioedema to ACEi, Hyperkalemia, Bilateral renal artery stenosis	Dry cough, angioedema, hyperkalemia rise in serum creatinine
	Ramipril	2.5–10 mg OD or BD		
ARB	Losartan	50–100 mg OD		Hypotension, acute renal failure, hyperkalemia
	Olmesartan	20–40 mg OD		
	Telmisartan	40–80 mg OD		
Diuretics	Chlorthalidone	12.5–25 mg OD	Pregnancy, Gout	Glucose intolerance, metabolic syndrome, hyponatremia, hypercalcemia, hypokalemia
	Hydrochlorothiazide	12.5 mg OD		
Beta-blockers	Carvedilol	12.5–50 mg OD or BD	Asthma, severe bradycardia, A-V block (grade 2 or 3), uncontrolled heart failure	Depression, fatigue, reduced exercise tolerance, hyperglycemia, sexual dysfunction
	Labetalol	100–400 mg BD		
	Metoprolol	50–100 mg OD or BD		
	Nebivolol	5 mg OD		
Aldosterone antagonist	Spironolactone	25 mg OD	Hyperkalemia	Mastalgia, gynecomastia, sexual dysfunction, gout

PHARMACOLOGICAL STRATEGY

- Combination therapy (two drugs from two different classes) could be the default initial pharmacological treatment for most adults with hypertension
- Single-pill combinations (SPCs/fixed-dose combinations, FDCs) are preferred over multiple pills to improve adherence
- Monotherapy remains appropriate only for (a) low-risk Grade 1 HTN, (b) elderly ≥ 80 years, or (c) frail patients
- A CCB or Thiazide/Thiazide-like diuretic should be used with a Renin-Angiotensin-Aldosterone System (RAAS) blocker (either an ACEi or an ARB)
- Three-drug combination, often a RAAS blocker, CCB, or a Thiazide/Thiazide-like diuretic, if blood pressure is not controlled with the initial two-drug combination
- β-blockers are appropriate in cases of angina, postmyocardial infarction, heart failure (HFrEF or HFpEF with ischemia)
- DO NOT combine two RAAS blockers as it increases the risk of adverse effects, including acute kidney injury (AKI)

SUGGESTED TREATMENT PROTOCOLS

PROTOCOL NO 1 ATTACC

1. **If BP is high:*** Prescribe Amlodipine 5mg
2. **After 4 weeks measure BP again. If still high:** Add Telmisartan 40mg
3. **After 4 weeks measure BP again. If still high:** Increase Telmisartan to 80mg
4. **After 4 weeks measure BP again. If still high:** Increase Amlodipine to 10mg
5. **After 4 weeks measure BP again. If still high:** Add Chlorthalidone 12.5mg
6. **After 4 weeks measure BP again. If still high:**

PROTOCOL NO 2 AATTCC

1. **If BP is high:*** Prescribe Amlodipine 5mg
2. **After 4 weeks measure BP again. If still high:** Increase to Amlodipine 10mg
3. **After 4 weeks measure BP again. If still high:** Add Telmisartan 40mg
4. **After 4 weeks measure BP again. If still high:** Increase to Telmisartan 80mg
5. **After 4 weeks measure BP again. If still high:** Add Chlorthalidone 12.5mg
6. **After 4 weeks measure BP again. If still high:**

Consider adding drugs of other classes, preferably MRA (eg.Spironolactone)

*High BP ≥140 /90 mmHg
At every visit: Check if the patient has been taking medications regularly and correctly

LIFESTYLE MODIFICATION

- Advise all patients against tobacco and alcohol use
- Limit salt intake to <5g/day
- Use healthy oils, eat more fruits/vegetables, prefer fish/omega-3 foods such as nuts and seeds
- Physical Activity: 30 minutes daily
- Weight Management: Keep BMI <23 kg/m^2 and waist circumference: <90 cm (men) and <80 cm (women)

MONITORING OF HYPERTENSION

- BP to be measured at every clinical visit
- Evaluate for diabetes (fasting plasma glucose or HbA_{1c}) and manage accordingly
- Annual evaluations - Serum creatinine, Urine (albumin, sugar, creatinine), Lipid profile, Fundoscopy
- Additional investigations (if required)- ECG, ECHO

HYPERTENSION URGENCY

- Systolic BP ≥180 AND/OR Diastolic ≥ 120 mmHg
  AND
- No signs of acute target-organ damage

Management

- Start oral antihypertensive drugs
- Do NOT use IV medicines
- Reduce BP gradually over 24–48 hours
- Refer/admit if symptoms or organ damage suspected
- Follow-up within 1 week

RED FLAGS SIGNS

Systolic BP ≥180 AND/OR Diastolic BP ≥120

with

Symptoms of target organ damage

- Visual disturbance, dizziness, confusion, headache
- Chest pain
- Breathlessness (worse lying down/leg swelling)
- Sudden weakness, speech/ swallowing difficulty, vision problem

Management

- Stabilise ABC and refer to emergency care at higher center

ABBREVIATIONS

ACEi: Angiotensin-converting enzyme inhibitor
ARB: Angiotensin receptor blocker
BP: Blood pressure
CCB: Calcium channel blocker
FDC: Fixed-dose combination
HFrEF: Heart failure with reduced ejection fraction
HFpEF: Heart Failure with Preserved Ejection
OD: Once Daily
MRA: Mineralocorticoid Receptor Antagonist
RAAS: Renin Angiotensin-Aldosterone System

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ALL ADULTS ≥ 18 YEARS SHOULD GET BLOOD PRESSURE MEASURED AT EVERY CLINIC VISIT

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Standard Treatment Workflow (STW) for the Management of

ACUTE RHINOSINUSITIS

ICD 10 J01.90

RELATED CLINICAL SCENARIOS

Recurrent acute sinusitis is episodes of acute sinusitis interspersed with symptom free intervals of more than 3 months in duration.

WHEN TO SUSPECT?

Usually a sequela of viral infection which causes ciliary impairment and bacterial superinfection

Diagnosis- persistence of nasal blockage/ nasal discharge and facial pain/ hyposmia beyond 7 days (maximum upto 3 months)

Symptoms with duration less than 7 days are treated as **viral upper respiratory infection.**

Invasive fungal sinusitis is suspected if in addition to above symptoms the following are present: facial hyposthesia, facial skin/palatal/ turbinate discoloration and proptosis/ diplopia/ reduced or loss of vision

Children may present with acute febrile illness/cough associated with these symptoms.

ALTERNATIVE CLINICAL SCENARIOS

- Consider alternate diagnosis if: Unilateral symptoms/ Bleeding/ Crusting/ Cacosmia (foul smell)
- Rule out other contributory factors: Allergy/ upper alveolar dental caries/ DNS/ LPR/ smoking.
- Rhinorrhoea and nasal congestion in second trimester of pregnancy is considered hormonal in etiology and is to be managed with saline irrigation/ drops

RED FLAGS FOR REFERRAL TO DISTRICT HOSPITAL

- Known diabetic/ immunocompromised
- Suspicion of complications viz. (A) Orbital involvement (Periorbital edema/ erythema, displaced globe, ophthalmoplegia, visual disturbance); (B) Meningitis/ altered sensorium; (C) Frontal fullness.
- Non-resolution with oral antibiotics for ten days
- Pointers of invasive fungal sinusitis (Facial hypoesthesia, facial skin/palatal/turbinate discoloration)

CLINICAL EXAMINATION

PRELIMINARY

- Anterior rhinoscopy: Discharge, bleeding, crusting, polyposis
- Oral examination: Dental caries, post nasal drip, palatal discolouration
- Assess for contributory factors listed above

DESIRABLE

- Nasal endoscopy

LABORATORY INVESTIGATIONS

Desirable in non-resolving/worsening cases despite antibiotic therapy

- Endoscopy- for guided nasal swabs/ KOH smear
- CT PNS (for suspected complications / non-resolving cases on antibiotics for 14 days)
- Screen for Diabetes / Immunodeficiency

MANAGEMENT

PHC / PRIMARY LEVEL

Duration of treatment 7-14 days

- Oral antibiotics- Amoxycillin/ Co-amoxyclav for 7-10 days. Levofloxacin and Azithromycin can be opted for patients intolerant/ sensitive to penicillins.
- Topical budesonide/ mometasone nasal spray once/twice a day for 2 weeks provides earlier symptomatic relief.
- Normal saline nasal washes help in clearing secretions and improved effect of topical medications
- Topical/ oral decongestant (Oxymetazline/ pseudoephedrine) for 3-5 days relieves symptoms.
- Adequate hydration and steam inhation.
- Antihistaminics (patients with co-existing allergy).

INDICATIONS OF PARENTERAL ANTIBIOTIC THERAPY

- Orbital/ intracranial complications
- Non-resolution of symptoms with atleast 7 days of oral antibiotics
- Worsening of symptoms while on oral antibiotics

DISTRICT HOSPITAL

- Surgical interventions to manage: Underlying anatomical conditions causing recurrent acute sinusitis like- DNS/ adenoid hypertrophy/ anatomical variations seen on CT
- Ophthalmology referral for suspected intraorbital complications
- Dental deferral for suspected dental origin infection.
- Invasive fungal sinusitis- start antifungal medications, control underlying immunocompromising co-morbidity and consider debridement.

TERTIARY LEVEL

Cases of acute invasive fungal sinusitis/ complicated acute bacterial sinusitis and patients with immunocompromised status may be referred for management.

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

ABBREVIATIONS

CT: Computerized Tomogram
PHC: Primary Health Center
DNS: Deviated Nasal Septum
LPR: Laryngo Pharyngeal Reflux

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Standard Treatment Workflow (STW) for the Management of CHRONIC RHINOSINUSITIS

ICD 10 - J32.9

WHEN TO SUSPECT?
If symptoms persist for more than 12 weeks:

nasal obstruction/ nasal discharge and facial pain/ reduced sense of smell

RULE OUT FOLLOWING PRECIPITATING/ EXACERBATING CONDITIONS

- Occupational exposure to irritants/ pollutants (refer to hyperlink)
- Allergic rhinitis, aspirin sensitivity, asthma, laryngopharyngeal reflux, smoking
- Adenoid hypertrophy, bottle feeding, passive smoking in children
- Medications and hormones associated with nasal congestion (NSAIDS, antihypertensive, psychotropic drugs, prolonged use of topical nasal decongestants)

EXAMINE THE NOSE FOR NASAL POLYPI
TWO PHENOTYPES
- Chronic sinusitis with nasal polypi (CRSwNP)
- Chronic sinusitis without nasal polypi (CRSsNP)

RED FLAG

Frontal swelling

Signs of meningitis/ intracranial complications
a. Fever with headache
b. Neck stiffness
c. Photophobia
d. Altered sensorium
e. Vomiting

Orbital symptoms
a. Periorbital edema/ erythema
b. Displaced globe
c. Double or reduced vision (loss of green-red color differentiation may be the first sign)
d. Ophthalmoplegia

Known diabetic/ AIDS/ immunosuppressive medications (suspect invasive fungal sinusitis)

TREATMENT OF CRS

- Mild/ moderate symptoms (no significant congestion/ discharge/ polypi/complications)
  1. Address etiology and exacerbating factors.
  2. For allergic rhinitis, antihistamines and nasal steroid spray to be given.
  3. Saline nasal wash
  4. Steam inhalation
  5. Stretching exercises and yoga are very effective for nasal congestion
  6. Topical (oxymetazoline/ xylometazoline) and oral decongestants are associated with cardiovascular risks and rebound phenomenon. Hence, careful patient selection and short course treatment to be followed.
  7. Intra nasal steroid sprays for 6-8weeks (Fluticasone proprionate/ Fluticasone furoate/ Mometasone) after discussing risk - benefit - cost issues with patient regarding steroid sprays

  If no symptomatic relief to above treatment, perform nasal endoscopy and consider NCCT of paranasal sinuses

IN ALL PATIENTS, ESPECIALLY IN THE PRESENCE OF NASAL POLYPI, RULE OUT ALLERGY/ALLERGIC RHINITIS
1. Consider allergen avoidance
2. Skin prick test
3. Co-existing bronchial asthma needs to be treated
4. Consider AIT if indicated.

In presence of nasal purulent discharge
1. Culture directed antibiotics to be considered
2. If culture is negative, empirical antibiotics (Amoxycillin/ Co-amoxyclav/ Fluoroquinolone/ Roxithromycin) to be given for at least 2weeks.
3. Upper dental (particularly 1st molar) infection may cause maxillary sinusitis which is to be treated with metronidazole.

HYPERLINK
(https://www.dovemed.com/diseases-conditions/airborne-irritant-induced-sinusitis/)

- In the presence of nasal polypi, initial nasal steroid spray and subsequent endoscopic surgery is to be planned.
  1. Short course of oral steroid (Prednisolone 0.5 mg/kg for 5 - 10 days) provides temporary relief in nasal obstruction in extensive polypi.
  2. Steroid therapy is not a replacement for surgery.

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 Immuno Therapy
DNS: Deviated Nasal Septum

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Standard Treatment Workflow (STW) for the Management of EPISTAXIS

ICD-10-R04.0

CLINICAL SCENARIOS

- Acute bleeding from the nose after physical trauma/ barotrauma/ nose picking/ physical exertion.
- Acute bleeding from the nose in hypertensive / hematological disorders.
- Acute bleeding from the nose without any obvious cause.

ESSENTIAL CLINICAL EXAMINATION

ESSENTIAL

- Local examination by anterior rhinoscopy/ endoscopy to look for source of bleeding (scanty/moderate).
  - Little's area bleeder/clot/congestion
  - Sharp septal spur
  - Congested nasal mucosa as in URTI
- General physical examination to evaluate other systems (Cardiovascular/Lower Respiratory/Neurological) clinically.

SYSTEMIC ASSESSMENT

Screen for coagulation disorders/ anticoagulant medications/ hematological malignancies

MANAGEMENT

STEP-WISE MANAGEMENT PRINCIPLE

1. Ensure patent airway/ avoid aspiration by head down/lateral positioning
2. Restore hemodynamic stability by intravenous fluid replacement/ transfusion
3. Control bleeding/bleeder by
   - Bidigital compression of nose for 10 minutes in Trotter's position (cotton pledgets soaked in 4% xylocaine with adrenaline may be used)
   - Short term tab labetalol will take care of uncontrolled hypertension
   - Chemical/electrocauterization of bleeder in Little's area
4. Tamponade of bleeders by anterior nasal packing/ epistaxis balloon
5. Posterior nasal packing if bleeding is not controlled with above measures
6. Antibiotic prophylaxis and hospitalizarion is recommended after nasal packing
7. H2blockers/ PPI to be given in case of blood aspiration to avoid gastritis
8. Persisting bleeding despite nasal packing > consider arterial ligation (sphenopalatine / anterior ethmoidal artery).
9. Selective embolization is an alternative to surgery
10. Address identified etiology, if any



INVESTIGATIONS

ESSENTIAL

1. Hemoglobin level
2. Coagulation profile
3. Complete blood count

DESIRABLE

CT scan with contrast in cases with no obvious cause// suspected benign or malignant lesion

RED FLAG SIGNS

- Features suggestive of neoplasia
  . Unilateral bleeding
  . Nasal obstruction
  .Visual/orbital symptoms
  . Obvious mass lesion
- Altered blood counts/ coagulation profile
- Persistent bleeding despite nasal packing
- Recurrent profuse bleeding
  - Consider JNA in teenage boys
  - Aneurysmal bleeding (specially following trauma) to be ruled out by DSA
  - To be managed by appropriate treatment at tertiary level

FOLLOW UP SERVICES

1. Continued nasal lubrication for 2 weeks with liquid paraffin
2. Repeat anterior rhinoscopy/ endoscopy to know/confim the cause of bleeding
3. Oral hematinics to be considered if needed

QUALITY ASSESSMENT PARAMETERS

1. Recurrence of episodes
2. Improvement in hemoglobin level over a period of time.

POINTS TO PONDER WHILE MANAGING EPISTAXIS

1. Epistaxis in children is almost always anterior and from Little's area, consequent to mucosal drying by dry air.
2. Epistaxis in adults is often related to hypertension and arises posteriorly from the posterior end of inferior turbinate
3. Initial non-invasive methods may suffice in a large majority of patients.

ABBREVIATIONS

JNA: Juvenile Nasopharyngeal Angiofibroma
DSA: Digital Subtraction Angiography
CT: Computerized Tomograms
URTI: Upper Respiratory Tract Infection

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the

Management of HEARING IMPAIRMENT IN PEDIATRIC AGE GROUP (0 - 12 YEARS)

ICD 10 H90.5

Disabling hearing impairment (31 or more dB HL in better ear) may affect language development and learning outcomes and hence needs urgent intervention

WHEN TO SUSPECT IN CHILDREN

1. Parental concern about delayed speech, language, and developmental delay (refer to red flags)
2. Family history of Hearing Loss (HL).
3. Exposure to ototoxic drugs/ hyperbilirubinemia requiring exchange transfusion/ Neonatal ICU stay for > 3days.
4. In-utero infections (CMV/ rubella/ syphilis/ herpes/ toxoplasmosis)
5. Syndromes (NF) Or neurodegenerative disorders (Hunter syndrome, FA) associated with HL.
6. Post-natal infection known to cause HL (Meningitis)
7. Head Trauma
8. Recurrent/ persistent (>/=3 months) middle ear disease
9. Chemo/ Radiotherapy to head and neck



UNIVERSAL HEARING SCREENING FOR CONGENITAL DEAFNESS

- Community based hearing screening:
  - i. May be co-ordinated with immunization schedule
  - ii. By primary health care workers.
  - iii. Using calibrated noisemakers/ toys
- All children who fail preliminary screen to undergo detailed evaluation at health care facility.

EVALUATION

ESSENTIAL

1. Clinical examination to look for ear canal deformities, tympanic membrane and middle ear status by otoscopy/ otoendoscopy.
2. Age appropriate audiological/ behavioral observation tests in a soundproof room by audiologist/ ENT specialist.
3. Tympanic membrane mobility test/ tympanometry.

COMMON CAUSES OF HL

1. Impacted wax
2. Middle ear fluid assciated with adenoid hypertrophy/ cold climate
3. Tympanic membrane perforation
4. Sensorineural Hearing loss (SNHL) due to various causes as indicated earlier

RED FLAGS POINTING FOR URGENT HEARING EVALUATION

- 6months- no head turning to the side of calling
- 1yr- no babbling/ speech like sound production
- 1.5yrs- not saying mama/papa/dada or other names
- 2yrs-not pointing to pictures/ body parts when named or speaking less than 10 words
- 3 yrs- does not understand action words or not asking for things by names or not speaking small sentences.
- At any age- has regressed or lost previously acquired speech/ language milestones

MANAGEMENT

GUIDING PRINCIPLES

CONDUCTIVE HL

- Wax removal under direct vision by ENT specialist relieves hearing impairement
- Appropriate surgery is to be planned for tympanic membrane perforation
- Middle ear fluid (OME) may be associated with adenotonsillar disease which needs to be treated. Initially medical treatment and surgery to be considered for OME persisting for more than 3months/ earlier in the presence of speech and language delay
- For non-surgical condidates/ delayed surgical management, amplification by hearing aid to be reinforced in bilateral CHL.

SNHL

- Appropriate amplification, preferential seating in classroom
- Periodic evaluation for hearing aid users for mould fitting and amplification settings
- Screening for developmental delay by pediatrician/ psychologist

DIVISION OF RESPONSIBILITIES

PHC LEVEL

- Suspect HL
- Initial evaluation
- Referral if initial evaluation is suggestive of HL
- Follow up of rehabilitated/ treated patients with HL
- Prevention of HL

DH LEVEL

1. Audiometric evaluation by Audiologist/ Otolaryngologist
2. Hearing aid dispensing (mould fitting and HA programming)
3. Rehabilitation by speech therapist
4. Appropriate surgery for CHL
5. Training programme for parents of hearing impaired children to enhance pre-school language development

TERTIARY LEVEL

- Surgical intervention options : Cochlear implant / BAHA (as per ADIP guidelines)
- Interdisciplinary team based interventions in children with multiple disabilities.

QUALITY ASSESSMENT PARAMETERS

- Short term: Quality of amplification using electroacoustic objective measures and culturally appropriate subjective questionnaire tools
- Long term (Desirable) : Use CBR matrix based measurement for ensuring holistic rehabilitation

FOLLOW UP SERVICES

1. Home visits by Health Worker/ASHA to ensure utilization of assistive devices and support parents to enhance language development.
2. School visits to educate teachers and normally hearing children to include their peers with hearing disability in the school environment
3. Home/ school visit by social worker for evaluation of social/ educational/ livelihood/ justice and empowerment domains of the child

☛ KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

ABBREVIATIONS

ADIP : Assistance to disabled persons for purchase/ fitting of aids and appliances
BAHA : Bone Anchored Hearing Aid
CBR : Community Based Rehabilitation
CMV : Cyto Megalo Virus
FA : Friedreich Ataxia
NF : NeuroFibromatosis
OME : Otitis Media with Effusion

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Standard Treatment Workflow (STW) for the Management of
NECK SPACE INFECTION
ICD-10-J36, J39.0, K 12.2, J39.1

Rapidly progressive bacterial infections which spread along facial planes and spaces of head and neck region. They may be fatal unless emergently treated. Most of these infections are secondary to dental infection.

CLINICAL SCENARIOS

They usually present as
- Ludwig's angina (submandibular space infection)
- Peritonsillar abscess
- Parapharyngeal abscess
- Retropharyngeal abscess

The typical presentation is with acute onset of pain and swelling in the neck with fever, malaise, trismus and dysphagia.

Extension along spaces to involve multiple deep neck spaces is frequent and may extend to parotid space, masticator space, temporal space, visceral vascular (carotid) space.

Cervical space infection may spread inferiorly to the anterior mediastinum and posteriorly along prevertebral space.

Tubercular cold abscess involves the same anatomical spaces but would not display inflammatory signs or rapid progression.

SYSTEMIC ASSESSMENT

Screen for diabetes mellitus, HIV infection, agranulocytosis and immunosuppressive therapy or chemotherapy.
Signs of inflammation may be less marked and disease course may be more rapidly progressive in immunocompromised patients.

CLINICAL EXAMINATION

- Airway assessment to rule out stridor or respiratory compromise
- Look for signs of dehydration
- Monitor temperature, heart rate, respiratory rate, BP, and signs of sepsis/ septic shock.
- Oral cavity examination to check jaw opening, condition of teeth and floor of mouth
- Oropharyngeal examination to check for inflammed medially displaced tonsil & uvula and bulge in lateral pharyngeal wall
- Palpation of neck for lymph nodes, cellulitis, abscess or subcutaneous crepitus
- Cranial nerve examination to rule out lower cranial nerve palsies

RED FLAGS FOR REFERRAL TO DISTRICT HOSPITAL

- Breathing difficulty
- Trismus
- Torticollis/ neck stiffness
- Subcutaneous crepitus and skin discolouration or blisters suggest necrotizing fibrofascitis.
- Toxaemia
- Lower cranial nerve palsy
- Facial puffiness suggestive of venous thrombosis
- Mediastinal extension

INVESTIGATIONS

ESSENTIAL INVESTIGATIONS

1. **Contrast enhanced CT scan** of head and neck is the standard in evaluation of neck space infections. If CT Scan facility is not available, following should be done:-
   a. **Lateral x-ray neck:** Prevertebral soft tissue thickening >7 mm at the level of C2 or > 2/3rd of the width of the vertebral body at C6 is highly suggestive of retropharyngeal abscess. It may also demonstrate foreign bodies, subcutaneous air, air fluid levels and erosion of vertebrae.
   b. **Ultrasound neck** can suggest abscess and guide aspiration attempts.
2. **Blood:** Total and differential leukocyte count, blood sugar, urea
3. **Abscess Cultures with Gram stain** to direct antimicrobial therapy. Anaerobic culture, when available.

MANAGEMENT

PHC/PRIMARY LEVEL

1. Cautiously assess the airway. If found compromised, do endotracheal intubation/ consider tracheotomy
2. Immediately gain an IV access for hydration, broad spectrum antibiotics and pain killers.
3. Transfer the patient to hospital with facility for surgical drainage

DISTRICT HOSPITAL

1. **Hospitalization:** As an emergency for close watch and intensive management.
2. **Airway management:** In progressive disease, in view of impending airway compromise, consider securing the airway early. During acute respiratory difficulty, tracheostomy should be done if intubation is difficult
3. **Correction of fluid and electrolyte imbalance**
4. **Antibiotics:** Early and aggressive IV antibiotic therapy with a combination of Crystalline Penicillin, Aminoglycoside and Metronidazole or Clindamycin is preferred.
5. **Incision and drainage:** Peritonsillar abscess is drained intraorally. All other abscesses are drained via an external approach

INDICATIONS FOR I&D

- Necrotizing fibrofascitis
- Abscess formation
- No response to antibiotics over 48-72 hours
- Deterioration despite antibiotics over 24 hours
- Airway compromise or impending airway compromise
- Mediastinal spread
- Vascular complication like venous thrombosis

QUALITY ASSESSMENT PARAMETERS

Complete resolution of infection and follow up to ensure no recurrence; treatment of initial cause of infection in tooth or tonsil.

FOLLOW UP SERVICES

Consider cold tonsillectomy for patients with history of multiple episodes of tonsillar abscess

ABBREVIATIONS

CT – Computerized Tomography

MRI – Magnetic Resonance Imaging

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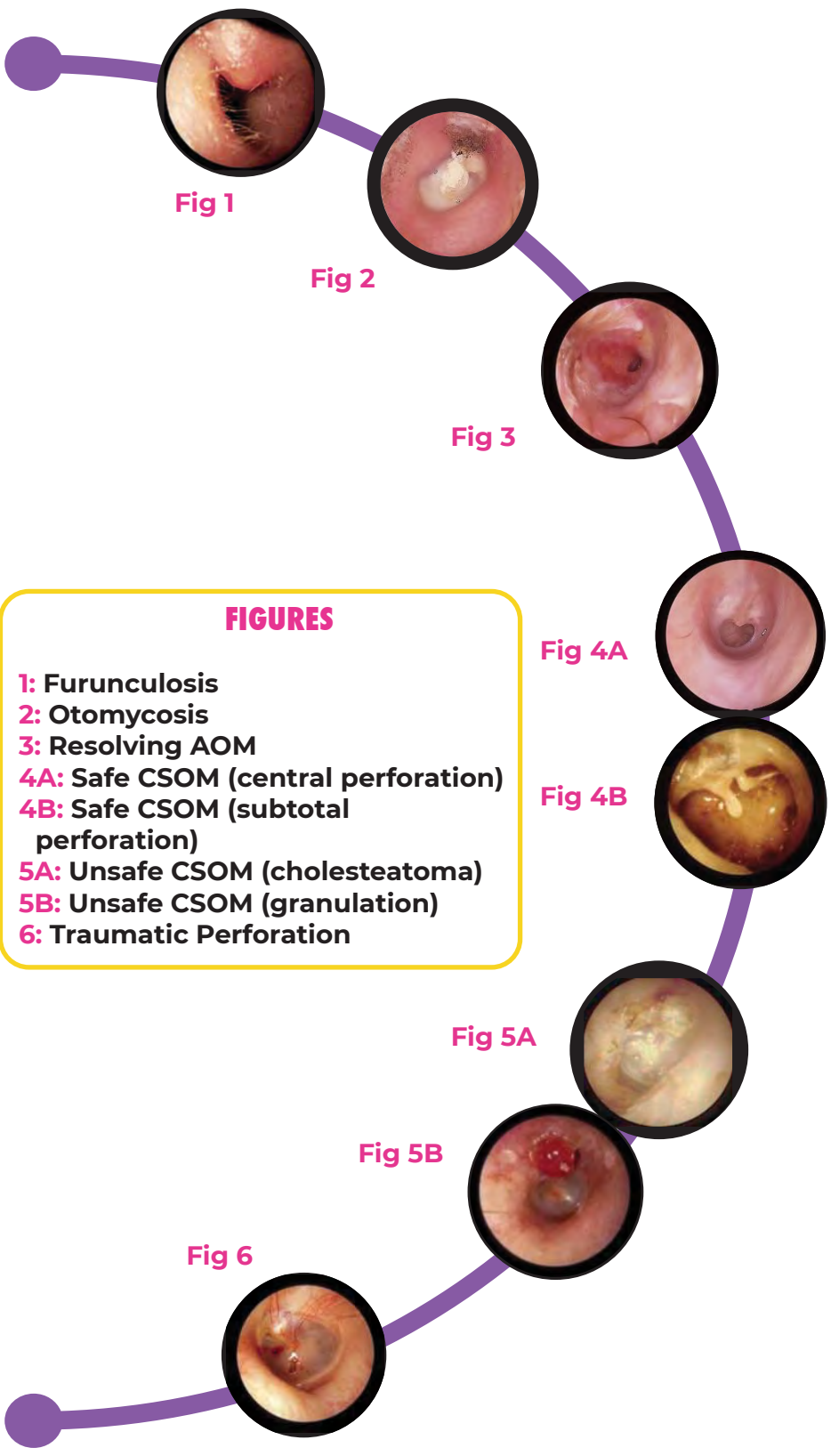
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Standard Treatment Workflow (STW) for the Management of

OTORRHOEA

ICD-10-H92.10

CLINICAL SCENARIOS



FIGURES

1: Furunculosis
2: Otomycosis
3: Resolving AOM
4A: Safe CSOM (central perforation)
4B: Safe CSOM (subtotal perforation)
5A: Unsafe CSOM (cholesteatoma)
5B: Unsafe CSOM (granulation)
6: Traumatic Perforation

DISEASES OF EXTERNAL EAR

- Serous/purulent discharge with significant tenderness of external ear amidst edema (localized-pus: furunculosis or generalized: **Acute otitis externa** denoting Staph/ Pseudomonas infection)
- Thick discharge with itching usually in hot/ humid climate: **Otomycosis** (Candida- white spores; Aspergillus- black spores) [Fig 2]
- Scanty serous discharge & itching with desquamated debris in ear canal **Eczematous otitis externa** (EAC)

DISEASES OF MIDDLE EAR

- URI with severe ear pain (manifested in children as inconsolable crying and ear tugging), relieved with episode of mucopurulent blood stained otorrhoea: **Resolving AOM** [Fig 3]
- Mucopurulent discharge > 12 weeks : CSOM
  - Active : otorrohoea in last 12 weeks
  - Inactive : no otorrohoea in last 12 weeks
  - Safe type : central perforation [Fig 4A] and total perforation [Fig 4B]
  - Unsafe type : cholesteatoma [Fig 5A] and granulation [Fig 5B]
- Recurrent painless profuse mucopurulent discharge with pale granulations/ multiple perforations unresponsive to antibiotics: **Tubercular otitis media** should be suspected and needs biopsy confirmation
- Bloody otorrhoea following Trauma: **Traumatic perforation**
- Acute onset bloody discharge with neural deficits/ neck nodes: **Neoplasia**
- Watery otorrhoea (may be associated with trauma) : **CSF Otorrhoea**

CLINICAL EXAMINATIONS

- Otoscopy as a part of Complete ENT examination by primary physician (Tele-otoscopy interpreted by physician)
- Hearing evaluation by conversation/ whisper/ Tuning forks tests
- General and systemic clinical examination

INVESTIGATIONS

- Pure tone audiometry
- Routine hemogram including blood sugar (fasting and postprandial)
- CT/ MRI in suspected complications (refer to red flags)
- Soft tissue x ray nasopharynx (To examine adenoid enlargement in children)
- Culture & sensitivity of aural secretions.

RED FLAGS FOR REFERRAL TO DISTRICT LEVEL

- Periaural abscess or cellulitis
- High grade fever, dizziness and toxic appearance
- Severe headache with neck stiffness/ vomiting / altered sensorium.
- Facial palsy/ Neurological defecits
- Diabetic with severe deep seated ear pain / neural defecits (Skull base osteomyelitis)
- Physical trauma with bloody/ watery discharge (suspected CSF leak)
- Suspected tuberculosis/ neoplasm

MANAGEMENT

PHC / PRIMARY LEVEL

- Acute otitis externa: Oral Ciprofloxacin/ Amoxycillin clavulanic acid combination for 7-10 days (2 weeks maximum) and analgesics. Ichthammol gycerine (1:9) packing of EAC in moderate to severe edema. Refer pus pointing furuncle to DH
- Otomycosis: Cleaning and Clotrimazole ear drops
- Eczematous otitis externa: Ciprofloxacin ear drops with steroid combination.
- AOM / Resolving AOM: Oral amoxicillin / Erythromycin / Clarithromycin for 10 days. With no response in 3 days start Amoxycillin clavulanic acid combination for 10 days. Refer to DH if no resolution
- Inactive CSOM: Referral to DH for surgery.
- Active CSOM: Ciprofloxacin ear drops with dry mopping & referral to DH for surgery. A course of oral antibiotics maybe prescribed in ase of persistant otorrhoea after topical antibiotics
- Traumatic perforation: Topical antibiotics for otorrhoea if any and maintain ear dry till healing complete
- In case of suspicion of complications start intravenous Amoxycillin clavulanic acid combination and refer to DH

DISTRICT HOSPITAL

- Surgical interventions except neurosurgical interventions (eg I&D, tympanoplasty, mastoidectomy)
- Biopsy in suspected neoplasm
- Medical management of medical co-morbidities such as diabetes, tuberculosis, meningismus/ meningitis

TERTIARY LEVEL

Surgical management particularly of intracranial complications including neurosurgical interventions

- Patient to be educated for proper technique of ear mopping, contralateral lie (10 min) following instillation of drops & avoiding water entry e.g ear-plugs during bathing
- To ensure adequate immunization (measles/ H.Influenza/ Pneumococcus) in recurrent AOM and to adopt correct posture during breastfeeding while avoiding bottle feeding
- Pus culture sensitivity to guide antibiotic regime in recurrent/ complicated cases

Patient education to refrain from indigenous (oil/ hot water/ acid etc) ear treatments

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

ABBREVIATIONS

CT: Computerized Tomogram
MRI: Magnetic Resonance Imaging
AOM: Acute Otitis Media
CSOM: Chronic Suppurative Otitis Media
EAC: External Auditory Canal
URI: Upper Respiratory Infection

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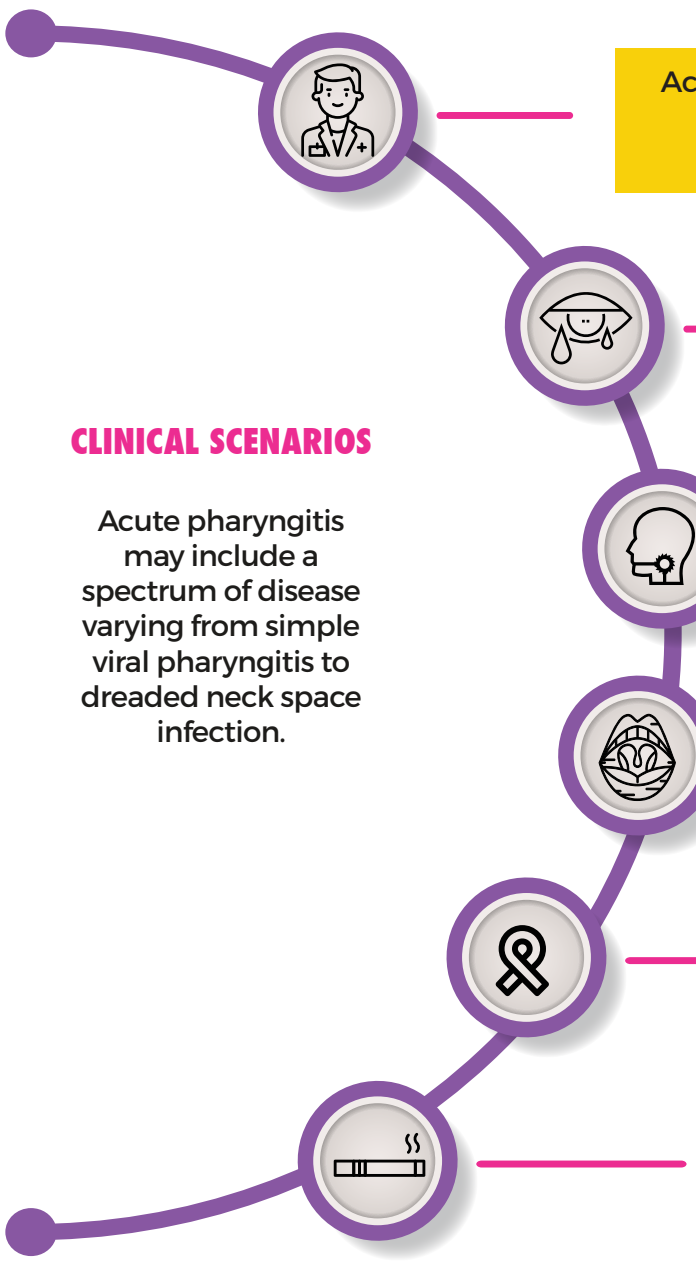
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Standard Treatment Workflow (STW) for the Management of PHARYNGITIS AND SORE THROAT

ICD-10-J02

CLINICAL SCENARIOS

Acute pharyngitis may include a spectrum of disease varying from simple viral pharyngitis to dreaded neck space infection.



- Acute onset of throat pain with or without – Fever, tonsillo-pharyngeal exudates, odynophagia and tender cervical lymphadenopathy is typically seen in **bacterial pharyngitis** Streptococcal (GABHS) pharyngitis is the commonest cause of bacterial pharyngitis
- Rhinitis, conjunctivitis, skin or mucosal rashes point towards a **viral etiology**. Pharyngitis and sore throat may be the initial symptoms in epidemics of flu
- Sore throat followed by high grade fever, cough, drooling, lymphadenopathy, breathing difficulty suggest Epiglottitis or Laryngotracheobronchitis, especially in pediatric patients
- An adherent membrane extending beyond the tonsillar confines with toxaemia suggests **Diphtheria**
- Pharyngitis with generalized lymphadenopathy is consistent with **Infectious Mononucleosis**(IM)
- Smoking and GERD are common causes of non-infective pharyngitis

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

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			

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
- Agranulocyosis
- Epidemic of flu

INVESTIGATIONS

ESSENTIAL	OPTIONAL	DESIRABLE
Throat swab for culture, routine hemogram including total and differential leukocyte counts and peripheral smear to look for atypical lymphocytes (seen in IM).	GABHS rapid antigen detection test (RADT)	Lab tests to rule out EB Virus, Coxsackie virus, Herpes virus, fungal or Gonococcal pharyngitis

MANAGEMENT

PHC / PRIMARY LEVEL

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 antibiotic of choice
6. Parenteral antibiotics (Ceftriaxone/ cefotaxime) and steroids are to be started when the airway is compromised due to suspected epiglottis/ Croup.

DISTRICT HOSPITAL

Management of complication e.g.
- Deep neck space infection
- Diphtheria
- Epiglottitis
- Croup

FOLLOW UP SERVICES

Recurrent (more than 7 episodes in previuos 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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NEPHROLOGY

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Standard Treatment Workflow (STW)

ACUTE KIDNEY INJURY

ICD-11-GB60

WHAT IS AKI?

Increase in serum creatinine ≥0.3 mg/dL in 48 hours OR
≥1.5× baseline within 7 days AND/OR
urine output <0.5 mL/kg/h for 6 hours.

*Criteria should be applied after excluding urinary obstruction

SYMPTOMS

- Reduced urine output
- Dark, concentrated urine
- Swelling over feet/face
- Breathlessness
- Nausea, vomiting, reduced appetite
- Confusion or altered sensorium

AKI RISK INCREASES IN THE PRESENCE OF

- Hypotension
- Volume loss (eg: vomiting, diarrhea, bleeding)
- Heat exposure or heat stroke
- Low effective arterial volume (Heart failure, decompensated liver disease)
- Nephrotoxic/ indigenous drug use
- Plant and chemical toxins
- Radio contrast exposure
- Infections
- Animal bites/ stings
- In neonates - oligohydramnios/birth asphyxia, respiratory distress
- Hemolysis
- Rhabdomyolysis (Post trauma)
- Pregnancy-related complications
- Multiorgan failure

PRINCIPLES OF ASSESSMENT

- Careful review of history and medications
- Determine whether pre-renal, renal or post-renal
- Identify and correct reversible factors
- Look out for occult causes (e.g. envenomations, poisoning)
- Determine severity of AKI
- Determine whether community acquired or hospital acquired

PRELIMINARY ACTIONS

- Monitor urine volume & body weight
- Identify and treat complications
- Correct hydration status
- Stop nephrotoxic drugs
- Exclude urinary outflow obstruction
- Stabilize blood pressure
- Treat infection
- Assess dialysis need
- Optimize blood sugar level

DESIRABLE ACTIONS/INVESTIGATIONS

- Stage AKI (KDIGO criteria*)
- Check electrolytes, acid-base status Including serum calcium, phosphate, and uric acid
- Urinalysis- if proteinuria, hematuria rule out glomerulonephritis
- CBC- hemolysis, low platelets- suggets TMA
- Rule out pre-existing kidney disease
- Ultrasound of KUB region
- Assessment for infection
- Laboratory investigation for specific cause
- CPK level in suspected rhabdomyolysis
- LDH, bilirubin for hemolysis
- ECG, Chest X-ray

AKI IN SPECIFIC SETTINGS

- Neonatal - refer to paediatrician
- Pregnancy - manage complications
- Envenomations - antisnake venom, hemodynamic correction
- Poisoning - specific antidote when available
- Systemic disease - refer for investigations
- Kidney transplant recipient - refer to nephrologist

TREATMENT OF HYPERKALEMIA

- 10 ml of 10% calcium gluconate over 2-5 minutes slow IV under ECG monitoring, can be repeated upto 3 times
- Inhaled Salbutamol : 10mg (4 respules of 2.5ml Salbutamol)
- Insulin-dextrose: 10U in 50ml of 50% dextrose or 100ml of 25% dextrose
- Avoid high potassium diet
- Withold medication likely to contribute to hyperkalemia (ACEi/ARB)
- Urgent dialysis if life threatening
- Potassium binders if dialysis unavailable

MANAGEMENT

PRIMARY CARE

- Detailed history and physical examination
- Identify and correct volume deficit
- Stop nephrotoxic agents
- Identify and correct bladder outlet obstruction
- Give anti-snake venom if indicated
- Identify hyperkalemia and start treatment
- IV loop diuretics if fluid overload
- Oxygen if pulmonary edema
- PD if indicated
- Timely referral after stabilisation

SECONDARY CARE

- As in primary care
- Admit to healthcare facility, identify and correct urinary tract obstruction (USG, CT)
- Detailed investigation for infections
- Manage pregnancy complications - deliver if indicated
- Look for underlying CKD
- Dialysis (PD or HD)
- Evaluate volume status
- Viral screening for dialysis initiation
- Blood grouping and typing
- Baseline Chest X-ray and ECG
- Look for any life threatening complications
- Admission for stabilization and further evaluation

TERTIARY CARE

- All interventions as in secondary care
- Admission for stabilisation and further evaluation
- Kidney biopsy if indicated
- Multidisciplinary consultation as indicated
- Dialysis (PD or HD or CRRT)
- Plasma Exchange where indicated

RED FLAGS FOR URGENT REFERRAL

- Indications for dialysis
- Unexplained AKI
- Involvement of other organs
- Sepsis
- Systemic disease
- Complicated pregnancy
- Post Transplant

INDICATIONS FOR DIALYSIS

- **A**cidosis- refractory
- **E**lectrolyte disturbance- hyperkalemia
- **I**ntoxications
- **O**verload - refractory
- **U**remic encephalopathy pericarditis

FOLLOW-UP OF AKI

- UO > 1L, stable or falling creatinine, no symptoms: stop dialysis
- Not resolving for >2 weeks: CECT to exclude cortical necrosis; kidney biopsy as indicated
- Look for systemic diseases (e.g. vasculitis, myeloma, TMA)
- Serum creatinine and urine protein q 6-12 months for life

ABBREVIATIONS

AKI: Acute Kidney Injury
CECT: Contrast-enhanced CT scan
PD: Peritoneal dialysis
TMA: Thrombotic microangiopathy
CKD: Chronic Kidney Disease
HD: Hemodialysis
UO: Urine output
USG: Ultrasonography

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STOP AKI: ACT FAST, PROTECT KIDNEYS

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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)

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

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)

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

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

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

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

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

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EARLY RECOGNITION. DECISIVE ACTION. PREVENT COMPLICATIONS

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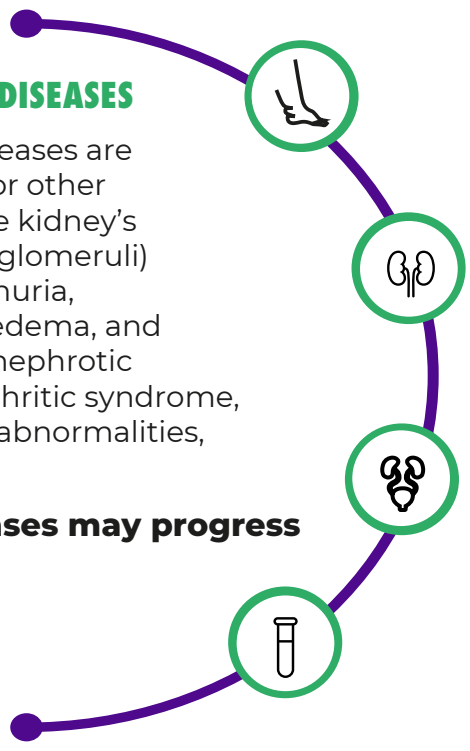
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Standard Treatment Workflow

GLOMERULAR DISEASES

ICD-11-N005.9



GLOMERULAR DISEASES

Glomerular diseases are inflammatory or other disorders of the kidney's filtering units (glomeruli) causing proteinuria, hematuria, or edema, and presenting as nephrotic syndrome, nephritic syndrome, RPGN, urinary abnormalities, AKI, or CKD.

Untreated cases may progress to ESKD

IDENTIFY THE SYNDROME

Syndrome	Key Features
Nephrotic Syndrome	Edema, frothy urine, hypoalbuminemia, hyperlipidemia. **Proteinuria (Nephrotic Range):** **Adults:** >3.5 g/1.73 m²/day or spot urine PCR >3 g/g **Children:** > 1000 mg/m2 per day or spot urine PCR >2 g/g
Nephritic Syndrome	Cola-coloured urine, oliguria, edema, hypertension, Hematuria (± RBC casts), no or mild proteinuria
Rapidly Progressive Glomerulonephritis	Rapid increase of Serum Creatinine within days to weeks. May have constitutional symptoms, e.g. pulmonary hemorrhage, fever, joint pains
Asymptomatic Urinary Abnormalities	Isolated proteinuria or hematuria, usually detected on screening. Repeat urine microscopy, dipstick, proteinuria quantification Refer to nephrologist if abnormalities persist

NEPHROTIC SYNDROME

Common Causes

Children: Minimal Change Disease (most common, steroid-responsive)

Adults: Minimal Change Disease, FSGS, Membranous Nephropathy, Diabetic Nephropathy, Lupus Nephritis

Key Tests

- Urine Microscopy
- Proteinuria quantification
- Serum albumin
- Lipid profile
- ANA, anti-dsDNA, C3, C4
- Anti-PLA2R
- Hepatitis B/C, HIV
- Myeloma profile (SPEP, serum free light chain assay)
- Blood Sugar F/PP
- Kidney Biopsy: as per indication
- Other tests as per clinical context

Management PHC Level/CHC Level

- Salt restriction
- Loop diuretics for edema (monitor Na+/K+; consider loop + thiazide for resistant edema; aim for 0.5–1 kg/day weight loss in adults)
- ACEi/ARB for proteinuria reduction Statins for dyslipidemia

District hospital/Tertiary level

- Steroid Protocol: To be done by specialised team
- Children: Prednisolone 2 mg/kg/day (max 60 mg) × 6 weeks → 1.5 mg/kg (max 40 mg) on alternate days × 6 weeks
- Adults: Treatment should be done as per kidney biopsy reports
- Thromboprophylaxis if albumin <2.5 g/dL

Special Paediatric Precautions

- Screen for TB before steroid initiation (Mantoux, CXR)
- Avoid live vaccines during and 3 months after steroids
- Regular growth and BP monitoring
- Avoid ACEi/ARB in steroid-sensitive cases with normal kidney function
- Relapses may occur, hence look for proteinuria during intercurrent illness
- Steroids in intercurrent ilness

NEPHRITIC SYNDROME

Common Causes
Post-infectious GN, HSP (children) IgA nephropathy, lupus nephritis, vasculitis

Key Tests
Urinalysis (RBCs, RBC cast, protein)
Serum creatinine
C3/C4, ANA, anti-dsDNA
ASO titre (if H/o sore throat or skin lesions)

Management PHC Level/CHC Level
BP control (<130/80 adults; <95th percentile children)
Supportive fluid management
Avoid NSAIDs/nephrotoxins
Treat underlying cause
Refer if unresponsive or atypical

RAPIDLY PROGRESSIVE GLOMERULONEPHRITIS (RPGN)

Definition:
Rapid renal decline (doubling of creatinine within days–weeks)

Causes:
ANCA vasculitis, anti-GBM disease, lupus nephritis, severe IgA nephropathy , Pauci-immune Glomerulonephritis

Key Tests:
Urinalysis, serum creatinine
ANCA (anti PR3, anti MPO titres), anti-GBM, ANA, anti-dsDNA, complements C3, C4, CXR
Look for coexisting diseases

Management
PHC Level/CHC Level
Immediate nephrology referral
District hospital/Tertiary level
Kidney Biopsy
IV methylprednisolone 500–1000 mg × 3 days
Cyclophosphamide/rituximab ± plasmapheresis

REFERRAL TO NEPHROLOGIST (DISTRICT HOSPITAL OR NEAREST AVAILABLE CENTRE)

Immediate – Same Day (Red Flag Signs)

Rapidly Progressive Glomerulonephritis

Pulmonary-renal syndrome

Suspected peritonitis in nephrotic syndrome

Hypertensive emergency

Pregnancy

Red Flag Signs

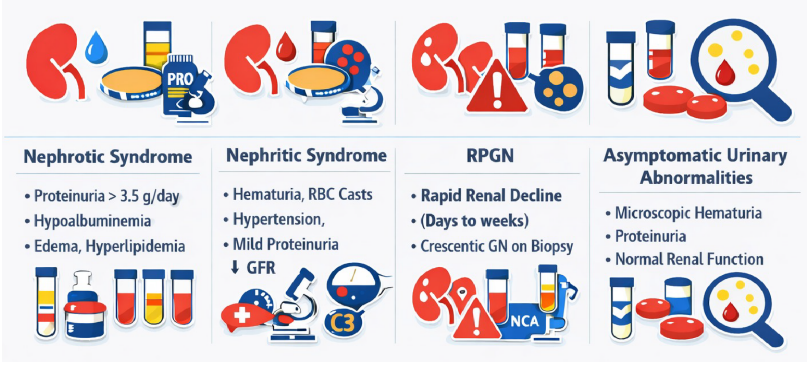
- Respiratory distress
- Severe abdominal pain
- Unilateral limb swelling
- Oliguria or anuria
- Seizures
- Hypotension
- Acute febrile illness

Look for complications

- Malnutrition
- Hypovolemia
- AKI
- Thromboembolism
- Infections

General Management Principles

- Maintain BP target <130/80 mmHg (adults) or <95th percentile (children)
- Restrict salt (unless paediatric without edema)
- Reverse edema gradually to prevent hypovolemia
- Avoid NSAIDs and aminoglycosides
- Maintain adequate nutrition and encourage physical activity



Infection Prevention

- Update Vaccinations before starting immunosuppressive therapy, if possible
- Pneumococcal and annual inactivated influenza vaccines are safe and recommended
- Maintain strict hygiene (handwashing, safe food and drinking water)
- While on immunosuppressive therapy, avoid crowded areas and wear mask

Monitor regularly

- BP & weight - each visit
- Urine Examination - monthly
- Serum creatinine and eGFR- (1–3 month) (more often in active disease)
- Monitor growth in children every 6 months
- Eye evaluation for posterior subcapsular cataract every 6 months

ABBREVIATIONS

ACR: Albumin-to-Creatinine Ratio
AKI: Acute Kidney Injury
ANA: Antinuclear Antibody
ACEi: Angiotensin-Converting Enzyme Inhibitor
C3/C4: Complement C3 and C4
CKD: Chronic Kidney Disease
dsDNA: Double-Stranded DNA
eGFR: Estimated Glomerular Filtration Rate
ESKD: End-Stage Kidney Disease
FSGS: Focal Segmental Glomerulosclerosis
HSP: Henoch-Schonlein Purpura
MCD: Minimal Change Disease
NSAIDs: Non-Steroidal Anti-Inflammatory Drugs
RPGN: Rapidly Progressive Glomerulonephritis
SPEP: Serum Protein Electrophoresis

REFERENCES

1. KDIGO 2021 Clinical Practice Guidelines for the management of Glomerular Diseases, available at www.kdigo.org

GLOMERULAR DISEASES: DETECT EARLY, TREAT TIMELY, PREVENT CKD/ESKD

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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 10^5/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

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

PREGNANCY UTI

- 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

CAUTI

- 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

PROSTATITIS

- 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

RECURRENT UTI

- 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)
CAUTI: Catheter-Associated Urinary Tract Infection
DMSA: Dimercaptosuccinic Acid
HPF: High-Power Field
MCUG: Micturating Cystourethrogram
USG: Ultrasonography
VUR: Vesicoureteral Reflux
WBC: White Blood Cells

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☛ UTI IS A CLINICAL DIAGNOSIS - DO NOT CULTURE ROUTINELY

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Standard Treatment Workflow

HEMODIALYSIS

ICD-11-N005.9

WHEN TO START HD — REMEMBER "AEIOU"

- A - Acidosis: severe metabolic acidosis not responding to treatment
- E - Electrolytes: refractory hyperkalaemia/ECG changes.
- I - Intoxication: a dialysable poison or drug.
- O - Overload: fluid overload / pulmonary oedema not responding to diuretics.
- U - Uraemia: uraemic pericarditis, encephalopathy, bleeding or intractable symptoms.
- Planned CKD start: for uraemic symptoms as function declines (≈ eGFR 5–10) — not by a number alone; decide with nephrology **P** **S**

RED FLAGS — STABILISE & REFER

URGENT - stabilise & arrange emergency dialysis / refer:

- Refractory hyperkalaemia/ECG changes - give IV calcium, insulin – dextrose, salbutamol, then dialyse
- Pulmonary oedema not responding to diuretics; severe acidosis/uraemic emergency
- Air embolism, haemolysis, anaphylaxis (intradialytic emergencies)
- Clotted/failing access (no thrill) or uncontrolled access bleeding; CRBSI/ sepsis

Also refer (non-urgent):

- Access creation / salvage & vein mapping
- Inadequate dialysis or repeated intradialytic hypotension; transplant work-up

INFRASTRUCTURE

- Trained staff (nephrology nurses/technicians)
- Water purification system for dialysate
- Waste management (biomedical waste protocol)

BASELINE WORKUP

- CBC, RFT, LFT; Ca, Phosphate, iPTH
- Hepatitis B & C and HIV status
- Blood group
- Others as clinically indicated

SHARED DECISION MAKING

- Elicit goals of care
- Choose KRT modality - including conservative kidney management (CKM)
- If choosing HD → consider HDF and dialyser type (low- or high-flux)

SELECTION & ACCESS

Kidney failure/AEIOU indication **P** **S**

- No → Plan access early- Fistula First-refer for AVF when dialysis is fore-seeable. Preserve veins **P** **S**
- Yes → Stabilise + urgent dialysis/refer (temporary catheter if no access) **T**

↓

Access order: AVF > AV graft > tunnelled catheter > temporary catheter (IJV; avoid subclavian) **T**

↓

Vein preservation: no IV/venipuncture/ BP cuff on the fistula arm-mark "Save This Arm" **P** **S**

↓

Start vaccination for HBV. Anemia, bone mineral disease, nutrition, BP, glycaemia reviewed **P** **S**

A SAFE SESSION

Before session: weight & weight gain, BP, breathlessness, oedema; examine access **P** **S**

↓

AVF/Graft- look, feel thrill, listen bruit, check redness. Catheter exit site- clean/dry, aseptic handling **S** **T**

↓

Machine & circuit checks; right patient/ dialyser/dialysate; hand hygiene; aseptic cannulation/connection **S** **T**

↓

Start — prescription set by nephrology: blood flow, dialysate, time (~4 h ×3/wk), UF to dry weight, anticoagulation **S** **T**

↓

New, severely uraemic patient → start short, gentle sessions to avoid disequilibrium **S** **T**

MONITOR & ADEQUACY

Monitor every 30–60 min: BP, pulse, symptoms, access/circuit; keep UF rate safe (avoid very high UF) **P** **S**

↓

Access pressure, circuit clotting watch -post dialysis needle site bleeding **T**

↓

Any intradialytic problem?

- No → Complete session; record UF, postweight, BP; review **P** **S**
- Yes → Manage per complications panel →escalate if severe **T**

↓

Adequacy: track Kt/V or URR periodically - if inadequate, refer for prescription review **S** **T**

TIP- counsel on cost if needed and transport

MANAGING COMPLICATIONS

A. Hypotension — the commonest event

◆ * Fall in BP ± dizziness, cramps, nausea?

↓

Stop/reduce UF · lay head-down · give saline 100–250 mL · reduce blood flow · oxygen if needed. Find cause: too-fast UF, dry weight too low, cardiac, sepsis, eating, BP meds **P** **S**

↓

Not improving / chest pain/arrhythmia → refer **T**

B. Intradialytic hypertension

Paradoxical BP rise during/after dialysis → check fluid status & dry weight, review drug adherence; consider a short-acting antihypertensive **P** **S**

C. Cramps/nausea/headache & disequilibrium

Cramps/nausea/headache — usually from hypotension/fast UF → reduce UF, give saline. Disequilibrium (new severe uraemia: confusion ± seizures) → prevent with short gentle starts; if it occurs → slow/stop, support, refer. **S** **T**

D. Air embolism — EMERGENCY

Clamp venous line, STOP pump. Lay on left side, head-down; give oxygen; resuscitate; refer now. **T**

E. Haemolysis — EMERGENCY

Port-wine blood, chest/back pain. Stop dialysis; DO NOT return blood. Support; check K^+; refer **T**

F. Fistula/graft problems

No thrill / no bruit, or new pain & swelling?

↓

Possible clotted/failing access → refer urgently (salvage is time-sensitive). Post-needle bleeding → firm pressure; if not stopping → refer. **T**

G. Catheter bloodstream infection (CRBSI)

Fever/rigors during or after dialysis in a catheter patient?

↓

Blood cultures (catheter + peripheral). Start empirical IV antibiotics covering gram-positive (incl. MRSA) + gram-negative per local protocol.
Refer - catheter may need removal. **S** **T**

H. Bloodborne infection control — every session

Hand hygiene & gloves; no shared multidose vials/supplies; clean station between patients.
Dedicated machine / area for HBsAg-positive; safe sharps; staff HBV vaccination. **P** **S**

VASCULAR ACCESS CARE

- Prepare the site properly before cannulation
- Use the rope-ladder cannulation technique (rotate sites)
- Ensure post-HD haemostasis (stop needle-site bleeding)
- Wear a mask for central venous catheter (CVC) use

INFECTION CONTROL

- Proper use of PPE (gloves, gown, mask, eye protection)
- Protocols for cleaning & disinfecting surfaces and equipment between patients

AUDITS

Track and review regularly:

- Infection rates & vaccination uptake
- Hospitalisations, drop-outs & deaths
- Complications (intradialytic & access)

PATIENT & CAREGIVER EDUCATION

Attend every session and control fluid - this matters most

- Don't skip sessions (risk: high K, overload)
- Limit fluid between sessions
- Diet: low potassium & phosphate, less salt
- Adequate protein; binders with food
- BP/anaemia/bone medicines as advised
- Protect the access arm; feel thrill daily
- Keep catheter dry & covered
- Warning signs: breathlessness, swelling, bleeding, no thrill, fever → seek care

INTERDIALYTIC CARE, INFECTION CONTROL & FOLLOW-UP

Access care

- Feel the thrill daily; report loss of thrill, pain, redness or bleeding at once **P** **S**
- Keep catheter dry & covered; aseptic handling only

Between sessions

- Keep to fluid & diet limits; take medicines; attend every session **P** **S**

Infection control & monitoring

- Clean station; no shared vials; HBsAg-positive on a dedicated machine.
- Periodic viral markers, Kt/V/URR, haemoglobin, Ca–PO_4–PTH, dry-weight review **S** **T**

HD IN ACUTE/LIMITED SETTINGS

Track and review regularly

- For unstable patients, SLED or gentler settings reduce hypotension **S** **T**
- If HD not available & patient can't be moved: stabilise hyperkalaemia & overload medically (calcium, insulin–dextrose, salbutamol, restrict fluid) & refer
- Consider acute peritoneal dialysis as a bridge **P** **S**

ABBREVIATIONS

AKI: Acute Kidney Injury
AVF: Arteriovenous Fistula
CKD: Chronic Kidney Disease
CRBSI: Catheter-Related Bloodstream Infection
ESA: Erythropoiesis-Stimulating Agent
HBsAg/HCV/HIV: Viral Markers
HD: Haemodialysis
IJV: Internal Jugular Vein
KRT: Kidney Replacement Therapy
Kt/V & URR: Adequacy Measures
P/S/T: Primary/Secondary/Tertiary
PD: Peritoneal Dialysis
SLED: Slow Low-Efficiency Dialysis
UF: Ultrafiltration

A ROADMAP FOR SAFE, EFFECTIVE AND STANDARDIZED HEMODIALYSIS

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Standard Treatment Workflow

PERITONEAL DIALYSIS

ICD-11-QB94.2

WHY & WHEN TO CONSIDER PD

- PD is as effective as haemodialysis (HD) in properly selected patients.
- Prefer PD when the patient still passes good urine (>200-500 mL/day-good residual kidney function).
- Often the only maintenance option (besides home HD) when all HD access has failed or for home-bound patients.
- Home-based therapy done by patient/caregiver after training-suits long travel, cost and HD slot limitation
- Counselling is the key to PD being chosen and continued **P** **S**

RED FLAGS - ACT & REFER

- REFER NOW - treat catheter removal as an EMERGENCY when
- Peritonitis not responding by ~5 days
- Peritonitis with exit-site / tunnel infection together
- Tunnel infection (usually needs catheter removal)
- Recurrent / relapsing peritonitis, or culture-negative & not improving (think TB / fungal)

Also refer (non-urgent):

- Catheter insertion & structured PD training
- Poor ultrafiltration / uraemia → prescription change
- Mechanical problem or pleuro-peritoneal shunt; decision to switch to HD

CLINICAL PATHWAY

PATIENT SELECTION

Kidney failure needing maintenance KRT **P** **S**
↓
Assess PD suitability: abdomen, home support, comorbidities **P** **S**
↓
Any contraindication to PD?

- No → Counsel patient & family; take informed consent **P** **S**
- Yes → Consider HD/other KRT, or refer nephrology to re-evaluate

↓
Refer to a centre with an established PD programme for catheter insertion & training **T**

INSERTION & START

PD catheter inserted **S** **T**
↓
Urgent need & no HD access? (or bloody effluent / adhesion risk)

- No → Wait ~2 weeks for exit-site & insertion to heal, then start
- Yes → Early-start PD — low volumes, supine; nephrology-led **T**

↓
Peri-catheter leak at any time → rest the catheter 2–4 weeks **S** **T**

START & MONITOR

Start PD prescription — begin with the lowest dextrose concentration **S** **T**
↓
Serial clinical + biochemical review. Track weight, urine output, symptoms (optimising may take up to 4 weeks) **P** **S**
↓
Worsening uraemia or fluid overload (poor UF)?

- No → Continue current prescription; keep monitoring **P** **S**
- Yes → Refer nephrologist for prescription change **T**

SELECTION CHECKLIST

Suitable for PD if

- Wants home therapy / lives far from a unit
- Willing, able caregiver or can self-perform
- Clean space, water & storage at home
- Good residual urine; or HD access exhausted

Caution /re-evaluate if

- Abdominal wall defect / large hernia / ostomy
- Active abdominal sepsis or inflammation
- Severely distorted anatomy / many adhesions
- No home support & cannot self-perform

INDIA Most are relative — discuss with nephrology first. Most CKD here is diabetic (PD usually still fine — watch glucose). Screen/treat abdominal TB before starting; counsel on monthly cost & supply

PRE-PROCEDURE PREP

Before insertion

- Confirm modality & consent **P** **S**
- Choose insertion method based on training & skills: Percutaneous (Nephrologist) in naïve abdomen or surgical method (preferred if prior surgery/adhesions/reinsertion)
- Chest X-ray before insertion
- Treat constipation; empty bladder; mark exit site

At insertion-infection control

- Prophylactic IV antibiotic just before/during - e.g. Inj. Vancomycin 1 g IV **S** **T**
- Strict aseptic technique throughout

HOME MONITORING SHEET

Patient/caregiver records daily — bring to every visit:

- Body weight
- Ultrafiltration (UF) — fluid removed each exchange
- Urine output
- Blood pressure & swelling (fluid-overload signs)
- Effluent appearance — clear vs cloudy

TIP: If a lab is far, teach the family to photograph a cloudy bag and call early — cloudy effluent = suspect peritonitis

MANAGING COMPLICATIONS

A. Peritonitis — catch early

Cloudy effluent and/or abdominal pain ± fever?
↓
1. Send effluent for cell count + culture if lab available. 2. Start empirical antibiotics without delay per local protocol - intraperitoneal (IP) preferred; IV if severe sepsis **P** **S** **T**
↓
Always examine exit site & tunnel at the same time **P** **S**
↓
Not better by ~5 days, recurrent, or exit/tunnel also infected?

- No → Complete full antibiotic course; review
- Yes → Refer — may need catheter removal (EMERGENCY) **T**

B. Exit-site infection

Discharge / redness at exit site → oral antibiotics (e.g. ciprofloxacin). Not settling or tunnel involved → refer.

INDIA Relapsing or culture-negative peritonitis not responding → think tuberculous or fungal peritonitis → refer

C. Tunnel infection

Redness/swelling/tenderness over tunnel → Refer - usually needs catheter removal **T**

D. Poor inflow/outflow

Treat constipation first (common cause). Do a quick in/out test — in 10–20 min, out 20–30 min, most fluid returns → obstruction unlikely. Abnormal / suspected → refer **P** **S**

E. Pleuro-peritoneal shunting

Poor UF + new/worsening pleural effusion → diagnose by pleural tap showing very high glucose (use diluted samples) → refer **S** **T**

F. Catheter malposition/omental wrap

Tip wandered out of pelvis or omentum wrapped → common cause of poor flow → usually needs surgery → refer **T**

Catheter re-insertion after removal

- Removed for infection → re-insert after treatment + 4-week wait (selected treated repeat-peritonitis: same-sitting exchange — nephrology decision).
- Removed for mechanical reason → can re-insert in the same sitting **T**

PATIENT & CAREGIVER EDUCATION

Training is the cornerstone of successful PD.

Every patient/caregiver must learn

- Hand hygiene before every exchange
- Clean exchange technique
- Daily exit-site care & dressing

Re-train after

- Any peritonitis / catheter infection
- A long break from therapy
- Keep the monitoring sheet
- Spot warning signs: cloudy bag, pain, fever, exit redness
- Store fluids; know whom to call
- Any change of caregiver
- Any technique error seen

DAILY CARE, INFECTION CONTROL & FOLLOW-UP

Daily catheter care

- Hand hygiene before handling the catheter; clean, dry exit-site care.
- Report redness, discharge, pain or cloudy effluent early **P** **S**

Intercurrent illness/procedures

- Do procedures on an empty abdomen (drain PD fluid first).
- Prophylactic antibiotics before invasive procedures that breach mucosa (dental, endoscopy) **P** **S**

When to switch PD → HD

- UF failure not fixable by prescription change; or unfavourable membrane after repeated peritonitis **S** **T**

PD IN ACUTE SETTINGS

A life-saving skill for AKI/CKD patients who cannot be referred — disasters, conflict, or unfit to transport

- A stiff or soft peritoneal dialysis catheter can be placed at the bedside **S** **T**
- Use clean technique; start low volumes and watch for leak/pain

ABBREVIATIONS

AKI: Acute Kidney Injury
CKD: Chronic Kidney Disease
HD: Haemodialysis
IP: Intraperitoneal
ISPD: International Society for Peritoneal Dialysis
IV: Intravenous
KRT: Kidney Replacement Therapy
P: Primary
PD: Peritoneal Dialysis
S: Secondary
T: Tertiary
TB: Tuberculosis
UF: Ultrafiltration

REFERENCES

1. ISPD Guidelines - International Society for Peritoneal Dialysis https://ispd.org/guidelines

CLEANING YOUR BLOOD, CLEARING THE WAY FOR A BETTER LIFE

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NEUROLOGY

October/ 2019

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Standard Treatment Workflow (STW) for the

APPROACH TO ACUTE PARALYSIS

ICD 10 G82, G83

PRESENTATION WITH ACUTE ONSET (WITHIN HOURS TO DAYS) PARAPLEGIA OR QUADRIPLEGIA

Are There Any Signs Of Upper Motor Neuron (UMN) Involvement?

- **Brisk reflexes**
- **Extensor plantar**
- **Increased tone**
- **Sensory level**
- **Bladder or bowel incontinence**

YES

Likely to be :
- Acute myelopathy like tuberculosis
- Trauma
- Tumor
- Transverse myelitis
- Epidural abscess
- Spinal cord stroke

MANAGEMENT
- Check pulse, BP and respiration
- If retention of urine present then catheterize
- Transfer/ refer to nearest district hospital/ medical college with MRI facility
- Treatment will depend on MRI and other investigation
- After treatment follow up at CHC for medications and rehabilitation

NO

Is the weakness predominantly proximal or distal?

WEAKNESS DISTAL

Presence of Lower Motor Neuron (LMN) signs like wasting, absent reflexes and sensory impairment

Likely to be :
Acute onset peripheral neuropathy (due to toxin/drug)

MANAGEMENT
- Transfer/ refer to nearest district hospital/ medical college with NCS and EMG facilities.
- CSF for cells and biochemistry
- Treatment as per diagnosis
- After treatment follow up at CHC for medications and rehabilitation

WEAKNESS PROXIMAL

REFLEXES ABSENT

Likely to be :
- Guillain Barre Syndrome (GBS) or
- Hypokalemic periodic paralysis.

MANAGEMENT
- Check pulse, BP and respiration
- Check serum K^+ levels
- Intubate if unable to complete sentences, single breath count low and breath holding time low and chest expansion poor
- Transfer/ refer to nearest District Hospital/ medical college with facility for doing plasma exchange or giving IVIg and presence of ventilator.
- After treatment follow up at CHC for medications and rehabilitation

REFLEXES PRESENT

If the weakness is fatigable
or
If extra ocular movements are affected

Likely to be :
- Myasthenia gravis or
- Snake bite

MANAGEMENT
- Check pulse, BP and respiration
- Intubate if unable to complete sentences, single breath count low and breath holding time low and chest expansion poor
- Transfer/ refer to nearest district hospital/ medical college with facility for doing NCS, plasma exchange or giving IVIg and presence of ventilator.
- After treatment follow up at CHC for medications and rehabilitation

If no sensory impairment and normal extra ocular movements

Likely to be :
- Myopathy (eg polymyositis)

MANAGEMENT
- Check pulse, BP and respiration
- Check serum electrolytes, creatine kinase
- Transfer/ refer to nearest district hospital/ medical college with facility for NCS & EMG
- After treatment follow up at CHC for medications and rehabilitation

ADMISSION CRITERIA
- Any progressive weakness
- Unable to walk
- Unable to swallow or choking while drinking water
- Evidence of respiratory distress like unable to complete sentences, falling serial single breath count, respiratory rate >20 or SaO2 levels < 95%
- Persistent tachycardia >100
- Fever
- Bowel and bladder involvement

DISCHARGE CRITERIA
- Cause of acute paralysis established
- Progression of weakness has stopped
- Able to breathe on his own
- If present care of tracheostomy taught to care giver
- If not swallowing- Ryles tube in place and care giver has been taught feeding
- Care of urinary catheter and constant turning taught to the patient
- Caregiver trained for physiotherapy at home

☛ KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

DEMENTIA

ICD 10 - F02,F03,G30

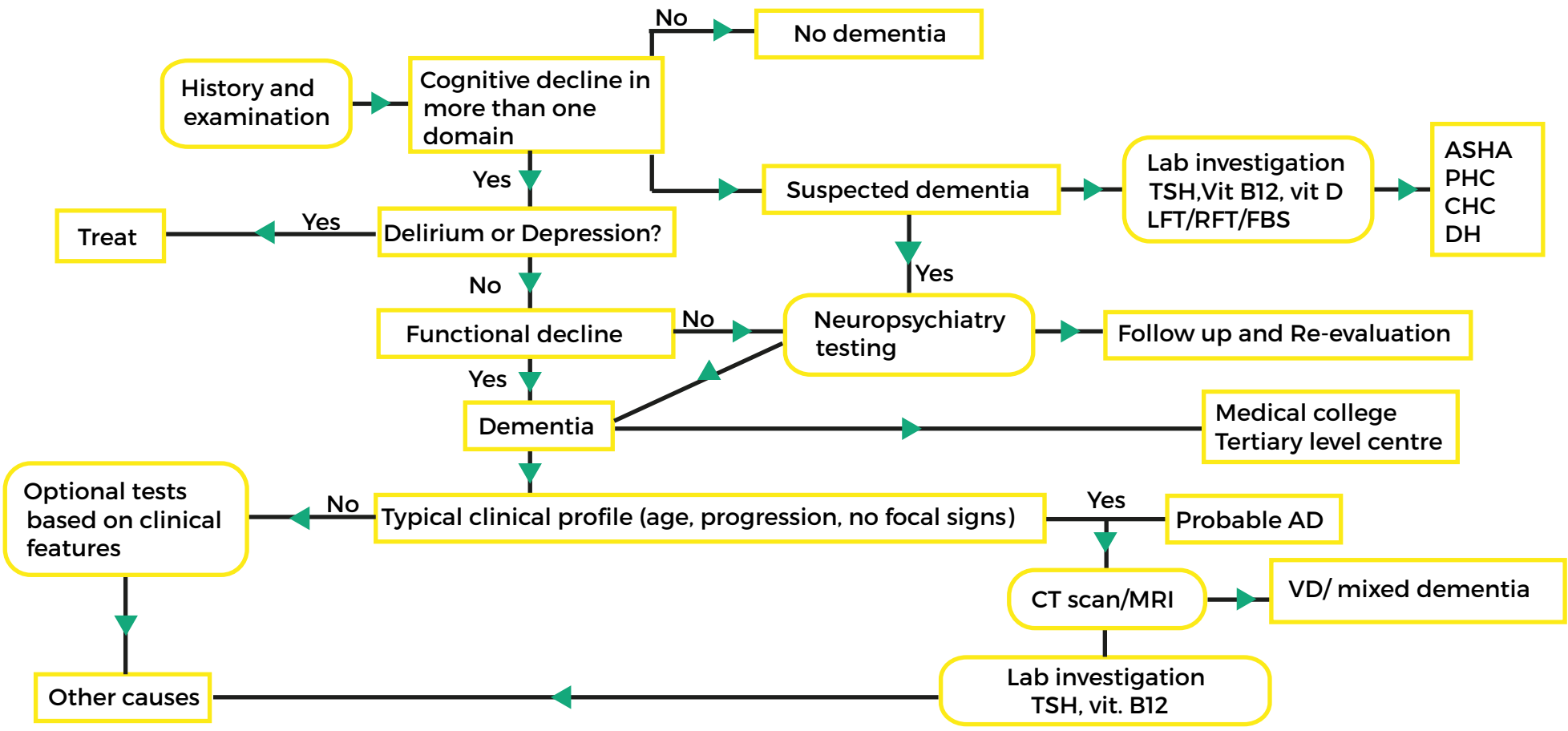
CLINICAL FEATURES OF DEMENTIA

- Impaired memory
- Anxiety
- Hallucinations
- Incontinence
- Apathy
- Agression
- Mood fluctuations
- Forgetting learned activities
- Depression
- Sleep disturbances
- Personality change

IMPORTANT POINTS TO CONSIDER

- Dementia is a complex and variable condition
- No single test will definitively diagnose dementia
- The clinical features if present, should be a change from baseline normal functioning in a middle aged to old person
- Assessment should aim at gathering information about changed behaviours, functional capacity, psychosocial support and medical comorbidities
- History should be taken from a close caregiver, staying with the patient for a longer duration than the appearance of symptoms

EVALUATION OF DEMENTIA



FOLLOW UP OF DIAGNOSED & TREATED PATIENTS INTERVENTION MATRIX FOR DEMENTIA ACROSS PLATFORMS OF CARE

PRIMARY HEALTH CENTRE (MEDICAL OFFICER)

- Diagnose dementia after detailed history
- Screening for:
  - Treatable causes of dementia - thyroid disorders, B-12 deficiency, subdural hemorrhage.
  - Depression.
  - Vascular risk factors
- Lab investigations- CBC, biochemistry, liver function tests, hemogram, lipid profile, TFT, VDRL, vit B12 level, vit D level
- Referrals for MRI/CT
- Initiation of treatment/drugs; treatment for co-morbid conditions (including depression, vision, hearing deficits and gait problems), thyroid, arthritis.
- Initiate therapy for vascular risk factors
- Encourage healthy lifestyle
- Assess for palliative care
- Learn and share facts about dementia to provide immediate need to the person with severe dementia
- Follow up and monitor for side effects of drugs/ red flags in patient/ signs of danger
- Follow-up of difficult patients under the guidance of higher centre.

DISTRICT HOSPITAL (SPECIALIST- PHYSICIAN/ GERIATRIC SPECIALIST/ NEUROLOGIST/ PSYCHIATRIST)

- Careful evaluation of all the referral patients of dementia
- Screening for treatable causes for dementia including normal pressure hydrocephalus, B12 deficiency, hypothyroidism, chronic meningitis
- Neuroimaging CT/MRI- to rule out subdural hematoma/ tumors/ NPH(surgically remediable causes of rapid cognitive decline)
- Lab investigations- CBC, liver function tests, biochemistry, hemogram, lipd profile, vit D levels, TFT, VDRL, retrovirus after counselling (whenever feasible and high index of suspicion)
- All the points mentioned in PHC to be followed if patient presents to a DH
- Upward referral linkages with tertiary care and downward referral with PHC.
- Encouraging patient and caregiver participation in an ongoing support program for them.
- Avoid antipsychotics until necessary
- Interaction with, training of MOs at PHC/UPHC and ongoing clinical support and supervision

REASONS FOR REFERRAL

- Not responding to adequate dose and duration of prescribed medications
- Presence of red flags

RED FLAGS

- Fever
- Rapid progression
- Seizures
- Recent head injury
- Alcoholism and falls

MEDICATIONS RECOMMENDED FOR USE FOR ALZHIEMERS DEMENTIA

FOR COGNITION

- **Donepezil**: 5 mg once after breakfast x 1 month, then 10 mg after breakfast to continue
  If any side effect/ not tolerating: **Rivastigmine** to be used start dose 1.5 mg BD / 1 month then 3 mg BD x 1 month, then 4.5 mg BD x 1 month, then 6 mg twice after meals only x 1 month.
- **Memantine:** in moderate to severe dementia 5 mg BD x 1 month, then 10 mg BD to continue.
- **Galantamine:** 8 mg BD if not tolerating 1

FOR DEPRESSION

- Escitalopram 10 mg

FOR AGITATION

- Identification of triggers
- Non pharmacological interventions

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

EPILEPSY

ICD 10 - G40

CLINICAL FEATURES

Episodic, few secs-mins	Abnormal jerky movements	Loss of consciousness/ awareness	Blank staring
Sudden drops/ falls, brief jerks	With or without urine/ stool incontinence, tongue bite, drooling	Bizzare activity out of context	Any other episode lasting for few mins (usually<5 mins)

Episodes could be single with high risk of recurrence. Prolonged motor convulsion of > 5 mins with loss of consciousness - **STATUS EPILEPTICUS** (SE) - **MEDICAL EMERGENCY**

PRIMARY HEALTH CENTRE (MEDICAL OFFICER)

- Clinical diagnosis of epilepsy: detailed history from an eyewitness
- Differentiate between provoked seizures and epilepsy (provoked due to fever, acute CNS insult, antibiotics, and metabolic causes)
- **Laboratory investigations:** CBC, liver function tests, routine biochemistry, hemogram, lipid profile, vit D levels, TFT (whichever feasible)
- **Initiation of treatment:**
  - Treat the patient if patient has epilepsy (2 or more episodes of unprovoked seizures)
  - Treat a single seizure if risk of recurrence is high as in patients with focal seizures,mentally retarded, neurological deficits having family history of seizures abnormalEEG, neuroimaging
  - Anti Epileptic Drug (AED broad spectrum, low dose, start low go slow, except status epilepticus)
  - Emergency medical care of status epilepticus
- **Treatment counselling:** side effects/toxicities of drugs, red flags, importance of adherence, maintaining treatment diary
- **Advice on prevention of seizures:** regular medication, sleep 7-8 hrs, avoid excess TV/mobile/ photic stimulation, regular diet, lifestyle choices(avoid alcohol)
- Evaluate any possibility of superimposed non-epileptic seizure
- Training of MLP/ANM/ASHA on epilepsy
- For excessive alcohol use, refer to ANM/MLP where psychosocial interventions are carried out for substance use disorders
- Follow up visits for treatment monitoring & difficult patients under neurologist at STC centre
- Basic management of co-morbidities (behaviour, cognition, reproductive health, bone health)
- Alert to signs of abuse and neglect
- Maintain upward referrals with paediatrician/physician at DH

REASONS FOR REFERRAL

(centres with specialists like paediatrician, neurologist)

- Redflag Signs
- Progressive problems, rapid appearance of new symptoms
- Recent injury
- Symptoms appearing after alcohol binge
- Status epilepticus after stabilization
- Non response to adequate dose and duration of medication
- Serious side effects
- Neuroimaging

RED FLAG SIGNS

- Fever
- Headache
- Vomiting
- Altered Sensorium
- Severe Giddiness
- Loss of function of body

DISTRICT HOSPITALS

- Careful evaluation of all referral patients, provide specialized management for patients and refer back to PHC for follow up of management
- Maintain communication, ongoing clinical support and supervision of MOs at PHC
- **Laboratory investigation**
  - CBC, liver function tests, antiepileptic drug levels, routine biochemistry, hemogram, lipid profile, vit D levels, TFT, CT brain (when necesary)
- Monitor side effects of AED
- Clinical Psychologist: counselling health services for persons with epilepsy or upon referral from PHC/UPHC

AED– BROAD SPECTRUM (GENERALIZED SEIZURES)	DOSE (MAINTENANCE: MG/D)	ADVERSE EFFECTS
Sodium Valproate (avoid in women of child bearing age unless non responsive to other drugs)	Starting dose :200mg TDS Maintenance Dose: 600-2400	Anorexia, wt gain, nausea, vomiting, tremors, hair loss, PCOS, thrombocytopenia
Lamotrigine	Starting dose: 25mg HS (Lower dose with VPA) Maintenance Dose: 100-300	Sedation, ataxia, dizziness, skin rash, SJS (lower risk with slow titration)
Levetiracetam	Starting dose: 250mg BD Maintenance Dose: 1000-3000	Somnolence, dizziness, cognitive slowing, psychosis
Topiramate	Starting dose: 25mg OD Maintenance Dose: 100-400	Sedation, somnolence, cognitive problems, weight loss, word finding difficulty, renal stones, seizure worsening
AED (focal seizures)		
Carbamazepine	Starting dose: 100mg BD Maintenance dose: 400-1200	Sedation, dizziness, ataxia, skin rash, SJS, hyponatremia, seizure worsening in some situations
Oxcarbazepine	Starting dose: 150mg BD Maintenance dose: 600 to 1800	Sedation, dizziness, ataxia, headache, hyponateremia, skin rash
Phenobarbitone Can be used for generalized also	Starting dose: 30mg HS Maintenance dose: 60-180	Sedation, ataxia, depression, memory problems, hyperactivity in children, skin rash
Phenytoin	Starting dose: 200mg HS Maintenance dose:200-400	Ataxia, sedation, gum hyperplasia, coarsening of facial features, hirsutism, memory problems, osteomalacia & bone loss, skin rash

Folic Acid 5 mg/day to be added along with AEDs in all women of child bearing age. Polytherapy and valproate to be avoided in women with epilepsy

IMPENDING SE — **5 MIN** | **ESTABLISHED SE** — **30 MIN** | **REFRACTORY SE** — **60 MIN 2 IV drugs fail (Benzo + IV AED)**

FIRST ABCS TO BE DONE FROM WHEN YOU SEE PATIENT SIMULTANEOUSLY WITH MEDICATION

Out of Hospital/home : Buccal/Intranasal IMDZ with acute repititive seizures/status (0.3-0.5 mg/kg)

EMERGENCY ROOM

IV Lorazepam up to 0.1 mg/kg @ 2mg/min
OR
IV Midazolam 0.1-0.2 mg/kg bolus or 0.05-0.5 mg/kg/hr in CIV
OR
IV Diazepam upto 0.25-0.4 mg/kg over 2-3 min

- Phenytoin @50 mg/min 20 mg/kg repeat plus 10 mg/kg if seizures do not stop in 15-20 min
- If seizures not controlled or contra indiction (CI) to PHT Intravenous Valproate 25-40 mg/kg @3-6 mg/kg/min
- If CI to above two; Phenobarbitone 20 mg/kg IV @ less than 5-60 mg/min but be prepared to Intubate and ventilate

Levetiracetam 20-30 mg/kg IV at 5 mg/kg/min (max 3g) or
Levetiracetam 1500-3000 mg via NGT or
Lacosamide 200-400 mg IV at 40-80 mg/min
Topiramate 150-800 mg bid via NGT

ICU
IV Midazolam loading 0.2 mg/kg
OR CIV 0.05-0.5 mg/kg/hr
(can go up to 2 mg/kg/hr)
Taper gradually after seizure stops
(preferably as evidenced by EEG)

Thiopental 5-7 mg/kg IV bolus
further 50 mg until seizures controlled
3-5 mg/kg/hr for only 48 hours

OR Propofol IV loading 2-5 mg/kg
CIV 1-15 MG/KG/HR
OR Pentobarbital IV upto 10 mg/kg
@ <0.2-0.4 mg/kg/min CIV 0.5-2 mg/kg/h
OR Ketamine bolus 1.5 mg/kg
CIV 0.01-0.05 mg/kg/h max 10mg/kg/hr * to be
EEG Monitoring

Super refractory
> 24hr no control

Airway, blood pressure, temperature, intravenous access, electrocardiography, CBC, glucose, electrolytes, AED levels, ABG, oximetry, tox screen, central line
If alcoholic- thiamine & glucose, if diabetic GLUCOTEST/blood sugar & glucose IV. MUST INFORM CONSULTANT ON CALL

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of HEADACHE

ICD-10-G43-44

TREATMENT FLOWCHART
LEGEND/ INDEX/ KEY

- Type of Headache
- Management at PHC
- Management at district hospital

CONTINUOUS HEADACHES
- Progressive headache of acute or subacute onset persisting more than 1 week
- Possibilities: Cerebral Venous Thrombosis, Intra Cranial Space Occupying Lesion, Meningitis, Brain abscess

→ Referred to higher centre →
- CT with CT Angiogram/ MRI with MR angiogram
- Lumbar puncture
- Refer to tertiary care centre

CHRONIC TENSION HEADACHE
Continuous bilateral headache for many years with significant insomnia and psychosomatic complaints.

→ Start Amitriptyline (10mg HS) and advice on lifestyle → Brain imaging if atypical features exist

MIGRAINE
Side alternating, associated visual aura, photo-phono phobia, nausea, relieved by sleep or analgesics

→ Frequency > 2 /month -
Start prophylaxis trial for 2 months
- Propranolol 40 mg OD
- Flunarizine 10 mg OD

Acute management
- Analgesics(Paracetamol 650 mg, or Indomethacin 50 mg) and
- Antiemetics (Prochlorperazine 10mg).

Life style changes
- Good sleep at least 6 hrs, food habit modification, avoiding triggers of migraine.

→ Brain imaging if there are atypical symptoms

ATYPICAL MIGRAINE
Hemiplegia, visual impairment, vertigo

→ Analgesics for pain Refer to higher centre with imaging facility →
- CT/ MRI with MR angiogram or CT angiogram if required
- Migraine prophylaxis after ruling out stroke and other diseases

TRIGEMINAL AUTONOMIC CEPHALGIAS
Rapid onset peri orbital and temporal pain with autonomic features

→ Indomethacin (25mg TID) for 7 days → Refer to tertiary care centre

CLUSTER HEADACHE, PAROXYSMAL HEMICRANIAS, SHORT LASTING UNILATERAL NEURALGIFORM PAIN WITH CONJUNCTIVAL INJECTION AND TEARING SYNDOME (SUNCT)

→ Refer to tertiary care centre → Refer to tertiary care centre

RED FLAG SIGNS

- First or worst headache of the patient's life
- Focal neurologic signs (not typical aura)
- Severe headache awakening from sleep
- Headache with fever, change in personality, mental status, level of consciousness
- Fever, neck stiffness or meningism
- New onset of severe headache in pregnancy or postpartum or while on hormone treatment
- Rapid onset with strenuous exercise
- Sudden onset (maximal intensity occurs within seconds to minutes, thunderclap headache)
- New headache type in a patient with malignancy or immunosuppression

REASONS FOR REFERRAL

- Non responding headaches
- Headaches with danger signs should be immediately referred and investigated for potentially dangerous conditions

TREATMENT OF MAJOR CATASTROPHIC HEADACHES AT TERTIARY CENTRE

Sudden Severe headache, First or Worst headache of life
→ CT with CT Angiogram/ MRI with MR angiogram
- → **SUBARACHNOID HEMORRHAGE** → Angiogram, clipping/ coiling of aneurysm (to prevent rebleed)
- → **INTRACEREBRAL HEMORRHAGE** → Stroke unit admission and neurosurgery for cortical hemorrhages or large hemorrhage with herniation

Progressive headache
→ MR venogram
→ **CEREBRAL VENOUS THROMBOSIS**
→ Intravenous UFH / subcutaneous heparin/LMWH

Headache with fever, personality change, altered sensorium, neck stifffness
→ CT scan followed by CSF study
→ **MENINGIOENCEPHALITIS**
→ Antibiotics/ antivirals

Progressive headache with seizure or focal deficit
→ CT/MRI with contrast
→ **BRAIN TUMORS**
→ Surgery, radiation, chemotherapy

INDICATIONS FOR ADMISSION

- Patient with unrelenting headache
- Immunosuppressed patients with continuous headache,
- First ever headache with worsening intensity,
- Progressive headache with other systemic disease
- Severe symptomatic primary headache disorders

CRITERIA FOR DISCHARGE

- Primary headache disorders- symptomatically improved severe episode of headache due to primary headache disorder can be discharged
- Secondary headache disorders- secondary headache disorders with essential work up, diagnosis and treatment as per individual case can be discharged

FOLLOW UP OF HEADACHE PATIENTS

CAUSES OF HEADACHE	TREATMENT OF HEADACHE
Intra cerebral hemorrhage	Good control of blood pressure
Seizures	Antiepileptic medications
Cerebral venous sinus thrombosis	Follow up of anticoagulation
Migraine	Give prophylaxis for adequate duration of time and taper after remission

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

REFERENCES

1. *Hainer BL, Matheson EM. Approach to acute headache in adults. American family physician. 2013 May 15;87(10).*
2. *https://www.uptodate.com/contents/evaluation-of-headache-in-adults*

ABBREVIATIONS

CSF: Cerobrospinal Fluid, UFH: Unfractionated Heparin, LMWH: Low Molecular Weight Heparin

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Standard Treatment Workflow (STW) for the Management of

NEUROINFECTIONS

ICD-10-G03.9

SYMPTOMS

Acute onset-hours to days

Alteration in sensorium

With/ without fever/ headache/vomiting/seizures

DIFFERENTIAL DIAGNOSIS

- Vascular-ischemic/hemorrhagic stroke
- Infections viral/bacterial/fungal/protozoal meningoencephalits/brain abscess
- Metabolic encephalopathies
- Seizures/postictal state
- Intoxications-drugs/toxins

AT PRIMARY CARE LEVEL

ESSENTIAL

- Check Airway/Breathing/Circulation
- Rule out circulatory shock, ongoing convulsions and hyperthermia/hyperpyrexia(core temperature > 40.5˚C or hypothermia(< 36.5˚C)
- Establish IV access-urgent blood for hemogram/sugar/electrolytes/malaria testing-peripheral smear/rapid antigen detection
- Correct hypoglycemia (blood sugar 50 mg/dl) with IV 100ml of 25% dextrose solution
- If seizing- IV/IM Lorazepam 0.1 mg/kg followed by loading with Phenytoin 20 mg/kg weight at a rate of 50 mg/minute
- When IV access not available-intra nasal or buccal Midazolam 0.2 mg/kg /intra rectal Diazepam 0.3-0.4 mg/kg
- Urgent referral to higher centres with intensive care facilities

NOT RECOMMENDED

- Stomach wash
- Inj Mannitol
- Inj Steroids

CRITERIA FOR REFERRAL

Altered sensorium/seizures /focal deficits/hemodyna mic instability –where imaging and ICU management are required.

AT SECONDARY CARE LEVEL(TALUK, DISTRICT) HEADQUARTERS HOSPITAL

ESSENTIAL

In addition to all the steps given above :

- Establish and maintain airway: Intubate if GCS<8, impaired airway reflexes, abnormal respiratory pattern, signs of raised ICP, oxygen saturation <92% despite high flow oxygen, and fluid refractory shock
- Inj Thiamine 100 mg IV
- Stomach wash/activated charcoal administration-if history or suspicion of drug overdose/ non corrosive poison intake
- Start treatment for cerebral malaria-first dose of IV Artesunate 2.4 mg/kg OR Quinine 20 mg/kg bolus
- Emergency CT/referral to centre with 24 hour CT facilities

DESIRABLE

- Neuroimaging-CT with contrast -to rule out hemorrhage/infarcts/focal edema or lesions
- Blood cultures aerobic/anaerobic
- First dose of empirical treatment of pyogenic meningitis-Inj Ceftriaxone 2 g + Inj Vancomycin 500 mg.
  Add Inj Ampicillin 2 g if older than 50 years / immunocompromised along with Inj Dexamethasone 8 mg
- Fundus examination,CSF study to rule out meningoencephalitis-if imaging rules out any mass lesions/herniations.
- Urgent referral to higher centres with Intensive care facilities

CRITERIA FOR REFERRAL

- Altered sensorium/seizures/focal deficits/hemodynamic instability –where imaging and ICU management are required.
- If no definite diagnosis achieved after preliminary investigations

AT TERTIARY CARE HOSPITALS-SELECTED DISTRICT HOSPITALS/MEDICAL COLLEGES

- Neuroimaging-MRI/CT with contrast to rule out abscess/herniations.
  If abscess-emergency neurosurgical consultation for favour of aspiration –open/stereotactic
- Blood cultures-aerobic/anaerobic
- CSF analysis-biocehmistry/cytology/gram staining/culture-bacterial , AFB and fungal/viral PCR/TB-PCR/fungal antigen

Empirical antibiotic (within 30 minutes of arrival)

- If suspecting pyogenic meningitis-Inj Ceftriaxone 2 g+ Inj Vancomycin 500 mg+ Inj Ampicillin 2 g if older than 50 years or immunocompromised+ Inj Dexamethasone 8 mg IV
- Continue empirical treatment till culture yields causative organism,then tailor treatment as per sensitivity reports for 10-14 days.
- Steroids to be stopped after 48 hours,unless any other compelling indications-adrenal insufficiency/TBM

Viral-Herpes simplex/Zoster

- Inj Acyclovir 500 mg IV 8 hourly for 10 days

Cerebral malaria

Inj Artesunate 2.4 mg/kg IM or IV 3 doses 12 hours apart and then OD /
Inj Quinine 20 mg/kg IV stat followed by 10mg/kg TDS till patient can take orally,then oral Artesunate+Pyrimethamine /Sulphadoxine for 3 days OR oral Quinine 10 mg/kg TDS for total 7 days + Doxycycline 3 mg/kg OD for 7 days.

COMPLICATIONS

Raised ICP	SIADH	Vasculitis	Hydrocephalus

*If uncomplicated-back referral to Secondary care centre for completing treatment regimen/monitoring.

CRITERIA FOR DISCHARGE

Afebrile,hemodynamically stable,seizure free >48 hours	Diagnosis and treatment plan made and initiated.	Continuation of treatment with monitoring can be ensured for the prescribed duration.

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

STROKE

ICD-10-I63, I64

WHAT IS STROKE?

An episode of neurological dysfunction caused by focal cerebral, spinal, or retinal infarction or haemorrhage

SYMPTOMS

- Numbness or weakness, especially on one side of the body
- Loss of consciousness or altered consciousness
- Decreased vision in one or both eyes
- Language difficulties, either in speaking or understanding
- Difficulty walking; loss of balance or coordination
- Confusion or loss of memory
- Swallowing difficulties
- Paralysis of any part of the body, including face
- Sudden, severe headache with no known cause
- Neck pain
- Nausea and vomiting

WARNING SIGNS (BEFAST)

- **B**ALANCE : Loss of balance or coordination
- **E**YES : Sudden blurred or double vision/ sudden, persistent vision trouble
- **F**ACE : Deviation at the angle of the mouth
- **A**RM : Arm Drift
- **S**PEECH : Slurred speech or the inability to speak or understand
- **T**IME : Act fast
- **S**udden new onset of headache or loss of consciousness
- **S**udden giddiness, vomiting and imbalance

TYPES OF STROKE

Ischemic stroke Focal cerebral, spinal, or retinal infarction	**Intracerebral haemorrhage** Focal collection of blood within the brain parenchyma or ventricular system that is not caused by trauma	**Subarachnoid haemorrhage** Bleeding into the subarachnoid space	**Cerebral venous thrombosis** Thrombosis of a cerebral venous structure	**Transient Ischemic Attack (TIA)** Transient episode of neurologic dysfunction caused by focal cerebral, spinal cord, or retinal ischemia, without acute infarction

PRELIMINARY MANAGEMENT

- Assess and manage ABCs
- Initiate cardiac monitoring
- Maintain O2 saturation >94%
- Establish IV access
- Determine blood glucose and treat accordingly
- Determine time of symptom onset or last known normal, and obtain family contact information, preferably a cell phone
- Triage and RAPID TRANSFER of patient to nearest district hospital with CT Scan facility or Stroke center with facility for thrombolysis
- Referal hospital to be notified to handle the referred patient with stroke

INVESTIGATIONS

ESSENTIAL	DESIRABLE	OPTIONAL
• CT Scan head • ECG • Blood Sugar • Lipids • Renal parameter	• CTA • Echocardiogram	• MRI/MRA • Holter monitoring

MANAGEMENT

STROKE ONSET TIME: <4.5 HOURS

ISCHEMIC: *
IV tPA (0-4.5 hrs) or endovascular treatment according to eligibility and availability

HAEMORRHAGIC:
- Dysphagia assessment,
- Blood pressure/blood sugar monitoring and IV fluids.
- Prevention of Pneumonia
- Prophylaxis for deep venous thrombosis etc, monitor and record ECG

* RECOMMENDED DIAGNOSTIC STUDIES

ALL PATIENTS

- Noncontrast brain CT or brain MRI
- Blood glucose
- Oxygen saturation
- Serum electrolytes/renal function tests
- Complete blood count, including platelet count
- Markers of cardiac ischemia
- BT, CT, Prothrombin time/INR
- Activated partial thromboplastin time
- ECG
- FLP and carotid doppler (ischemic stroke)

SELECTED PATIENTS

- TT and/or ECT if it is suspected the patient is taking direct thrombin inhibitors or direct factor Xa inhibitors
- Liver function tests
- Toxicology screen
- Blood alcohol level
- Pregnancy test
- Arterial blood gas test (if hypoxia is suspected)
- Chest radiography (if lung disease is suspected)
- Lumbar puncture (if subarachnoid hemorrhage is suspected and CT scan is negative for blood)
- Electroencephalogram (if seizures are suspected)

STROKE ONSET TIME: >4.5 HOURS

Rapid Assessment, CODE Stroke, Blood pressure and Blood Sugar monitoring, NIHSS, Intravenous lines
Endovascular treatment with Mechanical thrombectomy using stent retriever (4.5 hrs to 24hrs) according to eligibility

SECONDARY PREVENTION
Aspirin (in ischemic stroke)
Antihypertensives
Antidiabetics
Lipid lowering agents

REHABILITATION
Physiotherapy
Speech Therapy
Occupational Therapy
Vocational training

DISCHARGE PLANNING
(checklist : drugs, diet, compliance, exercises, health education)

FOLLOW UP at 2nd week, 1st month, 3rd month and 6th month

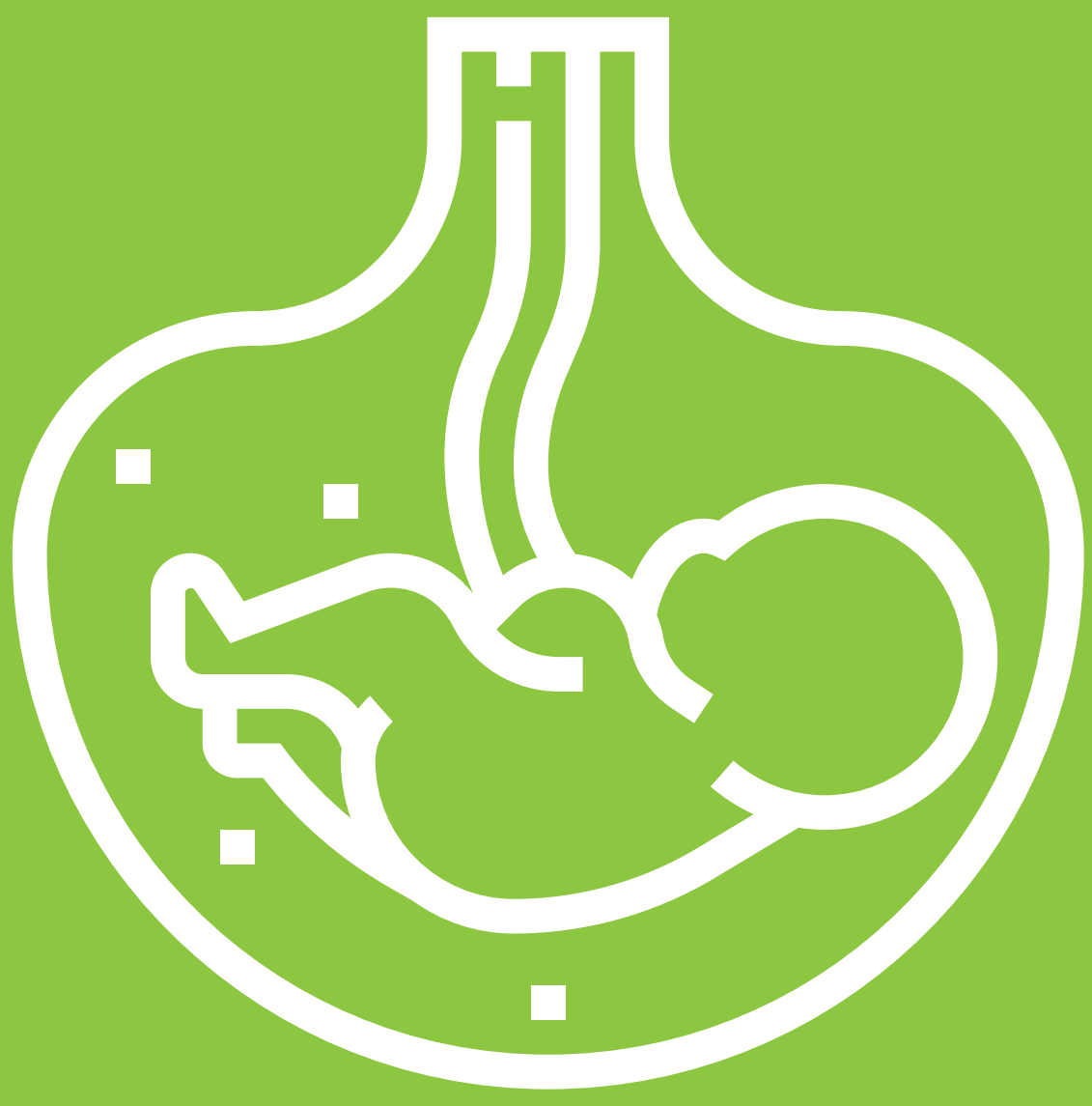
STROKE UNIT MANAGEMENT

· Medical and Nursing staff : control of blood pressure; control of diabetes; swallow assessment; DVT prophylaxis; antiplatelet drugs
· Rehabilitation staff:
  » Acute phase: basic bed mobility, transfer techniques, communication training, prevention of complications
  » Subacute and chronic phase: mobility, gait and balance training, training of activities of daily living (grooming, eating, dressing etc), bowel/bladder training, perceptual and cognitive rehabilitation, provision of assistive devices.

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Standard Treatment Workflow (STW) for

ANTE-NATAL MANAGEMENT OF NORMAL PREGNANCY

ICD-11-QA42

FIRST VISIT (PREFERABLY IN FIRST TRIMESTER)

ASK

- Age
- LMP
- Calculate EDD
- Parity & obstetric history
- Any complaints especially excessive nausea & vomiting/ bleeding PV
- H/o medical illness : diabetes, hypertension, cardiac problem, TB, epilepsy or any other chronic illness
- Consanguinity, multiple pregnancy
- H/o blood transfusion and H/o prior surgical intervention
- Personal history : tobacco/ alcohol intake
- Family history : diabetes, hypertension, genetic disorders/ congenital problems, multiple pregnancy, infections including tuberculosis

EXAMINE

- Height, weight
- Calculate BMI (BMI=weight(kg)/height(m)^2)
- Pallor, Jaundice, Pedal edema
- Pulse, BP, RR, temperature
- Thyroid
- Breast
- Respiratory and CVS exam - ination
- P/A examination, P/S and P/V examination

If woman presents with bleeding per vaginum do P/A & P/S to confirm amount of bleeding & rule out local causes. All such cases to be referred to CHC or higher centre

INVESTIGATIONS

ESSENTIAL TESTS
- Hemoglobin
- Urine R & M
- ABO & Rh grouping

DESIRABLE TESTS
- VDRL/ RPR
- HIV
- HBsAg
- DIPSI test
- TSH in high risk cases (BOH, goiter, obesity or residing in iodine deficiency prone areas)

OPTIONAL TESTS*

Aneuploidy screen* by USG & double marker

DO

- UPT if in doubt
- Fill up Mother and Child protection card or ANC card, make entry on RCH portal & generate RCH number
- Give filled Mother and Child protection card & safe motherhood booklet to woman
- Give Tab Folic Acid daily
- Give first dose of Td
- Single booster dose if received the first dose within last 3 years

SECOND VISIT (SECOND TRIMESTER)

ASK

- Any com- plaints since last visit
- Quickening foetal movements
- Adherence to medications

EXAMINE

- Weight
- Pallor
- Pedal edema
- Pulse, BP in sitting position
- P/A examination for fundal height & fetal heart auscultation

INVESTIGATIONS

ESSENTIAL TESTS
- Hemoglobin
- Urine albumin

DESIRABLE TESTS
- USG (Level II between 18-20 weeks for gross congenital malformations)
- DIPSI test if >24weeks & at least 4 weeks have elapsed after 1st test

OPTIONAL TESTS*

Quadruple test as per availability

*Should be performed only if adequate counselling facilities are available

DO

- IFA tablet one (if Hb >11g%) or twice (if Hb <11g%) daily with water or lemon juice
- Refer to higher centre if no rise in Hb after 4 weeks of oral tablets
- Calcium carbonate 500 mg with vitamin D 250 units twice daily with meals.
- Calcium Carbonate and IFA not to be given together
- Single dose of Albendazole 400mg
- Ensure compliance for investigations and treatment
- Discuss birth preparedness
- Give second dose Td at least four weeks after first dose

THIRD (28 – 34 WEEKS) AND FOURTH VISIT (36 - 40 WEEKS)

ASK

- Same as above
- Record POG

EXAMINE

- Same as above
- Auscultate FHS
- Measurement of abdominal girth and Symphysiofundal Height

INVESTIGATIONS

- Hemoglobin
- Urine albumin
- Optional USG for fetal growth and liquor

DO

- Continue IFA and calcium tablets and ensure compliance
- If non compliant or Hb < 9g% give parenteral iron sucrose therapy (not > 200mg at one time & not > 3 times a week) and refer patient with Hb < 7g% to higher centre
- Refer to higher centre if any discrepancy between fundal height and period of gestation or danger signals

DANGER SIGNALS FOR PATIENT TO REPORT TO HEALTH FACILITY

- Fever
- Persistent vomiting
- Abnormal vaginal discharge
- Palpitations, easy fatigability and breathlessness at rest and/ or on mild exertion.
- **Generalized swelling of the body/ puffiness of the face**
- Vaginal bleeding
- Decreased or absent fetal movements at > 28 weeks gestation
- Leaking of watery fluid per vaginum (P/V)
- Severe headache/ blurring of vision/ convulsion
- Passing lesser amounts of urine and/ or burning sensation during micturition
- Itching all over the body

HIGH RISK PREGNANCY

- Any H/o medical illness, previous caesarean section, past obstetric mishap or congenital malformation
- Past H/o PPH
- Age > 35 years or < 19 years or parity > 4
- Malnourished (BMI < 18.5 kg/m^2 or > 30 kg/m^2)
- Hemoglobin < 7g%
- BP > 140/90mm Hg on 2 occasions 6 hours apart
- APH
- Discrepancy between fundal height and period of gestation > 4 weeks
- GDM/ overt DM
- Multiple pregnancy
- Malpresentation at term
- Previous uterine surgery

* High risk pregnancy to be delivered at district hospital/medical college
* Preferably to have antenatal care also at these centres

COUNSELLING AT ALL VISITS

- Timing and place of next ANC visit based on presence or absence of risk factor
- Rest, nutrition, balanced diet and exercise
- Counselling for HIV testing
- Danger signs
- Institutional delivery
- Birth preparedness
- Early & exclusive breastfeeding for six months
- Post partum contraception

BIRTH PREPAREDNESS MUST INCLUDE IDENTIFICATION OF THE FOLLOWING

- Facility for delivery
- Support persons
- Birth companion
- Means of transport in emergency (Including contact number)
- Blood donors (if required in emergency)

ASSESSMENT OF FUNDAL HEIGHT & ITS CORRELATION WITH GESTATIONAL AGE

At 12 th week : Just palpable above the symphysis pubis

At 16 th week : At lower one-third of the distance between the symphysis pubis and umbilicus

At 20th week : At two-thirds of the distance between symphysis pubis and umbilicus

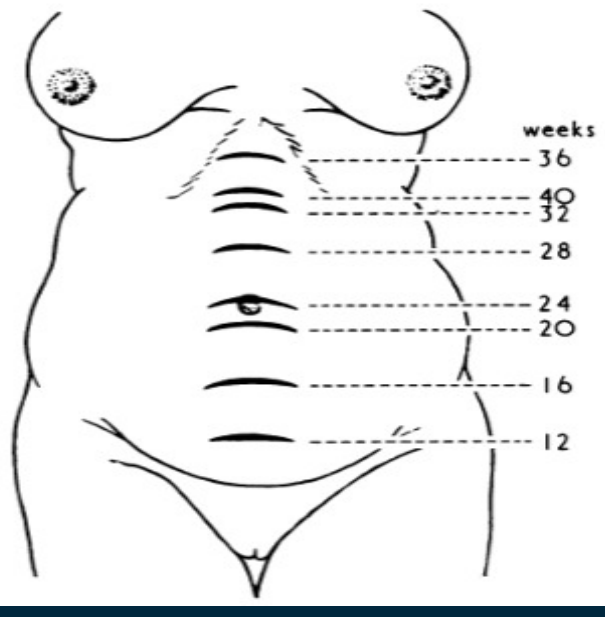
At 24th week : At the level of umbilicus

At 28th week : At lower one-third of the distance between the umbilicus and xiphisternum

At 32 nd week : At two-thirds of the distance between the umbilicus and xiphisternum

At 36th week : At the level of xiphisternum

At 40th week : Sinks back to the level of the 32 that in the 32 nd week nd week, but the flanks are full, unlike



ABBREVIATIONS

ANC: Antenatal Care
APH: Antepartum Haemorrhage
BOH: Bad Obstetrics History
CVS: Chorionic Villus Sampling
EDD: Estimated Due Date
FHS: Foetal Head Station
GDM: Gestational Diabetes Mellitus
PPH: Post Partum Haemorrhage
RCH: Reproductive and Child Health
Td: Tetanus Diphtheria
TSH: Thyroid Stimulating Hormone
UPT: Urine Pregnancy Test
USG: Ultrasound Sonography

REFERENCES

WHO Standard Of Care for Antenatal Care

CARING FOR EVERY STEP OF YOUR MOTHERHOOD JOURNEY

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Standard Treatment Workflow (STW) for
DILATATION AND CURETTAGE (D&C)

ICD-11-JA00

- Mostly done for gynaecological indications, but may also be considered in early pregnancy complications
- **Though office endometrial biopsy using either thin flexible or Karman cannula or office hysteroscopy has obviated the need for** traditional D&C in gynaecological cases, it still has a place when other modalities are not available or do not yield adequate tissue

INDICATIONS :

GYNAECOLOGICAL

- Abnormal uterine bleeding in appropriate cases (refer to HMB STW)
- Post menopausal bleeding (ECC with D&C)
- Infertility (to rule out TB)
  Amenorrhoea
- As a haemostatic measure in women with excessive / prolonged vaginal bleeding
- **Inadequate tissue obtained after office** sampling

EARLY PREGNANCY COMPLICATIONS

- Retained products of conception or as a treatment of inevitable, incomplete, missed, septic or induced abortion
- Molar pregnancy

GYNAECOLOGICAL PROCEDURES

- Endometrial Aspiration Biopsy [EA]
  OR
- D & C
  OR
- Differential curettage (Endocervical curettage [ECC] with EA)

PROCEDURES FOR EARLY PREGNANCY COMPLICATIONS

- Dilatation and Evacuation [D & E]
  OR
- D & C
  OR
- Evacuation (with or without suction)

CONTRAINDICATION

Acute pelvic and vaginal infections

WHERE CAN IT BE PERFORMED?

- In secondary or tertiary healthcare centres preferably where facilities for anaesthesia and operation theatre are available to deal with procedure related complications, if any.
- Endometrial aspiration biopsy is usually done as an outpatient procedure in non pregnant cases.

ALL TISSUE REMOVED MUST BE SENT FOR HISTOPATHOLOGICAL EXAMINATION

PRE- OPERATIVE REQUISITES

Presence of a valid indication	General medical fitness & no contraindication	A written informed consent

ANESTHESIA (ANY OF THE FOLLOWING)

- General anesthesia
- Regional anesthesia
- Paracervical block with 1% xylocaine
- IV sedation
- IM/oral analgesics

Strict asepsis to be maintained. Antibiotics to be used judiciously and decided as per need of individual case.

POST PROCEDURE CARE & FOLLOW UP

- Observe the patient for minimum two hours after the procedure for haemorrhage or any other symptoms or signs of complications prior to discharge
- Patient can be discharged as soon as she is comfortable and alert
- Most common side effect is abdominal cramps which can be managed by oral analgesics
- **Warning signals to report back** are to be explained at the time of discharge - severe pain, bleeding, foul smelling discharge or fever
- Follow up is done after a week with histopathology report for further advice.

COMPLICATIONS

- Excessive bleeding
- Cervical laceration
- Perforation of the uterus
- Injury to bowel and bladder
- Pelvic infection
- Post-operative intra uterine adhesions

DO'S

- Evacuation of urinary bladder before procedure.
- Safety checklist
- Dorsal/lithotomy position
- Bimanual pelvic examination prior to the procedure
- Sounding to measure uterocervical length ONLY in non pregnant women.
- Sample to be sent for histopathology and microbiology (where indicated)
- **REFER in case of a complication**

DONT'S

- Over abduction of legs
- No sounding in cases of pregnant uterus.
- No forceful insertion of any instrument
- Abandon the procedure in case of suspected perforation and refer to higher centre.
- Insertion of the dilator should be just beyond the internal os and NOT till the fundus

D&C is a blind procedure and may miss the pathology in some cases. In cases where focal pathology is suspected, tissue should be obtained under hysteroscopic visualization.

REFERENCES

Dutta, DC. DC Dutta's Textbook of Obstetrics: Including Perinatology & Contraception. 10th ed. Edited by Hiralal Konar. New Delhi: Jaypee Brothers Medical Publishers; 2025.

☛ COUNSELLING IS AN IMPORTANT ADJUNCT TO MANAGEMENT

☛ OLD PROCEDURES BUT STILL BEING USED

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Standard Treatment Workflow (STW)

HEAVY MENSTRUAL BLEEDING (HMB)

ICD-11-GA20

TO DO AT ALL LEVELS

HISTORY

- Age
- Parity, Abortions, Infertility
- Detailed Menstrual History Including Irregularities
- Other Medical Illness: Thyroid Disorder, Hypertension, Bleeding Disorders, Heart Disease, Liver Disorders,
- IUCD Use, Tubectomy
- Drug History
- Family history-Malignancies, Bleeding disorders

EXAMINATION

General
- Pallor (Mild/Moderate/Severe)
- Calculate BMI
- Pulse rate and BP measurement
- Lymphadenopathy

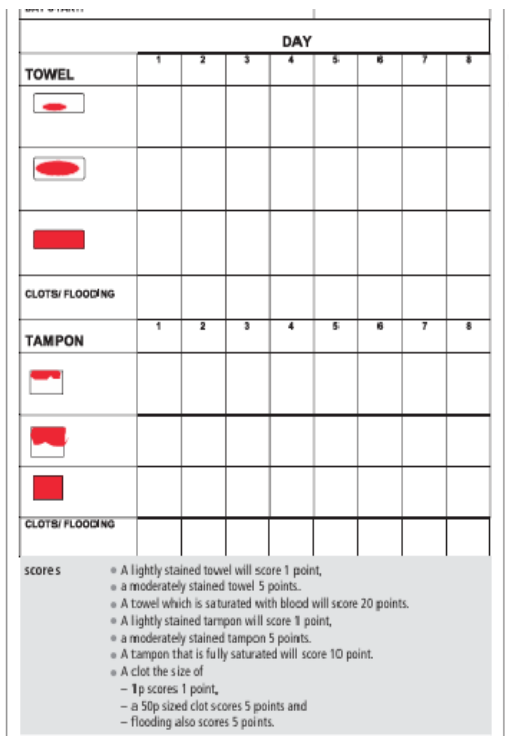
Systemic
- CVS, RS and hepatosplenomegaly,
- Mass abdomen

SUPPORTIVE TREATMENT

- Reassurance
- Hematinics
- Tranexamic acid **during** episode of heavy bleeding (Injection/Oral)
- Tranexamic acid+ Mefenemic acid- if pain is associated

MANAGEMENT OF HMB AT PRIMARY LEVEL

PICTORIAL BLOOD ASSESSMENT CHART (PBAC)



INVESTIGATIONS
- Hemoglobin
- CBC with peripheral smear
- BT / CT
- LFT

HISTORY AND EXAMINATION

Abnormality → Refer to Higher centre

No Abnormality

Adolescents → USG → Supportive Treatment → -Tranexamic acid - OC Pills → No Relief → Refer to higher centre

Women of Reproductive Age → Exclude pregnancy Speculum examination Pelvic examination → Any Abnormality → Refer to higher centre

No abnormality

Contraception desired → OC Pills → No Relief → Refer to higher centre

Contraception not desired → - NSAIDs - Tranexamic acid - Progestogens**

Age > 40 years → Refer to higher centre

If Hb <7g/dL or acute ongoing blood loss refer to higher centre
* Exclude pregnancy in all women of reproductive age group after appropriate consent
** Amongst progestogens Norethisterone provides the best hemostasis

MANAGEMENT OF HMB AT SECONDARY LEVEL (CHC)

HISTORY AND EXAMINATION

Adolescents → USG → Supportive treatment → -Tranexamic acid - OC Pills → No Relief → Refer to higher centre

Married <40 years → Do USG
- Endometrial thickness < 12 mm → Supportive treatment
- ET>12mm or High Risk for endometrial cancer* → Do endometrial sampling and send for histopathological examination

Married >40 years → Do endometrial sampling and send for histopathological examination

Post Menopausal → Refer to higher centre

Secretory/Proliferative Phase endometrium without hyperplasia → - NSAIDS - Tranexamic acid - Combined OC Pills - Progestogens - LNG IUS → If no relief, Refer to higher centre

Hyperplasia without atypia → - Levonorgestrel-releasing intrauterine system (LNG IUS) Progesterones Hormonal therapy to continue for 6 months → If no relief or recurrence Refer to higher centre

Hyperplasia with atypia/ malignancy → Refer to higher centre

INVESTIGATIONS
- Hemoglobin
- CBC with peripheral smear
- BT /CT, LFT, RFT
- ABO and Rh typing
- Thyroid function test
- USG of Abdomen & Pelvis

In selected cases
- SIS/Hysteroscopy MRI

If Hb <7g/dL or acute ongoing blood loss refer to higher centre

HIGH RISK FOR ENDOMETRIAL CANCER

Patient having:
- Low parity
- Obesity
- PCOD
- Diabetes

MANAGEMENT OF HMB AT TERTIARY LEVEL

HISTORY, EXAMINATION AND ULTRASONOGRAPHY

No structural abnormality

Adolescents → USG → Supportive treatment → -Tranexamic acid - OC Pills → No Relief → Refer to higher centre

< 40 years → - NSAIDS - Tranexamic Acid - OC Pills - Progestogens - LNG IUS - Ormeloxifene - Ablative Techniques → If no relief 3-6 months → Consider hysterectomy

> 40 years → Endometrial sampling - D&C/ Hysteroscopic guided → No hyperplasia or benign hyperplasia → Conservative modalities - Tranexamic Acid - Progestogens - LNG IUS - Ormeloxifene - Ablative techniques → If no relief → Hysterectomy

Structural abnormality

Thickened endometrium → Endometrial sampling - D&C/ Hysteroscopic guided → Atypical Hyperplasia → Hysterectomy

Adnexal mass Fibroids & polyps, and adenomyosis → Management as per the condition

INVESTIGATIONS
- Hemoglobin
- CBC with peripheral smear
- BT/CT
- ABO and Rh typing
- TSH
- USG of Abdomen & Pelvis

Blood transfusion if Hb <7g/dL or acute ongoing blood loss

TREATMENT FOR ACUTE BLEEDING EPISODE

- IV Tranexamic acid 1g stat slowly followed by oral Tranexamic acid 0.5-1g, 6-8 hourly for 5 days
- Blood transfusion if Hb <7g/dL

HORMONE THERAPY

- Consider one of the following
  - Norethisterone (max daily dose 40 mg) OR
  - Medroxyprogesterone acetate (max daily dose 40 mg)
  - Hormone therapy should be given orally daily in divided doses from the fifth day of the cycle for three weeks and repeated in a cyclical manner for total of 4-6 cycles of treatment
  - As an alternative LNG IUS should be considered

COUNSELLING IS AN IMPORTANT ADJUNCT TO MANAGEMENT

CONSERVATIVE MANAGEMENT FOR HMB MUST BE ATTEMPTED BEFORE DEFINITIVE SURGICAL PROCEDURE ESPECIALLY IN YOUNGER WOMEN

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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

INDICATIONS :

LEIOMYOMA
- Symptomatic fibroids especially if not responding to medical management
- Asymptomatic fibroids greater than or equal to 14 weeks uterine size
- Fibroid causing hydroureteronephrosis
- Rapidly enlarging fibroids
- Any fibroid causing severe anemia

HEAVY MENSTRUAL BLEEDING
- Failed medical treatment

ENDOMETRIOSIS
- Failed medical treatment
- Causing hydroureteronephrosis
- Recurrence after medical/conservative surgical management

PROLAPSE
- Third or fourth degree utero vaginal prolapse

PRE - INVASIVE DISEASES
- Endometrial hyperplasia without atypia with failed medical treatment
- Endometrial hyperplasia with atypia.
- CIN II with poor compliance or CIN III

OTHERS
- Adnexal masses : Need for hysterectomy to be individualised and justified
- Recurrent post-menopausal bleeding (even in the absence of malignancy)

ROUTES OF HYSTERECTOMY

- **ABDOMINAL**
- **VAGINAL**
  - Pelvic organ prolapse
  - Non descent hysterectomy
- **LAPAROSCOPIC**
  - In appropriately selected patients where expertise and equipments are available

Simple ovarian cysts less than 5 cm in size and without other significant/ suspicious features should be kept on observation and reviewed after 6 months

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 than12 weeks size uterus)	Simple ovarian cyst less than or equal to 5 cm

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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2. *Darelius A et al, Efficacy of salpingectomy at hysterectomy to reduce the risk of epithelial ovarian cancer: a systematic review. BJOG. 2017 .*

COUNSELLING IS AN IMPORTANT ADJUNCT TO MANAGEMENT

☛ IMPORTANT PROCEDURE IN APPROPRIATELY SELECTED CASES

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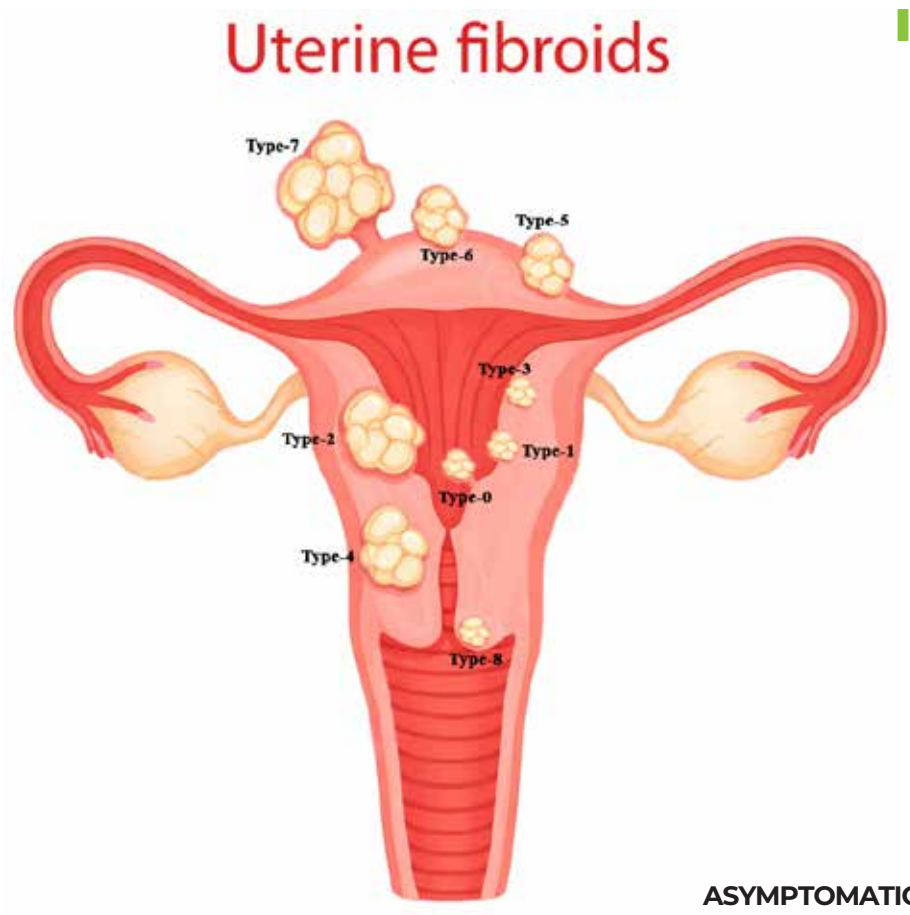
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Standard Treatment Workflow (STW)

UTERINE FIBROIDS AND POLYPS

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



SYMPTOMS

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

Essential- CBC , Ultrasound

Desirable – TFT

Optional – HIGHER IMAGING LIKE MRI

ASYMPTOMATIC FIBROIDS <5CM DO NOT NEED TO BE TREATED

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

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

- Endometrial polyps/sub mucus fibroids
  - Hysteroscopic removal
    - Endometrial polyps
    - Select appropriate patient with submucus fibroids (selection should be based on size and proportion of the fibroid projecting into the uterine cavity)
- Fibroids
  - Small Fibroids (<5cm)
    - Asymptomatic
      - Observation
    - Symptomatic
      - Medical Management:
        - Tranexamic acid
        - Levonorgestrel-releasing intrauterine system (if uterine cavity normal)
        - Progestogenic agents*
      - No Relief
  - Large Fibroids (Uterine size >12 weeks)
- Fibroid Polyps
  - Thin pedicle
    - Polypectomy
  - Thick pedicle
    - Individualized management at tertiary centre

- ALL THERAPUTIC OPTIONS NEED TO BE EXPLAINED TO THE PATIENT INCLUDING JUST KEEPING THE PATIENT ON OBSERVATION.
- ALL PATIENTS OF FIBROID UTERUS DO NOT NECESSARILY NEED HYSTERECTOMY

Discuss treatment option based on age and parity

- Non surgical
  - Uterine artery embolization
- Surgical
  - Hysterectomy (to be avoided in young patients aged <35 years as far as possible)
  - Myomectomy (younger age &/ or low parity)

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

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Standard Treatment Workflow (STW)

POSTPARTUM HAEMORRHAGE (PPH)

ICD-11-JA43

More than 500 ml of blood loss or any amount of bleeding which causes derangement of vital parameters is PPH

RED FLAG SIGN:
- PR > 120/min
- Systolic BP < 100 mm Hg
- Tachypnea < 95%
- SpO_2 < 95%
- Shock index >1 (Shock index = pulse rate/systolic BP)
- Deterioration of sensorium

- Call for help
- Rapid Initial Assessment - evaluate vital signs: PR, BP, RR and Temperature
- Establish two IV lines with wide bore cannula (16-18 gauge)
- Draw blood for grouping and cross matching
- Start RL/ NS, infuse 1 L in 15-20 minutes*
- Give Oxygen @ 6-8 L /minute by mask,
- Insert indwelling Catheter and connect to urobag
- Check vitals and blood loss frequently - at least every 15 minutes
- Monitor input and output

SUPPORTIVE MANAGEMENT
- Monitoring of vitals
- Measurement of input and output
- Give blood transfusion as indicated

- Give Inj. Oxytocin 10 IU IM (if not given after delivery)
- Start Oxytocin infusion : 20 IU in 500 ml RL/NS @ 40-60 drops per minute
- IV bolus of oxytocin should NOT be given
- Check to see if placenta has been delivered.

PLACENTA NOT DELIVERED

- Continue Oxytocin drip
- Palpate uterus
- Attempt controlled cord traction if uterus is contracted

PLACENTA DELIVERED
- Continue oxytocin and uterine massage
- Check for completeness of placenta and membranes

PLACENTA NOT DELIVERED
Shift for manual removal of placenta (MRP)

PLACENTA DELIVERED

- Fundal Massage of the uterus
- Inspect placenta for completeness
- Explore uterus for any retained placental bits/ membranes/ clots and evacuate

Uterus well contracted but bleeding continuing

TRAUMATIC PPH

- Explore for cervical/ vaginal/ perineal tears. Repair if present
- If bleeding persists despite repair of above, suspect inadequate repair, rupture uterus or scar dehiscence.
- Shift to OT for exploration under GA and/or laparotomy

Uterus flabby

ATONIC PPH

Bimanual compression and pharmacotherapy as per details below

If bleeding continues without any apparent cause check for coagulopathy

* Arrange for blood / blood product at the earliest
3 ml of crystalloid solution should be used to replace every ml of blood lost during the initial part of the acute bleeding phase

MANAGEMENT OF ATONIC PPH

PHARMACOTHERAPY

ANY OF THE FOLLOWING OPTIONS CAN BE USED EITHER ALONE OR IN COMBINATION AS PER AVAILABILITY

Inj Methyl Ergometrine 0.2 mg IM or IV slowly
- Contraindicated in hypertension, severe anemia, heart disease
- Can be repeated after 15 minutes to a maximum of 5 doses (1mg)

Or Tab Misoprostol (PGE1) 800 µg Per rectal or sublingual

Or Inj Carboprost (PGF2 alpha) 250 µg IM
- Contraindicated in asthma
- Can be repeated every 20 minutes to a maximum of 8 doses (2 mg)

Bleeding not controlled

Explore uterus for retained bits

Continue bimanual compression & Oxytocin infusion @10-20 units /hr

Bleeding not controlled

- Check for coagulation defects
- If present give blood and blood components

Intra uterine balloon tamponade using condom catheter

Bleeding still not controlled

Surgical intervention
- Uterine compression sutures
- Systematic uterine devascularisation by doing Uterine → Ovarian → Internal Iliac artery ligation
- Hysterectomy

Bleeding controlled

- Repeat uterine massage every 15 minutes for first two hours
- Monitor vitals every 10 minutes for 30 minutes , every 15 minutes for next 30 minutes and every 30 minutes for next 3-6 hours or until stable
- Continue Oxytocin infusion @5-10 units /hr (total Oxytocin not to exceed 100 IU in 24 hours)

Tranexamic Acid (1g slow IV) is routinely recommended as an adjunctive treatment for PPH to be used as early as possible irrespective of cause but definitely within three hours of delivery. It can be repeated after 30 minutes if bleeding persists Standard treatment for PPH must continue meanwhile

Timely Referral to a higher centre must be considered if facilities for blood transfusion or exploration and surgical intervention are not available. Patient must be transported with I/V fluids containing oxytocin on flow and preferably with uterine/vaginal tamponade in situ.
- Aortic compression may be used as a short time measure to reduce blood loss while awaiting definitive steps.
- Non- pneumatic anti-shock garment (NASG) should be used during transport if available
- Uterine artery embolization may be offered in selected patients if facilities are available

COUNSELLING IS AN IMPORTANT ADJUNCT TO MANAGEMENT

☛TIMELY ACTION AND REFERRAL IS IMPORTANT TO SAVE THE LIFE OF THE MOTHER

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PAEDIATRICS

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Standard Treatment Workflow (STW) for the Management of
ACUTE ENCEPHALITIS SYNDROME (AES) IN CHILDREN
ICD-10-G04

Acute onset of fever (</= 5-7 days) with altered sensorium and/or new onset of seizures (excluding simple febrile seizures)

SYMPTOMS

- Fever, headache, vomiting, lethargy, unconsciousness
- Seizures
- Abnormal posturing
- Paucity of limb movements

ADDITIONAL INFORMATION (HISTORY OF)

- Rash, vesicles, past history of chicken pox
- Residence of child: rural/urban, endemic for cerebral malaria, any epidemic of AES in neighborhood
- Animal contact, insect bite, dog bite
- Drug or toxin exposure: enquire for presence of any drugs at home
- Recent travel
- Trauma
- Seizures
- Recent immunizations
- Recurrent episodes of encephalopathy
- Past or concurrent systemic illness
- Pre-morbid developmental/ neurological status of the child

EXAMINATION

VITAL SIGNS
- Temperature
- Pulse rate
- Respiratory rate
- Blood pressure

GENERAL EXAMINATION
- Pallor
- Petechieae
- Rash
- Icterus

NEUROLOGICAL EXAMINATION
- Level of consciousness by Glasgow Coma Scale (GCS)
- Abnormal posturing: decerebrate, decorticate
- Active seizures
- Cranial nerves: pupil size and reaction, doll's eye movements, squint, facial deviation
- Focal neurological deficits
- Meningeal signs

INVESTIGATIONS

ESSENTIAL
CBC, LFT, KFT, blood sugar, CECT Brain, CSF examination* (cytology, biochemistry, culture, AFB staining, Gene Xpert), peripheral smear for malarial parasite, Rapid Malarial Antigen Test

DESIRABLE
MRI Brain, CSF PCR for Herpes simplex encephalitis, JE serology, EEG, Dengue serology and NS1 testing, HIV testing

OPTIONAL
CSF Neurovirology panel, anti-NMDA receptor antibody testing, PCR viral testing of other samples (throat swab, nasopharyngeal aspirates, stool etc), Blood Tandem Mass Spectrometry and urine gas chromatography, antinuclear antibodies

***Lumbar puncture is contra-indicated or neuroimaging must be obtained before lumbar puncture**
1.Fundus: papilledema 2. Platelet count < 50,000 3. Focal neurological deficits 4. Asymmetric/unreactive pupils 5.Decerebrate/decorticate posturing

MANAGEMENT

All patients need to be admitted.
If any of the following signs are present, the child should be referred to tertiary care facility with PICU and facilities for mechanical ventilation:
• Glasgow Coma Scale < 8 • Abnormal breathing pattern • Shock not responding to fluid bolus • Decerebrate or decorticate posturing
• Seizures persisting despite benzodiazepine and phenytoin

Step I: Rapid assessment and stabilization
- Establish and maintain airway: Intubate if GCS<8, impaired airway reflexes, abnormal respiratory pattern, signs of raised intracranial pressure, SpO2 <92% despite high flow oxygen and fluid refractory shock
- Ventilation, oxygenation
- Circulation: Establish IV access, take samples for relevant investigations, fluid bolus if in circulatory failure (20 mL/kg NS), inotropes if required
- Identify signs of cerebral herniation or raised ICP
- Temperature: treat fever and hypothermia
- Treat ongoing seizures- Benzodiazepine, followed by phenytoin loading

Step II: History, Examination and Investigations as given above

Step III: Empirical Treatment (must be started if CSF cannot be done/ report will take time and patient sick)
- **Ceftriaxone:** 100 mg/kg/day in 2 divided doses X 10-14 days
- **Acyclovir** (use in all suspected sporadic viral encephalitis):
  3 mo to 12 y: 500mg/m2 8 hourly (min 21 days)
  >12 y: 10mg/Kg 8 hourly (14-21 days in confirmed cases)**
- **Artesunate combination therapy** (stop if peripheral smear and RDT are negative) : 3mg/kg in child <20 kg, and 2.4mg/kg in child > 20kg IV/IM at 0,12 and 24 hours, followed by once daily parental/oral X 3-7 days

****If therapy was started empirically stop acyclovir, in case an alternative diagnosis is confirmed, or HSV PCR of CSF is negative on two occasions (24-48 h apart) and MRI imaging not suggestive of Herpes Simplex Encephalitis**

Step IV: Supportive care and treatment
- Maintain euglycemia, hydration and control fever
- Treat raised intracranial pressure#, mild head-end elevation–15-30˚
- Treat seizures##; Give anticonvulsant if: history of seizures / GCS <8 / child has features of raised ICP
- Steroids: Pulse steroids (methylprednisolone) to be given in children with suspected acute disseminated encephalomyelitis or autoimmune encephalitis

Step V: Prevention/treatment of complications and rehabilitation
- Physiotherapy, posture change, prevent bed sores and exposure keratitis
- Complications: aspiration pneumonia, nosocomial infections, coagulation disturbances
- Nutrition: early feeding
- Psychological support to patient and family

#Management of raised intracranial pressure
- Intubate if: GCS <8 / evidence of herniation / irregular respirations and inability to maintain airway
- Signs of impending herniation: patient to be hyperventilated to a target $PaCO_2$ of 30-35 mmHg
- Initial bolus of Mannitol(0.25 g/kg), then 0.25 g/kg q 6 h as per requirement, up to 48 hours.
- In the presence of hypotension, hypovolemia, and renal failure: hypertonic (3%) saline (preferable to mannitol) 0.1–1 mL/kg/hr by infusion; serum sodium to be targeted to 145-155 meq/L
- Adequate sedation and analgesia
- Avoid noxious stimuli
- Administer nebulized lignocaine prior to endotracheal tube suctioning

##Treatment of seizures
1st Line: IV Lorazepam 0.1mg/kg or Midazolam 0.2 mg/kg orDiazepam 0.3 mg/kg).
If no IV access: IM Midazolam 0.2 mg/kg
2nd Line: Inj. Phenytoin 20 mg/kg (in Normal saline 1mg/kg/min)
If seizures still persist:
Refractory status: Transfer to PICU -> midazolam infusion (1-18 microgram/kg/min)
If ICU facilities not available: sodium valproate (20 mg/kg) or levetiracetam (20-40 mg/kg) or phenobarbitone (20mg/kg)

DISCHARGE CRITERIA

Hemodynamically stable	Improvement in consciousness	Afebrile	Has started eating and drinking orally	Seizures have subsided	Parents have been explained the supportive care and physiotherapy to be continued at home

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

ACUTE DIARRHEA

ICD-10-R19.7

DIARRHEA IS
- >3 loose or watery stools/ day
- Acute Diarrhea <14 days
- Persistent diarrhea >14 days
- Dysentery – blood in stools

ASK FOR
- Duration
- Blood in stool
- Vomiting, fever, cough, recent measles, HIV status (if known)
- Immunization status and pre illness feeding practices
- Fluids/ food/ drugs and other remedies taken during illness

EXAMINATION
- General condition of child
- Nutritional status (weight/ weight for height / MUAC)
- Classify malnutrition if any
- Signs of dehydration & classify dehydration

SKIN PINCH TEST
- Locate the area on the child's abdomen halfway between the umbilicus and the side of the abdomen.
- Use thumb and first finger to pinch and not finger tips.
- The fold of the skin should be in a line up and down the child's body.
- Firmly pick up all layers of the skin and tissue under them.
- Pinch the skin for one second and then release it. Look to see if the skin pinch goes back:
  - Very slowly (longer than 2 seconds)
  - Slowly (skin stays up even for a brief instant)
  - Immediately (normal)

REFER TO HOSPITAL
- Severe malnutrition/ HIV
- Severe dehydration
- Hypernatremic (Na >145mmol/L) / hyponatremic dehydration (Na <135 mmol/L)
- Dysentery with age <1 yr/ measles in past 6 weeks/ dehydration/ sick
- Dysentery with no improvement on antibiotics
- Persistent diarrhea with dehydration
- Persistent diarrhea with serious systemic infection such as pneumonia, sepsis, infants <4 months of age, or when there is no improvement with treatment over 5 days

MANAGEMENT

CLASSIFY DEHYDRATION

Not enough signs to classify some or severe dehydration

2 of following:
a) Restless , irritable
b) Sunken eyes
c) Drinks eagerly, thirsty
d) Skin pinch - goes back very slowly

2 of following:
a) Lethargy / unconscious
b) Sunken eyes
c) Not able to drink/ drinking poorly
d) Skin pinch - goes back slowly

NO DEHYDRATION: PLAN A

- **Fluids**
  - **Give extra fluids** (as much as child will take) until diarrhea stops.
  - **Use WHO ORS** after each loose stool (in addition to usual fluid intake)
    - Upto 2 yrs → 50 -100 ml
    - 2 yrs or more → 100 -200ml
  - **On ORS packet check whether** 200ml or 1 litre of clean water is needed
  - Frequent small sips with spoon or cup.
  - **If child vomits**, wait 10 minutes then continue slowly.
  - **Homemade fluids**- salted rice water, salted yogurt drink, vegetable or chicken soup with salt and clean water, unsweetened fresh fruit juice and coconut water
  - **Unsuitable fluids** - carbonated beverages, commercial fruit juice, sweetened tea & coffee, other medicinal teas / infusions.
- **Zinc supplement** (Zinc sulphate/ carbonate / acetate)
  - 2-6 months → 10mg/day x 2 weeks
  - >6 months → 20mg/day x 2 weeks
- **Counsel Mother/ Attender**
  - **Feeding advise**
    - Infants on breast feed, to continue more frequent breast feeding than usual.
    - Those not on breast feed to continue their usual milk feed/ formula at least once in 3 hours.
    - Give age appropriate foods to >6 months old based on their pre illness feeding pattern

- **Danger signs (return immediately)**
  - Passing many watery stools
  - Repeated vomitings / very thirsty
  - Eating / drinking poorly
  - Develops fever / blood in stools

- **Follow up in 5 days if no improvement**

SOME DEHYDRATION: PLAN B

- Manage in clinic /daycare facility with recommended amount of ORS (75ml /kg) over 4 hour period
- If weight is not known

AGE	< 4 months	4 -11 months	12 -23 months	2 – 4 years	5-14 years	15 years or older
WEIGHT	<5kg	5 – 7.9 kg	8 - 10.9 kg	11 – 15.9 kg	16 – 29.9 kg	30 kg or more
IN ml	200 - 400	400 - 600	600 - 800	800 - 1200	1200 - 2200	2200 - 4000

- After 4 hours reassess the child, classify dehydration and select appropriate plan (A /B/C)
- Give extra fluids, zinc supplement, feeding advise and counselling regarding danger signs* as in plan A
- Follow up in 5 days if no improvement

PATIENT EDUCATION
- Danger signs*
- Hygiene practices
- Hand washing , proper disposal of excreta
- Safe drinking water
- Appropriate feeding practices
- Vaccination as per IAP guidelines

INVESTIGATIONS
- **Some dehydration:** **Preferable Tests-** electrolytes
- **Severe dehydration:** **Essential tests-** CBC, electrolytes **Preferable Tests-** Renal Function Tests, VBG
- **In suspected cholera cases:** **Preferable tests-** stool for hanging drop and stool culture
- **Dysentery:** (no response to antibiotic in 2 days) **Preferable test-** stool culture & stool routine for trophozoites of Ameoba
- **Persistent diarrhea:** **Preferable test-** stool routine microscopy, urine routine microscopy, urine culture , sepsis screen

WHEN CONSIDERING ALTERNATIVE DIAGNOSIS OF PERSISTENT DIARRHEA AND DYSENTRY

SEVERE DEHYDRATION: PLAN C

- Urgent referral to hospital
- Mother to continue rehydration by giving frequent sips of ORS during transport or use NG tube when possible in patients with poor drinking

NO

CAN YOU GIVE INTRAVENOUS (IV) FLUIDS IMMEDIATELY?

NO

- Start IV fluid immediately
- Ideal fluid is Ringer lactate solution / Normal saline (DNS in malnourished)

AGE	FIRST GIVE 30 ML/KG IN	THEN GIVE 70 ML/KG IN
Infant (< 12 months)	1 hour	5 hours
Older	30 minutes	2.5 hours

- If child can drink, give ORS by mouth while the drip is set up
- Assess heart rate/ respiratory rate/ BP/ CFT/ consciousness and recognize early shock
- Refer for hospitalization
- If prevalance of cholera – Doxycycline single dose 300mg or Tetracycline 12.5mg/kg 4 times a day x 3 days. For young children Erythromycin 12.5mg/kg 4 times a day x 3 days
- Associated vomitings – Ondanstetron 0.15 mg/kg/dose IV/oral in addition to rehydration therapy
- Reassess every 15-30 minutes till a strong radial pulse is present and then every hour If hydration status is not improving, give IV drip more rapidly
- After 6 hours (infants) and 3 hours (older patients) - evaluate for dehydration and choose the appropriate plan (A, B, or C) to continue treatment
- Give ORS (about 5 ml/kg/hour) as soon as the child can drink: usually after 3-4 hours (infants) or 1-2 hours (children)
- Observe for 6 hours after the child has been fully rehydrated.
- In hypernatremic and hyponatremic dehydration child appears relatively less ill / more ill respectively and needs to be referred for hospitalization

DISCHARGE CRITERIA
- Suffcient rehydration (indicated by wt gain &/or clinical status)
- IV fluids no longer needed
- Oral intake = / > losses
- Medical f/u available

PERSISTENT DIARRHEA
- Appropriate fluids to prevent or treat dehydration
- Nutrition:
  - If breastfeeding, give more frequent, longer breastfeeds, day and night.
  - Other milk: replace with increased breastfeeding, or with fermented milk products, such as yogurt, or half the milk with nutrient-rich semi-solid food.
  - For other foods, follow feeding recommendations for the child's age: give small, frequent meals (at least 6 times a day), and avoid very sweet foods or drinks.
- Zinc for 14 days
- Supplement vitamins / minerals
- Antimicrobial to treat diagnosed infection
  - A) Intestinal infection:
    - If blood in stool: Treat like dysentery
    - If stool routine suggestive of Amoebiasis: Treat for it
    - If stool suggestive of cyst/ Trophozoite of Giardia: Give Metronidazole 5mg/kg/dose x 8hrly x 5 -7 days
  - B) Treat Non intestinal such as UTI / Otitis Media
- Follow up in 5 days
- Refer to hospital (See box)

DYSENTERY
- Treat dehydration according to assessment.
- Ciprofloxacin 15mg/kg twice a day and reassess after 2 days. Improvement: 3 days of treatment
- No improvement → Cefixime 10 mg//kg/d, 2 div doses. Reassess after 2 days. If better complete 3 -5 days of treatment.
  - If stool routine positive for Ameobiasis : Metronidazole 10mg/kg/dose 8 hourly x 7 days (10 days in severe cases)
- Refer to hospital (See box)

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KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of DENGUE FEVER

ICD-10-A90

WHEN TO SUSPECT?

SYMPTOMS
Fever and two of the following criteria:
1. Nausea
2. Vomiting
3. Rash
4. Myalgia
5. Headache
6. Retro orbital pain
7. Arthralgia
8. Hemorrhagic manifestations

Live in / travel to dengue endemic area

WARNING SIGNS
- Abdominal pain or tenderness
- Persistent vomiting
- Clinical fluid accumulation – pleural effusion, ascites.
- Mucosal bleed – malena, epistaxis, gum bleed
- Liver enlargement > 2 cms
- Shock (DSS) – weak rapid pulse, pulse pressure < 20mm Hg hypotension, cold clammy skin, restlessness.

ASSESSMENT

Dengue without warning signs

Dengue with warning signs

Severe dengue

TREATMENT OF PROBABLE DENGUE WITHOUT WARNING SIGNS
- Symptomatic ambulatory treatment
- Paracetamol for fever: avoid NSAIDs
- Daily monitoring: clinical, PCV, platelets

SEVERE DENGUE
- Fluid accumulation with respiratory distress
- Severe bleeding
- Impaired consciousness

REASONS FOR REFERRAL
- Cold extremities, restlessness
- Acute abdominal pain
- Decreased urine output
- Bleeding and hemoconcentration
- Rising PCV & thrombocytopenia without clinical symptopms

INVESTIGATIONS

ESSENTIAL
- Hb, TLC, DLC, Platelets, PCV
- Positive tourniquet test
- NS1 antigen (ELISA method)

DESIRABLE
- Chest X-ray
- LFT, RFT,
- CPK, albumin
- USG abdomen
- Dengue IgM

OPTIONAL
- Echocardiography
- PCR - dengue
- CVP monitoring
- USG guided measurement of collapsibility of IVC for monitoring hypovolemia

SHOCK

Assess airway, breathing, circulation & start oxygen inhalation

COMPENSATED SHOCK
(tachypnea, tachycardia, normotensive)

Ringer's Lactate/ NS 10 ml/kg/hr

Assess after every hour by checking HR, RR, BP, CVP and PCV

No Improvement
- RL 10-15ml/kg/hr
- Assessment at second hour
- No Improvement
- RL 15ml/kg/hr
- Assessment at third hour
- Colloids 10ml/kg/hr
- No Improvement
- Look for anemia, acidosis, myocardial dysfunction and treat accordingly

Improvement
- RL 5-7ml/kg/ 1-2hr
- Further Improvement
- RL 3-5ml/kg/hr
- Continue IV fluids till stable for 24 hours
- Once stable, observe for 24 hours, then discharge if the discharge criteria is fulfilled

HYPOTENSIVE SHOCK
(tachypnea, tachycardia, hypotension, peripheral pulses not palpable)

20 ml/ kg crystalloid or colloid in 15 minutes

Assessment of Shock
(monitor HR, RR, BP, PCV and CVP)

No Improvement
- PCV Increased → Colloids 10-20ml/kg
- PCV Decreased → Blood Transfusion
- Assessment
- No Improvement → Look for blood loss, acidosis cardiac dysfunction and treat accordingly
- Improvement → Gradually decrease infusion rate
  10ml/kg/hr 1-2 hr
  7ml/kg for 2-3 hrs
  5ml/kg for 2-4 hrs
  3ml/kg for 2-4 hrs
  Stop at 48 hours

In case of shock, start bolus and arrange for urgent referral with continuous monitoring by a health professional to facilities with a PICU.

INDICATION FOR PLATELET TRANSFUSION & PACKED RED CELLS

PACKED RED CELLS
- Loss of blood (overt blood) 10% or more of total blood volume.
- Refractory shock
- Fluid overload

PLATELETS
- Prolonged shock
- Prophylactic platelet transfusion (PLT <10.000/cumm)
- Systemic massive bleeding

FRESH FROZEN PLASMA/ CRYOPRECIPITATE
Coagulopathy with bleeding

DISCHARGE CRITERIA (ALL OF THE FOLLOWING CONDITIONS MUST BE PRESENT)

CLINICAL
- No fever for 48 hours
- Improvement in clinical status (check for general well-being, appetite, haemodynamic status, urine output, respiratory distress)

LABORATORY
- Increasing trend of platelet count
- Stable haematocrit without intravenous fluids

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

FEVER IN CHILDREN

ICD-10-R50

FEVER IS Core (rectal) temperature ≥ 38.0°C (100.4°F) or axillary temperature > 37.5°C (100.4°F).

WHAT TO ASK?

- Fever duration
- Localizing symptoms of: RTI, UTI, GI tract infection, CNS infection
- Rash, joint symptoms, skin/ soft tissue swelling or redness
- Vaccination within 24 hours, drug/ toxin exposure
- Family/ neighbourhood history of similar illness

EXAMINATION

Vital signs: Temp, HR, RR, BP, CFT

Appearance: Sick, toxic, lethargic, irritable, inconsolable, dehydrated

General Examination:
- Ear, nose, throat
- Rash (petechieae, macules, papules, vesicles, nodules, polymorphic)
- Lymphadenopathy
- Skin (pustules, pyoderma, impetigo, cellulitis)
- Joints
- Genitalia (for erythema, tenderness, edema)
- Bones

Systemic Examination
- Chest auscultation, abdominal palpation, CNS, CVS

CLUES TO A SPECIFIC DIAGNOSIS

Fever + respiratory symptoms:
- Cough, runny nose: URTI
- Membrane over tonsils/pharynx: Diphtheria
- Paroxysmal cough: Pertussis like illness
- Barking cough: Laryngotracheobronchitis/ croup

Fever + rash
- Red maculopapular rash: Measles, Rubella, Dengue.
- Fine generalized maculopapular rash with systemic dysfunction/shock: Meningococcemia.
- Itchy erythematous macules evolving to clear vesicles: Varicella

Fever + other symptoms:
- Parotid gland swelling: Mumps
- Arthritis: Consider Chikungunya, acute rheumatic fever, JIA
- Strawberry red tongue, skin peeling, lymphadenopathy, conjunctival injection: Kawasaki disease

INVESTIGATION OF THE FEBRILE CHILD

(Consider if one or more of the following are warranted. Perform investigations only where result impacts management)

<7 DAYS FEVER ALONE

ESSENTIAL:
If fever <72 hours and child not looking sick: No investigations
If fever >72 hours, consider: TLC, DLC, P.S for leukocyte morphology, malarial parasite & platelet count

DESIRABLE: Rapid antigen test for malaria, NS1 antigen and dengue IgM antibody, blood culture

OPTIONAL: C reactive protein, procalcitonin

<7 DAYS AND LOCALIZING SYMPTOMS PRESENT

ESSENTIAL: As given in the first box

DESIRABLE: As given in the first box + consider: (Clean-catch) urine microscopy & culture, chest Xray, CSF analysis

OPTIONAL: As given in the first box + consider: ultrasonography, throat/ pharyngeal swab, pus aspiration.

<7 DAYS AND NON SPECIFIC SYMPTOMS

ESSENTIAL: As given before

DESIRABLE: As given before. Additionally consider: serology for specific viral infection, rapid antigen test for malaria, NS1 antigen and dengue IgM antibody, blood culture, serology for scrub typhus

OPTIONAL: As given before

>7 DAYS AND FEVER ALONE OR WITHOUT LOCALIZING SYMPTOMS

ESSENTIAL: All mentioned in Essential & Desirable list in the prior boxes. Additionally consider Widal test.

DESIRABLE: Consider Mantoux test, ultrasonography

OPTIONAL: As given before. Additionally consider: Ultrasonography of abdomen, chest, pericardium, joint(s), abscess, lymph node clusters, parotid gland etc, for microscopy, Xpert MTB RIF assay, Mycobacterial culture. Consider: bone marrow, ANA-profile, HIV serology, echocardiography, CT PET scan.

>7 DAYS AND LOCALIZING SYMPTOMS PRESENT

ESSENTIAL: All investigations mentioned in the prior boxes

DESIRABLE: All investigations mentioned in the prior boxes. Additionally consider: serology for Brucella, CMV, Herpes, Japanese encephalitis. CT scan in deep seated abscess or lung abscess, Bone marrow examination, ANA profile, HIV serology, PET scan.

OPTIONAL: All investigations mentioned in the prior boxes

MANAGEMENT

STEP 1 — INITIAL ASSESSMENT AND STABILIZATION

Manage urgent issues
- Decrease body temperature with Paracetamol (15mg/kg by any route) and/or hydrotherapy.
- Manage any life-threatening issue.
- Consider first dose antibiotic in suspected meningitis, severe pneumonia, or severe malnutrition.
- Consider anti-malarial in suspected malaria

STEP 2 — CONSIDER HOSPITALIZATION FOR OBSERVATION/ MANAGEMENT IN

- All neonates
- Young infants with toxic appearance.
- Severe malnutrition, toxic appearance, inability to feed, lethargy, irritability, dehydration, etc.
- >14 days illness without diagnosis.
- Any reason deemed by the treating physician.

STEP 3 — CONSIDER REFERRAL TO TERTIARY CARE CENTRE

(after appropriate stabilization and/or initial management):
- Need for intensive care
- Complex multi-system disease.
- Confirmed complications of the primary illness

STEP 4 — EMPIRIC MANAGEMENT

- Consider based on likely diagnosis, sickness status, and availability of investigation facilities.
- Empiric treatment should be tailored based on subsequently available investigation reports & local antimicrobial sensitivity.
- Anti tuberculosis treatment (ATT) should not be started on empiric basis except in suspected TBM

STEP 5 — CONSIDER DISCHARGE WHEN

- Afebrile > 48 hours or fever is showing defervescence
- Feeding well
- Presenting symptoms (in addition to fever) resolved/resolving
- Physician is satisfied that further care can be continued on ambulatory basis
- Duration of i.v antibiotic therapy is completed

ABBREVIATIONS

ANA: Anti-nuclear antibody
BP: Blood pressure
CFT: Capillary filling time
CMV: Cytomegalovirus
CNS: Central nervous system
CSF: Cerebro-spinal fluid
CT: Computed tomography
DLC: Differential leukocyte count
CVS: Cardiovascular system
GI: Gastro-intestinal
HR: Heart rate
JIA: Juvenile idiopathic arthritis
PET: Positron emission tomography
PS: Peripheral smear
RR: Respiratory rate
RTI: Respiratory tract infection
TLC: Total leukocyte count
URTI: Upper respiratory tract infection
UTI: Urinary tract infection

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of
SEPSIS AND SEPTIC SHOCK IN CHILDREN
ICD-A41.9, R65.21

Sepsis to be suspected: in children with any infections (fever with or without rashes/ pneumonia/ diarrhoea) and they are at risk of life threatening organ dysfunction



WHEN TO SUSPECT (2-59 MONTHS)?

Poor Feeding	Lethargy	Decreased responsiveness	Unconsciousness
Cold/ bluish peripheries	Rapid or shallow breathing	Chest in drawing	Stridor
Excessive vomiting	Decreased urine output	Convulsions	Stiff neck

CHECK FOR HISTORY OF

- Prior treatment
- Previous recurrent infections
- Prior hospitalisation
- Chronic systemic illness (congenital or acquired)
- Immunization (age appropriate)

EXAMINATION

GENERAL PHYSICAL EXAMINATION

Lethargy	Petechial rash
Decreased alertness	Mucosal bleeding
Activity	Rapid breathing
Pallor	Chest in drawing
Cyanosis	Cold peripheries
Skin mottling	Assess nutritional status

VITAL SIGNS

Pulse volume (High volume as well as low volume/feeble pulse)	Heart rate and respiratory rate (outside the age range)
Capillary refilling time > 3 seconds	Pulse oximetry (saturation <95%)
Blood pressure* (Systolic blood Pressure < 70 in <1 year)	>1 year child if systolic BP < 70+ Age (yrs) x2) or (lower than age range)

SYSTEMIC EXAMINATION

Respiratory: Signs of respiratory distress – retraction, nasal flaring, grunting ,crepitation on auscultation
CVS: Murmur, gallop rhythm
Per abdomen: Abdominal distension
CNS: *AVPU scale, signs of meningitis, seizures
Skin: Rashes
Bone & joints: Swelling, redness, tenderness

SIGNS OF SEVERE DEHYDRATION

Diarrhoea plus any two of these: Lethargy or unconscious, not able to drink or drinks poorly, Sunken eyes, skin pinch goes back very slowly

INVESTIGATIONS- (Based on symptoms and available facility)

Essential – Complete blood counts, peripheral blood film, urine routine, blood sugar, CRP, serum electrolytes, renal function test, liver function test

Desirable - Blood culture, blood gas, relevant cultures (based on symptoms), chest X-ray, specific illness- Malaria – rapid malarial antigen test, Dengue- dengue NS1, IgM, CSF study

Optional- PCT , USG to guide the fluids

MANAGEMENT

DIAGNOSTIC ALGORITHM

CHILD (2-59 MONTHS OF AGE WITH FEBRILE ILLNESS (WITH WARNING SIGNS)

GOOD PERIPHERAL PERFUSION

Admit or initiate treatment as per IMNCI guidelines[2]

POOR PERIPHERAL PERFUSION**

With fast pulse, cold peripheries, poor pulse volume, CRT >3 seconds
(Fast pulse: HR> 180 in < 12 month old child,
HR >120 in >12 month old child)

↓

Admit, initiate treatment, refer to centre with facility of ICU, ventilation, 24 hour monitoring (if required)

↓

Start O_2 with face mask @ 4-6 lit/min, or hood @8-10 lit if not available nasal prongs 1-2 lit/min to maintain SpO_2 >95%, Insert two IV cannulas, give first dose of antibiotics within first one hour

↓

Give 20 ml/kg of normal saline fluid bolus over 20- 30 minutes.

Reassess for decreases in heart rate, improvement in pulse volume and warm peripheries

↓

If no improvement

Repeat bolus of 20 ml/kg over 30 minutes, with careful monitoring for hepatomegaly, oxygen saturation, crepitation's in chest (if any of above appears then stop fluids)

↓

If shock persists

Start Inj Adrenaline infusion @0.1 microgram/kg/min and refer to higher centre

#For severe acute malnutrition – consider SAM STW
#For suspected Dengue follow Dengue Fever STW

**If there is improvement after 1st bolus and history of diarrhea present then:

Give 70 ml/kg over 5 hours in infants and over 2 ½ hours in a child with hypovolemic shock. Give additional fluids if losses continue.

Start maintenance fluid in case of other illness

Antibiotics

1. >3 months Inj Ceftriaxone 100mg/kg/day (2 divided doses)
2. <3 month Inj Cefotaxime 200mg/kg (divided 6-8hrly),
   Inj Gentamicin 5-7.5 mg/kg single dose /day
3. If soft tissue infection: consider Inj Cloxacillin 200mg/kg divided
   6 hourly or Inj Amoxicillin- Clavulanic acid 30 mg/kg/dose 8hrly)

Inj Adrenaline- 0.3x body weight in mg in 50 ml NS or 5% dextrose at 1 ml/hr will give 0.1 microgram/kg/min

When to refer

- Shock does not improve after 2nd fluid bolus
- Signs of fluid overload
- No facility for continuous monitoring.
- Before referral counsel the parents and inform referring facility

When to Suspect Cardiac Failure

- History of underlying heart disease
- History of forehead sweating/ suck rest suck cycle
- Murmur
- Hepatomegaly or basilar crept

If it is suspected be careful in giving fluid bolus

Complications

- **Respiratory failure** (excessive increase in the respiratory rates and inability to maintain saturation> 94% with oxygen) -non-invasive (CPAP/BIPAP) or invasive ventilation
- **Congestive heart failure**- Dobutamine / Milrinone infusion and Furosemide
- **Infections on other sites**- explore and treat accordingly

DISCHARGE CRITERIA

Completion of antibiotics as per culture sensitivity	Afebrile for 48 hours	Vitals within normal limit for age	Good oral intake	Adequate urine output >1ml/kg/hr

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

***DISABILITY (AVPU SCALE)** **A** Is the child Alert? If not; **V** Is the child responding to Voice? If not; **P** Is the child responding to Pain?; **U** The child who is Unresponsive to voice (or being shaken) AND to pain is Unconscious *Anything below A should be classify as danger sign

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Standard Treatment Workflow (STW) for the Management of
SEVERE ACUTE MALNUTRITION WITH COMPLICATIONS
ICD-10-E43

WHEN TO SUSPECT?

COMMON PRESENTATION
- Faulty feeding
  - Not exclusively breastfed for 6 months
  - Bottle feeding
  - Delayed/Inadequate complementary feeding
- Poor appetite
- Not gaining weight
- Lethargic
- Disinterested in surroundings
- Delayed development

Additional symptoms of complications
- Loose motions
- Jaundice
- Seizures

Inter-current infections:
- Pneumonia
- Diarrhea
- Sepsis
- Skin infections
- Severe dehydration
- Untreated tuberculosis
- HIV
- Social challenges

DIAGNOSTIC CRITERIA FOR SAM & MAM

0-6 months
- Consider SAM if MUAC <11.0 cm

6-59 months
- Consider SAM if MUAC <11.5 cm or WHZ <-3 SD or bilateral pitting oedema
- Consider MAM if MUAC is between 11.5- 12.4 cm or WHZ is between -2 to -3 SD

>5 years
- Consider SAM if BMI ≤ 3SD (severe thinness)
- Consider MAM if BMI ≤ 2 SD (thinness)

EXAMINE FOR
- Vital signs: PR, RR, CRT
- Lethargy/ irritability
- Loss of subcutaneous fat
- Muscle wasting
- Pallor
- Signs of Vitamin B, K and A deficiencies
- Respiratory distress
- Dehydration

TRIAGE

SAM + GOOD APPETITE + NO MEDICAL COMPLICATION
Home based treatment + oral amoxicillin 50 mg/kg/dose twice a day for 7-10 days

SAM + COMPLICATIONS/ POOR APPETITE/ FAILED HOME TREATMENT
Hospitalize

INVESTIGATIONS

ESSENTIAL	DESIRABLE	OPTIONAL
Hemogram, RBS, LFT, KFT, Chest X-Ray, RDT-HIV, Gastric aspirate for CBNAAT/AFB	ECG, Stool pH, Stool microscopic, Urine culture, Serum electrolytes (Na, K, Cal), Serum B12, Serum Folate levels	Blood Culture, Blood gases, Ultrasound (inferior vena cava to ascending aorta ratio)

TREATMENT

A. STABILISATION PHASE: Monitor vitals, urine frequency, stool/vomitus volumes
INTAKE: IVF (DNS) 4 ml/kg/hr for 2-3 days with early/concomitant initiation of oral feeds (130 ml/kg/day)

CONDITION	PLACE OF TREATMENT	TREATMENT
INFECTIONS (empirically)	Facilities for supportive monitoring, investigations and IVF	• Inj.. Ampicillin – 50 mg/kg/iv or im X 6hrly Plus inj. Gentamicin- 7.5 mg/kg iv or im, OD for 7-10 days • If no response within 48 hrs or critically ill give inj. Ceftriaxone 50 mg/kg, OD for 7-10 days • When accepting orally, switch to oral amoxicillin 40-45 mg/kg/dose twice a day for 7 days • If prolonged diarrhea (>7 days): Metronidazole 10-12 mg/kg, 8 hrly for 7-10 days (inj.ectable or oral)
HYPOGLYCEMIA (RBS <54mg/dL)	Facilities for supportive monitoring, investigations and IVF	Conscious: 50 ml of 10% Dextrose or 1 tsf sugar in 3 tsf water orally
	Transfer to intensive care facility to manage shock	Unconscious: 5 ml/kg of 10% Dextrose IV NO IMPROVEMENT treat as shock
HYPOTHERMIA (<35.5 °C or 96 °F)	Facilities for supportive monitoring, investigations and IVF. Plus warmer	Skin to skin care with mother (infants) Warming under warmer, incandescent lamp or warmer
	Intensive care facility to manage shock	NO IMPROVEMENT treat as shock
SEVERE DEHYDRATION	Facilities for supportive monitoring, investigations and IVF	Conscious: 50 ml of 10% Dextrose or 1 tsf sugar in 3 tsf water orally
	Transfer to intensive care facility to manage shock	Unconscious: 5 ml/kg of 10% Dextrose IV NO IMPROVEMENT treat as shock
ELECTROLYTE IMBALANCE (emperically)	Facilities for supportive monitoring, investigations and IVF	Potassium: 3-4 mmol/kg/D, orally for 2 wks Magnesium: 0.4-0.6 mmol/kg/D1 IM followed by oral for 2 wks
ANEMIA	Facilities for supportive monitoring, investigations and IVF	Whole blood /PRBC transfusion (10 ml/kg over 3 hrs) : if Hb <4 gm/dL or Hb 4-6.5 gm/dL with respiratory distress with close monitoring and hy. Furosemide (1 mg/kg) at start of transfusion

B. REHABILITATION PHASE (Transfer to NRC when child meets criteria for discharge* & accepts home available foods)

FEEDING
Place of treatment: Facilities for supportive monitoring

Treatment:
a. 6 months and above: F75 at least 5 times/day gradually increasing to give 150-200 kCal/kg/day (usually 2-3 days) then switch to F100 for next 5-7days with introduction of home available food
b. Below 6 months: same as above with return to exclusive breastfeeding where ever possible

ELECTROLYTES
Place of treatment: Facilities for supportive monitoring

Treatment:
a. Zinc: 2 mg/kg/day X 2wks orally
b. Copper: 0.3 mg/kg/day X 2 wks orally
c. Iron: 3 mg/kg/day once weight gain has started orally for 6 weeks

VITAMINS
Place of treatment: Nutritional rehabilitation center (NRC)

Treatment:
a. Vitamin A: >12 months- 2 lac iu, 6-12 months: 1 lac iu, <6 months: 0.5 lac iu if food not fortified
b. Vitamin D, A, B Complex: RDA

***CRITERIA FOR DISCHARGE FROM HOSPITAL TO OUTPATIENT CARE:** Clinically well and alert; no or resolving medical complications; no or resolving oedema (if present); satisfactory oral intake has a good appetite (taking at least 75% of target calorie intake of 150- 200 kcal/kg/day & 0-6 months old have weight gain of 3-5 gm/kg/day for three days).

PRIMARY FAILURE OF TREATMENT: **(a.)** Failure to regain appetite by day 4 **(b.)** Failure to lose oedema by day 4 **(c.)** Oedema still present Day 10 **(d.)** Failure to gain at least 5g/Kg/day for 3 consecutive days on catchup diet. *Look for unrecognized congenital abnormality, inborn errors of metabolism, immune deficiency, other major organ dysfunction, and malignancy.*

APPETITE TEST: Passed if, a child not fed for last 2 hours, when fed by mother in a quiet place consumes in 1 hour:
- 7-12 months: of ≥ 25 ml/kg of F100
- > 12 months: of locally prepared ready to eat food **

AMOUNT TO BE GIVEN: 15 gms or more if < 4 kg; 25 gms or more if 4 – 7 kg; 35 gms or more if 7-10 kg
**[Mixture of Roasted groundnut 1000 gm , Milk powder 1200 gms, Sugar 1120 gms, Coconut oil 600 gms. To be kept refrigerated for not more than 1 week.]

HOW TO PREPARE F75 AND F100	F75	F100
FRESH WHOLE CREAM MILK	300 ml	900 ml
SUGAR	100 gm	75 gm
VEGETABLE OIL	20 ml	20 ml
ADD WATER TO GET TOTAL VOLUME OF	1 Litre	1 Litre

ABBREVIATIONS

WHZ: Weight for Height Z-score
SAM: Severe Acute Malnutrition
MUAC: Mid-upper Arm Circumference
SD: Standard Deviation (from median)
MAM: Moderate Acute Malnutrition
BMI: Body Mass Index

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of SEVERE PNEUMONIA IN CHILDREN

ICD10-J18.9

PRESENTING SYMPTOMS /WHEN TO SUSPECT?

Cough, cold, with or without fever, difficulty in breathing (that includes fast breathing and chest indrawing) of less than 2 weeks duration.

GENERAL DANGER SIGNS
Not able to drink, persistent vomiting, convulsions, lethargic or unconscious, stridor in a calm child or severe malnutrition.

SUSPICION OF FOREIGN BODY ASPIRATION
Sudden onset choking and breathlessness.

ADDITIONAL INFORMATION CHECK FOR HISTORY OF

Similar illness in past, if yes, history of improvement with nebulized medications to consider asthma.

Asthma/allergy in family.

Influenza like illness in family over past 2 weeks: to consider treatment for influenza.

Immunization (age appropriate specifically vaccination included in national schedule and Pneumococcus, Influenza).

EXAMINATION FOR FOLLOWING SIGNS

Chest indrawing, state of alertness, cyanosis, clubbing, stridor, grunting.

VITAL SIGNS

Respiratory rates, heart rate, temperature, capillary refill time, pulse oximetry.

NUTRITIONAL STATUS

Specifically for defining Severe Acute Malnutrition (SAM).

AUSCULTATION OF CHEST

Breath sounds, crepitation, rhonchi.

DIAGNOSTIC ALGORITHM

Child age 2–59 months with cough and/or difficult breathing.

RED FLAG SIGNS
Irregular or gasping respiration, cold extremities, altered sensorium, cyanosis.

Cough and cold, no breathing difficulty.	Fast breathing (2-12 months >50; 1-5 years>40; >5 years >20) and/or chest indrawing oxygen saturation>92%.	Fast breathing (2-12months>50; 1-5 years>40 ;>5 years >20) and/or chest indrawing with any of the general danger signs (not able to drink, persistent vomiting, convulsions, lethargic or unconscious, stridor in a calm child or severe malnutrition).
NO PNEUMONIA	**PNEUMONIA**	**SEVERE PNEUMONIA**
Home care advice.	Ambulatory treatment with oral Amoxicillin and follow up.	**No red flag signs** Admit or refer to a facility with following: oxygen by mask or hood, pulse oximeter, IV fluids, oxygen, clinical supervision, X ray film (desirable).	**Red flag signs positive** Admit or refer to facility with following: Appropriate: ventilation facility, ICU, round the clock monitoring **If plan to refer:** Give first dose of antibiotics, arrange transport and inform to the referral centre.

INVESTIGATIONS

ESSENTIAL: Hemogram, random blood sugar, CRP, chest X-ray.
DESIRABLE: Blood culture, pleural tap, serum electrolytes, renal and liver function tests.
OPTIONAL: ABG, lung ultrasound, PCT, tracheal aspirate (gram stain with culture), bronchoscopy/BAL, microbiology culture, investigations for atypical organisms, PCR for viral etiology.

TREATMENT

OXYGEN INHALATION: by mask (1-2 L/min) or hood (4-6 L/Minute) to maintain oxygen saturation> 95%.
IV ANTIBIOTICS:
- **For children 2-59 months:** Ampicillin 100-200mg/kg in four divided doses + Gentamicin ±5-7.5 mg/kg as single dose daily.
- **For children >5 years:** Ampicillin/Amoxicillin, add macrolide (Azythromycin/Erythromycin) if atypical pneumonia is suspected.
- If suspected Staphylococcal pneumonia in any age (Pneumatocele on CXR, post measles, infected scabies or pyoderma) add Cloxacillin/ Amoxiclavulanic acid.

SUPPORTIVE CARE: Paracetamol for fever, IV fluid, bronchodilators (inhaled) as needed.
WHEN AND WHAT TO SWITCH TO ORAL AND DURATION:
- **Child is afebrile, RR has returned to below age specific cutoffs, no chest indrawing and accepting orally:** switch to oral Amoxicillin to complete a total of 5-7 days duration (include duration of IV also in it).
- **If getting Doxacillin/Amoxyclav:** continue oral Cloxacillin or Amoxclav for 2 weeks.
- Start feeding as soon as possible when child shows improvement.

IF ASSOCIATED SAM: follow treatment guidelines for SAM.

COMPLICATIONS AND THEIR TREATMENT

NON RESPONDERS: persistence of symptoms and/or signs 48-72 hours after initiation of appropriate treatment-change antimicrobials.
PLEURAL EFFUSION: diagnostic aspiration.
EMPYEMA: drainage with ICD.
LUNG ABSCESS: change antibiotics for longer duration (4-6 weeks).
PNEUMOTHORAX: Intercostal drainage.
RESPIRATORY FAILURE: consider ventilation.
INFECTION IN OTHER SITES: identify and treat appropriately.

ADDITIONAL INFORMATION

First and second line antibiotics for severe pneumonia:

FIRST LINE	ALTERNATE FIRST LINE	SECOND LINE
Ampicillin	First gen Cephalosporins	Amoxiclav Cefuroxime Cefotaxime/ Ceftrioxone

WHEN TO REFER TO HIGHER CENTERS?

Facilities (as described above) for treatment or complications (if develops) are not available, suspecting chronic respiratory problems.

WHEN TO SUSPECT INFECTION WITH H1N1 VIRUS?

Child with cold, cough, fever with similar illness in any family members, consider H1N1 infection. Start Oseltamivir (as per national guideline).

WHEN TO SUSPECT ACUTE BRONCHIOLITIS?

A child below 2 years of age fulfilling case definition of first episode of severe pneumonia with predominant finding of wheezing on auscultation.

WHEN TO SUSPECT ASTHMA?

A child of age >3 years with history of recurrent cough, cold, wheezing with or without fever with good response to bronchodilator and personal or family history of asthma.

WHEN TO SUSPECT CHRONIC RESPIRATORY PROBLEM?

Child has any of the following: severe malnutrition, clubbing, feeding difficulty, family history of sibling death due to pneumonia, multi site infections (diarrhea, ear discharge oral thrush).

Discharge when child is switched to oral medications, accepting oral for 24 to 48 hours

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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PSYCHIATRY

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Standard Treatment Workflow (STW) for the Management of ALCOHOL USE DISORDERS

ICD10-F10

Universal screening for every patient attending any healthcare facility

Special attention to: (AUDIT can be used for screening)

- H/ o head injury
- Appearing under influence of alcohol
- H/ o impaired social, occupational functioning
- Daily alcohol consumption
- Drinking in large quantities (men: 5 or more drinks/ day; women: 4 or more drinks/ day)

ASSESSMENT (DETAILED HISTORY)

- Age at initiation, quantity, frequency and progression (daily use and/or morning drinking)
- Time of last alcohol use and amount
- Binge drinking (men: 5 drinks over 2 hours; women: 4 drinks over 2 hours)
- Withdrawal state: insomnia, restlessness, anxiety, tremors. Use of alcohol (or benzodiazepines) to relieve or avoid withdrawal symptoms.
- Tolerance: increased doses of alcohol taken to achieve effects produced by earlier intake
- Craving
- Difficulty in controlling duration of drinking or amount of use
- Preoccupation with alcohol use with neglect of alternative pleasures or interests
- Increased time spent to obtain/ take alcohol/ recover from its effects
- Continued use despite patient being aware of evidence of harmful consequences that have occurred
- Abstinence and treatment attempts in past and reasons for relapse
- Co-morbid medical illness or psychiatric illness and their treatment
- Complications:
  - Physical- gastritis, peripheral neuropathy, hepatic dysfunction, accidents/injuries
  - Psychosocial - loss of work, fights at home, financial, legal problems

EXAMINATION

VITALS
- BP
- Pulse Rate
- Temperature

WITHDRAWAL SIGNS
- Tremor
- Sweating
- Tachycardia

SIGNS OF HEPATIC DYSFUNCTION
- Enlarged liver
- Icterus
- Abdominal swelling

NEUROLOGICAL SIGNS
- Cerebellar signs
- Peripheral neuropathy
- Confusion

DIAGNOSIS

Hazardous or Harmful use

- Involvement in risky behaviours such as binge drinking, driving under the influence of alcohol
- It should have resulted in harmful physical or psychosocial consequences

Alcohol dependence (three of the following six criteria to be present for at least one month)

1) A strong desire or sense of compulsion to take alcohol
2) Difficulty in controlling alcohol use
3) Withdrawal state when alcohol use has stopped or been reduced or use of the alcohol (or benzodiazepines) to relieve or avoid withdrawal symptoms
4) Evidence of tolerance
5) Preoccupation with alcohol use
6) Alcohol use persisting despite clear evidence of harmful consequences

INVESTIGATIONS

CBC | Liver function test | Blood sugar | Electrolytes | CT head (in case of seizure/ delirium tremens)

MANAGEMENT

PRIMARY CARE
- Alcohol Hazardous/ Harmful users - Brief Intervention* to reduce/stop consumption
- Alcohol Dependent users – Advice to stop use and motivate for treatment using Brief intervention*

REFER TO SECONDARY CARE IF
- H/ o withdrawal seizures/ hallucinations
- Additional psychiatric disorder
- Recurrent failed attempts at treatment

SECONDARY CARE
- Treatment of withdrawal symptoms
- Managment of withdrawal seizure
  - Inpatient management with benzodiazepines (diazepam or lorazepam)
  - Frequent titration of medication. Higher dosage may be required.
  - Closer monitoring and nursing care
- Treatment of additional psychiatric disorder or substance use disorder

REFER TO TERTIARY CARE IF
- H/ o delirium tremens
- Major medical problems
- Additional substance use

TERTIARY CARE
- Treatment of delirium tremens
  - R/ o head injury, hepatic encephalopathy, Wernicke's encephalopathy
  - R/ o other causes of delirium
  - Manage on similar lines as withdrawal seizures
  - Management in ICU setting when indicated
- Consult with other medical specialists (like gastroenterology or medicine for hematemesis).
- Management for suicidality or violence when emergent threat

*BRIEF INTERVENTION

Inquire using open ended questions in a non-judgmental manner. Help patient to evaluate the risks versus the perceived benefits and to arrive at a decision to reduce or stop alcohol use.

Includes (FRAMES) :
- **F**eedback about alcohol related problems
- **R**esponsibility – acknowledging that the patient is responsible for making the decision about their alcohol use
- **A**dvice regarding the harms associated with continued use
- **M**enu of alternative change options (includes identifying alternative activities such as hobbies, involving the family in treatment)
- **E**mpathetic attitude
- **S**elf efficacy - to encourage patients' confidence that they can make changes in their alcohol use and lifestyle

WITHDRAWAL MANAGEMENT

- Tab Diazepam (20-40mg/day in divided doses) based on severity of withdrawals.
- Monitor and titrate dose.
- If patient comfortable, reduce dose of medication by 10% to 20% per day, taper within 7 to 10 days
- Thiamine 100 mg OD
- Significant liver dysfunction: Lorazepam (2 mg Lorazepam equal to 5 mg Diazepam)

RELAPSE PREVENTION

(Long term goals- abstinence and socio-occupational integration)

- **Disulfiram (250 mg OD)**
  Pre-requisites:
  - Motivated patient
  - Patient's written consent
  - Under supervision of family members.
  - Inform patient and family about unpleasant, potentially serious reaction with even small amounts of alcohol (flushing, headache, vomiting, reduction of blood pressure, arrhythmias)
  - Ability of health personnel in the area to handle a potential reaction
- **Relapse prevention counselling:**
  - Identify cues leading to craving (like person, place, situation etc)
  - Develop strategies to deal with them effectively

INDICATIONS FOR ADMISSION

Failure of outpatient treatment | H/o withdrawal seizures/ delirium tremens | Co-morbid significant medical illness and/or psychiatric illness | Poly-substance use

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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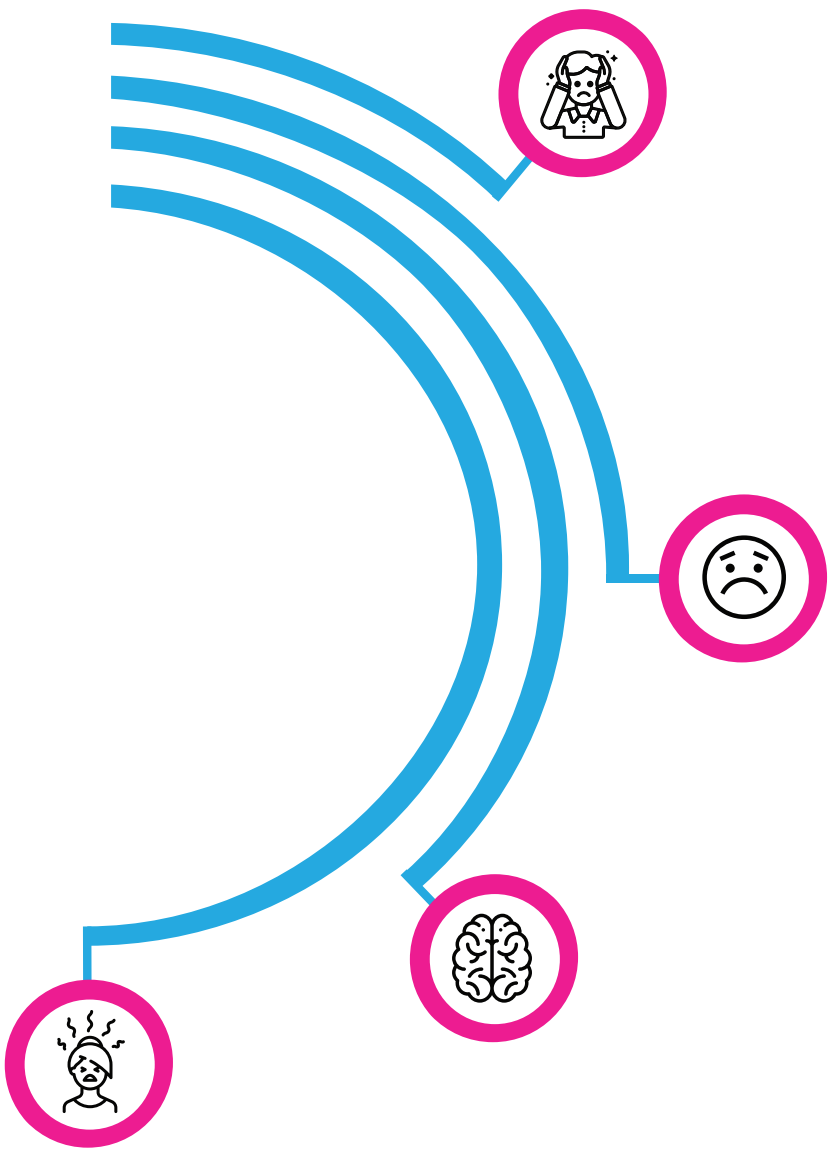
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Standard Treatment Workflow (STW) for the Management of ANXIETY DISORDERS

ICD-10-F40-F42



- Tension, anxiety, apprehension, fear, worrying
- Sadness, lack of interest, uncontrolled negative thoughts
- Unexplained physical symptoms like chest pain, abdominal pain, muscular tension, headache, nausea
- Episodes of palpitations, difficulty in breathing, feelings of choking, light headededness, dizziness, fainting, trembling
- Attacks of fear, losing control or going "crazy", fear of dying
- Repetitive unwanted thoughts and behaviours

DIAGNOSIS

Generalized Anxiety Disorder (GAD): Chronic feeling of tension, apprehension, anxiety or worrying about a number of events or activities that involve every day routine life circumstances (e.g., work, school, health, finance, household chores etc.)

Agoraphobia: Fear of going out of home alone, being in enclosed spaces (e.g., malls, cinemas etc.), open spaces (e.g., bridges, vast playgrounds etc.), using public transportation (e.g., trains, buses, planes etc.)

Panic Disorder: Recurrent unexpected attacks of intense fear/ anxiety along with physical symptoms (palpitations, feelings of "choking", trembling, chest pain feeling dizzy/faint etc.)

Social Phobia: Marked fear and avoidance of social situations (e.g., interaction with strangers, meeting unfamiliar people, performing in front of others)

Obsessive-compulsive disorder (OCD): Recurrent and persistent unwanted thoughts (e.g., unwanted sexual and blasphemous thoughts, fear of harming self or others, fear of contamination, doubts about daily activities etc.) and repetitive behaviours (e.g., excessive washing / cleaning, checking, ordering etc.)

ASSESSMENT

- Duration of anxiety
- Degree of distress, and impairment of day-to-day functioning
- Symptoms of depression
- Substance and alcohol misuse
- Physical disorders: thyrotoxicosis, pheochromocytoma and hypoglycaemia
- Psychosocial factors: ongoing stress and other issues pertaining to work, family

MANAGEMENT

PRIMARY CARE LEVEL

Psychoeducation

- Reassurance
- Explain symptoms are of anxiety/ fear and mimic symptoms of physical illnesses (e.g., heart attack)
- Do not investigate excessively. Few investigations like ECG, ECHO maybe necessary in some patients
- Discourage doctor shopping
- Do not avoid triggers of panic attacks (e.g., physical exertion, agoraphobic situations) and fear (e.g., travelling by public transport).
- Emphasize avoidance maintains fears and phobias.
- OCD: Educate that the unwanted thoughts are a part of illness, and not a reflection of character or hidden intentions.

Pharmacological treatment

- Mild illness: Spending time, reassurance, and psychoeducation. May not need any medications.
- No improvement (few weeks): Escitalopram 5mg / day at night, with increase to 10 mg/d in a week. No satisfactory improvement in 4-6 weeks, may increase to 20 mg / day. If there is no significant improvement in another 4-6 weeks, refer to a specialist.
- Severe and unbearable anxiety: Diazepam (5 -10 mg) may be given at night. Do not continue for > 1 month. Taper and stop over 2 weeks. Long-term treatment with benzodiazepines to be avoided
- Escitalopram to be continued for at least 1-2 years after remission
- Side-effects (sexual dysfunction, sedation, weight gain) : monitor and address periodically

SECONDARY CARE LEVEL (DISTRICT HOSPITAL)

- Review diagnosis and treatment history if there is no improvement with a trial of Escitalopram.
- Check whether the patient has taken medication at prescribed dose and on a regular basis

- Second SSRI (either of them for about 2-3 months):
  - Sertraline upto 200 mg/day,
  - Fluoxetine upto 60 mg/day,
  - Paroxetine upto 50 mg/day,
  - Fluvoxamine upto 300 mg/day

- No response to second SSRI: cognitive behaviour therapy (CBT) if trained therapists available.
- Refer to tertiary centre if unsatisfactory response after second SSRI and / or addition of CBT.
- If referral to tertiary centre is not feasible, psychiatrists may try other strategies (other than Deep Brain Stimulation and surgery for OCD) mentioned under the "tertiary care" at the secondary level itself.

TERTIARY CENTRE (MEDICAL COLLEGE, REGIONAL MEDICAL CENTRE, PSYCHIATRIC HOSPITAL)

- Evaluate reasons for treatment resistance like
  - Wrong diagnosis
  - Inadequate drug treatment,
  - Poor adherence to treatment
  - Inadequate CBT,
  - Presence of comorbid conditions such as personality disorders and organicity
- **Panic disorder:** evaluate any medical conditions that mimic panic disorder (hyperthyroidism, hyperparathyroidism, pheochromocytoma, vestibular diseases, seizures, arrhythmias, etc.).
- **OCD:** Trial of third SSRI or clomipramine
- **Treatment resistant OCD:** inpatient treatment for intensive therapist-assisted daily CBT and for rationalization of medication regimen.
- **Other anxiety disorders:** Trial of non-SSRIs (e.g., venlafaxine, duloxetine, pregabalin etc.) and tricyclic antidepressants

- **If response to medications is poor or unsatisfactory:**
  - CBT is the preferred mode of treatment alone or in combination with medications.
  - Treat comorbid psychiatric disorders (e.g., personality disorders)
  - Pharmacological augmenting strategies if antidepressants and CBT do not provide relief.

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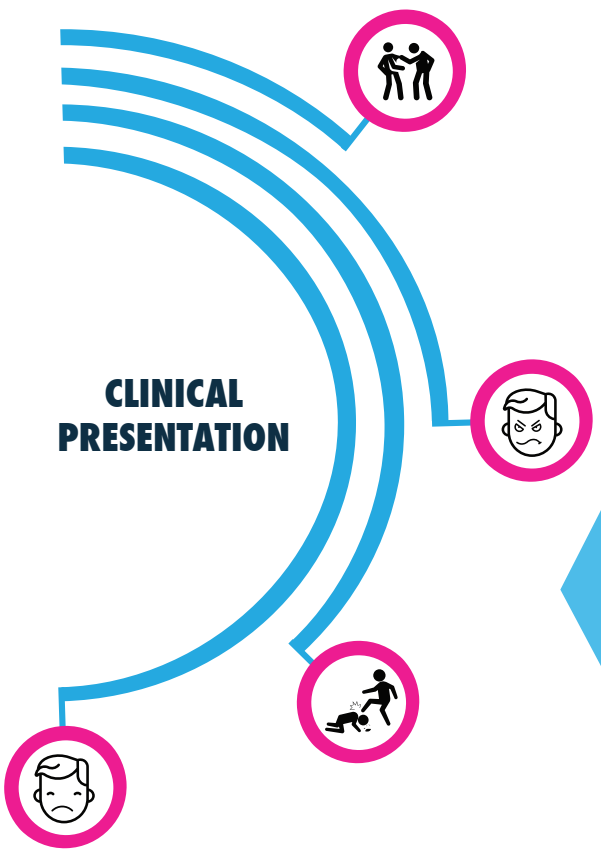
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Standard Treatment Workflow (STW) for the Management of CHILDHOOD BEHAVIORAL DISORDERS

ICD10- F90-98

CLINICAL PRESENTATION



OPPOSITIONAL DEFIANT DISORDER (ODD)

- Doesn't obey or listen, back-answers, rude behaviors
- Demanding, stubborn, throws tantrums when demands are not met

CONDUCT DISORDER

- Aggressive – angry, abusive, fights, hits or hurts people, bullies other children, damages articles
- Stealing, lying, threatening or misbehaving with people, truant (keeps away from school without parents' knowledge), runs away from home, bad company, cruelty to animals

ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)

- Restless, always on the move / running, can't sit in a place,talkative
- Can't focus attention on a task, poor concentration, gets easily distracted, disorganized, does not complete school work
- Too mischievous, can't be left alone, troubles people or damages things, or gets injured
- Impatient, always in a hurry, can't wait for his turn, does not care for danger, acts without thinking

ALL 3 DISORDERS

Poor or erratic school performance and / or complaints about behaviour from school

DIAGNOSIS

- Symptoms are present and persistent over several months
- Attempt further classification into ADHD, ODD and CD (ADHD may be present with or without ODD and CD

CAUTION

- Abrupt onset
- Recent onset (few weeks to few months)
- Sudden increase in severity (consider another psychiatric disorder such as bipolar affective disorder, hypomanic or manic episode -> follow the relevant STW)

ASSESSMENT (History From Multiple Sources)

PARENT INTERVIEW

- Symptoms- onset, duration, type(ODD, Conduct, ADHD-as above) and severity
- Developmental problems, emotional disturbances and stress
- Alcohol and substance use /misuse
- Impact on child and family

FAMILY SITUATION

- Health (including mental health) and wellbeing of family members
- Cohesion, mutual understanding and harmony in the family
- Parenting and childrearing practices: caring and disciplining, criticism, unfair comparison and physical punishments, mutual blaming of parents for child's problem

SCHOOLING

- Attendance
- Performance
- Learning problems,
- Classroom behaviors
- Recent changes in syllabus and/or school

CHILD INTERVIEW

- Develop rapport(discuss neutral topics; avoid direct tackling of misbehaviors)
- Observe:
  - Features of ADHD (restless, fidgety, easily distracted, attention keeps shifting)
  - Speech and language ability, intelligence, academic skills and mood
- Enquire about any stress or difficulties child is facing at home, school, and with peers and anger control

MANAGEMENT

WORK WITH FAMILY

- PSYCHOEDUCATION
  - Explain the child's behaviours are not intentional
  - Not child's fault, do not blame the child
  - Multifactorial causes-lack of self-regulation, and adverse environment
  - Can be improved with proper management
  - Parents can directly contribute to the child's improvement
- Help parents deal with their own worries and stress (listening, giving space to ventilate, validate and empathize their difficulties, reassure)
- Recognize and manage mental health problems such as depression and alcohol problem in parents
- Parent management training*

WORK WITH THE CHILD

- Avoid advice
- Anger management (count from 10 -1 backwards, move away from situation, deep breaths, relax, self-talk to cool down)
- Children with ADHD: "stop-think-act" or "halt and proceed" technique

WORK WITH THE SCHOOL

- Feedback to school regarding child's condition
- Teachers to give extra attention, help and support for the child
- Extra coaching, if needed in case of learning problems

*PARENT MANAGEMENT TRAINING

- Analyse the problem behaviors and understand patterns : time of occurance, triggers, duration and consequencies
- Engage with child in mutually enjoyable, pleasurable activities (playing games, discussing interesting things or doing activities together)
- Set clear do's and don'ts and explain to child in clear, simple, short instructions the consequencies (like withholding privileges following misbehavior; use star-charting (contingency management) and rewards based on number of stars earned
- In children with ADHD, develop clear daily routines, supervise activities and appreciate on completion of taks
- Limit screen time/ monitor use of electronic devices

• Dos
- Consistency in enforcing rules
- Catch the child being good and praise
- Ignore negative behaviours
- Child can be put in a boring place till he/ she becomes quiet for a few minutes (time-out)
- Encourage age appropriate responsibilities

• Don'ts
- Bribe
- False promises and threats
- Harsh punishments
- Excessive criticism and blaming especially in front of others
- Unfair comparison
- Yielding to unreasonable demands

MEDICATION (AVOID BEFORE 5 YEARS)

- **Severe and persistant aggression:**
  - **T. Risperidone** under close supervision (starting dose-0.25 mg, single daily morning dose after breakfast. Based on response, increase by 0.25 mg weekly up to 1 mg single daily dose).
    Not to exceed 1 mg/day
  - **Response + :** continue 3 months f/b slow taper
  - **Response - :** 4 weeks trial, then refer
  - Monitor adverse effects: weight gain, extra-pyramidal symptoms (EPS)
    [if EPS : add I mg Trihexyphenidyl OD morning]
- **Severe hyperactivity and impulsivety:**
  - T. Clonidine (starting dose-25 µg single daily dose before sleep, increase by 25 µg weekly up to100 µg per day in 2-3 divided doses
- Monitor BP and drowsiness
- Advise against sudden discontinuation

REASONS FOR REFERRAL

Severe, complicated presentation	Lack of response to treatment	Severe aggression	Highly dysfunctional family	Alcohol and substance abuse

SECONDARY CARE (DISTRICT HOSPITAL)

- Review and reassess diagnosis (clinical evaluation using Rutter's multi-axial system) and all the pointers given above
- If failed trial of Clonidine/ Moderate ADHD:
  T. Atomoxetine (starting dose-10 mg single daily morning dose after breakfast. Increase up to 1mg/ kg/day under close supervision).
  Monitor adverse effects and response
- Systematic parent management training / behavioral management and individual therapy (as given above)

TERTIARY CARE (MEDICAL COLLEGE / REGIONAL REFERRAL CENTRE)

- Evaluate and manage severe behavior disorders – severe ADHD, ODD, and CD, if necessary on short-term inpatient basis
- Multi-modal management with clear individualized plan
- Trial of Methylphenidate in moderate / severe ADHD under expert supervision
- Recognize and treat comorbid disorders such as bipolar disorder, substance use disorder, and internalizing disorders and manage
- Pharmacological management of older children / adolescents with severe aggression / impulsivity with Risperidone and/or Lithium
- Family therapy for dysfunctional / discordant families, contributing to child's condition
- Management of children in difficult circumstances with mental health issues (children in need of care and protection; children in conflict with law)

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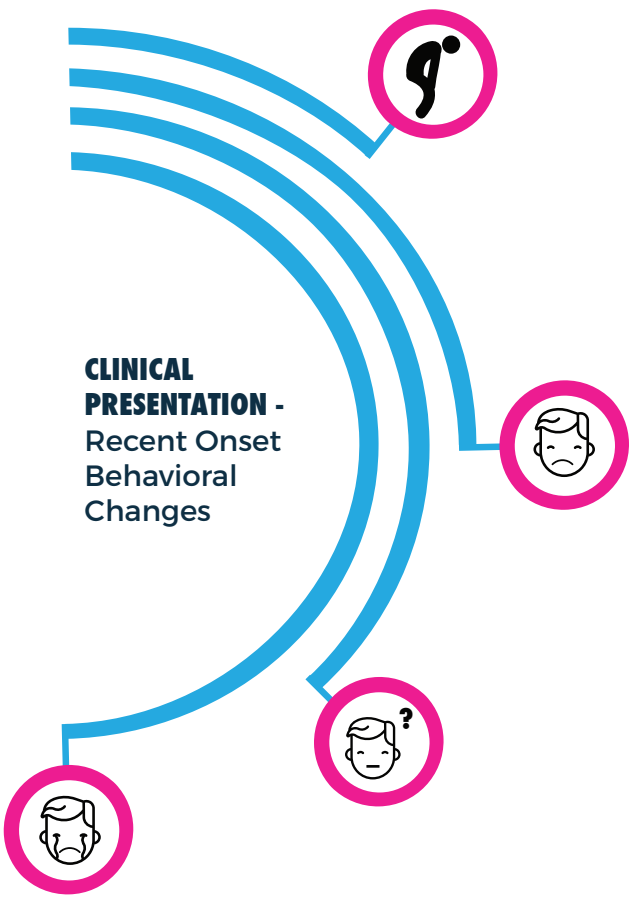
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Standard Treatment Workflow (STW) for the Management of CHILDHOOD EMOTIONAL DISORDERS



CLINICAL PRESENTATION - Recent Onset Behavioral Changes

SOMATIC (PHYSICALLY UNEXPLAINED) SYMPTOMS
- Weakness and tiredness
- Aches and pains
- Headache
- Non-epileptic attacks of fainting
- Chest pain and stomach pain
- Hyperventilation- often triggered by stress or distress

SYMPTOMS OF DEPRESSION
- Loss of interest in usual activities
- Recent deterioration in school performance
- Wanting to be alone, withdrawn, not interacting with people
- Looks unhappy, "off mood", crying for trivial or no reason, irritable, sensitive to any criticism
- Decreased sleep, loss of appetite and weight loss
- Talking about death and dying, self harm (eg. self-cutting) or suicidal attempt

SYMPTOMS OF ANXIETY
- Always worrying, tense
- Exam tension, performance anxiety, worries about marks and ranks
- Excessive fear and avoidance of some objects or situations (insects, animals, ghosts)
- Reluctance or refusal to go to school
- Very shy, avoids social situations, scared of talking or interacting with strangers,
- Clinging to mother, scared of being separated from mother

DIAGNOSIS
- Persistent symptoms of emotional disturbance for several weeks, significantly affecting the child's life
- Unexplained by medical condition such as hypothyroidism
- Depression and anxiety symptoms can co-occur
- Depression more common in adolescents, may have features similar to adult onset depression

CAUTION
- Assessment of suicidal risk and a plan of action is important in children with emotional disorders, especially depression (refer to appropriate STW)
- Elicit h/o hypomania/mania in children with moderate to severe depression (consider diagnosis of bipolar disorder)
- Physical conditions can cause similar symptoms (anemia and thyroid disturbance)

ASSESSMENT

PARENT INTERVIEW AND HISTORY TAKING
- Onset, duration, severity and full range of symptoms
- Home environment, family life and relationships, parenting practices and stressors
- Information (from paretns and school) about school performance, behavior, school refusal, bullying experiences, peer relations and any recent change

CHILD INTERVIEW
- Develop rapport
- Ask subjective distress (low mood, irritability, sadness, lack of enjoyment of activities, worries, fears, tensions, autonomic symptoms)
- Stressful events (loss, death in the family, separation, frightening experiences, traumatic abusive or shocking events, humiliating experiences, bullying in school, academic stress) and interpersonal difficulties
- Explore parent-child relations and interactions and any undue punishment or criticism

PHYSICAL EXAMINATION
(Rule out)
- Post-viral syndrome
- Recurrent attacks of malaria
- Chronic infections, chronic physical illness, anaemia, PCOD or thyroid disturbance

MANAGEMENT

WORK WITH PARENTS
- PSYCHOEDUCATION:
  - Child is emotionally disturbed and not able to function well
  - Not the child's fault
  - Avoid undue criticism, over expectation, unfair comparison, scolding and punishment
  - Parents' support, encouragement and understanding is important
- Counsel about suicidal risk in depression and to be alert to pointers to suicidality
- Evaluation and management of the mental health issues in parents
- Discuss about specific steps to reduce undue stress the child is facing

WORK WITH THE CHILD
- Psycho-education of the child- explain they are suffering from an emotional problem and it is not their fault and they will get better with proper treatment
- Anxiety management and emotional regulation skills
  - Muscle relaxation
  - Deep breathing exercises
  - Praanaayaama / yoga
  - Substituting distressing thoughts with more comforting thoughts
- Counsel the child to confide any distressing thoughts, including thoughts of death and dying
- Encourage the child to gradually return to the usual life and activities in a step-by step manner with parental support and encouragement

WORK WITH SCHOOL
- Give feedback to the school about child's condition and stress, need for support, encouragement and school's cooperation.
- If school refusal, graded return to school: encourage child to return to school gradually with the support of family and cooperation of school (e.g. initially for a few minutes in school compound, later for 1 period in school and moving on to longer duration

MEDICATION (MODERATE CASE OF DEPRESSION OR ANXIETY IN ADOLESCENTS)
- Tab Fluoxetine - start at 10 mg OD morning, increase to 20 mg OD after 2 weeks depending on response
- Inform adverse effects: behavioral activation (marked restlessness and irritability), onset of hypomanic symptoms, and worsening of suicidal ideas. Stop drug if they are troublesome
- Avoid benzodiazepines (except as temporary measure for few weeks in severe anxiety attacks or panic attacks - Clonazepam 0.25- 1 mg /day)

REASONS FOR REFERRAL
- Frequent expression of suicidal ideation/ attempted suicide / self-harm behavior such as self-cutting
- Severe symptoms
- Complicated picture, or features of obsessive compulsive disorder (OCD)
- No response to interventions in 4-6 weeks

SECONDARY CARE (DISTRICT HOSPITAL)
- Review and reassess diagnosis through detailed clinical examination using Rutter's multi-axial system
- Review the treatment received and plan multi-modal treatment.
- Reconsider medications, and augmentation strategies
- Review child's and family's awareness of the illness and do psycho-education
- Ascertain the presence of psychosocial factors : disturbed home environment, parent-child relationships and severe stressors
- Screen parents for mental health problems and manage accordingly
- **Individual therapy** focussing on identifying and challenging negative thoughts, anxiety management and coping with stress, helping them face difficult situations in small steps, improving interpersonal relationships
- **Parent counselling** to address family issues, communication and interaction patterns
- Collaborate with school wherever necessary (get school report; explain problem in simple terms, and suggest ways by which school can help)
- Recognize and manage less common problems such as obsessive compulsive disorder, psychoses and bipolar disorders
- Manage adolescents with mild / moderate suicidal risk

TERTIARY CARE (MEDICAL COLLEGE / REGIONAL REFERRAL CENTRE)
- Thorough diagnostic evaluation
- Manage severe mental disorders – psychoses, recurrent mood disorders, adolescents with severe depression, & treatment resistant cases, persistent suicidality, recurrent self-cutting, if necessary in inpatient setting
- Family therapy for dysfunctional / discordant families contributing to child's condition
- Cognitive behavior therapy for older children with severe OCD, depression, and anxiety disorders
- ECT on case to case basis (older adolescents with severe depression, mania, psychosis or catatonia unresponsive to adequate pharmacological management)
- Appropriate psycho-social steps if there is abuse, maltreatment or neglect
- Neurology referral in suspected cases of epilepsy and organicity

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of CHILDREN WITH DEVELOPMENTAL PROBLEMS

ICD10-F70-89

CLINICAL PRESENTATION

- Slow in development / delayed milestones of development
- Poor speech, self-care, learning and memory
- Less intelligent compared to other children

DIAGNOSIS

- Intellectual disability (mental retardation)* - global developmental delay + impairment compared to peers in intellectual functioning and adaptive skills
- Specific Learning Disorder (SLD)- Average intelligence with poor academic skills (reading, writing, spelling and maths inspite of adequate schooling)
- Specific speech delay – Only lagging in speech with normal intelligence, hearing and non-verbal communication
- Autism Spectrum Disorder (ASD) marked impairment in verbal and non-verbal social interactions (being solitary or "in his own world", poor response to name call and poor eye-to-eye contact) and stereotyped behaviors *in children under 5 years, avoid diagnosis of ID, name it as global developmental delay and start intervention

ASSESSMENT

DETAILED DEVELOPMENTAL ASSESSMENT:
- Assess if child is lagging behind in developmental attainments compared to same-age children
- Ask mother to estimate the mental age of child
- Ascertain if delay is global (all milestones) or restricted to one area (motor or speech)

PHYSICAL EXAMINATION:
- Height and weight,
- Head circumference,
- Vision and hearing
- Any noticeable physical anomalies (club-foot) or unusual facial appearance
- Motor abnormalities (stiffness / spasticity or weakness of limbs, unsteady gait)
- Any other problems (heart murmurs, organomegaly)

BEHAVIOURAL PROBLEMS:
- Hyperactive
- Impulsive behaviors
- Sleeping and feeding problems
- Aggression

EMOTIONAL PROBLEMS:
- Excessive crying
- Irritability
- Shyness and fears

OTHERS:
- Family situation
- Parents' awareness of the child's problems
- Quality of attention and care being given to the child,
- Past consultations and treatment educational history

MANAGEMENT

PSYCHO-EDUCATION OF PARENTS

- **Normal** – reassure parents
- **Mild delay** ("at risk") – early intervention and follow-up
- Explain causation due to some damage to brain before, during or after birth
- No medication can improve intelligence Teaching and training to improve skills and gaining independence
- Systematic, persistent and repetitive training as per the child's ability
- Treatment of associated problems (vitamin or mineral deficiency or epilepsy, ADHD, vision/ hearing issues,) – refer to appropriate STW
- Avoid overprotection, overindulgence and understimulation

EARLY INTERVENTION / SENSORY-MOTOR STIMULATION FOR YOUNG CHILDREN – UNDER 3 YEARS
- Create opportunities for the child to learn with interset and attention
- Engaging and spending time with child in activities
- Offer appreciation
- Engage the child to use eyes and ears (different types of sounds and sights), touch (eg., tickling, stroking, gentle massaging), movements (gentle movement of limbs, gentle bouncing, range of movement exercises) and improving hand functions (taking, holding, giving, pushing, pulling)
- Use play materials–rattles, paper balls, rubber balls, clay, soft dough, water play, soap bubbles, vegetables.
- Parallel vocalization to improve utterances (making the same sound as the child immediately).
- Improve conceptual skills by classifying, arranging, sorting, and recognizing and naming activities (for eg., vegetable sorting, grain sorting, arranging vessels by their size and shape)

HOME-BASED PARENT MEDIATED SKILLS TRAINING

- Develop and maintain regular, stimulating daily routines
- Teach parent to teach child : simple imitation, pointing, pretend-play; self-help skills (eating, toilet training, bathing, dressing), doing simple household chores (washing utensils, helping in cleaning house), social skills – skills of interaction, simple academic skills, simple vocational skills, helping in kitchen under supervision, self-protection
- Find current level of adaptive abilities of the child and choose a target skill
- Tell and show how to do things (modelling), make the tasks simpler, break activities in simple steps and teach one step at a time, notice and praise even minor efforts and improvements (rewarding or reinforcing), using hand-on-hand techniques (keeping your hand on the child's hand and making them do the activity)

EDUCATION AND TRAINING
- Liaise with schools and ensure child attends school that is most appropriate
- Assist in enrolment to special school
- Consider training in vocational skills (informal and formal) for older adolescents

SOCIAL WELFARE / LIAISON MEASURES
- IQ testing and certification for social welfare benefits
- Help parents to link with other agencies/ services that deal with such children such as CBR programs or parent associations

REASONS FOR REFERRAL

- Severe or multiple developmental problems
- History of regression (loss of acquired skills)
- Definite family history of developmental problems (h/o similar problem in the sibling)
- Co-occuring severe behavioral or emotional problems
- Suspected case of ASD
- Suspected SLD
- Genetic counselling
- Speech therapy or physiotherapy

SECONDARY CARE (DISTRICT HOSPITAL)

- Psychological testing for ID, SLD and diagnosis of ASD
- Basic management of ASD – home-based parent-mediated training in social, communicative, and self-help skills
- Appropriate management of behavior problems with medication / psychosocial or behavioral intervention (see relevant STW's)
- Help parents access relevant services such as District Early intervention centres (DEIC's), parent organizations, and benefits

TERTIARY CARE (MEDICAL COLLEGE / REGIONAL REFERRAL CENTRE)

- Evaluate and manage children with severe IDD, ASD, multiple disabilities, and those with severe comorbid disorders such as ADHD, aggression, bipolar disorder, and psychotic disorders through multi-disciplinary approach
- Investigate for the cause – review tests already done; imaging, genetic tests, metabolic tests (as per requirement) ;arrange for genetic counselling
- Manage treatable disorders (like hypothyroidism and inherited metabolic disorders)
- Manage comorbid physical health problems (like epilepsy, visual /hearing impairment, locomotor/ orthopaedic problems)
- Assessment and management for SLD – psychoeducation of the child and parents, liaison with school, teaching basic remediation techniques to parents, helping parents access relevant organizations, issue of exemption certificates, and decisions about further schooling such as open schooling

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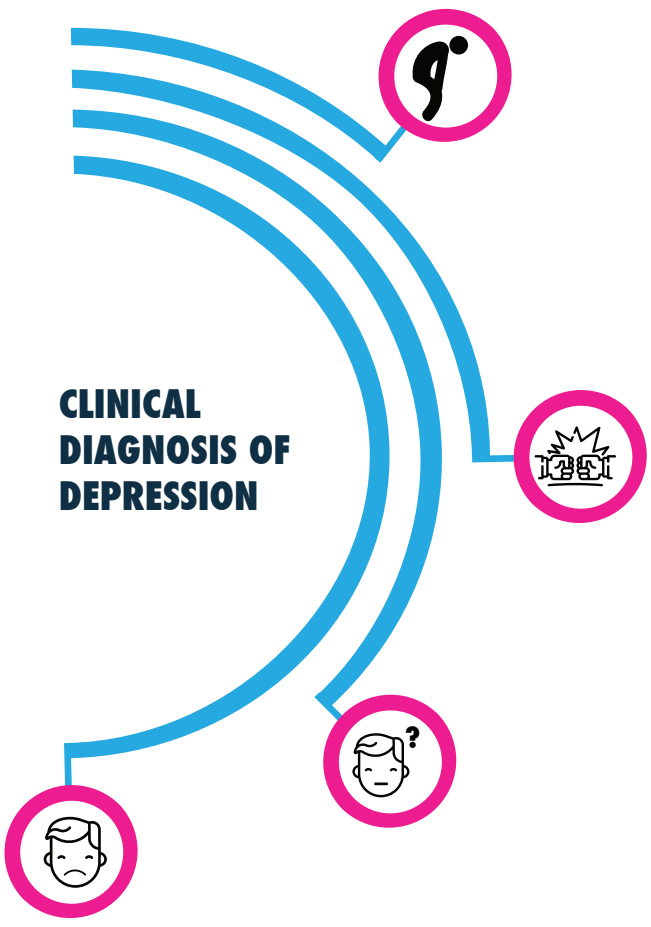
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Standard Treatment Workflow (STW) for the Management of DEPRESSION

ICD10-F45



CORE SYMPTOMS

1. Depressed mood
2. Loss of interest and enjoyment
3. Easy fatigability/ diminished activity

ADDITIONAL SYMPTOMS

- Reduced concentration and attention
- Reduced self-esteem and self-confidence
- Ideas of guilt and unworthiness
- Bleak and pessimistic views of the future
- Ideas or acts of self-harm or suicide
- Disturbed sleep
- Diminished appetite

To make a diagnosis of depression, symptoms must present for at least 2 weeks.

Severity of depression	Core symptoms	Additional symptoms
Mild depression	2	2 or more
Moderate depression	2	3 or more
Severe depression	3	4 or more

Rule out Bipolar Disorder / Grief / Adjustment Disorder

CLINICAL ASSESSMENT

Cognition
- Hopelessness (about future)
- Helplessness (about others)
- Worthlessness (about self)

→ Assessment of Depressive Cognition

Assessment of Suicide Risk
- Suicidal thoughts
- Suicidal idea
- Suicidal intent
- Immediate risk for attempt

→ Assess friend and family support

INVESTIGATION

- Haemogram
- Thyroid function tests
- Electro Cardiogram
- Electrolytes (Sodium)
- Rule out secondary medical cause of depression like Hypothyroidism
- Rule out use of anticancer drugs (Cyclophoshamide) / anti retroviral drugs (Efavirenz, Zidovudine)/ Antibiotics (Dapsone , Ethambutol)/ Anabolic Steroids/ Propanolol
- Rule out associated comorbid medical condition – Diabetes, Stroke, Epilepsy, Cancer, Coronary Artery Disease and Auto Immune disorder

AT PRIMARY CARE

MILD DEPRESSION

- Advise Behavioral Activation to patients
- Practicing activity monitoring - write down your activities / rate your depression / schedule activities that make you feel good / make a to do list/ set clear and specific goals
- Focusing on your value categories – make time for your family / friends / set clear goals at work / contribute to community
- Reccomend yoga & mediatation
- Handling daily task - monitor sleep /diet and practice good personal hygiene
- Supportive psychotherapy / Brief Counselling
- Validate the problems and ensure frequent follow-up
- If no improvement in 4 to 6 weeks, consider pharmacotherapy

MODERATE / SEVERE DEPRESSION

- Tab Escitalopram 10 mg-20 mg /day or Cap. Fluoxetine 20mg -40mg /day
- Tab. Clonazepam 0.25mg – 0.5mg /day for sleep disturbance / anxiety symptoms and consider taper and stop after 2 weeks.
- If patient responds to SSRI in 2 to 4 weeks, then continue treatment for 6 to 9 months and taper and stop

REFERRAL TO SECONDARY CARE

- Difficulty in making diagnosis
- No improvement after 4 to 6 weeks of treatment with first line medications
- Depression in special population: Elderly / Pregnancy / Lactation / Children / Adolescents
- Comorbid medical illness / Substance use
- Suicidal risk assessment

BROAD MANAGEMENT PLANS

- Selective Serotonin Reuptake Inhibiters (SSRI) are usually first choice (watch for GI bleed and drug interaction)
- Improvement starts in in 2nd week and expect adequate response by 6 weeks
- Duration of treatment typically lasts 6-9 months and Gradual tapering of medication advised for first episode
- Restart SSRI , In case of resurgence and recurrence of depressive symptoms
- Observe for switch / activation with Antidepressants
- Watch for risk of overdose with TCA (Amitriptyline / Imipramine) and Mirtazapine

AT SECONDARY CARE

- Confirm Diagnosis and Suicide risk assessment
- Assess for other Medical Comorbidities
- Investigations – Haemoglobin,Thyroid Function Test, Electrocardiogram
- Non Responder - Switch over to SNRI (Venlafaxine 75 – 150 mg, Mirtazapine 30 mg) or TCA (Amitriptyline 75 - 225mg / Imipramine 75 -225mg)
- Cognitive Behavioral Therapy / Problem Solving Therapy
- Add on Yoga Therapy / Meditation

REFERRAL TO TERTIARY CARE

- No improvement in 2nd line treatment
- Immediate risk for suicidal attempt / thought
- Needing intense counselling/ psychotherapy
- Co Morbid Substance - Cannabis / Poly substance

SPECIAL POPULATION

- Pregnancy / Lactation period - Pre Conception counselling and preferred drug is Tab. Sertraline 50 mg – use lowest possible dose
- Elderly - Tab. Escitalopram 10 -20 mg or Tab. Sertraline 100 mg (monitor for hyponatremia)
- Avoid TCAs like Amitriptyline / Imipramine in Elderly (due to anticholinergic side effects)
- Adolescents- Cap. Fluoxetine 20 -40 mg /day (observe for switch / activation/ suicidality)

AT TERTIARY CARE

- Reconfirm Diagnosis
- Assess other psychiatric comorbidities
- Partial Responder - Optimise the SNRI /TCA or Augment with Tab. Lithium 300 to 600mg /per day or Tab. Thyroxine 25 - 50 ug per day.
- Non Responder – Add Tab. Sertraline 100mg or Tab. Bupropion 300mg to existing Venlafaxine 150mg / Tab. Mirtazapine 30mg / Amitriptyline 225mg / Imipramine 225mg.
- Add on Electro Convulsive Therapy for Catatonia / Suicidality
- Add on Cognitive Behavioural Therapy/ Inter Personal Therapy / Problem Solving Therapy
- Add on low dose antipsychotic treatment (Risperidone 2 -4 mg / Tab. Olanzapine 5 – 10 mg) for psychotic symptoms

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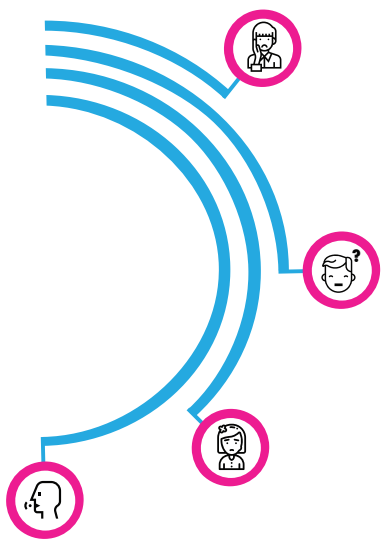
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Standard Treatment Workflow (STW) for the Management of PSYCHOSIS

ICD10-F20-29



DIAGNOSIS

- Presence of delusions (suspiciousness and fear without obvious explanation)
- Hallucinations (talking, smiling or laughing to self)
- Disorganized behaviour & poor self-care
- Social and occupational dysfunction

PRIMARY CARE LEVEL

WELLNESS CENTERS

Identify, educate and refer to PHC

If immediate threat to self/ others, refer to Taluk / District center

FOLLOW-UP AND REHABILITATION:

- Monitor & manage challenges in treatment continuation
- If unsatisfactory outcome despite regular treatment:
  - Liaise with higher centers for optimal outcome
  - Liaise with social welfare department for disability certification & welfare benefits if continued poor outcomes

PHC

INITIATE TREATMENT:

- T. Risperidone 2mg HSx1 week f/b 3 – 4 mg HS + Trihexyphenidyl (THP) 2mg(morning)
- Psychoeducation:
  - medical model of psychosis
  - address misconceptions & build hope
  - inform about possible adverse effects of medications

FOLLOW UP:

- 2 weeks after initial contact: Check for changes in symptoms and adverse effects (excess sleep, extrapyramidal symptoms (EPS), tiredness) adjust the dose of risperidone and THP accordingly; address questions if any; advise gradual return to work/school; give specific follow-up date; liaise with wellness center for ensuring continuity of care
- Once in 1 – 2 months: Check for symptoms, functioning and adverse effects (EPS, weight-gain, menstrual/sexual dysfunction); adjust the dose of Risperidone (range: 2 – 8 mg/day) and THP (range 2 – 6 mg/day); liaise with wellness center for ensuring continuity of care

REASONS FOR REFERRAL TO TALUK / DISTRICT LEVEL:

- Diagnostic confusion / suspicion of organic condition
- Substantial risk of harm to self or others and catatonic symptoms
- Comorbid substance use, depression/anxiety, intellectual disability
- Poor symptom-control or functioning despite regular treatment or poor treatment adherence
- Significant adverse effects: weight-gain, metabolic adverse effects, tardive dyskinesia
- Questions regarding marriage, pregnancy, sexual dysfunction

SECONDARY CARE (TALUK/DISTRICT HOSPITALS)

INDICATION FOR REFERRAL FROM PHC	Diagnostic confusion	Poor response to Risperidone	Intolerance to Risperidone	Poor adherence to treatment	Comorbid conditions	Challenging situations	Rehabilitation needs	Pregnancy
MANAGEMENT #Encourage follow up in primary care after addressing referral issues * Watch for adverse effects as SSRIs may increase serum levels of antipsychotics	Clarify diagnosis; neuroimaging if organicity is suspected	Positive symptoms: Follow algorithm Negative symptoms: • Rule out or manage depression/ anxiety and extrapyramidal symptoms; • Family counseling if understimulated/ over-protected • Consider less-sedating antipsychotics and adding SSRIs*	Follow algorithm	• Assessment of factors causing poor adherence & specific manage-ment • Consider depot anti-psychotics • Liaise with primary care for assertive follow up	• Depression/ anxiety: Brief psychological intervention; consider SSRIs* • Substance use: Detoxification and brief interventions (see SUD module) • Developmental disabilities: Behavioral	• Suicidality: -Inpatient care, -Crisis management, -Management of comorbidity; -Consider ECT • Violence: -Verbal de-escalation -IV sedation, -Brief inpatient care	• Assess disability & counsel about welfare benefits • Rehabilitation counseling - Family intervention for expressed emotions and attitudes & behaviors interfering with functioning - Brief interventions for cognitive & social-skill deficits - Address vocational/ educational challenges involving governmental/ non-governmental	• Proactively address sexual and endocrine problems when relevant • Educate about risk of obstetric outcomes, risk of relapse & risk of psychosis in the offspring

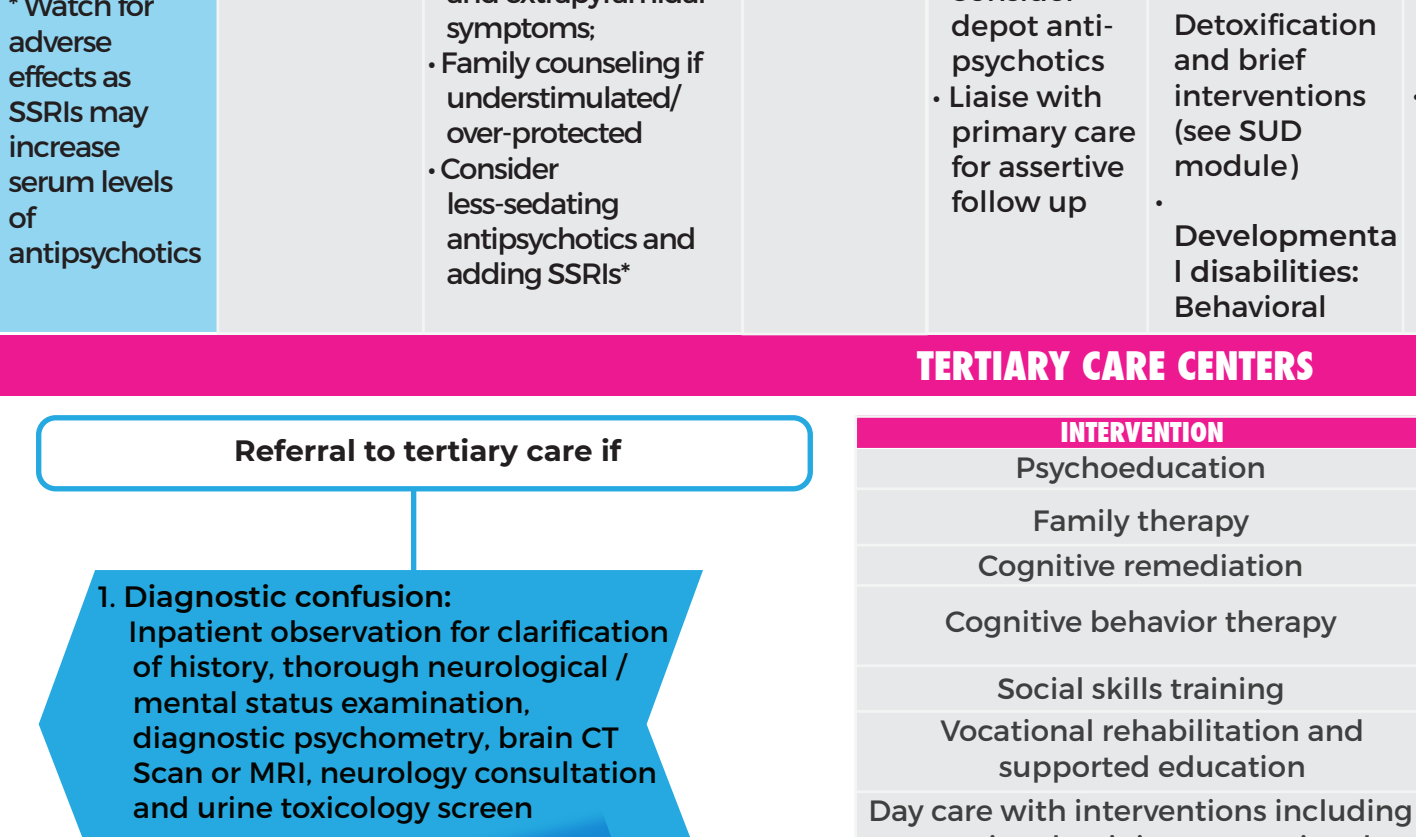
TERTIARY CARE CENTERS

Referral to tertiary care if

1. Diagnostic confusion:
   Inpatient observation for clarification of history, thorough neurological / mental status examination, diagnostic psychometry, brain CT Scan or MRI, neurology consultation and urine toxicology screen
2. Poor outcome:
   +Following psychosocial interventions may be offered in isolation or in combination depending on the context in inpatient, outpatient or day-boarding settings

INTERVENTION	CONTEXT IN WHICH USEFUL
Psychoeducation	Poor adherence; high family expressed emotions
Family therapy	High family expressed emotions; family discord
Cognitive remediation	Poor neuro and social cognitive functions
Cognitive behavior therapy	Depression, anxiety, obsessions, persistent psychotic symptoms
Social skills training	Poor social skills
Vocational rehabilitation and supported education	Poor occupational functioning, challenges in studying or getting / pursuing gainful occupation
Day care with interventions including vocational training, recreational activities, living-skill training, etc.	Negative symptoms, poor socio-occupational functioning, combination of other symptoms listed in the table
Interventions for substance-use	Hazardous use of substance or substance use disorder
Pregnancy – puerperium services	Pre-pregnancy, pregnancy and post-partum advise and interventions Pre-pregnancy, pregnancy and post-partum advise and interventions

ALGORITHM FOR CHOOSING ANTIPSYCHOTIC MEDICATION (AP) FOR TREATMENT OF SCHIZOPHRENIA



At any point, consider electroconvulsive therapy if:
1. Serious suicidal risk
2. Catatonia not responding to Lorazepam
3. Refusal of food / fluids
4. Severe aggression / violence
5. Refractory / intolerance to clozapine

* Treat with adequate dose as shown in table-1 for 6 – 8 weeks to assess efficacy
#While choosing alternative AP, consider adverse effect profile and cost
^ At any point, if there is medication non-adherence, consider long-acting preparations in addition to other measures for managing non-adherence

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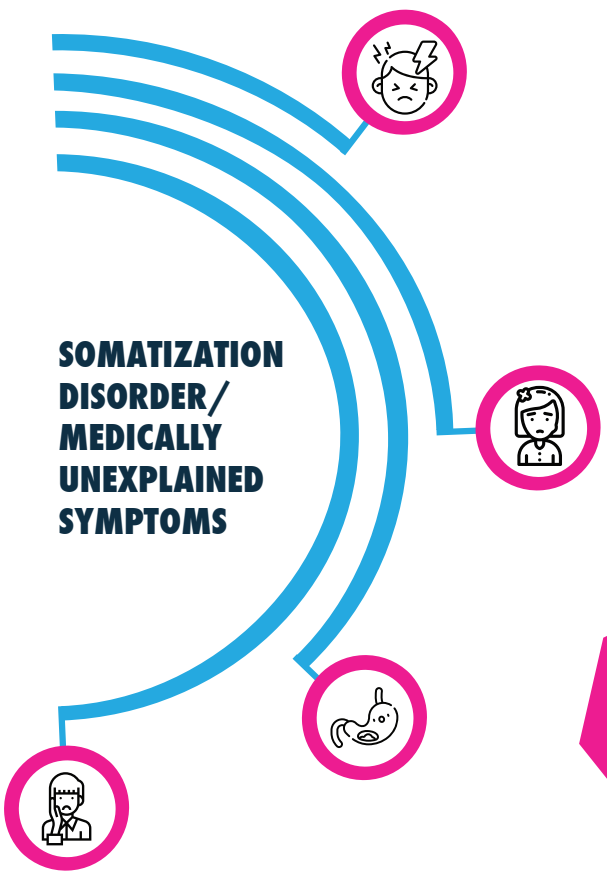
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Standard Treatment Workflow (STW) for the Management of SOMATOFORM DISORDER (SD)

ICD10-F45



Repeated subjective experience of physical symptoms which are not explained by any recognizable physical disease

Bodily complaints are often the most common reason for consultation with health professionals

CHALLENGES FACED BY THE DOCTOR

- Repeated request for investigations – despite negative findings and reassurance
- Doctor shopping and not satisfied with repeated reassurance

PRESENTION TO A DOCTOR

- Pain at multiple sites
- Fatigue and exhaustion
- Significant distress and impairment
- Functional disturbance of different organ systems
- Focus of patient is on symptom relief rather than cause of illness

DIAGNOSTIC CRITERIA

INITIAL ASSESSMENT

- Detailed clinical examination – to rule out any medical illnesses which might explain the symptoms
- Complete history of the onset of all symptoms, exacerbating and relieving factors
- Assessment for any other psychiatric illness such as depression or anxiety disorders

PSYCHOSOCIAL ASSESSMENT

- Encourage to talk about psychosocial stressors if any
- Individual factors – poor copying skills, anxiety, life events, health anxiety, medical illnesses
- Family related factors – Substance use in family, interpersonal relationship with family, financial status
- Environmental factors – support system, peer relationship, work environment

DIAGNOSTIC CRITERIA

A. One or more somatic symptoms that are distressing or result in significant disruption of daily life.
B. Excessive thoughts, feelings, or behaviours related to the somatic symptoms or associated health concerns as manifested by at least one of the following:
   1. Disproportionate and persistent thoughts about the seriousness of one's symptoms
   2. Persistently high level of anxiety about health or symptoms
   3. Excessive time and energy devoted to these symptoms or health concerns
C. Although only one somatic symptom may not be continuously present, the state of being symptomatic is persistent (typically more than 6 months)
A persistent course is characterized by severe symptoms, marked impairment, and long duration (more than 6 months)

Severity:
Mild – only one of the symptoms specified in criterion B is fulfilled
Moderate – Two or more of the symptoms specified in criterion B is fulfilled
Severe – Two or more of the symptoms specified in criterion B are fulfilled, plus there are multiple somatic symptoms (or one very severe somatic symptom)

Following list include the commonest symptoms

1. Pain symptoms at multiple sites (such as abdominal, back, chest, dysmenorrhea, dysuria, extremity, head, joint, rectal) is often present
2. Gastrointestinal sensations (pain, belching, regurgitation, vomiting, nausea)
3. Abnormal skin sensations (itching, burning, tingling, numbness, soreness) and blotchiness
4. Sexual and menstrual complaints (ejaculatory or erectile dysfunction, hyperemesis of pregnancy, irregular menses, menorrhagia, sexual indifference) are also common

MANAGEMENT

PRIMARY CARE

- Detailed physical examination
- Management of anemia and nutritional deficiencies
- Avoid irrational use of pain medications
- Low dose of antidepressant medications – Amitriptyline 12.5 mg to 50 mg (max) night dose
- Explain that onset of medication effect will take 2-3 weeks
- Validate the somatic symptoms
- Advise to engage in routine activities, physical exercise and relaxation techniques like deep breathing
- Discuss with family members that the symptom, distress and disability are genuine
- Strengthen supports
- Regular follow up

REFER TO SECONDARY CARE IF

1. Difficulty in making diagnosis
2. No improvement after 4 weeks of treatment with first line medications
3. Comorbid medical illness
4. Suicidal risk
5. Comorbid psychiatric illness

SECONDARY CARE

- Investigations – to rule out any medical illnesses that might explain the symptoms
- Complete history with behavioural observation
- Use 2nd line medications – SSRIs (Escitalopram 10-20 mg, Sertraline 50-100 mg, Fluoxetine 20 mg) and SNRIs (Venlafaxine 75 – 150 mg, Duloxetine 30- 60 mg)
- Combination of two psychotropic medications (might be required if poor response to single medication)
- Brief counselling
- Psycho education – focusing on relationship between stress and physical symptoms
- Relaxation training, regular exercise, yoga and meditation

REFER TO TERTIARY CARE IF

1. No improvement in 2nd line treatment
2. High suicidal risk
3. Needing intense counselling/ psychotherapy
4. Difficult patients

TERTIARY CARE

- Inpatient care if needed
- Combination of two psychotropic medications (when required)
- Add on second and third line medications – Duloxetine, Mirtazapine, anticonvulsants (Lamotrigine, Pregabalin). Use of Gabapentin, Carbamazepine if chronic pain symptom predominates
- Structured Cognitive Behavioural Therapy, Cognitive restructuring, Mindfulness and acceptance based approach
- Use of alternative medicine approach – Yoga
- Collaborative approach – involve Physician, Neurology team and Pain Clinic referral (where indicated)
- Vocational rehabilitation if needed
- Physical therapies – guided exercise and physiotherapy

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KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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PULMONOLOGY

October/ 2019

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Ministry of Health and Family Welfare, Government of India

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Standard Treatment Workflow (STW) for Management of
ACUTE RESPIRATORY INFECTION IN ADULTS
ICD-10-J09-J18; J00-06; J40

WHEN TO SUSPECT

SYMPTOMS
- Cough with yellow/rusty sputum
- Breathlessness
- Pleuritic chest pain
- Malaise, myalgia, arthralgia
- Extra pulmonary symptoms

PAST HISTORY
- TB
- Pneumonia
- Airway disease
-
- Diabetes
- Chronic steroid use

CLINICAL EXAMINATION

1. Vital parameters: Sensorium, Pulse, Blood pressure, Respiratory rate, Temperature, Oxygen saturation

Signs of respiratory failure: RR> 30/ min, Abdomin othoracic paradox, cyanosis, speaks in short sentences. Refer Respiratory Failure STW.

2. Systemic examination:
a. Upper respiratory tract: nose & paranasal sinuses (frontal and maxillary sinus tenderness), throat examination (pharynx and tonsils)
b. Lower respiratory tract: breath sounds (type, intensity), added sounds (crackles, wheeze, pleural rub)

Frank haemoptysis, may suggest Pulmonary TB or malignancy

PROCEED FOR FURTHER ASSESSMENT

- Fever, tachycardia, pharyngitis, suffusion of eyes, rhinitis, hoarse voice
- Respiratory system examination: Normal

- Fever, tachycardia
- Respiratory system exam: Wheeze
* Consider acute exacerbation of asthma/ COPD if there is a history of any of these 2 illnesses

- Fever, tachycardia, tachypnea
- Respiratory system exam: Crackles/ bronchial breath sounds
* Consider acute exacerbation of asthma/ COPD is there is a history of any of these 2 illnesses

PATHWAYS BASED ON INITIAL ASSESSMENT FINDINGS

PATHWAY 1: ACUTE URI (RESPIRATORY CATARRH)

LABORATORY INVESTIGATION:
- Total and differential count in suspected flu.

TREATMENT
- Symptomatic treatment for fever, myalgia (Paracetamol or other NSAID),
- Rest, Oral fluids (plenty)
- Oral antihistamines (Tab. CPM 4mg BD) for severe runny nose or sneezing
- Antibiotics in acute follicular tonsillitis: Amoxicillin/ Ampicillin 500mg tid X 5 days
  In penicillin sensitive individuals: Erythromycin estolate 250mg q 6 hrly X 5 days with food

Suspect epidemic flu
H/ o recent travel, symptoms of upper respiratory infection, diarrhoea, myalgia, breathlessness **Refer to higher centre for diagnosis, notif ication and treatment.**

PATHWAY 2: ACUTE BRONCHITIS

LABORATORY INVESTIGATION:
- Total and differential count if sputum is purulent,
- X-ray chest PA view

TREATMENT
- Symptomatic treatment for fever (Paracetamol or other NSAID), Oral fluids (plenty)
- Inhaled bronchodilators: Salbutamol nebulization (5mg/ 2.5ml) 6-8 hourly
- Antibiotics if there is purulent sputum and polymorphonuclear leukocytosis
  - Amoxicillin 500mg tidX 5 days
  - In penicillin sensitive individuals: Erythromycin estolate 250mg q 6 hrly X5 days with food
- If asthma is suspected refer to asthma STW

PATHWAY 3: COMMUNITY ACQUIRED PNEUMONIA

SEVERITY ASSESSMENT
- X-ray
- Use CRB-65* score for mortality risk assessment in primary care

CRB-65 SCORE

SCORE	RISK CLASS	SITE OF CARE
0	Low Risk	OP
1-2	Intermediate Risk	IP
3-4	High Risk	ICU

*65 in the scoring mnemonic refers to age> 65

Give 1 point for each of the following Prognostic features:
- Confusion
- Respiratory rate ≥30/ min
- Low BP (DBP ≤60 mm Hg or SBP ≤90 mm Hg)
- Age ≥65 years

OUT-PATIENT BASED CARE OF CAP (CRB-65 SCORE 0-1)

INVESTIGATIONS

Preliminary
Chest radiogram
Repeat if:
i. Patient is not improving/ worsening clinically
ii. Suspected underlying malignancy

Desirable
1. Pulse oximetry in outpatients
2. Sputum microbiology: In suspected PTB & non-response after 48 hours of antibiotics

TREATMENT

1. Targeted towards Streptococcus pneumoniae
2. Oral antibiotics after checking for comorbidities* (Diabetes, CVDs, CKD, CLD, Hepatic Pathology, Cancer, Alcohol Abuse, H/ o antibiotics within last 3 months.)
   a. Without comorbidities: Cap. Amoxicillin (500 mg TDS) / Tab. Erythromycin 250mg QID/ Tab. Doxycycline 100mg BD
   b. With comorbidities: Cap. Amoxicillin 500mg TDS + Tab.Azithromycin 500 mg OD
3. Duration: 5 days in (A); extend to a 7-10 days course if there is no response within 3 days of starting treatment and in (B).
4. **Do not give:**
   a. Corticosteroids: unless other medical indications present
   b. Fluoroquinolones: as they have anti-tubercular activity.

INPATIENT MANAGEMENT OF CAP

ANTIBIOTIC THERAPY IN THE HOSPITALIZED NON-ICU SETTING
a. Single agent IV β-lactam
b. If suspected atypical pathogens, other end organ disease, diabetes, malignancy, severe CAP, use of antibiotics in past 3 months: Combination of IV β-lactam (Cefotaxime 2 grams TID/ IV Ceftriaxone 1gram BD/ Amoxicillin–Clavulanic acid 1.2 grams TID) + ORAL macrolide (Tab Azithromycin 500 mg PO OD/ Tab Clarithromycin 500 mg PO BD)

ANTIBIOTIC THERAPY IN THE HOSPITALIZED ICU SETTING
i. Patients without risk factors for Pseudomonas aeruginosa: Manage as above
ii. Suspected P. aeruginosa (diabetes, chronic lung disease like bronchiectasis, chronic steroid therapy):
IV Cefepime (1G BD)/ IV Ceftazidime (2G TID)/ Piperacillin–tazobactam(4.5 G QID)/ IV Cefoperazone–sulbactam 1.5G IV TID/ IV Meropenem 1g TID;
Combination therapy : Aminoglycosides(IV Amikacin)/ Antipseudomonal fluoroquinolones(Levofloxacin/ Moxifloxacin)

ADJUNCTIVE THERAPIES FOR THE MANAGEMENT OF CAP
a. Steroids are not recommended for use in non-severe CAP
b. Non-invasive ventilation may be used in patients with CAP and acute respiratory failure

CONTRA INDICATIONS FOR NON-INVASIVE VENTILATION
a. Cardiorespiratory arrest
b. Presence of severe upper airway inflammation & edema
c. Severe haemodynamic instability - hypotension
d. Eu-capnic (normal $PaCO_2$) coma
e. Multiple organ dysfunction or severe psychomotor agitation

DISCHARGE CRITERIA
Accepting orally, Afebrile and Hemodynamically stable for a period of at least 48 h

REFERRAL TO A HIGHER CENTRE : CLINICAL CRITERIA
1. Frank hemoptysis and /or Signs of respiratory failure [listed under in the history and evaluation sections]
2. CRB-65 score > 1
3. Oxygen saturation by pulse oximetry ≤ 92% (patients ≤ 50 yrs) OR <90% (patients > 50 yrs)
4. Multi-lobar consolidation on chest X-ray
5. Confusion/disorientation
6. Hypothermia (core temperature<360C)

POINTS TO NOTE WHILE SHIFTING
1. If referring to a higher center, give the first dose of antibiotic (oral and if available, parenteral), secure an IV line and start 0.9% Normal saline and oxygen supplementation through face mask at 4-6 litres per minute during shift
2. If the patient is drowsy, has copious secretions, consider calling for help from the SUB-DISTRICT/ DISTRICT hospital for endotracheal intubation and shifting on a transport ventilator

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of ASTHMA

ICD-10-J45

SYMPTOMS

Classic symptoms
- Recurrent/ episodic wheezing
- Breathlessness
- Cough and/ or chest tightness

Supportive features
- History of atopy, family history of asthma, presence of triggers, presence of rhonchi on chest auscultation
- No alternative explanation for these symptoms

TRY AND RULE OUT
- Other obstructive airway disorders – see Table 1 for features that favour asthma over COPD
- Other mimics – presence of fever, constitutional symptoms, purulent sputum, hemoptysis, focal chest signs on physical examination, foreign body aspiration, abnormal chest radiograph, etc.

APPROACH TO DIAGNOSIS
- Clinical assessment is the mainstay
- Airway obstruction, and bronchodilator reversibility, on spirometry (if available) may support diagnosis
- Refer patients for further work-up if diagnosis is in doubt

INITIATION AND MODULATION OF ASTHMA PHARMACOTHERAPY

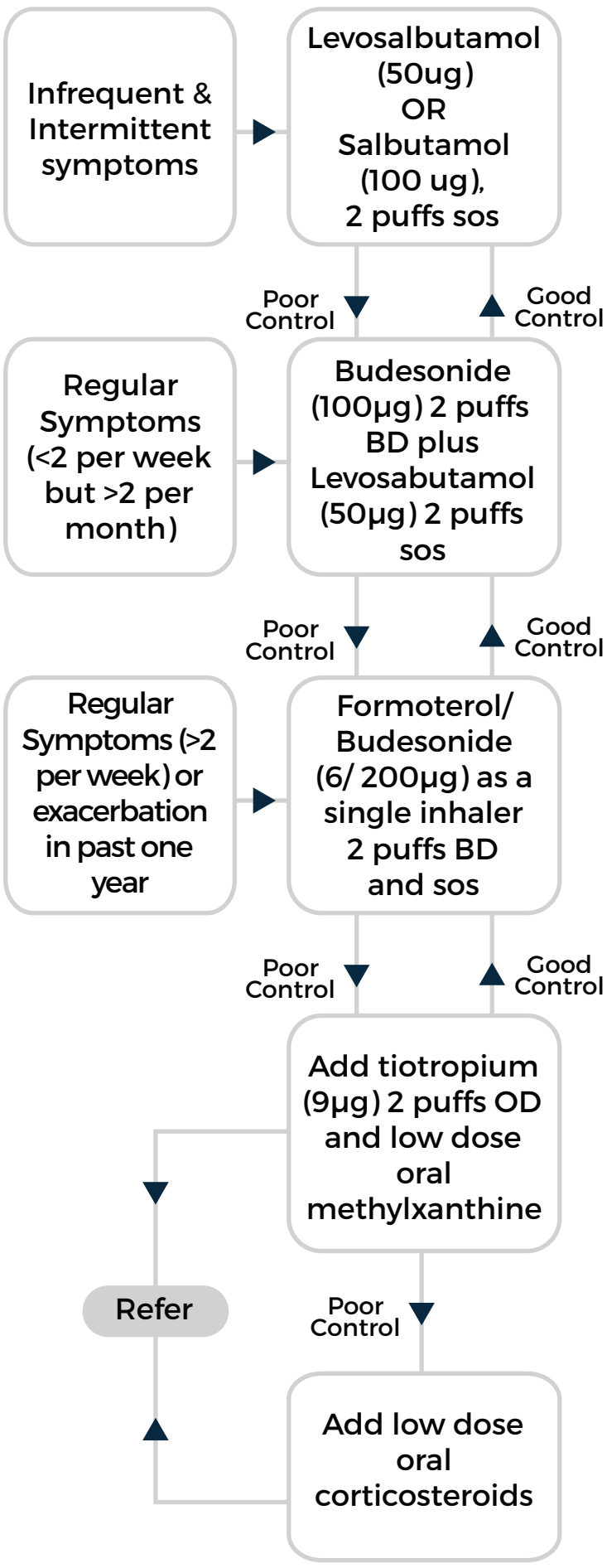


TABLE 1. DIFFERENTIATING BETWEEN ASTHMA AND CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COPD)

	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 exposures	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

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Standard Treatment Workflow (STW) for the Management of
CHRONIC OBSTRUCTIVE PULMONARY DISEASE

ICD-10-J44.9

WHEN TO SUSPECT?

Symptoms – chronic cough, progressively worsening breathlessness

Risk factors – tobacco smoking, use of solid fuels for cooking, occupational exposures, Age - >35 years

Supportive features: Barrel shaped chest, hyperresonant note , diminished breath sounds and rhonchi on chest auscultation, forced expiratory time > 6 seconds, features of cor pulmonale (loud P2, elevated JVP, edema) in advanced cases

No other alternative explanation for these symptoms

TRY AND RULE OUT

Other obstructive airway disorders – Refer Asthma STW (Table 1) for features that favor COPD over asthma

Pulmonary tuberculosis – sputum AFB examination in case of cough (>2 weeks)

Consider alternative diagnosis/- complication– presence of fever, hemoptysis, orthopnea, chest pain, significant weight loss, focal chest signs on physical examination, abnormal chest radiograph, etc.

DIAGNOSIS & SEVERITY ASSESSMENT

Airway obstruction should be documented on spirometry on all patients provisionally diagnosed as having COPD – refer if necessary, Post-bronchodilator FEV1/ FVC <0.70 defines airflow obstruction

Assess severity based on spirometry, severity of dyspnea (mMRC scale, Table 1), exacerbation frequency and presence of complications (see Table 2)

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 uncotrolled/ complications develop, refer to higher center

DISEASE EXACERBATION

Three cardinal symptoms:
- Increase in dyspnea
- Increase in sputum volume and/or
- Increse 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 monetoring available)

Disease progression

Mild COPD	Moderate COPD	Severe COPD
Levosalbutamol (50 µg) 2 puffs prn	Tiotropium (9 µg) 2 puffs OD plus Levosalbutamol (50 µg) 2 puffs prn	Formoterol/Budesonide (6/200 µg) as a single inhaler 2 puffs BD plus Levosalbutamol (50 µg) 2 puffs prn
Persistent Symptoms	Persistent Symptoms	Persistent Symptoms
Add Tiotropium (9 µg) 2 puffs OD	Add low dose methylxanthines	Add Tiotropium (9 µg) 2 puffs OD and/or low dose methylxanthines

Refer if inadequate response, onset of new complications, or suspicion of alternative diagnosis

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 EXCERBATION

- 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

REFERENCES

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.*
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Standard Treatment Workflow (STW) for the Management of
RESPIRATORY FAILURE
ICD 10 : J96.0



SYMPTOMS: Cough; Shortness of breath; Wheezing; Chest tightness

SIGNS: Tachycardia; Restlessness; Anxiety; Confusion; Seizure; Cyanosis; Asterexis; Arrhythmia

Look for underlying causes in hypercapnia, headache, bounding pulse, tremor/flap, papilloedema, coma.

HYPOXIA (SPO2 <90%)

HEART FAILURE

SYMPTOMS
- Dyspnea or exertion or rest
- Chest Pain
- Wheezing
- Fatigue

SIGNS
- Tachycardia
- Pulsus Alterans
- Weak Rapid Thready Pulse
- Pink Frothy Sputum
- Cyanosis
- Pallor
- Distended Neck Veins

PNEUMONIA/ LRTI

SYMPTOMS
- Cough with or without Sputum
- Chest Pain
- Fever with Chills, Fatigue, Malaise

SIGNS
- Tachypnea
- Tachycardia
- Crackles and Rhonchi
- Hypoxemia
- Pleuritic Chest Pain

PULMONARY EMBOLISM

SYMPTOMS
- Sudden Shortness of Breath
- Chest Pain
- Calf Pain & or Swelling
- Hemoptysis

SIGNS
- Syncope
- Arrhythmia
- Tachycardia

AIRWAY DISEASE

ACUTE ASTHMA

SYMPTOMS
- Wheeze
- Shortness of Breath
- Chest Tightness
- Cough

SIGNS
- Tachypnea
- Tachycardia
- Fall in SPO2
- Use of Accessory Muscle

AE OF COPD

SYMPTOMS
- Worsening of Dyspnea
- Increase in Sputum Production
- Increased Cough

SIGNS
- Tachypnea
- Hypoxemia
- Hypercarbia
- Confusion
- Drowsy
- Peripheral Edema

BRONCHIOLITIS

SYMPTOMS
- Cough
- Shortness of Breath
- Wheezing

SIGNS
- Cyanosis
- Nasal Flares
- Tachypnea
- Paradoxical Breathing (children)
- Crackles and or Rattling sounds in Lung

INVESTIGATIONS

ABG, CRP, FBC, U&E	Chest Xray	Sputum culture, Blood culture (if febrile)	Spirometry(COPD, Neuromuscular disease

TREATMENT

	Heart failure	Acute Severe Asthma	AE COPD	ARI	Pneumonia LRTI	Pulmonary embolism
DIAGNOSIS						
OXYGEN	Start oxygen therapy at SpO2 < 90% Monitor SpO2 during oxygen therapy to titrate flow rate: target SpO2 < 96% Oxygen delivery usign Nasal cannulae/ Simple face mask/ Venturi mask/ Non re-breathing mask (Note: for patients with AECOPD, keep lower target SpO2 = 88-92%)					
BRONCHODILATORS	SOS	SABA ± SAMA (Salbutamol ± Ipratropium neb q20 min X 1 hr then prn)	SABA + SAMA (Salbutamol neb hourly + Ipratropium neb 4 hourly)	SABA + SAMA	SOS	SOS
DIURETICS	Yes (IV Furosemide 40 mg or Torsemide 20 mg)	SOS	SOS	SOS	SOS	SOS
ANTIBIOTICS	---	---	No risk factor Pseudomonas: Ceftriaxone or levofloxacin or moxifloxacin Pseudomonas risk factor: levofloxacin or piperacillin tazobactam or ceftazidime or cefepime Influenza suspect: Oseltamivir	---	Mild/ Mod cases: Amoxycillin PO/ IV or Ceftriaxone IV Severe Cases: Amoxycillin IV or Ceftriaxone IV Atypical pneumonia: Azithromycin IV/ PO or Doxycycline IV/ PO	---
STEROIDS	---	Yes (Methylpredniolone IV 40 to 60 mg or Prednisolone PO 60 mg)	Yes (Methylprednisolone IV 60 to 125 mg IV q6-12 hourly)	Yes	Severe CAP (fiO2 > 0.5 AND pH <7.3 OR lactate >4 mmolL-1 OR CRP > 150 mgL-1): Methylprednisolone IV 0.5 mg/ kg q12h	---
LMWH	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	Prophylactic, if indicated	If high suspicion with low risk of bleeding: UFH (if thrombolysis anticipated), OR LMWH
REFERRAL	No relief OR Need for mechanical ventilation OR life threatening features: Stabilize CAB, transfer to higher center					

ABBREVIATIONS

- **LRTI :** Lower Respiratory Tract Infection
- **LMWH:** Low Molecular Weight Heparin
- **SABA :** Short Acting Beta Agonist
- **SAMA:** Short Acting Muscarinic Antagonist
- **CAP:** Community Acquired Pneumonia
- **UFH :** Unfractionated Heparin

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UROLOGY

November/ 2025

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Standard Treatment Workflow (STW)

ACUTE URINARY RETENTION IN MEN (AUR)

ICD-11-MF50.3

DEFINITION: Emergency condition characterized by a sudden and painful inability to void voluntarily despite having a full bladder

HISTORY

- Nature and duration of urinary symptoms prior to AUR
- Associated symptoms like fever, weight loss, sensory loss or weakness of lower limbs
- Past history of retentions
- Rule out precipitating causes like diabetes mellitus, alcohol consumption, recent surgery, UTI, constipation, cold exposure, prolonged travel and neurological conditions
- Medication history
- Look for risk factors

EXAMINATION

- Fever
- Enlarged tender palpable bladder dull on percussion
- Phimosis, meatal stenosis, urethral induration, stone, urethral discharge
- DRE for estimating prostatic size, consistency, tenderness ; exclude fecal impaction
- Focused neurological examination-anal tone, perianal sensation and bulbocavernous reflex

RISK FACTORS OF SPONTANEOUS AUR

- Old age
- Severe lower urinary tract symptoms (LUTS)
- Low peak flow rate
- High postvoid residual urine (PVR)
- Enlarged prostate or large median lobe
- High serum PSA
- Symptom worsening
- Increasing PVR during medical therapy

RISK FACTORS OF PRECIPITATED AUR

- Surgical procedure with general or loco-regional anaesthesia
- Bladder over-distension (eg prolonged journey)
- Exposure to cold
- Medications with sympathomimetic or anticholinergic effects, diuretics, alcohol intake
- Feacal impaction

CAUSES

THAT BLOCK THE PASSAGE: BPH · Urethral Calculus · Urethral Stricture · Acute Prostatitis · Ca Prostate · Vesical Calculus · Faecal impaction

THAT PARALYSE DETRUSOR: Neurological diseases e.g. spinal cord compression, transverse myelitis, stroke, head injury · Drug induced eg. opiods, anticholinergics, anti-histaminics, anti-diarrhoeals, flavoxate

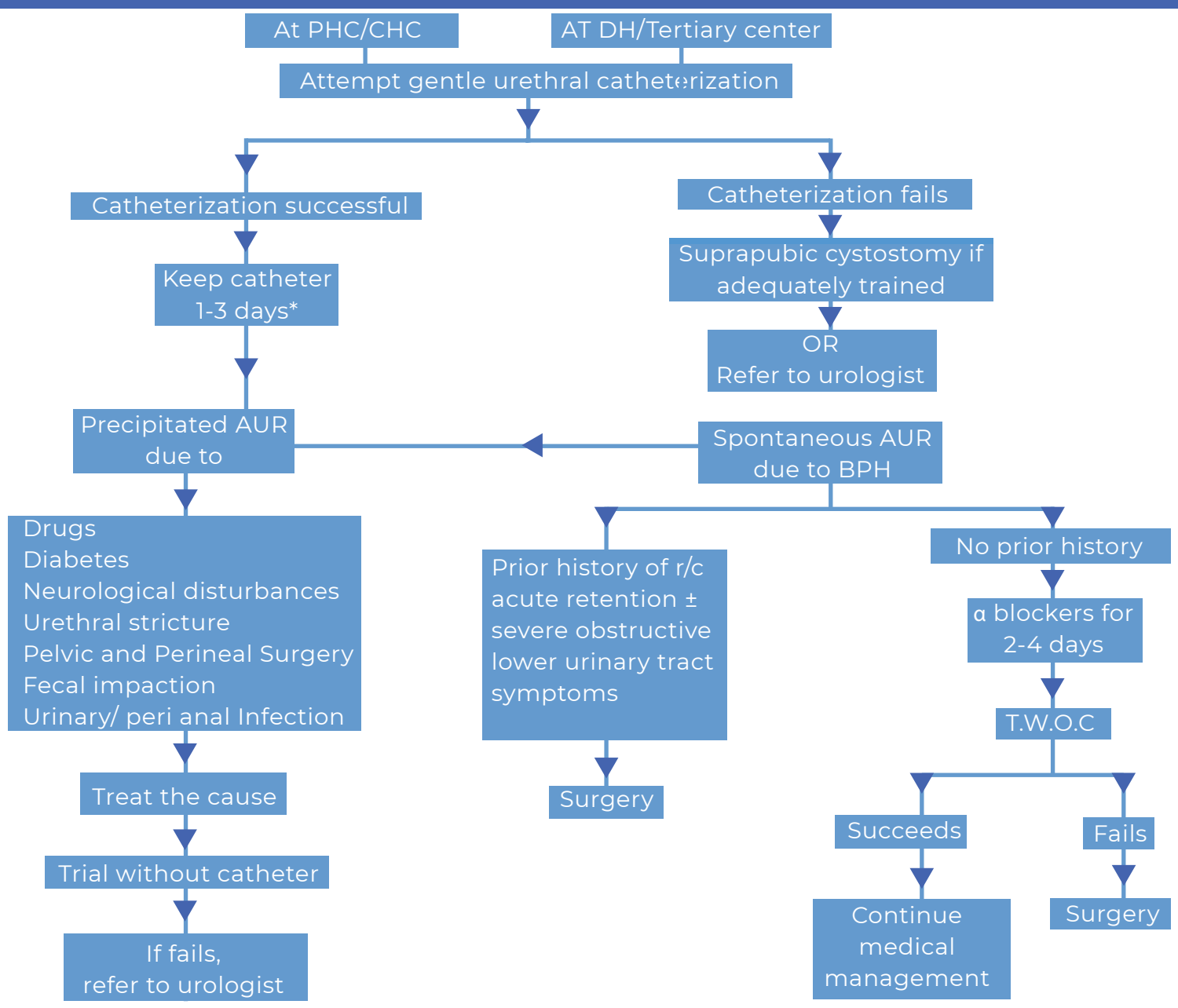
INVESTIGATIONS

As AUR is an acute emergency, no investigation is required before catheterization to relieve symptoms. The volume of urine drained should be documented.

DESIRABLE
CBC, S. Glucose,S. Creatinine and Electrolytes, USG KUB Urine analysis& Urine culture of the drained urine

OPTIONAL (ONLY BY SPECIALISTS)
NOT TO BE DONE ROUTINELY
- Cystoscopy,CT / MRI,RGU + MCU,Urodynamic studies

MANAGEMENT ALGORITHM



FOR CATHETERIZATION

- Use a aseptic technique with proper cleaning
- Use adequate lubrication
- Use a 14 or 12 Fr Foley urethral catheter
- Do not remove catheter earlier than a day

COMPLICATIONS DUE TO AUR

- Urinary tract infection
- Acute kidney injury

BLADDER SPASM

- Suprapubic pain with pericatheteric leak
- Council and analgesics
- Check that bladder is empty
- Don't change catheter unless blocked

COMPLICATIONS DUE TO CATHETERIZATION

- Post obstructive diuresis with dys-electrolytemia
- Transient decompression hematuria
- Urethral injury during catheterization

INDICATIONS FOR HOSPITALIZATION

- Patients of AUR with significant comorbidities
- Patient of AUR with complications listed above

ABBREVIATIONS

BPH: Benign Prostatic Hyperplas
IPSS: International Prostate Symptom Score
TWOC: Trial Without Catheter
WW: Watchful waiting

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☛ ASEPTIC AND ATRAUMATIC CATHETERIZATION TO PREVENT LIFE LONG MISERY OF STRICTURE

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Standard Treatment Workflow (STW)

GROSS HAEMATURIA

ICD-11-MF50.40

PERFORM THOROUGH CLINICAL EVALUATION



SYMPTOMS

- Blood in urine - red coloured or dark coloured
- May be associated with pain:
  - Pain during voiding (urethra)
  - Pain in suprapubic region (bladder)
  - Pain in flank (kidney)
- Acute retention of urine due to clots

RISK FACTORS

- Age > 40 years and male gender
- Smoking
- Occupational exposure (Textile, Chemicals, Rubber, Dye, Printing)
- Family History of Genitourinary malignancy
- Personal history of contact with tuberculosis
- History of stone disease
- Recurrent UTI

EXAMINATION

- Pulse, blood pressure
- Check for pallor
- Check for anasarca
- Per abdomen examination: Palpable bladder, flank mass
- Digital rectal examination: Enlarged prostate, hard nodular/ smooth surfaced prostate
- Rule out vaginal causes of bleeding

RED URINE BUT NOT HAEMATURIA

- Foods: beetroot, blackberry, rhubarb
- Medicines: rifampicin, pyridium

Even single episode of haematuria (irrespective of severity) warrants complete evaluation

MAKE A CLINICAL DIAGNOSIS

INITIAL

- Urethra: stone, urethritis, stricture
- Prostate: inflammation, benign hyperplasia, malignancy

TOTAL

- Kidney: stone, malignancy (renal parenchyma, pelvis/ureter, genito-urinary tuberculosis
- Ureter: stone, malignancy, genito- urinary tuberculosis
- Bladder: infection, genitourinary tuberculosis, stone, malignancy)

TERMINAL

- Bladder: stone, tumor at bladder neck
- Prostate: inflammation, benign hyperplasia, malignancy

HOW TO INVESTIGATE

ESSENTIAL

- Urine examination - routine, microscopy
- Complete Hemogram
- Kidney function tests (KFT)
- Ultrasonography of kidney urinary bladder and prostate region

DESIRABLE

- Contrast enhanced computed tomography of kidney urinary bladder region/ intravenous pyelography (if KFT normal)
- Magnetic resonance imaging of Kidney urinary bladder region (if KFT deranged)
- Urine cytology if > 40yrs or smoker
- Cystoscopy if > 40 years or smoker

OPTIONAL

- Urine culture
- Urine for active sediments(if nephrotic/ nephritic syndrome suspected)
- PT/INR (if bleeding disorder suspected)
- Serum prostate specific antigen (if required)
- Urine for acid fast bacilli - 3 samples (if tuberculosis suspected)

WHEN TO REFER (WARNING SIGNS)

- Deranged kidney functions
- Suspecting malignancy
- Haematuria with hypertension / albuminuria
- Persistent severe haematuria

HOW TO TREAT

PHC/DH (GENERAL)

- Start intravenous fluids if required
- If Anaemia - may transfuse blood as required
- Manage clot colic /flank pain with analgesics
- If Acute urinary retention - catheterise with 20/22Fr 3 way Foley and may start continuous irrigation with normal saline

SPECIFIC

- Suspect urinary tract infection : presents with dysuria, increased frequency of voiding and other irritative lower urinary tract symptoms with/ without fever- treat with broad spectrum oral antibiotics

TERTIARY CENTER (GENERAL)

- Cystoscopic clot evacuation may be performed if feasible
- If basic evaluation and management facilities are unavailable

SPECIFIC

- **Haematuria should be considered as a symptom of genitourinary malignancy in patients >40years old until proven otherwise**
- Suspected nephrotic/nephritic syndrome: cola coloured urine, proteinuria, anasarca, hypertension - Refer to nephrologist

DIFFERENTIAL DIAGNOSIS FOR CHRONIC CONDITIONS LEADING TO HAEMATURIA

	Stones	Renal cell cancer	Bladder tumor	Genito-urinary tuberculosis
Symptoms	Flank pain Ureteric colic Recurrent urinary tract infection Haemturia	Flank mass Flank pain Haematuria	Haematuria Urinary retention	Dysuria Frequency Nocturia Haematuria
Investiga-tions	Ultrasonography Xray KUB Intravenous pyelography or Computed tomography	Ultrasonography Computed tomography/MRI	Ultrasonography Computed tomography/MRI Urine cytology	Urine analysis Urine acid fast bacilli Urine tuberculosis culture CBNAAT (optional) Intravenous pyelography or Computed tomography
Treatment	>5mm or symptomatic - refer to urologist	Mostly surgical treatment - refer to urologist	Mostly surgical treatment - refer to urologist	Oral Antitubercular treat-ment - 6months, refer to a urologist, close follow up

ABBREVIATIONS

CBNAAT: Catridge based Nucleic Acid Amplification test

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DON'T DELAY, GET EVALUATED FOR GROSS HEMATURIA TODAY

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Standard Treatment Workflow (STW)
MALE INFERTILITY
ICD-11-GB04

WHEN TO SUSPECT?

Inability to conceive even after one year of regular unprotected intercourse.

Evaluation earlier than one year if female age is >35yrs, family history of infertility or very anxious couples.
Infertility incidence is 10-15%.

Prevalence - 180 million couples worldwide and 15% of all couples

*Both have contributory factors in 30-40% cases

Male factor solely responsible in 20% and contributory in 30%

CAUSES

Pretesticular	Testicular	Post testicular
• Hypogonadotrophic hypogonadism, sexual disorders	• Primary testicular failure, cryptorchidism, atrophic testes, testicular tumors, varicocele	• CABVD, EDO, post vasectomy

HOW TO PROCEED?

Both partners examined simultaneously*

Ensure marriage is consummated, couple has frequent timed intercourse with the knowledge of ovulatary cycle

*Male factor is an under recognised problem and the failure to recognise often leads to social and psychological adverse effects. Often the male is evaluated once the female has been examined thoroughly and this delays the treatment . Greater the duration of infertility lesser the chance of success

AIM
- To ascertain contributory male factor
- Identify potentially correctable conditions
- Identify incorrectable condtions that may or may not be amenable to Assisted Reproductive Technique (ART)
- Identify serious underlying medical conditions like pituitary tumors, adrenal tumors, testicular cancer, GUTB, CKD, hypogonadism and other hormonal disorder

PHYSICAL EXAMINATION
- Body habitus (obesity, Klinefelter's). Secondary sexual characters, gynecomastia
- Penis: hypospadias, epispadias chordee
- **Testes:** volume, consistency, masses, contours
- Epididymis: flat, turgid, nodularity. Vas deferens – present/absent thickened or beaded
- Cords-presence of varicocele. Inguinal or scrotal scar
- Rectal examination: cyst, dilated seminal vesicles

HISTORY
- Age of partners and duration of infertility.
- Use of contraception and lubricants.
- Knowledge of ovulation cycle
- Sexual and ejaculatory dysfunction, volume of ejaculate
- Medical illness: STD, diabetes, any febrile illness within last 3 months chronic bronchitis and any debilitating medical condition
- H/o Chemotherapy, Radiotherapy
- Congenital anomalies, cryptorchidism, hypospadias, Chordee
- Testicular torsion, drug history, trauma and swelling
- H/o past surgeries(hernia repair, orchiopexy, retroperitoneal surgery)
- Family history (infertility,consanguinity,genetic disorders)
- Personal history-smoking, tobacco, alcohol, caffeine, drug abuse, anabolic steroids
- Exposure to environmental toxins (pesticides,herbicides, chronic heat and radiation, sauna bath, tight non cotton undergarments, laptops & mobile phone)
- Partner history: Any menstrual abnormality, infertility evaluation till date

INVESTIGATIONS

SEMEN ANALYSIS (ESSENTIAL)
- At least 2 samples 2-4 weeks apart; Abstinence of 1-3 days.; Collected in a sterile, medical grade plastic wide mouth container
- Provided within the lab or transported within an hour at room temperature and examined immediately
- WHO Semen criteria (2021, 6th edition), Volume 1.4 (1.3 - 1.5 mL), Total count 39 (35-40), Total motility 42 % (40-43), Progressive motility 30 % (29-31), Immotile sperms 20% (19-20), Vitality 54% (50-56), Morphology 4% (3.9-4)

DIAGNOSTIC CATEGORIES ACCORDING TO SEMEN ANALYSIS REPORT

Normal Semen Analysis: Rule out sexual dysfunctions, Anatomic abnormalities, Female factor and unexplained

Low volume semen: Incomplete Collection, Retrograde ejaculation, Ejac. duct obstruction, Cong. Absence of VasDeferens, Hypogonadism

- **Azoospermia:** Complete absence of sperm to be confirmed by centrifugation of semen and examining pellet

Obstructive (Epididymal,vasal)
- **Nonobstructive:** (Genetic, Chromosomal, Hormonal, CT/RT, Post torsion testes, orchitis, Cryptorchidism, Idiopathic)
- **Oligo-astheno-teratospermia: Isolated** Asthenospermia: Antisperm antibodies, Sperm structural defect, Hypogonadism
- **Multiple defects:** Varicocele, Cryptorchidism, Genital tract infection, Systemic illness, Prolonged abstinence, Drugs (Sulfasalazine, NFT, Colchicine, Chemotherapy, GnRh analogs, Spironolactone, Ketokonazole, Anabolic steroids, cocaine, alcohol. Chemicals: heavy metals, herbicides, organic solvents, fungicides, pesticides)

Note: If a patient is unable to produce semen consider retrograde ejaculation and anejaculation. Further evaluation may require electro ejaculation or vibrator induced ejaculation

OTHER INVESTIGATIONS
- Extended testing - SDF (sperm DNA fragmentation) test, ROS (reactive oxygen species), Genetic (karyotyping, Y chromosome micro deletion, CFTR mutation in Congenital absence of Vasdeferens)
- Hormonal assay: Serum FSH, LH, Prolactin, Testosterone, Estradiol, T/E ratio
- Culture: Urine, Semen, Prostatic fluid, Antisperm antibodies, Viability assay, Sperm function tests, Scrotal USG & doppler, TRUS, Genetic studies,
- Testicular biopsy (Multiple bilateral biopsies preferably in a center with facility for cryopreservation)

MANAGEMENT

PHC/CHC
- History and Physical examination

Normal Semen report:
(Rule out unconsummation, sexual dysfunction, anatomic abnormailities)
Female partner to be evaluated by gynecologist

Abnormal Semen report:
- Management of reversible nonsurgical causes (Infections etc.) and surgical cause i.e. varicocoele if surgeon available
- Preventive measures: Avoid gonadotoxins, gonadotoxic drugs, smoking, tobacco, chronic heat , excess use of mobiles; Encouraging healthy life style: Nutritious diet, regular physical exercise, avoid stress, use of antioxidants and vitamins(Vit. C, Vit E , Zinc)
- For further evaluation refer to district/ tertiary hospital

DISTRICT HOSPITAL
- Hormonal assay and Testicular biopsy
- Management of sexual and ejaculatory dysfunction
- Management of Varicocele and Hypogonadotropic hypogonadism
- ART: AIH/AID and counselling for adoption

TERTIARY LEVEL
- **Additional testing:** TRUS, Genetic, ASA, SDF, ROS
- **Advanced surgery:** Microsurgical VVA,VEA, Varicocelectomy, TURED, Sperm retreival techniques, Cryopreservation and sperm banking
- **Advanced ART:** IVF-ET/IVF ICSI

TREATMENT ALGORITHM

AZOOSPERMIA
(Low volume, ↓pH, Fructose -ve)

Retrograde ejaculation ruled out

Examine Vas

- Not palpable → CABVD
  - CFTR Gene Mutation → ICSI
  - DI/ Adoption → Counselling
- Palpable → E.D.O. → TRUS
  - Cystic SV & ED → TURED
  - Fibrous → Non-operable → PESA + ICSI

AZOOSPERMIA
(Normal volume, Fructose +ve)

Clinical Examination & FSH

- Obstructive (FSH-N, Epid, turgid) → Normal testes → Exploration, check vasal patency → Needle biopsy (if required) → Microsurgical VEA
- Equivocal (N-FSH, N-testes) → B/L Multiple testicular biopsy
  - Normal → VEA/ ICSI
  - No Sperms → DI/ Adoption
  - Focal Sperms → TESE-ICSI
- P.T.F. (Testes small, FSH>2N) → Discuss options
  - DI/ Adoption
  - Considering ICSI → Genetic study → Multiple testicular biopsy
    - Sperms absent
    - Sperms present → Cryo preservation → ICSI

OLIGO-ASTHENO-TERATOSPERMIA
(↓ count, ↓ motility, poor morphology)

- ↑ FSH, Severe Germ epith damage
- ↑ASA (Role of steroids debatable)
- Varicocele → Varicocelectomy
- Establish Infection → Antibiotics
- Idiopathic → Empirical Medical Rx (Clomiphene, Tamoxifen, HCG, aromatase inhibitors, antioxidants)

→ Refer for Assisted Reproductive Technique (IUI/IVF/ICSI)

NEVER MISS EXAMINING THE MALE PARTNER IN A CASE OF INFERTILE COUPLE

ABBREVIATIONS

AID: Artificial Insemination Donor
AIH: Artificial Insemination Husband
ART: Assited Reproductive Technique
ASA: Anti Sperm Antibodies
CABVD: Congenital Absence of Bilateral Vas deferens
DI: Donor Insemination
EDO: Ejaculatory Duct Obstruction
FSH: Follicle Stimulating Hormone
GUTB: Genito Urinary Tuberculosis
ICSI: Intra Cytoplasmic Sperm Injection
IVF-ET: Invitro Fertiliztion - Embryo Transfer
PESA: Percutaneous Epididymal Sperm Aspiration
PTF: Primary Testicular Failure
SV & ED: Seminal Vesicle & Ejaculatory Duct
TESE: Testicular Sperm Extraction
TRUS: Trans Rectal Ultrasonography
TURED: Trans Urethral Resection of Ejaculatory Duct
VEA: Vasoepididymal Anastomosis
VVA: Vaso Vasostomy

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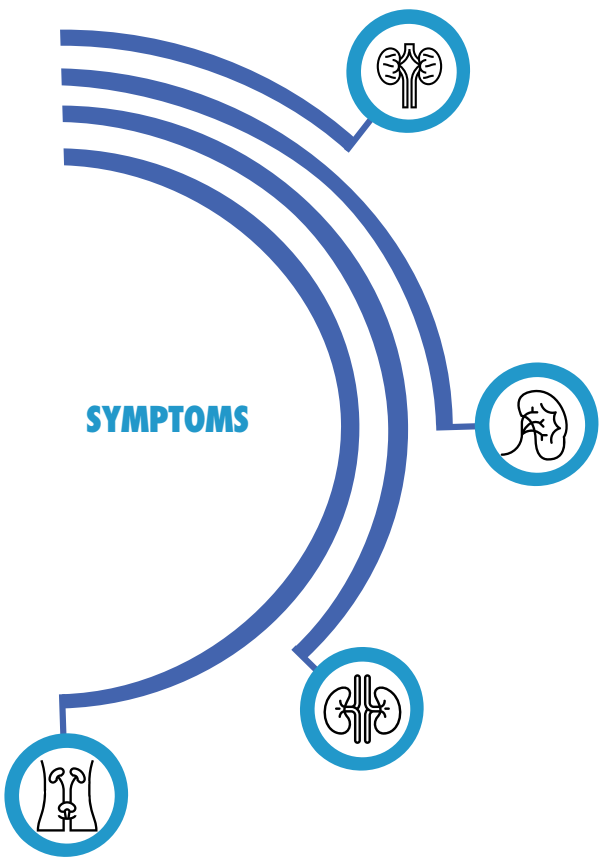
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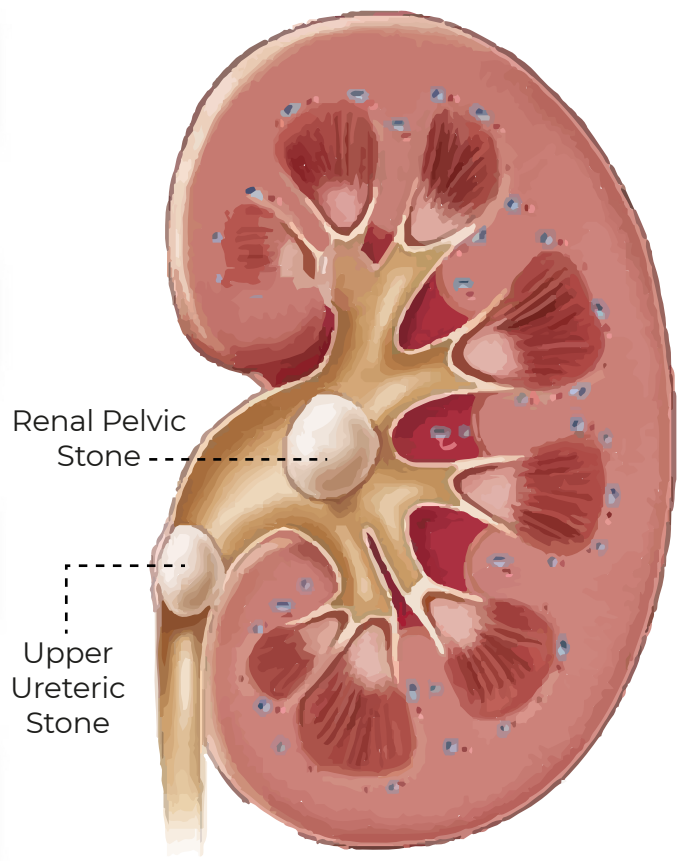
RENAL AND URETERIC STONES

ICD-11-GB70

HOW WILL YOUR PATIENT PRESENT AND WHAT TO SUSPECT



CLINICAL SCENARIO	SUSPECT
Flank pain	Renal Stone
Colicky pain starting from back and radiating to front	Upper ureteric stone
Colicky pain starting from back & radiating upto groin	Mid ureteric stone
Colicky pain starting from back & radiating to upper thigh & scrotum/ vulva	Lower ureteric stone



- Haematuria may be present with stone at any location
- Lower ureteric stones may also present with difficulty in passing urine

- Colics may be associated with nausea and vomiting
- Can present as anuria in bilateral ureteric stones, ureteric stone in a solitary kidney

History of site & type of pain, associated symptoms hint towards possible site of stones. Remember to take past history of stone diseases, medications, family history etc

INVESTIGATION

RADIOLOGY

NAME	ADVANTAGES AND DISADVANTAGES
X-KUB	Readily available, inexpensive, minimal radiation but needs preparation hence may not be the preferred test in emergency settings
USG	Readily available, no radiation, **safe test in pregnancy**, detects radiolucent stones, high sensitivity for hydronephrosis. Can miss a ureteric calulus
IVP	Anatomical and functional imaging, aids in planning surgery but high radiation and needs preparation. Not useful in poor renal function
CT Scan	No contrast required, highly sensitive and specific, detect radiolucent stones, detect other causes of flank pain, but risks higher radiation and cost

TIPS FOR ORDERING INVESTIGATIONS

- Order X-KUB and Ultrasound in all patients of suspected renal stones (90% of renal stones are radio-opaque).
- In acute colic NCCT should be preferred if available
- Once the stone is detected, get Intravenous pyelography if stone is seen on X-ray
- CT urography if stone is radiolucent to aid further treatment

METABOLIC EVALUATION

Initial biochemical evaluation in all stone formers

Urine analysis, serum creatinine, electrolytes namely calcium, phosphorous and uric acid. Intact parathyroid hormone and stone analysis are preferrable.

Extended Evaluation

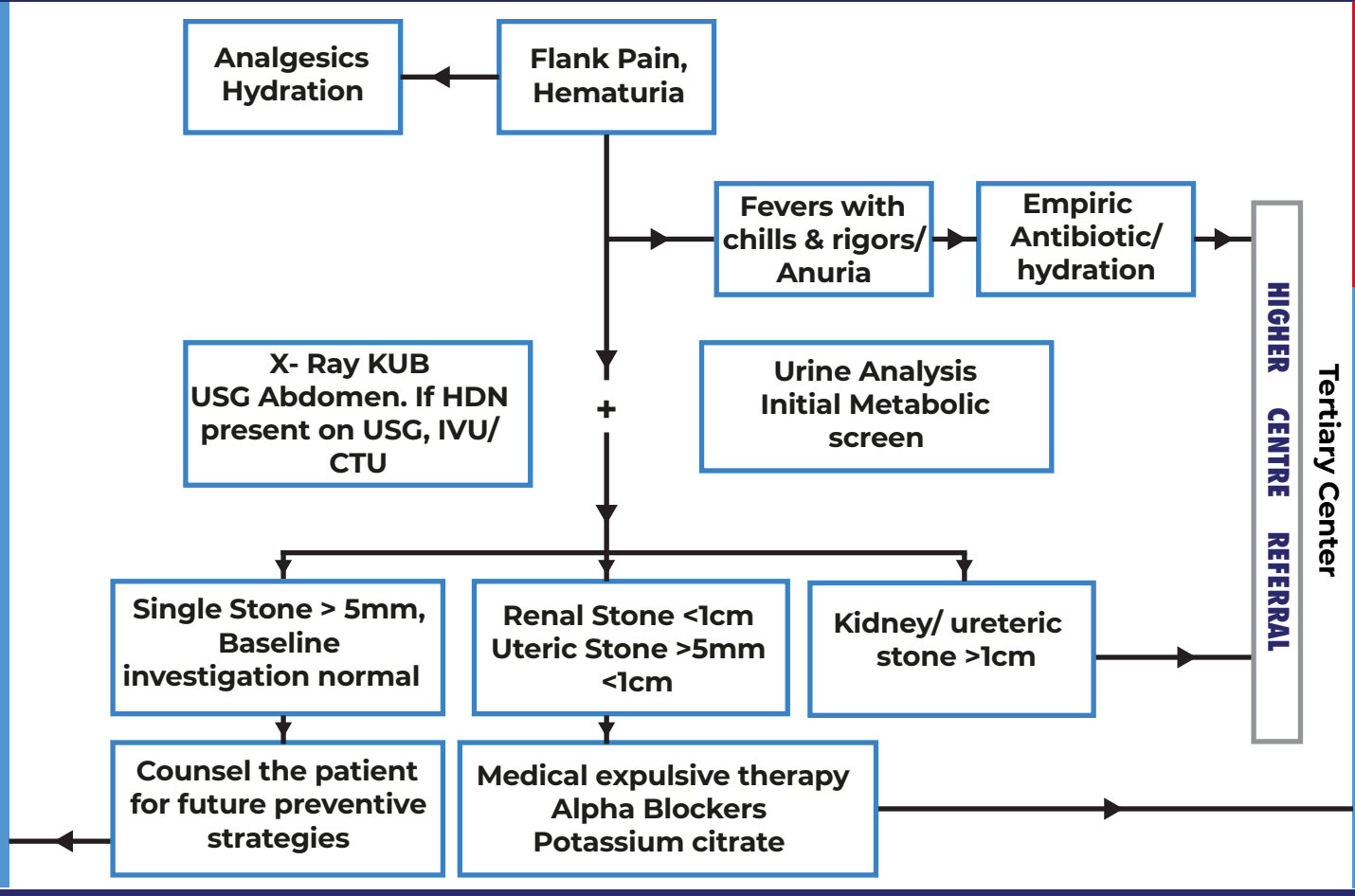
To be done in recurrent stone former, stone in children, bilateral stones, family history of stone, history of gut surgery, solitary kidney and cysteine stones. Typically to be done at 3-4 weeks after stone clearance

Should include initial metabolic evaluation plus 24-hour urinary levels of calcium, uric acid, and creatinine. Preferable to do intact parathyroid hormone (if not done earlier)and urinary oxalate and citrate levels

MANAGEMENT ALGORITHM

PHC/CHC level

- Increase daily fluid intake to ensure a urine output >2 lit/day
- Restrict extra salt intake and increase dietary fibre.
- Do not restrict calcium intake.
- Increase citrate rich food such as lemon, orange juice etc.
- Decrease consumption of food rich in oxalates like spinach, nuts, beet root, potato chips, French fries.
- Avoid purine rich foods like animal protein, alcoholic drinks like beer



Warning signs for immediate referral

- Anuria
- Fever with chills and rigors
- Suspected renal failure
- Persistent haematuria

Medical Expulsive Therapy (MET)

- Alpha blockers such as Tamsulosin(0.4mg/day) Alfuzosin (10mg/day); Silodosin(8mg/day)
- MET should be offered
  - In Ureteric stones <10mm
  - In the absence of infection, obstruction or deranged renal function.
- MET can be tried for upto 4 weeks

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A STONE REOCCURENCE IS COMMON FOLLOW PREVENTIVE STRATEGIES

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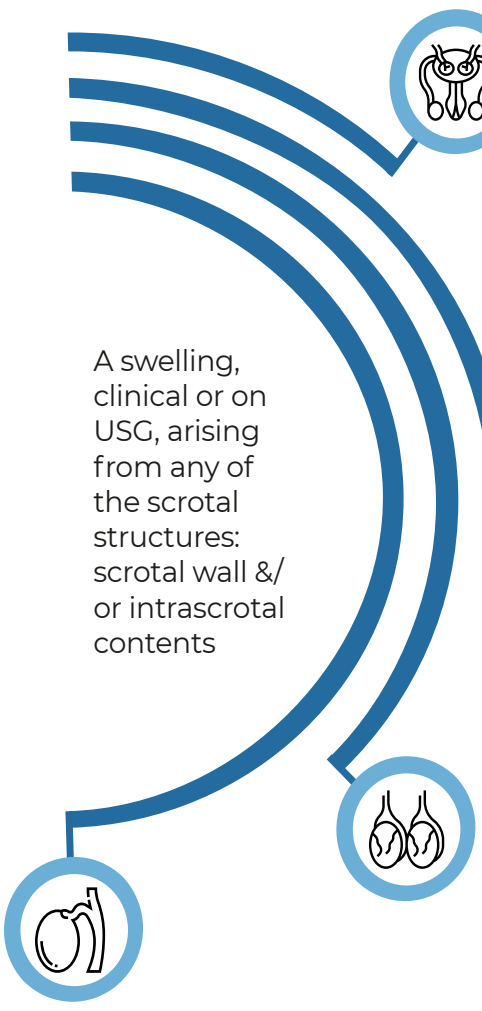
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Standard Treatment Workflow (STW)

SCROTAL SWELLING

ICD-11-N50.89

A swelling, clinical or on USG, arising from any of the scrotal structures: scrotal wall &/ or intrascrotal contents



MAKE A CLINICAL DIAGNOSIS

DIAGNOSE THE SITE OF SWELLING?

Are you able to reach above the swelling?

- Yes → SCROTAL SWELLING
  - Scrotal wall involved in swelling → Parietal Swelling
  - Scrotal wall normal & can be pinched off the swelling → Intrascrotal Swelling
    - Normal Testis palpated separately; Swelling located well above testis → Spermatic Cord Swelling
    - Testis not palpable normally; Swelling located just above &/or behind testis → Epididymal Swelling
    - Testis itself appears enlarged → Testicular Swelling
- No → INGUINOSCROTAL SWELLING

DIAGNOSE THE NATURE OF SWELLING?

- PAINFUL
  - Cystic → Fluid accumulation, (e.g. Hydrocele, epididymal cyst)
  - Solid → • Ch. inflammatory, (e.g. Filariasis, TB) • Tumors
- PAINFUL
  - Fever Present → Acute infection
  - Fever Absent → • Traumatic • Ischaemic (e.g. torsion)

MAKE A CINICAL DIAGNOSIS

PARIETAL (SCROTAL WALL) SWELLINGS

	BILATERAL	UNILATERAL
Ac. Inflammation	• Cellulitis • Fournier gangrene	• Reactionary to epididymo- orchitis • Furuncle, Abscess
Traumatic	Contusional	Blunt trauma
Ch. Inflammation	Filarial Elephantiasis	
Fluid Accumulation	• Edema in anasarca, IVC thrombosis • Urinary extravasation	Scrotal wall cysts
Neoplasm		Melanoma, Scrotal Carcinoma Dermatofibroma;

INTRASCROTAL SWELLINGS

	Testicular	Epididymal	Spermatic cord
Cystic	Hydrocele	• Epididymal cyst • Spermatocele	Varicocele
Solid	**Painless** • Testicular tumor **Painful** • Torsion testis • Orchitis	**Painless** • Ch. Filarial epididymitis • Ch. Tuberculous Epididymitis • Adenomatoid tumor **Painful** • Ac. Epididymitis	**Painless** • Lipoma cord **Painful** • Funiculitis

RED FLAG SIGNS

PAINFUL SWELLING
- Sudden onset-Severe pain, Vomiting
- O/E tender enlarged testis, pain increases on elevating testis
- No fever

▶ **TORSION TESTIS** (More common in adolescents) ▶ **CONFIRM BY**
- Scrotal doppler
- To save testis, surgery should be done within six hours

▶ **REFER URGENTLY FOR EXPERT CONSULTATION**

PAINLESS SWELLING
- Solid testicular swelling is felt

▶ **TESTICULAR TUMOR** ▶ **CONFIRM BY**
- Scrotal USG
- Serum tumor markers

▶ **REFER ALL CASES FOR EXPERT CONSULTATION**

INVESTIGATIONS

SUSPECTING AC. INFLAM DISEASE

Essential
- TLC/DLC
- Blood sugar

Desirable
- Anti filarial antibody

SUSPECTING CH. INFLAMMATORY DIS.

Essential
- TLC/DLC
- ESR
- Scortal USG

Desirable
- Anti filarial Ab

SUSPECTING TESTICULAR TUMOR

Essential
- Beta hCG
- Alfa feto protein
- Serum LDH

Desirable
- Scrotal USG
- Abdomino - Pelvic CECT Scan

SUSPECTING TORSION

Essential
- TLC/DLC

Desirable
- Scrotal doppler

SUSPECTING VARICOCELE

Essential
- TLC/DLC

Desirable
- Scrotal doppler

HOW TO TREAT COMMON CONDITIONS?

PARIETAL SWELLINGS

FURUNCLE/ABSCESS
PHC/CHC level
- Broad Spectrum Antibiotic Amoxy + Clavulinic acid
- Consider drainage if fluctuations+ or impending rupture

District Hospital
- If abscess appears part of underlying disease
- Nonresponders
- Immunocompromised patient



FILARIAL ELEPHANTIASIS
PHC/CHC level
- DEC 100 mg TDS x 20 days
- Doxycycline 100 mg BD x 20 days
- Scrotal Elevation/support

District Hospital
- Non responders
- Huge size



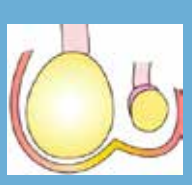
INTRASCROTAL SWELLINGS

AC. EPIDIDYMO-ORCHITIS
PHC/CHC level
- If patient had a urinary tract instrumentation or dysuria - suspect bacterial type, treat by - antibiotic and support If no response in 48 hrs
- Treat all other cases as filarial by - DEC 100 mg x TDS x20 days and doxycycline 100 mg x BD x 20 days
- Give anti inflammatory drugs to all



District Hospital
- Non responders

HYDROCELE
PHC/CHC level
- Small size - no treatment
- Aspiration can be performed under aseptic precautions in select cases



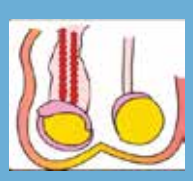
District Hospital
- Moderate to large -Do hydrocelectomy

Tertiary Center
- If not trained to do the surgery

CHRONIC EPIDIDYMO-ORCHITIS
PHC/CHC level
- Mostly filarial in origin but if -
- Patient has had H/O UTI or urethral catheterization, suspect bacterial
- Patient has H/O TB, suspect tuberculosis
- Treat by DEC 100 mg TDS + Doxycycline 100 mg BD for 20 days



District Hospital
- No response to treatment
- Epididymal abscess or local sinus discharging syrup like pus



VARICOCELE
PHC/CHC level
- Counsel for semen analysis (2-3 times)

District Hospital
- If 'discrepancy in size of testis' and/or 'abnormal semen parameters present' and /or persistent pain & swelling
- Rest all cases be given symptomatic treatment

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ABBREVIATIONS

DEC: Diethyl Carbamazine Citrate

KEEP A HIGH THRESHOLD FOR INVASIVE TESTS AND PROCEDURES

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 the website of DHR for more information: **https://dhr.gov.in/** © Department of Health Research, Ministry of Health & Family Welfare, Government of India.

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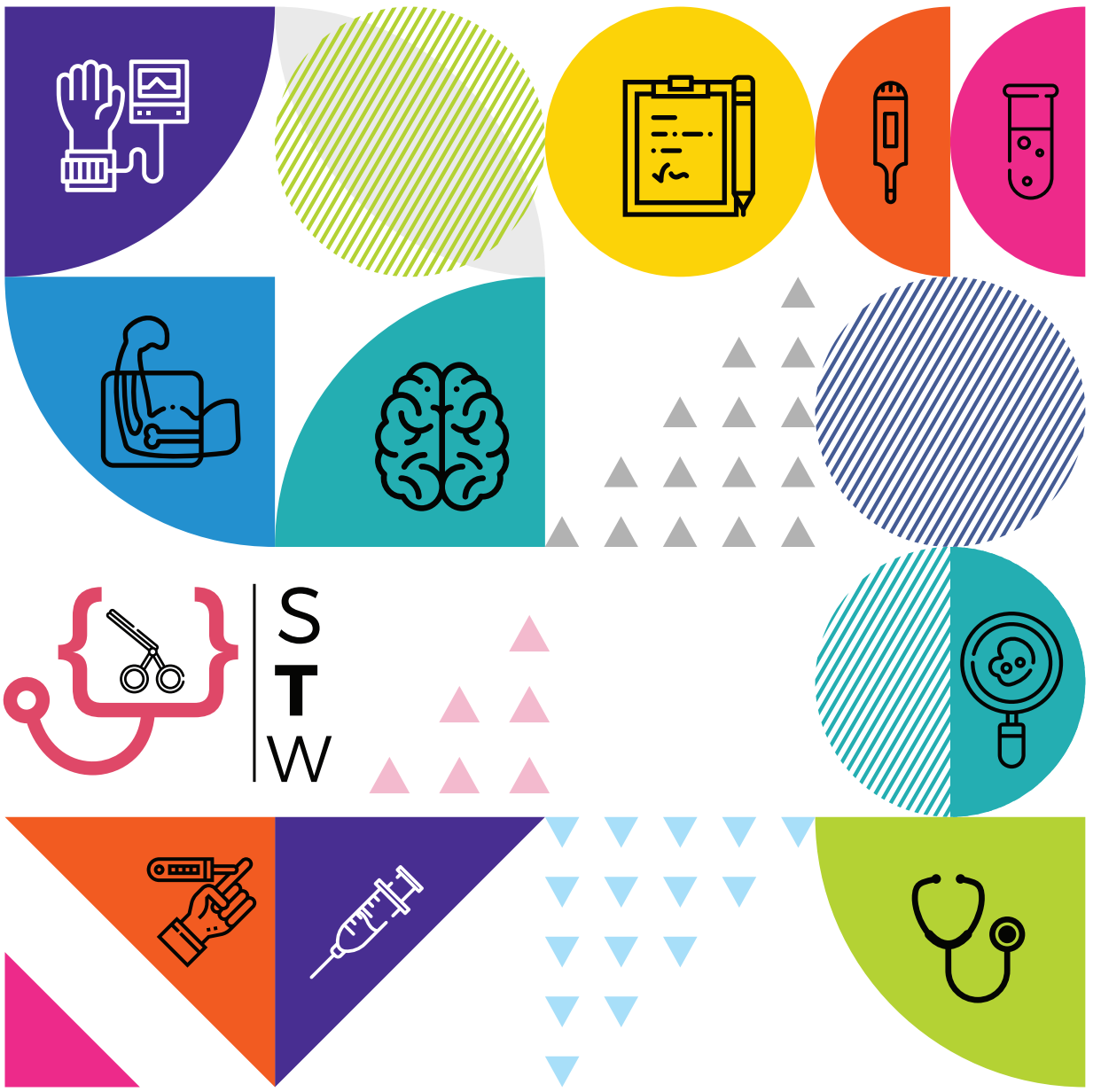
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