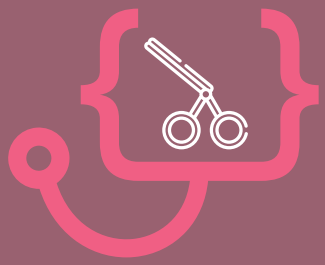
सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911



2022 Edition, Vol.III

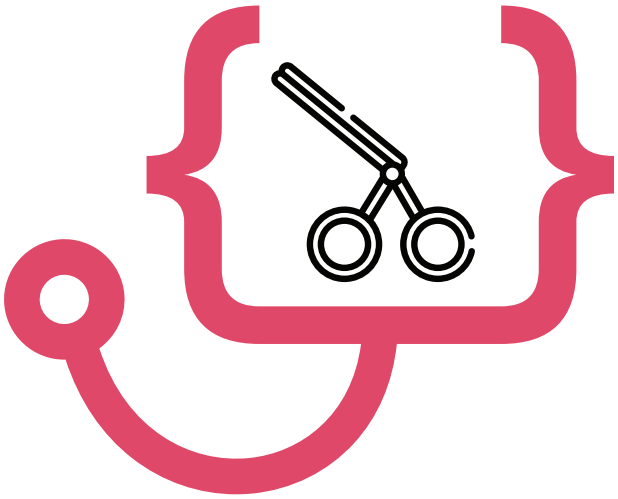
STANDARD TREATMENT WORKFLOWS

of India

PARTNERS

national health authority

World Health Organization India



STANDARD TREATMENT WORKFLOWS *of India*

Department of Health Research
Ministry of Health and Family Welfare, Government of India

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

Suggested Citation: Standard Treatment Workflows of India, 2022, Edition, Vol. 3, New Delhi, Indian Council of Medical Research, Department of Health Research, Ministry of Health and Family Welfare, Government of India.

Printed in India

CONTENTS

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Department of Health Research
Ministry of Health and Family Welfare, Government of India
icmr
INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

- **Infertility**
  - Female Infertility
- **Neonatology**
  - Feeds and Fluids
  - Neonatal Hypoglycemia
  - Neonatal Jaundice
  - Neonatal Seizures
  - Neonatal Sepsis
  - Neonatal Transport
  - Neonatal Triage
  - Post Asphyxial Management of Neonates
  - Respiratory Distress in Neonates
  - Thermal Care
- **Oncology**
  - Breast Cancer
  - Lung Cancer
  - Oral and Lip Cancer
- **Ophthalmology**
  - Cataract
  - Diabetic Retinopathy
  - Glaucoma
- **Orthopaedics**
  - Septic arthritis
  - Supracondylar fracture of Humerus in Children
- **Paediatric Surgery**
  - Acute Scrotum
  - Constipation
  - Empyema
  - Hernia in children/ Congenital Hernia
  - Undescended Testes

• CONTRIBUTORS

INTRODUCTION

Department of Health Research
Ministry of Health and Family Welfare, Government of India

icmr INDIAN COUNCIL OF MEDICAL RESEARCH

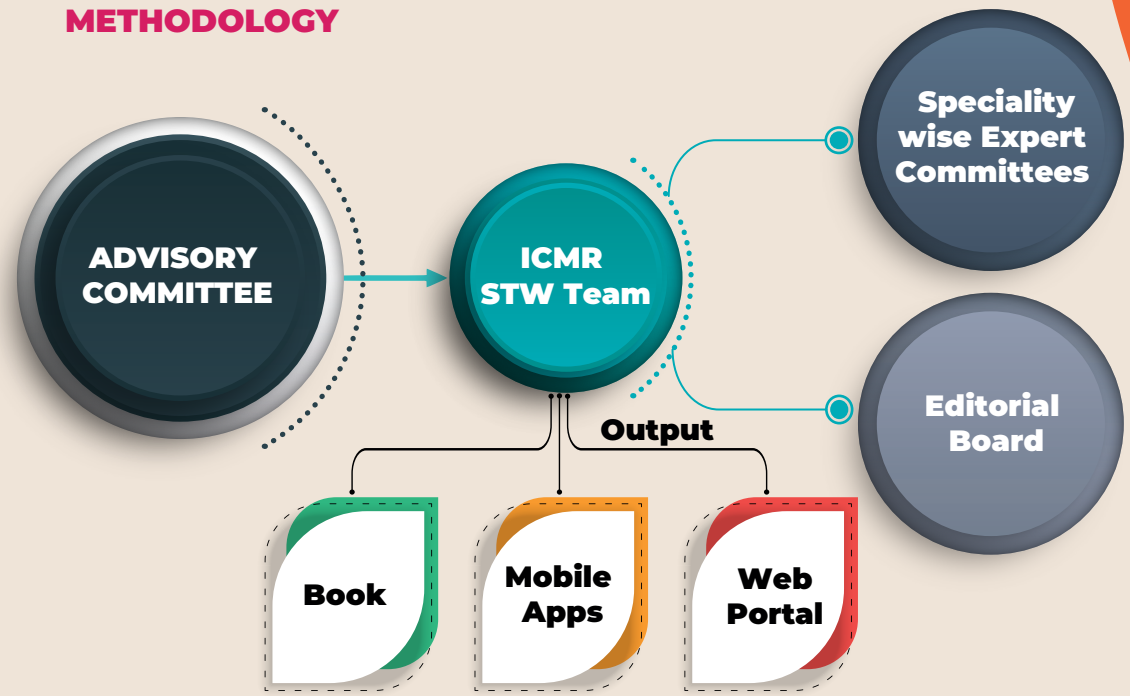
GOAL

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

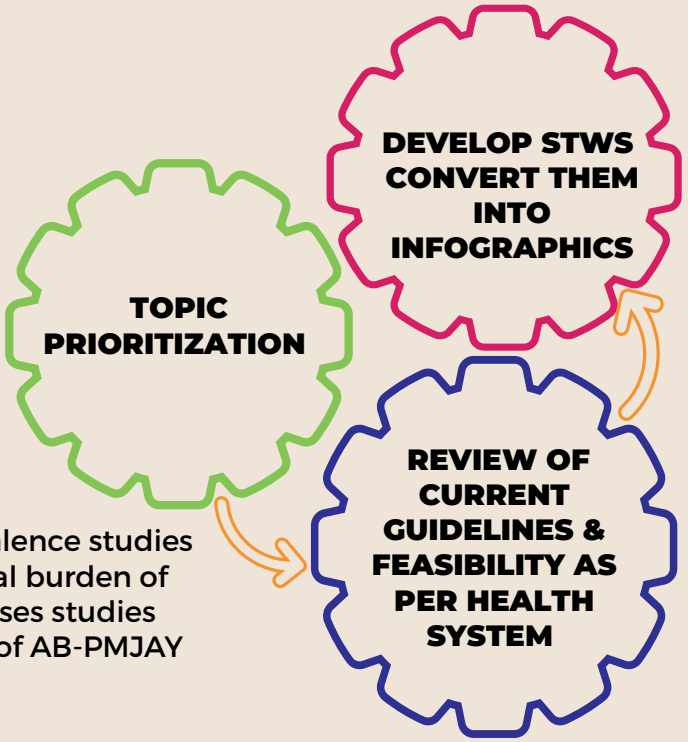
OBJECTIVES

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

METHODOLOGY



PROCESS OVERVIEW



- Participation also from Public Health Specialists Search Strategists Graphic Designers

- Prevalence studies
- Global burden of diseases studies
- HBP of AB-PMJAY

- Review by Editorial Board
- Approval by Advisory Committee

DERMATOLOGY

July/ 2022

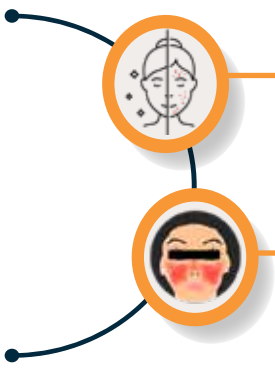
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

ACNE AND ROSACEA

ICD-10-L70-71



Acne is a common dermatosis of adolescence and often persists into adulthood

Rosacea often mimics acne but has distinct management issues

WHEN TO SUSPECT?

ACNE

- Comedones (open-blackheads, closed-whiteheads) ± any one or more of the following
  - Papules, pustules
  - Painful nodules containing pus
  - Cysts
  - Scarring
- Sites: Face and/or trunk
- Symptoms: None/pain/pricking

ROSACEA

- Photosensitivity
- Persistent erythema, telangiectasia ± papules and pustules in absence of comedones
- Sites: Convexities of the face (cheeks, forehead, nose, chin)
- Bulbous enlargement of nose- rhinophyma
- Symptoms: Sensitivity to hot and spicy food, and emotional triggers

USEFUL INFORMATION

- Acne and rosacea can co-exist
- It is important to treat acne early so that scarring is minimal
- In Indian scenario, consider 'topical corticosteroid induced acne and rosacea'

ADDITIONAL INFORMATION FOR CLINICAL EVALUATION

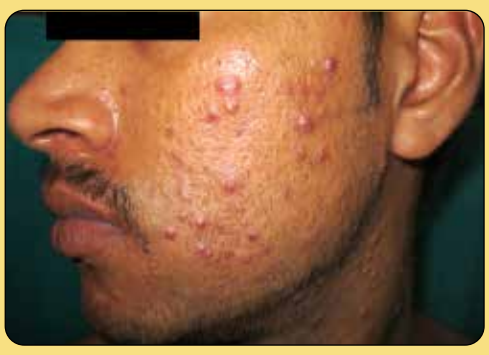
- History of cosmetics/topical steroid use- as such, or in combination with creams/fairness creams
- Age of onset usually around puberty; onset before 8 years of age requires hormonal evaluation
- History of recent drug intake (>fortnight/ month)- Drug induced acne
- History of contact with cutting oils/ halogens (ingestion of iodides/ bromides)
- History of menstrual irregularities (oligomenorrhea), weight gain and hirsutism- look for polycystic ovarian syndrome
- History of premenstrual flare
- Persistence or onset/ recurrence after 25 years of age
- History of dry and gritty eyes- requires ophthalmologic evaluation for ocular rosacea

ACNE VARIANTS AND DIFFERENTIALS

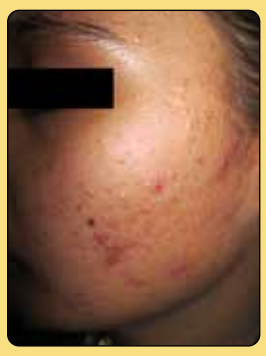
- **Acne conglobata:** Severe scarring on trunk and face with nodular lesions
- **Drug induced acne** (with corticosteroids/ antiepileptic drugs/ antitubercular drugs/ vitamin and protein supplements): Extensive, monomorphic papules and pustules in absence of comedones
- **Topical corticosteroid induced acne:** Hypertrichosis, shiny, thin skin, pigmentary changes with papulo-pustules
- **Hormonal acne:** Adult female with seborrhea, hirsutism, androgenetic alopecia, insulin resistance and PCOS, premenstrual flare, menstrual irregularities and prominent involvement of mandibular area
- **Occupational acne:** Predominantly comedones with history of exposure to cutting oil/ petroleum products
- **Acne excoriee:** Predominantly picked and excoriated lesions with prominent pigmentation
- **Acne fulminans:** Fever and bone pains in association with severe necrotic acne lesions
- **Hidradenitis suppurativa:** Association to consider when axillae/groins/ other flexures are involved with polyporous comedones/ pustules/ nodules/ abscesses/ scarring

DIFFERENTIALS OF ROSACEA

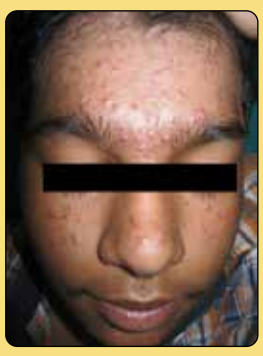
- **Connective tissue diseases like lupus erythematous or dermatomyositis:** Photosensitivity, presence of Raynaud's phenomenon, arthralgia, muscle weakness, dyspnea, dysphagia, oral/ genital ulcers, abdominal pain, frothy urine, seizures, or alopecia
- **Steroid induced rosacea:** Photosensitivity, hypertrichosis, atrophy and pigmentary changes, prior history of topical corticosteroid application for a long time
- **Seborrheic dermatitis:** Predominant involvement of nasolabial folds, eyebrows with erythema and greasy scales
- **Contact dermatitis or atopic dermatitis:** Significant itching, exudation and crusting



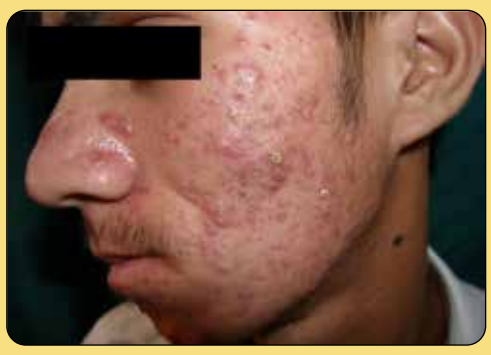
ACNE VULGARIS



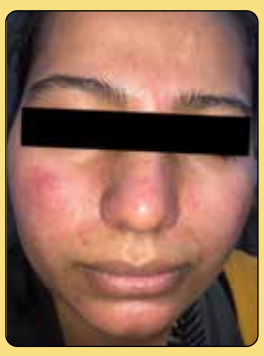
ACNE EXCORIEE



DRUG INDUCED ACNE



NODULOCYSTIC ACNE



ROSACEA

MANAGEMENT

ACNE

- Stop unsupervised topical corticosteroid and cosmetic use on face
- Clean face with soap/ mild cleanser
- Mild-moderate acne: 2.5% Benzoyl peroxide gel or 0.025% Tretinoin cream or 1% Adapalene gel ± Clindamycin gel for local application, at night time
- Moderate acne, not controlled with topicals: Cap Doxycycline 100mg OD for minimum of 4-6 weeks
- Severe nodulocystic acne: Isotretinoin treatment at tertiary level after documentation of normal lipid profile and liver functions
- Acne fulminans: start Prednisolone 0.5-1 mg/kg/day and refer to higher center
- Hormonal acne: Treatment with anti-androgens at tertiary level
- Drug induced acne: Stop offending drugs if feasible; treatment as per severtiy as detailed above

ROSACEA

- Avoid triggers (alcohol, caffeine, spicy food, cosmetics, topical steroids)
- Photoprotection
- **Mild papulopustular rosacea:** topical Azelaic acid (15%) or Metronidazole (1%) or Ivermectin (1%)
- Moderate disease, not controlled with topicals: Cap Doxycycline 100mg OD for minimum of 4-6 weeks
- Severe/phymatous/ ocular rosacea: refer to a specialist for low dose Isotretinoin/interventional treatment

TREAT ACNE EARLY TO PREVENT SCARRING

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

ALOPECIA / HAIR LOSS

ICD-10-L63.9

DEFINITION
Excessive hair shedding and/ or sparsening leading to visible scalp that may be either patchy or diffuse

HISTORY AND EXAMINATION

Elicit history pertaining to
- Duration and age of onset of hair loss
- Whether patchy or diffuse scalp involvement, and if other hair bearing areas are affected
- Relevant medical history pertaining to specific entities mentioned below
- Hair care practices including cosmetic hair procedures

Examine scalp for scarring vs non-scarring by looking for
- Loss of skin markings
- Loss of hair follicle ostia
- Pigmentary changes

GENERAL HAIR CARE PRINCIPLES
- Hair fall of upto 100 per day may be normal and need not cause alarm
- Regular cleaning of scalp and hair with plain shampoo
- Avoid hair oil application and damaging mechanical/ chemical hair care procedures

NON SCARRING ALOPECIA (SMOOTH BALD AREAS WITH SMALL BLACK INTACT HAIR FOLLICLES)

CONGENITAL

Alopecia due to inherited/ congenital disorders with or without easy hair breakage
- Congenital hypotrichosis
- Monilethrix
- Trichorrhexis nodosa
- Loose anagen hair syndrome
- Woolly hair syndrome

Refer to tertiary centre for further evaluation

ACQUIRED

Patchy

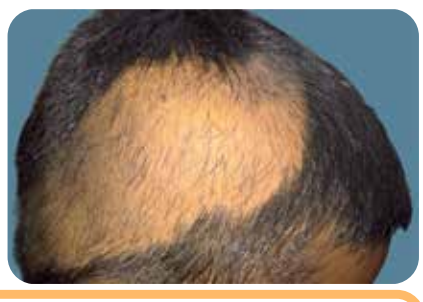
Alopecia areata

- Asymptomatic, single/ multiple smooth bald patches; can progress to involve whole scalp (alopecia totalis) or all body hairs (alopecia universalis)
- H/o atopy, examine for nail pitting
- <50% of scalp: Topical 0.05% Betamethasone lotion OD, intralesional Triamcinolone once in 2-4 weeks (5 mg/ml for scalp and 2.5 mg/ml for beard or eyebrows) only for limited involvement, topical Minoxidil 5% OD
- >50% of scalp or involvement of facial and body hairs or margin of occipital area: refer to tertiary centre to be worked up for immunosuppressants such as oral steroids mini pulse, Methotrexate or Cyclosporine

Tinea capitis

- Children with patches of hair loss with scaling and/ or signs of inflammation (erythema, pustulation, boggy swelling). Easy pluckability of hair within the patch
- KOH mount for confirmation, if available
- Oral antifungals- Griseofulvin 10-20 mg/kg, Terbinafine 5 mg/kg; for 6-8 weeks
- Topical antifungal shampoos
- Avoid comb sharing

Trichotillomania



- Children or young adults with bizzare shaped bald patches with broken hair of different length and focal scalp hemorrhages
- Look for other signs of impulsive behaviour
- Counselling and referral to psychiatrist if needed

Diffuse

Telogen effluvium
- History to rule out underlying medical illness, drug intake, menstrual irregularities, hypo/ hyperthyroidism, anemia, physical/ mental stress
- Labs- Hemogram, and if indicated serum ferritin, TSH
- Reassurance and treatment of underlying disorder. If persistent, consider 1 ml of 5% topical Minoxidil once a day

Pattern hair loss

Androgenetic alopecia: males
- Adult males with fronto-temporal hairline thinning or recession, it may progressively involve vertex & parietal areas with usual sparing of occipital area
- Treat with 1mL of topical 5% Minoxidil solution BD
- If effective continue this treatment to maintain hair growth
- Addition of oral Finasteride 1 mg/day may be considered
- Can be referred to trained specialist for hair transplant, if required

Female pattern hair loss
- Hair thinning with widening of partition usually in postmenopausal women
- In premenopausal, look for signs of hyperandrogenism. If present, hormonal workup to rule out PCOS or virilising tumors of ovary/ adrenal glands
- 1 ml of 5% Minoxidil solution OD for local application
- Treatment of underlying condition
- Severe non-responsive: refer to tertiary care
- Oral anti-androgens (Finasteride, Spironolactone, cyproterone acetate with oral contraceptives may be added)

SCARRING ALOPECIA (AREAS WITH FIBROSIS AND DAMAGE TO HAIR FOLLICLES)

All cases of scarring alopecia must be referred to a dermatologist for histological confirmation & further management

Primary

Pustules or boggy lesions

Folliculitis decalvans
Dissecting cellulitis of scalp

Investigations:
- Trichoscopy, scalp biopsy for histopathology

Treatment:
- Long term oral antibiotics: Doxycycline/ Clindamycin for 10-12 weeks
- Consider low dose oral steroids
- Isotretinoin

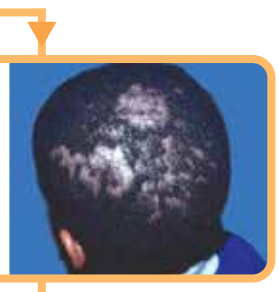
Pigmentary changes

Lichen plano pilaris
Violaceous plaques and follicular plugs. Examine for lichen planus of other sites

Investigations:
- Trichoscopy, scalp biopsy for histopathology

Treatment:
- Oral steroid mini pulse +/- Methotrexate/ Azathioprine/ Cyclosporine for halting active progression
- Strict laboratory monitoring for any adverse drug events
- For burnt out disease- wigs and camouflage

Discoid lupus erythematosus
Erythematous to depigmented plaques with atrophy, scaling and follicular plugs



Investigations:
- Trichoscopy, scalp biopsy for histopathology, direct immunofluorescence, workup to rule out SLE

Treatment:
- Photoprotection
- Topical steroids
- Hydroxychloroquine 5mg/kg/day after baseline ocular examination; usually required for 6-12 months

Secondary

Due to trauma/ burns/ dermatoses like morphea, pemphigus, neoplasms affecting the scalp

Investigation and treatment of underlying disorder

☛ HIGH REGROWTH POTENTIAL WITH NON-SCARRING ALOPECIA, GUARDED REGROWTH POTENTIAL WITH SCARRING ALOPECIA

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

BACTERIAL SKIN INFECTIONS

ICD-10-L01, L73.9, L08, L02, L03, A46, L00

GENERAL PRINCIPLES OF MANAGEMENT

- Skin hygiene, advise on handwashing/ local hygiene, avoidance of oil application, adequate nutrition
- For recurrent/ severe lesions: evaluate for nasal carriage, diabetes, underlying skin conditions (scabies, atopic dermatitis)
- In immunocompromised/ diabetics: consider the need for gram negative coverage

1. IMPETIGO

CLINICAL FEATURES

Wet yellow brown crusts overlying red inflamed skin

- **Types** Non bullous (NBI; commoner), bullous (BI)
- **Affected age group** usually children
- **Common sites** Face (perinasal, perioral) > extremities; extensive with scabies/ atopic eczema

MANAGEMENT

- Topical antibiotics for 5 days
- Oral antibiotics for extensive involvement or numerous lesions, lymphadenopathy or in outbreaks to prevent transmission

2. ECTHYMA

CLINICAL FEATURES

- Black thick crust (eschar) with underlying ulcer & surrounding redness & edema

MANAGEMENT

- Treat with oral antibiotics for 7 days
- Gentle crust removal may be attempted after soakage with sterile saline; topical antibiotics over the exposed ulcer

3. FOLLICULITIS

CLINICAL FEATURES

Hair follicle centred pustule/ papule
Rule out non bacterial causes: oils, chemicals, waxing, epilation, occlusive dressing
RECURRENT FOLLICULITIS Recurrent infection or outbreak in multiple members of family may indicate nasal *Staphylococcus aureus* carriage or human-pet transmission

MANAGEMENT

- Topical antibiotics for 5 days
- Oral antibiotics for multiple lesions
- Anti-inflammatory: Paracetamol 500mg/ Ibuprofen 400mg SOS for pain relief

4. FURUNCLE

CLINICAL FEATURES Painful follicle centric nodule/ pus point/ impending bulla/ ulcer with marked surrounding erythema, edema and induration

5. CARBUNCLE

CLINICAL FEATURES Confluence of multiple closely spaced furuncles + pus draining from multiple follicular orifices
Commonly nape of neck> breasts, buttocks in uncontrolled diabetes

6. CUTANEOUS ABSCESS

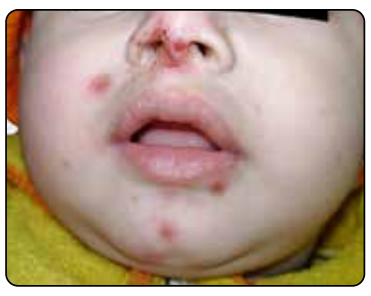
CLINICAL FEATURES Painful, warm, red fluctuant skin swelling

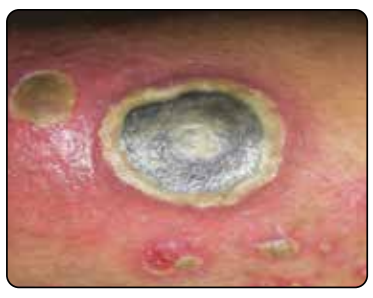
MANAGEMENT

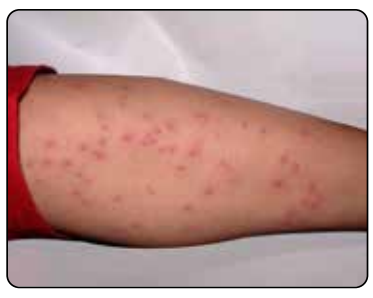
- **SMALL** → Oral antibiotics + Topical antibiotics: to reduce contamination of surrounding skin
- **LARGE** → **INCISION AND DRAINAGE**
  - Incision and drainage/ debridement
  - Ancillary antibiotics if systemic inflammatory signs, associated septic phlebitis, multiple/ large abscesses, prominent cellulitis & immunocompromised state

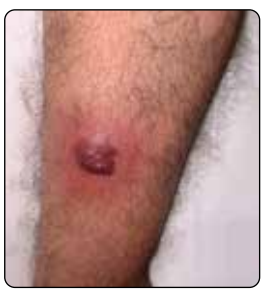
HOSPITALIZATION AND IV TREATMENT FOR SEVERELY ILL PATIENTS

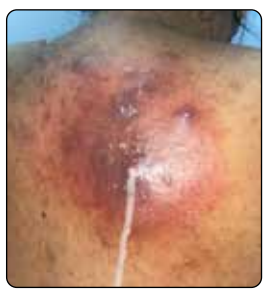
- Inj Ceftriaxone 2g BD OR Inj Amoxicillin-clavulanate 1.2gm TDS
- Alternatively - Inj Clindamycin 600-900mg TDS

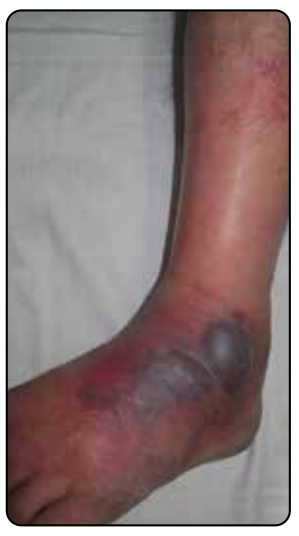

IMPETIGO


ECTHYMA


FOLLICULITIS


FURUNCLE


CARBUNCLE


CELLULITIS WITH BULLAE

7. CELLULITIS

CLINICAL FEATURES Acute spreading infection of skin involving subcutaneous tissue; Painful, red, tender, diffuse swelling mostly involving the limbs

8. ERYSIPELAS

CLINICAL FEATURES A more superficial, bright red, edematous, painful area with a clear demarcated edge; common sites: lower extremities>face. Often associated with lymphangitis and lymphadenopathy; broken skin/ portal of entry may be visualised

MANAGEMENT

CATEGORIZE DISEASE SEVERITY

MILD

- Typical cellulitis/ erysipelas with no focus of purulence

MANAGEMENT

- Outpatient treatment with oral antibiotics
- Elevation of affected area (to allow for dependent drainage); treatment of predisposing factors
- Anti-inflammatory (Ibuprofen 400mg BD, Indomethacin 75mg BD)

MODERATE

- Typical cellulitis/ erysipelas with systemic signs of infection

MANAGEMENT

Hospitalization and parenteral antibiotics:

- Inj Ceftriaxone 2g BD OR Inj Amoxicillin-clavulanate 1.2gm TDS
- Alternatively (allergic to penicillins) Inj Clindamycin 600-900mg IV TDS

SEVERE

With poor response to oral antibiotics, immunocompromised, signs of deeper infection like bullae, skin sloughing or systemic signs of infection like hypotension, or with organ dysfunction

MANAGEMENT

Empiric broad spectrum IV antibiotic coverage

- Vancomycin + Piperacillin/ tazobactum
- Surgical debridement
- Sensitivity profile based modification of antibiotics

INVESTIGATIONS

1. Swabs for gram staining and pus culture are desirable
2. Blood cultures and biopsies are not routinely recommended, but useful with co-morbid conditions (malignancy on chemotherapy, immunocompromised states, animal bites etc.)

COMPLICATIONS

Subcutaneous abscesses, blistering (often haemorrhagic), ulceration, tissue necrosis, myositis, septicemia

9. STAPHYLOCOCCAL SCALDED SKIN SYNDROME

- Superficial peeling of skin due to toxin producing strains of staphylococcus
- Starts as tender and warm erythema and progresses to localised or generalised exfoliation with fever, malaise +/- dehydration and electrolyte disturbances
- Follows a local staphylococcal infection of either skin, throat, nose, umbilicus, or gut
- Bacteria cannot be demonstrated from blisters (cultures from original site may be positive)
- Treatment: preferably in-patient
- Mild cases: oral anti-staphylococcal antibiotics; severe cases: IV antibiotic
- Consider methicillin resistant *Staphylococcus aureus* (MRSA) coverage
- Usually remits within a week in children, high mortality in adults

RED FLAGS

- Temperature >100.4 ˚F, WBC>12,000 or < 4000/µL, heart rate > 90 bpm, or respiratory rate > 24/min may indicate sepsis
- Severe pain followed by deceptive absence may indicate necrotising fasciitis
- Dark discoloration of overlying skin

PHARMACOTHERAPY

ANTIBIOTICS FOR SKIN AND SOFT TISSUE INFECTIONS

PREFER β-LACTAMS

- Amoxycillin 500mg TDS (25-50 mg/kg/day)
- Cloxacillin 500mg QID (50mg/kg/day)
- Cephalexin 250-500mg QID (25–50 mg/kg/day)
- Amoxicillin clavulanate combination: 625mg TDS

IF ALLERGIC TO PENICILLINS

- Erythromycin 500mg QID (40 mg/kg/day)
- Clindamycin: 300-600mg BD/TID (20mg/kg/day)

FOR NASAL CARRIERS

2% Mupirocin ointment for 5 days a month

TOPICAL ANTIBIOTICS

- Mupirocin cream 2%
- Fusidic acid cream 2%
- Framycetin cream 1%

IN ALL PATIENTS SUSPECT THE NEED FOR MRSA COVERAGE IF:

- Poor immune status
- Severe systemic signs
- MRSA infection elsewhere
- If no improvement in 48-72 hours
- Penetrating trauma

ORAL ANTIBIOTICS FOR SUSPECTED OR CONFIRMED MRSA INFECTION

- Cotrimoxazole 2 DS tablets BD
- Doxycycline 100 mg BD
- Minocycine 200 mg BD
- Linezolid 600 mg BD

IV ANTIBIOTICS FOR MRSA

- Vancomycin: 15 mg/kg BD
- Linezolid: 600 mg BD
- Clindamycin: 600-900 mg TDS

ANTIBIOTIC SUSCEPTIBILITY PATTERNS MAY VARY WITH REGION AND TIME

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

CUTANEOUS ADVERSE DRUG REACTIONS- PART A

ICD-10-L27.0

Cutaneous adverse drug reactions (cADR) are undesirable clinical manifestations to a drug, which include predictable or unanticipated side effects, with or without systemic involvement

COMMON TYPES OF cADR

NON- SEVERE cADR

- Fixed drug eruption (FDE)
- Maculopapular/ Exanthematous reactions

SEVERE cADR

- Drug induced hypersensitivity syndrome/ DRESS*
- Acute generalized exanthematous pustulosis
- Angioedema/ Anaphylaxis*
- Erythema multiforme/ Stevens Johnson syndrome/ Toxic epidermal necrolysis*

***Refer to separate STW on Urticaria/ Angioedema, and cADR Part-B for DRESS/ Stevens Johnson syndrome/ Toxic epidermal necrolysis**

GENERAL PRINCIPLES

- **Common presentation**: Sudden onset of an itchy rash that is symmetrically distributed and spreads rapidly. May have had a previous similar allergic reaction.
- **Withdraw:** The offending drug(s) immediately, except life saving drugs (if they are not the suspected drugs)
- Take necessary measures to **prevent similar events** (record on patient's medical chart, educate, provide allergy card etc.)
- **Recognize danger signs**
  - » Mucosal lesions, purpuric lesions, skin tenderness, bullous lesions (peeling/ sloughing of skin)
  - » Systemic symptoms: High grade fever, jaundice, decreased urine output
- **Action required:** Prompt and urgent care at a specialised centre. Apart from maintenance of vitals, withdrawal of all drugs, initiation of oral or intravenous corticosteroids, care of the eye, evaluation of secondary infection/ sepsis are important

HISTORY ELICITATION

- History of prior adverse drug reaction
- Patients on polypharmacy: list all recently introduced drugs and/ or dosage increments. However, all drugs should be kept in suspect list
- Concomitant viral infection or illnesses affecting drug metabolism or excretion (eg. chronic kidney disease)

TIMELINES FOR DRUG REACTIONS AND SOME TYPICAL EXAMPLES

- **5-15 minutes:** Anaphylaxis, urticaria, angioedema
- **Few hours:** Reactivation of fixed drug eruption
- **Few hours- 2 weeks:** Maculopapular exanthem, erythema multiforme, Stevens –Johnson syndrome, toxic epidermal necrolysis, first episode of FDE
- **4- 12 weeks:** DRESS syndrome, Dapsone syndrome, anticonvulsant induced hypersensitivity syndrome

1) FDE

- **Distinctive drug eruption:** usually recur at the same site on drug re-exposure
- **Acute FDE:** dusky red-violaceous plaques with or without vesiculation or bullae
- **Common sites:** lip, genitalia, proximal extremities, low back, sacrum
- **Local symptoms:** pruritus, burning, and pain; solitary or numerous (latter is difficult to differentiate from toxic epidermal necrolysis). Resolve with persistent hyperpigmentation
- **Clinical variants:** bullous, generalised, pure mucosal
- **Common drugs that cause FDE:** Sulfonamides, tetracyclines, quinolones, NSAIDS, dapsone, antimalarials, barbiturates, nitroimidazoles

REFER TO HIGHER CENTER IF

- There are atypical symptoms
- Uncertain diagnosis
- Severe reaction (multiple lesions, bullae, severe mucosal lesions, systemic symptoms)

MANAGEMENT

PRIMARY HEALTH CENTRE

- Withdraw the drug
- General management: Bullous/ moist/ oozy lesions- normal saline compresses
- Topical steroid: Betamethasone valerate cream BD for cutaneous lesions
- Antihistamines –Tab Pheniramine maleate 25 mg BD/TID for itching
- Review patient in 1 week

SECONDARY LEVEL CARE

- Continue treatment as described at primary care level
- If severe: add short course of oral steroids: Prednisolone 0.5 mg-1 mg/kg for 3-5 days

TERTIARY LEVEL

- Admit the patient if the episode is generalized and severe
- Histopathology in doubtful cases
- If the oral mucositis is severe, consider parenteral steroids
- Provocation tests may be done after resolution of symptoms (usually after 1-6 months) by an oral challenge with each suspected individual drug consecutively

2) MACULOPAPULAR/EXANTHEMATOUS REACTIONS

- Abrupt onset, erythematous maculopapular eruption
- Typically starts on the trunk, spreads symmetrically to extremities. Dependent areas may have purpuric lesions
- Usually accompanied by mild systemic symptoms- pruritus, low grade fever, mild eosinophilia
- All drugs taken in the last 4 weeks are suspects. May manifest within 48 hours if the patient has taken the drug previously
- Commonly observed with co-trimoxazole, cephalosporins, anti-tubercular drugs, aminopenicillins, quinolones, dapsone, NSAIDS, anticonvulsants, nevirapine, abacavir, allopurinol, leflunomide
- Differential diagnosis: Viral exanthem, Rickettsial rash, HIV, Kawasaki disease (in children)
- Fever and prodromal symptoms (coryza, malaise) occur before the development of rash in most viral exanthems and the drug history is usually negative prior to it

RED FLAG SIGNS

- Mucosal involvement
- Purpuric lesions
- Bullous lesions
- Skin tenderness
- Facial/ acral edema
- Erythroderma
- Systemic symptoms - High grade fever, hepatitis, renal involvement, significant eosinophilia

MANAGEMENT

PRIMARY CARE

- Withdraw the suspect drug(s)
- Pheniramine maleate 25 mg TID
- Calamine lotion
- Refer to higher center if symptoms persist or red flag signs present

SECONDARY CARE

- Confirm the diagnosis by history and clinical findings
- Admit if red flag signs are present
- Laboratory tests: CBC (Eosinophilia supports the diagnosis), LFT, serum creatinine, urine M/E
- Treatment: in severe cases, prednisolone 0.5-1 mg/ kg/ day x 5-7 days (after ruling out infection)

TERTIARY CARE

- Admit if red flag signs are present
- Confirm diagnosis of drug rash
- Additional lab tests if required: ANA, HIV, skin biopsy
- Consider DRESS if rash is progressing or significant organ involvement is evident

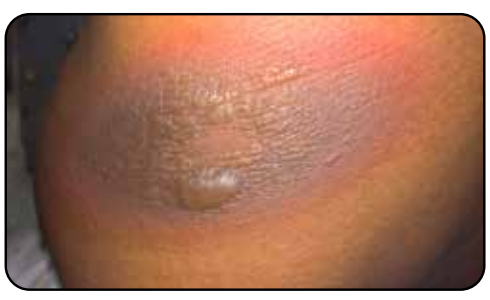
DRUG PROVOCATION TEST

In the absence of any reliable *in vitro* test in clinical setting, oral drug challenge is the only way to detect the responsible drug

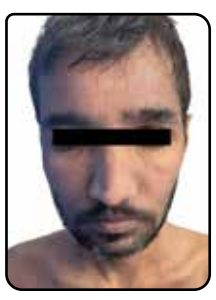
Usually undertaken when drug avoidance is impractical, especially in case of polypharmacy or life saving medicines (e.g. antituberculous therapy)

- Take a written consent prior to challenge
- Contraindicated in active illness or pregnancy
- Assess the risk benefit ratio
- Caution: patients on antihistamines, oral steroids and tricyclic antidepressants may have a modified response to the challenge
- A negative test only indicates that the patient is not allergic to the drug at the time of challenge
- The dose of drug for challenge depends on the severity of the previous reaction and the pharmacokinetic profile
- Drug provocation should always be done
  - After admission/ under observation except in cases with FDE
  - Usually in the daytime so that the faintest erythema is appreciated
  - It should be treated immediately and aggressively with an appropriate dose of systemic corticosteroid which may be required for only 1-2 days
  - Drug provocation in cases with DRESS has to be avoided or if provoked, a prolonged retreatment is required
  - In case of SJS-TEN drug provocation should be done only if the drug cannot be avoided. Provocation is preferred with a chemically unrelated molecule
- Intradermal tests can be done in IgE mediated reactions
- Patch test has a low sensitivty and should not be relied upon in severe cADR

FDE



BULLOUS FDE



MACULOPAPULAR RASH

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

CUTANEOUS ADVERSE DRUG REACTIONS- PART B

ICD-10-L27.0

Cutaneous adverse drug reactions (cADR) are undesirable clinical manifestations to a drug, which include predictable or unanticipated side effects, with or without systemic involvement.

COMMON TYPES OF cADR

NON- SEVERE cADR

- Fixed drug eruption (FDE)*
- Maculopapular/ Exanthematous reactions*

SEVERE cADR

- Drug induced hypersensitivity syndrome/ DRESS
- Acute generalized exanthematous pustulosis
- Angioedema/ Anaphylaxis*
- Erythema multiforme/ Stevens Johnson syndrome/ Toxic epidermal necrolysis

***Refer to separate STW on Urticaria/ Angioedema, and cADR Part-A for FDE/ Maculopapular/ Exanthematous reactions**

DRUG RASH WITH EOSINOPHILIA AND SYSTEMIC SYMPTOMS (DRESS) SYNDROME

- Potentially life threatening systemic adverse reaction
- Onset 2-6 weeks after start of drug intake (up to 12 weeks)
- The rash may continue to progress weeks to months after discontinuation of the drug
- Commonly observed with anticonvulsants, dapsone, allopurinol, abacavir, leflunomide, minocycline

When to suspect DRESS syndrome

- Exposure to a high risk drug
- Clinical presentation: fever (>38°C-40°C), rash, leukocytosis with eosinophilia, lymphadenopathy, hepato-renal dysfunction
- Features of the rash: involves >50% body surface area, facial edema, desquamation or dusky erythema
- Occasionally pustules and targetoid lesions may be seen

MANAGEMENT

PRIMARY CARE

- Withdraw drugs
- Assess vitals, stabilise the patient and refer to higher center
- Symptomatic relief: Antihistamines, emollients
- Do not add any unnecessary new medications

SECONDARY CARE

- Same as primary care
- CBC, absolute eosinophil count (optional), LFT, renal function- monitored at least weekly
- CXR, ECG and ECHO to rule out myocarditis
- **Treatment**
- If no evidence of major organ involvement
- First line- Systemic steroids- Prednisolone 0.5-2 mg/kg, slow taper after symptoms and signs resolve (over months if needed)
- Antihistamines-Pheniramine 25 mg TID, bland emollients like liquid paraffin
- If there is severe organ involvement- liver, renal or cardiac refer to tertiary center for multidisciplinary intensive care

TERTIARY CARE

- Same as primary/ secondary care
- Second line - Cyclosporine (if the renal function is normal)
- Management will require a multidisciplinary team approach, depending on the organ(s) involved
- In the presence of severe liver failure, hemophagocytic syndrome, gastrointestinal bleeding, multiorgan failure, the patient may require intensive care treatment

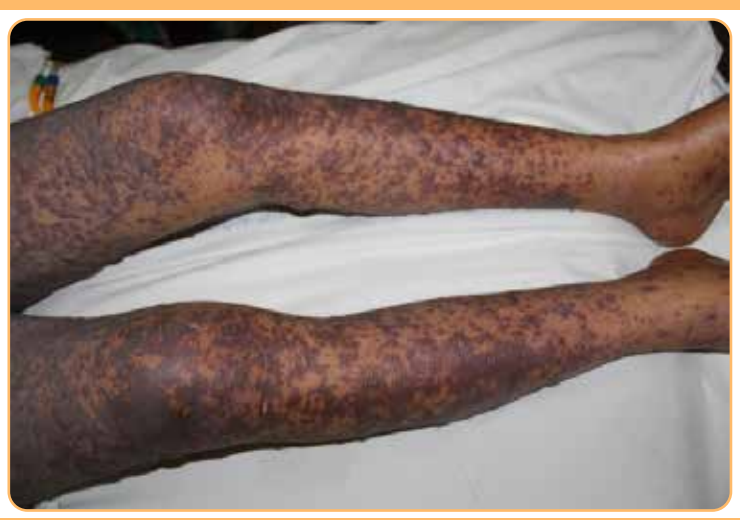
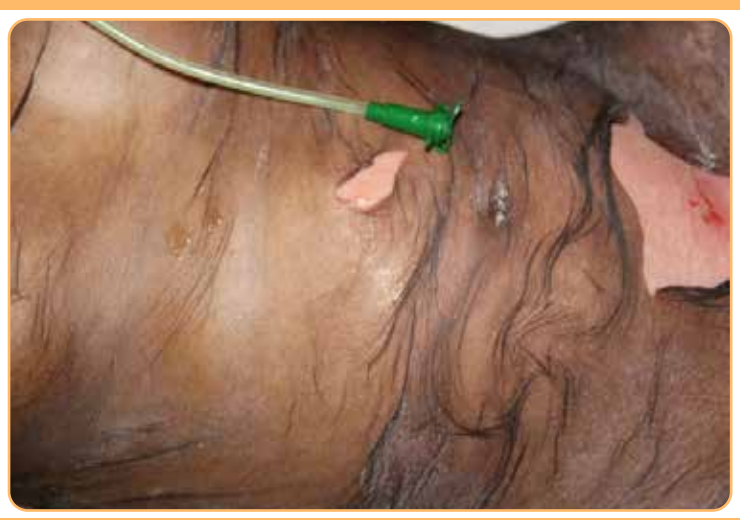
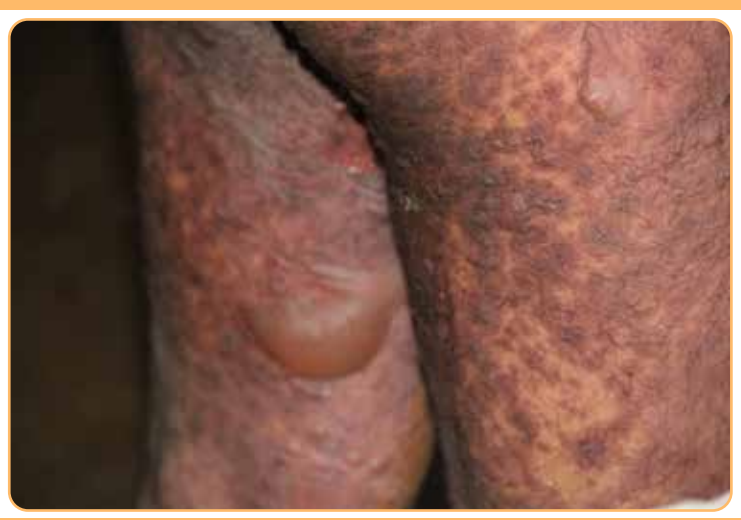
STEVENS JOHNSON SYNDROME (SJS) AND TOXIC EPIDERMAL NECROLYSIS (TEN)

- Acute, severe mucocutaneous reactions associated with epidermal detachment and/ or tenderness, and widespread erythematous lesions with central dusky erythema or vesiculation often associated with high grade fever
- Usually observed with aromatic anticonvulsants, allopurinol, nevirapine, abacavir, NSAIDs, co-trimoxazole
- The classification of SJS, TEN is based on the extent of detachment
- D/d-Staphylococcal scalded skin syndrome, pemphigus

TYPE	DETACHMENT (% BSA)	WIDESPREAD ATYPICAL TARGETS *OR ERYTHEMATOUS MACULES
SJS	<10%	Present
SJS-TEN	10-30%	Present
TEN	≥30%	Present
TEN without SPOTS	≥10%	Absent

*Atypical targets (Red macules with purpuric vesiculations/ crusted centers)

TOXIC EPIDERMAL NECROLYSIS

PROGNOSIS

SCORTEN PROGNOSTIC FACTORS	POINTS
Age > 40 years	1
Tachycardia > 120 bpm	1
Neoplasia	1
Initial detachment > 10%	1
Serum urea > 60 mg/dL	1
Serum bicarbonate < 20mmol/L	1
Blood glucose > 252mg/ dL	1

Assess prognosis with a SCORTEN score done within 24 hours of presentation and repeated 3 days later

SCORTEN SCORE	ESTIMATED MORTALITY %
0-1	3
2	12
3	35
4	58
≥ 5	> 90

INVESTIGATIONS

- Chest X- ray
- ECG
- **Laboratory tests-** CBC, LFT, KFT, electrolytes, magnesium, phosphate, lactate
- Blood gas analysis
- **Microbiology-** Pus culture from infected areas and blood culture
- **Skin biopsy-** Not usually required unless the diagnosis is in doubt
- **Optional-** In TEN, biopsy and direct immunofluorescence is useful to rule out SLE and pemphigus

MANAGEMENT

PRIMARY CARE

- See primary care for drug rash with eosinophilia and systemic symptoms (DRESS)

SECONDARY CARE

- Assess vitals, stabilise the patient, nutrition and fluid replacement as appropriate
- Local care for skin and mucosae
- Skin care- dilute potassium permanganate baths/ saline compresses/ Chlorhexidine baths
  - Detached epidermis can be left in situ and covered with non-adherent dressing (sterile vaseline gauze)
  - Topical antibiotics (Mupirocin or Fucidin) on sloughed off areas
  - Oral care- Rinse mouth with Chlorhexidine 2-3 times, soft paraffin on lips as needed, steroid mouth washes
  - Eye care- refer to ophthalmologist
- Antibiotics-broad spectrum antibiotics (in case of sepsis or secondary infection) to cover staph, strep and pseudomonas. Change according to culture results and avoid suspected drug class
- Adjuvant systemic therapy (ideally within the first 24-72 hours of onset)
  - The role of systemic steroids is limited to early phase of SJS/TEN. High doses for longer periods can increase the risk of sepsis and metabolic complications. However judicious use of Prednisolone 1-2 mg/kg or equivalent dose of intravenous Dexamethasone for 3-7 days may be of benefit
  - Cyclosporine in a dose of 3-5 mg/kg for a period of 10-14 days (with monitoring)
- If skin detachment >10% refer to a center with an ICU familiar with management of skin failure
- If < 10% follow the treatment as described

TERTIARY CARE

- Admit in specialized units within dermatology wards if vitals are stable and follow secondary care treatment
- Barrier nursing
- If patient has SIRS/ sepsis or in shock, admit to ICU
- Long term follow up will be required to address complications: ophthalmic, skin and respiratory tract involvement

☛ ANY DRUG BELONGING TO ANY MEDICINAL SYSTEM CAN CAUSE cADR

July 2022

सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DERMATOPHYTOSES

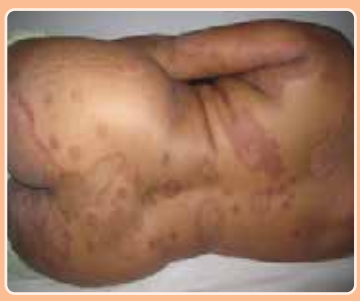
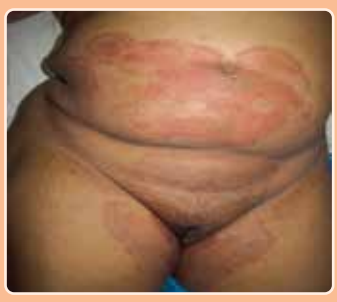
ICD-10-B35.9

DEFINITION
- Superficial fungal infection caused by dermatophytes
- Affects keratin bearing structures i.e the skin, nails and hair

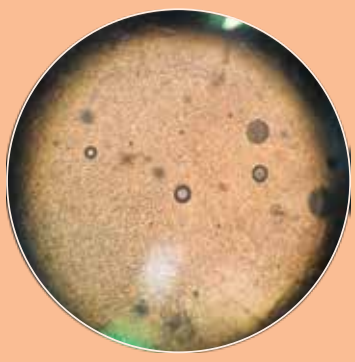
ADVISE ALL PATIENTS TO
- Take treatment regularly as advised and never stop without consultation after obtaining some relief to prevent relapse
- Do not self medicate. This can make the infection difficult to treat
- Do not ever use any steroid containing OTC creams from chemists/ on own

TINEA CORPORIS/CRURIS

EXAMINATION
- Itchy scaly lesion on the skin
- Typically annular (ring like) lesions with variable scaling (flaking) and erythema (redness)
- Always examine: groins, buttocks, nails, palms and soles
- Ask for lesions in other family members

DIAGNOSIS
- For doubtful cases: KOH microscopy of scales shows the typical septate hyphae
- Culture and other advanced methods are not required in routine practice



GENERAL MEASURES

ADVISE THE FOLLOWING DOS AND DONTS TO THE PATIENT

DOS	DON'TS
Take daily bath with regular bathing soap and normal temperature tap water	Do not share towels and clothes
Dry skin well after bath	Do not re-wear clothes before washing
Wash clothes separately in hot water and dry inside out in the sun	

TREATMENT

TOPICAL ANTIFUNGAL
- For limited involvement in cases of Tinea corporis and cruris
- USE
  - Clotrimazole 1%/2% cream BD
  - Miconazole 2% cream BD
  - Terbinafine 1% cream BD
  - Ketoconazole 2% cream BD
- For extensive disease,it is not feasible to use antifungal creams alone; advise oral antifungals

OR

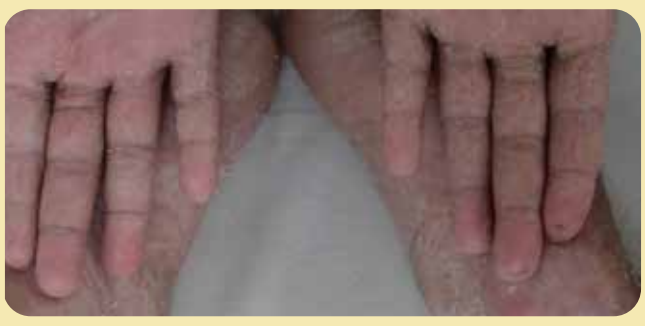
Advise anti fungal creams over most bothersome lesions only (in addition to systemic drugs)

TREATMENT IN CHILDREN
- Always look for infection in the parents/caregivers
- Prefer topical antifungals for younger children
- Oral antifungals (weight based dosing)
  - Terbinafine : 3-6mg/kg/day or
    <20kg : 62.5mg
    20-40kg : 125mg
    >40kg : 250mg
  - Fluconazole : 6mg/kg/day
  - Griseofulvin : 10-20mg/kg/day

REFER TO A SPECIALIST/ TERTIARY CENTRE IF
- Very extensive disease
- No/ minimal improvement with regular treatment after 4 weeks
- Cure not achieved despite prolonged treatment and good compliance
- Recurrent infection
- Co-morbid conditions present: Pregnancy/lactation/hepatic disease/renal disease or cardiac disease
- History of prolonged topical/ oral/parenteral/ steroid use
- **Remember:** The lesions are often modified by self application of topical steroids/ combination products
- The "ring" may be incomplete
- Scaling may be minimal
- Pigmentation may be prominent
- Do not use any steroid containing cream

TINEA PEDIS/ MANUUM

EXAMINATION
- Dermatophytic infection of palms (Tinea manuum)and soles (Tinea pedis)
- Generally unilateral involvement; toe webs commonly involved
- Scaling may present along the creases of palms/soles only or may be diffuse; occasionally dried vesicles are seen
- A scaly (+/- erythema) margin may be seen at the level of wrist (T. manuum) and at insteps or out steps of feet (T.pedis)
- Coexistent involvement of nails is common



GENERAL MEASURES
- Prolonged treatment is required;
- Treatment with adequate dosage for recommended duration should be adhered to
- **Advise patient to:**
  - Avoid walking barefoot in public places esp swimming pools/ community bathing areas
  - Wash feet with bathing soap and normal temperature tap water
  - Wipe and dry well with a towel
  - Dry toe clefts before wearing shoes/socks
  - Wear cotton socks
  - Wash worn socks separately in hot water

TREATMENT

SYSTEMIC TREATMENT
- ALWAYS TREAT TILL ALL LESIONS HAVE COMPLETELY RESOLVED
- This may take between 3-8 weeks or more depending on the extent of infection and previous treatments used; longer when palms/soles also involved or history of prolonged steroid use
- Follow up regularly every 2 weekly
- Oral antifungals for adults:
  - Tab Terbinafine 250mg BD
  - Tab Griseofulvin 500mg BD
  - Tab Fluconazole 50-150 mg OD
- **For relief of pruritus:**
  Tab Cetirizine 10mg HS or Tab CPM 4mg TDS

TREATMENT IN PREGNANCY
- Preferably use only topical antifungals
- Maximum safety data for use of
  - Miconazole cream
  - Clotrimazole cream
- Limited safety data in humans to recommend use of any systemic antifungal during pregnancy esp first trimester
- If required, fluconazole may be preferred

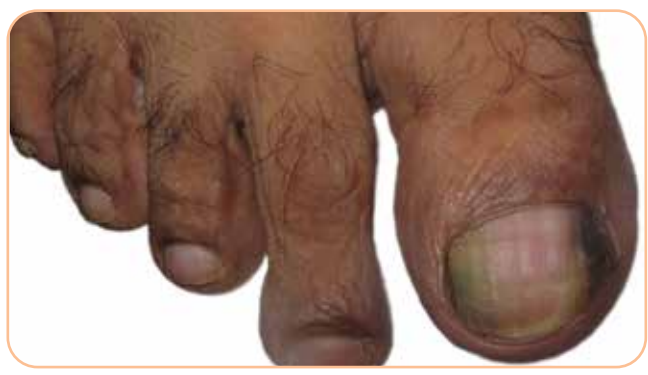
MANAGEMENT AT TERTIARY CARE
- Individualise treatment
- Treat till complete clinical and mycological cure (KOH negativity)
- Send for culture, speciation and antifungal susceptibility testing, if available

TOPICAL TREATMENT (OVER LIMITED AREAS ONLY)
- In addition to previously mentioned:
- Luliconazole cream topically OD
- Sertaconazole cream topically BD

SYSTEMIC TREATMENT
- Cap Itraconazole 100-200 mg/day
- Tab Terbinafine 250mg BD

ONYCHOMYCOSIS

EXAMINATION
- Discoloration of nail with build up of keratinous debris under the nail plate
- Generally affects isolated nails asymmetrically
- The whole nail may crumble in advanced cases
- Look for simultaneous involvement of palms/soles
- Ask for diabetes; signs of peripheral vascular disease

GENERAL MEASURES
- **ADVISE PATIENTS TO:**
  - Keep affected nails trimmed as they are fragile and trauma prone
  - Keep separate nail clippers
  - Avoid any cosmetic nail procedures, pedicure/manicure
- Inform the patient that it might take several months after treatment completion for a completely normal looking nail to appear and in severe cases, a cosmetically acceptable result may not be achieved

It is important to treat the nail infection as it is a potential focus for spread of the fungus to other body sites

TREATMENT

TOPICALS
- Limited disease with less than 50% nail surface involvement/ not going back till the lunula

OR
- Patients with contraindication for oral antifungals(eg. renal disease etc
- Amorolfine 5% nail lacquer application once a week or Ciclopirox 8% nail lacquer thrice a week

SYSTEMIC ANTIFUNGALS
- Tab Terbinafine 250mg BD (6 weeks for fingernails and 12 weeks for toenails)
- Cap Itraconazole 100 mg BD for 12 weeks

OR

200mg BD/day for seven days a month (2 such pulses for fingernails and 3 for toe nails)

ENSURE TREATMENT FOR ADEQUATE DURATION TO PREVENT RELAPSE

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

ECZEMA/ DERMATITIS

ICD-10-L20

ACUTE
Red, edematous plaques with small, grouped vesicles

SUBACUTE
Erythematous plaques with scaling or crusting

CHRONIC
Lesions may have scaling or lichenification

MAJOR FORMS OF ECZEMA

EXOGENOUS ECZEMAS

Those with a known exogenous trigger, management of exogenous eczemas is to remove the cause if possible, along with pharmacological intervention

- Allergic contact eczema
- Dermatophytide
- Eczematous polymorphic light eruption
- Infective eczema
- Irritant contact eczema
- Photoallergic contact eczema
- Post-traumatic eczema

ENDOGENOUS ECZEMAS

Without a known exogenous trigger, more often requires pharmacological intervention

- Asteatotic eczema
- Atopic eczema
- Chronic superficial scaly eczema
- Eyelid eczema
- Hand eczema
- Juvenile plantar dermatosis
- Nummular eczema
- Pityriasis alba
- Eczema associated with systemic disease
- Seborrhoeic eczema
- Venous eczema

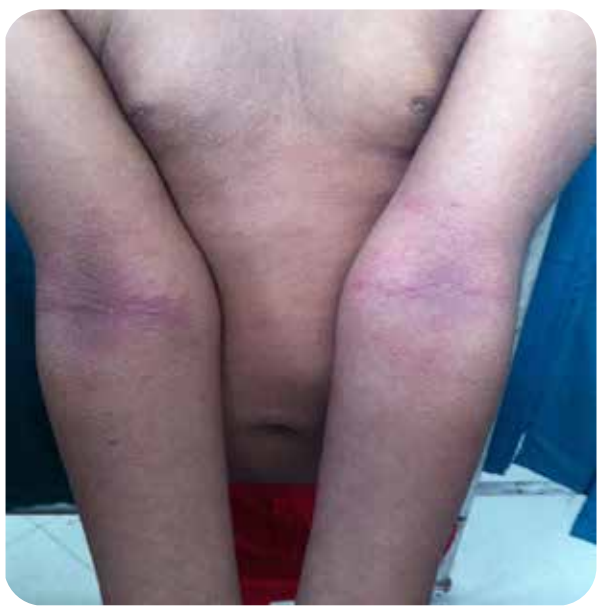
HISTORY

- Associated history of atopy, allergic rhinitis or asthma in patient and family members
- Age of onset is usually early(less than 5 years) in atopic dermatitis
- Site of onset- predominant flexural involvement in atopic dermatitis
- Possible allergens implicated
- High risk occupations with increased exposure to allergens or irritants such as agricultural work, masons, hair-dressers etc.
- Associated photosensitivity, especially in parthenium dermatitis
- Change in severity with season; summer exacerbation in parthenium dermatitis
- Winter exacerbation in atopic dermatitis

EXAMINATION

ATOPIC DERMATITIS

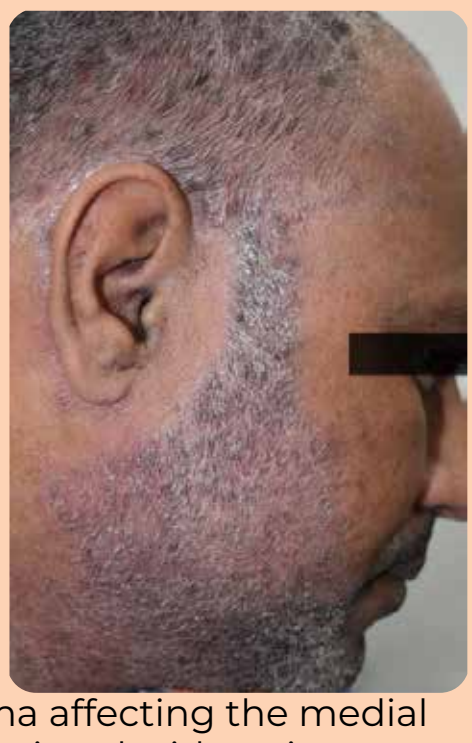
- **Infantile:** Most commonly on the face, followed by involvement of extensors of the knees and elbows
- **Childhood/ Adult phase:** Pattern changes to flexural involvement (cubital and popliteal fossa)



ATOPIC DERMATITIS

ENDOGENOUS ECZEMA

- **Nummular dermatitis/eczematous:** Circular or oval, commonly affecting neck, hands and feet
- **Seborrhoeic dermatitis:** Involvement of the scalp and other seborrhoeic areas and skin folds; ranging from mild flaking to thicker, yellow, greasy scales and crusts



- **Venous eczema:** Eczema affecting the medial aspect of ankles associated with varicose veins/ venous incompetence

CONTACT DERMATITIS

- It can be irritant or allergic
- Eczema pattern corresponds to the pattern of allergen/ irritant exposure
- It can be localized or widespread

EXAMPLE:
Parthenium dermatitis
contact dermatitis to nickel
contact dermatitis to hair dye

DIAGNOSIS

- Most cases of eczema can be diagnosed clinically
- Secondary infection is common, may cause eczema to flare and can be confirmed by taking swabs for culture and sensitivity
- Patch tests are designed to detect allergens in cases of suspected allergic contact dermatitis
- Potassium hydroxide (KOH) preparation or biopsy when dermatophyte infection or other diagnoses are suspected

DIFFERENTIAL DIAGNOSIS

- Tinea corporis
- Psoriasis
- Cutaneous t-cell lymphoma (CTCL)

TREATMENT

GENERAL PRINCIPLES

- Avoidance of allergens and irritant materials
- Daily bath with mild soap, keep nails short, avoid scratching
- Moisturizer are cornerstone in the management of eczema; to be applied immediately after bathing while the skin is still damp and apply multiple times during the day
- Antihistamines for (eg. levocetirizine) for control of pruritus
- Topical corticosteroids (TCS) mild – Over face/ flexures genitals. Mid potent TCS over palms, soles and lichenified lesions
- Topical calcineurin inhibitors (TCIs)- Face/ flexures genitals and/or as maintenance treatment
- If secondary infection (pain, pus discharge, yellow crust)- Treat with topical/ oral antibiotic as needed

SPECIFIC MANAGEMENT

Primary/Secondary Level

- Treatment of active eczema: Daily use of TCS of appropriate strength until completely clear ± antihistamine (for sedative/antipruritic effects) ± oral antibiotic course (if superinfection) - (refer to STW on rational use of topical therapy)
- Maintenance treatment for area where lesions are more resistant to treatment or there is propensity for relapse, like flexural skin- Intermittent use of mid-potency TCS (e.g. 2-3 days/week) and/or TCI (e.g. 3–5 days/week)

Tertiary Level

- Severe disease in addition to above may require phototherapy or systemic treatment (Short course of oral corticosteroids, cyclosporine, azathioprine etc.)

☛ AVOIDANCE OF PROVOKING AGENTS, MOISTURIZERS AND EARLY TREATMENT ARE THE AIM OF ECZEMA MANAGEMENT

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

IMMUNOBULLOUS DERMATOSES

ICD-10-L13.8

WHEN TO SUSPECT?

- Appearance of fluid-filled, itchy or painful blisters (either flaccid or tense) on skin, over a normal or erythematous base
- Appearance of raw, erythematous erosions ± crusting on skin
- Appearance of erosions/ blisters inside oral cavity, eyes, nose and genitals

AUTOIMMUNE BLISTERING DISEASES

- Pemphigus vulgaris/ variants
- Pemphigus foliaceus/ variants
- Bullous pemphigoid
- Pemphigoid gestationis
- Mucous membrane pemphigoid
- Linear IgA bullous diseases/ chronic bullous disease of childhood
- Dermatitis herpetiformis
- Epidermolysis bullosa acquisita
- Bullous systemic lupus erythematosus

ADDITIONAL INFORMATION

- Age at onset and duration of blistering
- History of any recent drug intake
- History of prior varicella/ chicken pox
- History of similar illness in family
- History of itching, pain, burning
- Predominant sites affected
- Associated photosensitivity

EXAMINATION

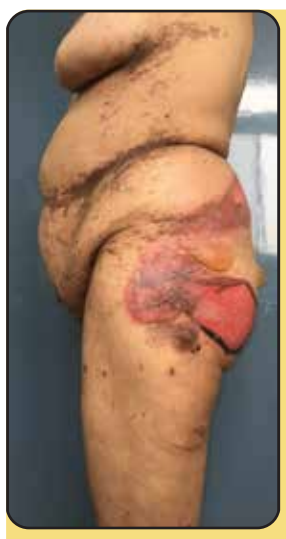
- Are the blisters flaccid or tense?
- Are the erosions crusted?
- Do the blisters contain clear or hemorrhagic fluid?
- Are the blisters umbilicated?
- Is the base of the blisters erythematous/ urticarial?
- Are the blisters healing with or without scarring?
- Are they healing leaving behind hyper/hypopigmentation?
- What is the color of the crust?
- Are mucosae involved?

DIAGNOSIS OF AUTOIMMUNE BULLOUS DISEASES

- **Likely pemphigus group of autoimmune bullous diseases**
  - Flaccid blisters/ erosions ± crusting on skin ± mucosae
  - Usually seen in adults; can rarely affect children
- **Likely sub-epidermal autoimmune bullous diseases**
  - Tense, small to large blisters, containing clear or hemorrhagic fluid, on an itchy erythematous base, commonly healing with hypopigmentation ± scarring
  - Seen in children, adults and elderly (most common is bullous pemphigoid)

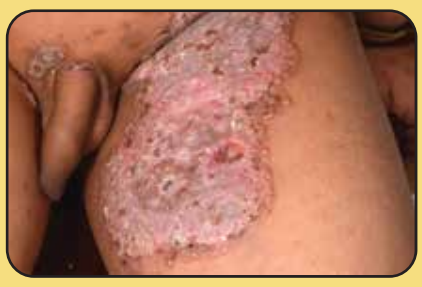
- Get a Tzanck smear
- Get a biopsy for histopathology from margin of a lesion
- Get a peri-lesional biopsy for direct immunofluorescence, if facility is available

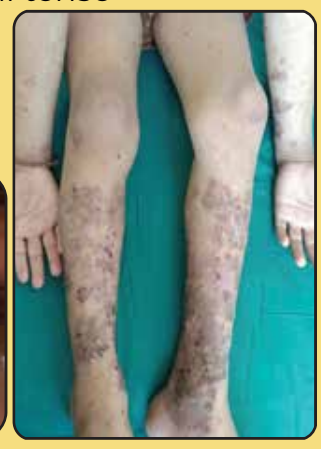
PEMPHIGUS



BULLOUS PEMPHIGOID

- Child < 5 years
- Erosions with peripheral tense blisters
- Urticarial base
- Face/ peri-genital involvement





CHRONIC BULLOUS DISEASE OF CHILDHOOD

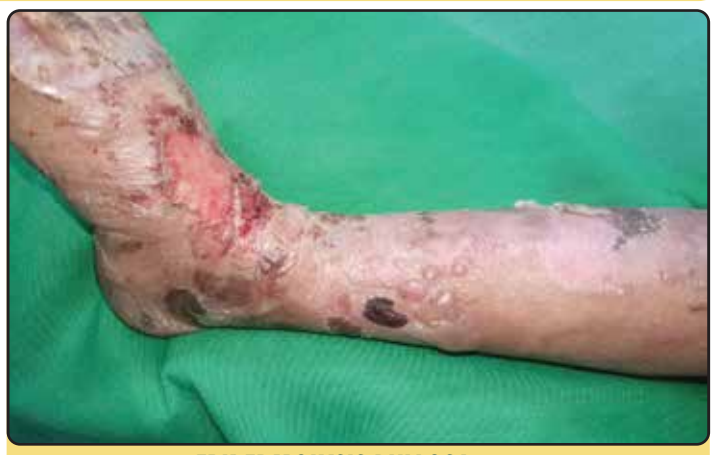
RED FLAG SIGNS

- Fever ± chills and rigors
- Hypotension (indicating hypovolemia due to fluid loss or sepsis)
- Altered sensorium (indicating dyselectrolytemia or sepsis)

DIFFERENTIAL DIAGNOSES

- **Bullous Impetigo, Varicella, Stevens Johnson Syndrome/TEN***
- **Epidermolysis bullosa,** a hereditary blistering disease with onset in neonatal period or infancy and predominantly affecting pressure sites; presence of scarring on limbs, acral areas, trunk and abnormality of the teeth or nails
- Consider **Congenital syphilis** in a neonate- get VDRL for mother and child

*Refer to STW on Bacterial Infections; Varicella and Herpes Zoster and cADR Part B



EPIDERMOLYSIS BULLOSA

GENERAL MEASURES

- Monitor temperature, respiratory rate, pulse rate
- Administer antibiotics if lesions are infected and foul smelling
- Fluid-electrolytes balance
- Get hemogram, basic biochemistry including renal and hepatic function tests, blood sugar
- Get pus culture and if sepsis is suspected, also blood culture
- Supportive management
  - Clean non-adherent dressings
  - Maintain hygiene with normal soap bath
  - Topical antibiotics
  - Aspiration of large blisters with 18G needle if needed
  - Avoid deroofing the blisters as the roof of the blister acts as a natural dressing

- Maintain oral hygiene (if involved)
  - Chlorhexidine mouth wash
  - Brush teeth with pediatric brush with small head and soft bristles
  - Avoiding eroding gingival margin
- Maintain skin hygiene (if involved)
  - Diluted potassium permanganate bath/ potassium permanganate compresses on localized lesions/ thick crusted lesions
  - Emollients/ coconut oil application
  - 2% savlon scalp wash
- Encourage oral intake (fluids and calories); consider other comorbidities
  - Liquid/ semisolid diet for oral erosions

PEMPHIGUS (START TREATMENT ONLY IF FACILITY FOR MONITORING AND MANAGEMENT OF COMPLICATIONS OF TREATMENT IS AVAILABLE)

- **Mucosal/ mucocutaneous with body surface area <5%**
  - Oral Prednisolone (0.5 mg/kg/day), with one or more of the following
    - Azathioprine (2-3 mg/kg/day)
    - Mycophenolate mofetil (35mg/kg/day, start at a lower dose)
    - Cyclophosphamide (1-2 mg/kg/day)
    - Methotrexate (0.3mg/kg/week)
    - Dapsone (100-150 mg/day)
- **Mucocutaneous with body surface area >5%**
  - At primary level-Stabilize patient, initiate general measures and refer to a specialist/ tertiary level
  - To be managed at a tertiary level
    - Dexamethasone- Cyclophosphamide pulse therapy
    - Rituximab

BULLOUS PEMPHIGOID (START TREATMENT ONLY IF FACILITY FOR MONITORING AND MANAGEMENT OF COMPLICATIONS OF TREATMENT IS AVAILABLE)

- **Limited (<10% body surface area)**
- Start treatment and refer to tertiary level
- Topical Clobetasol propionate (upto 30 gm/day)
- Oral Prednisolone (0.5 mg/kg/day) ±
  - Dapsone (100-150 mg/day)
  - Doxycycline (100- 200 mg/day)
  - Niacinamide (500 mg thrice/day)
  - Azathioprine (2-3 mg/kg/day, start at a lower dose)
  - Mycophenolate mofetil (35mg/kg/day, start at a lower dose)
  - Methotrexate (0.3mg/kg/week)
- **Extensive (>10% body surface area)**
- To be managed at a tertiary level
- Oral Prednisolone (0.75- 1 mg/kg/day) ±
  - Dapsone
  - Doxycycline
  - Niacinamide
  - Azathioprine
  - Mycophenolate mofetil
  - Methotrexate

CORRECT DIAGNOSIS; PREVENTION/ TREATMENT OF SEPSIS; AND REGULARITY OF TREATMENT BRINGS BEST RESULTS

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

PSORIASIS

ICD-10-L40

*GENERAL PRINCIPLES OF MANAGEMENT

- Establish the diagnosis
  - Usually clinical and by bed side tests (Auspitz sign, Grattage test)
  - If in doubt, refer to higher centre for evaluation & skin biopsy
- Assess for psoriatic arthritis and metabolic syndrome (obesity, dyslipidemia, diabetes, hypertension)
- Counsel about variable natural course of disease and expected treatment outcome, and lifestyle modifications (including weight reduction, avoidance of smoking and alcohol)
- Assess for requirement of systemic treatment, in addition to topical treatment
- Advise regular use of emollients/ moisturizers. Antihistamines if pruritic
- Avoid Methotrexate and Cyclosporine A in children scheduled for live vaccines
- Rule out tuberculosis, HIV, Hepatitis B and C infections before systemic immunosuppressive treatment
- Pregnancy test-prior to systemic therapy (Acitretin avoided in child bearing age group)
- Systemic steroids should not be given for the treatment of psoriasis, except for generalized pustular psoriasis of pregnancy
- If first-line treatment options fail or are contraindicated, refer to tertiary care center for combination. Baseline investigations to be carried out

These principles should be used only as a general guide to choose a treatment; final decision should be made on case-to-case basis

TREATMENT OVERVIEW

TOPICAL THERAPY {<5% BODY SURFACE AREA (BSA)}

- Moisturizers like white soft paraffin
- Topical corticosteroids, Tacrolimus ointment, Tazarotene, Calcipotriol, Coal tar, Dithranol, Salicylic acid combinations

PHOTOTHERAPY (>5% BSA/ PALMOPLANTAR PSORIASIS)

- Narrow band UVB, Targeted phototherapy, Topical/systemic PUVA or Psoralens with sunlight (PUVAsol)

SYSTEMIC THERAPY (>5% BSA/ SEVERE RECALCITRANT DISEASE/ PALMOPLANTAR PSORIASIS/ ARTHRITIS)

- Methotrexate/ Cyclosporine A/ Retinoids-isotretinoin (may be preferred in adolescent girls), Acitretin/ oral antibiotics (guttate psoriasis)/ novel small molecules
- Resistant cases- Biologics

VARIANTS OF PSORIASIS

- PLAQUE PSORIASIS
- GUTTATE PSORIASIS
- PALMOPLANTAR PSORIASIS
- ERYTHRODERMIC PSORIASIS
- PUSTULAR PSORIASIS

PLAQUE PSORIASIS

Erythematous plaques with silvery white scales

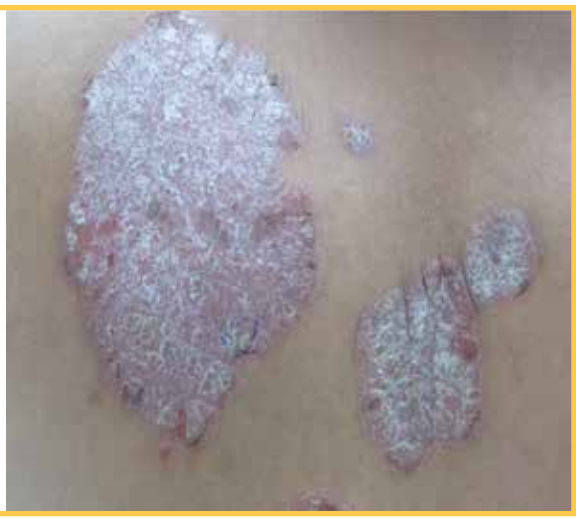
LIMITED PLAQUE PSORIARIS (< 5%)

PRIMARY/ SECONDARY LEVEL

- Face and flexures - 1% Hydrocortisone/ low potency steroid cream OD for 2 weeks
- Trunk and extremities - Betamethasone cream (or any other potent steroid, preferably with Salicylic acid 3-6%) OD for 2-4 weeks
- Other topical treatment as listed in treatment overview

TERTIARY LEVEL

- Continue with topical therapy
- If the patient does not respond in 6-8 weeks, try alternate topical agents and/ or systemic therapy or NB UV-B/ PUVA/ PUVAsol



GENERALIZED PLAQUE PSORIASIS

REFER TO GENERAL PRINCIPLES OF MANAGEMENT PREFERABLY TO BE MANAGED AT HIGHER CENTRE

- Systemic treatment- refer to treatment overview
- If these fail or are contraindicated, refer to tertiary level for combination or rotational therapy/ novel small molecules/ biologicals

- Continue emollients
- Avoid irritants & prolonged use of topical steroids

Scalp- Tar based shampoo and topical steroids +/- salicylic acid lotions

GUTTATE PSORIASIS

CLINICAL FEATURES

- Shower of numerous erythematous papules < 1 cm on the trunk and extremities
- Seen more commonly in younger patients

TREATMENT

REFER TO GENERAL PRINCIPLES OF MANAGEMENT*

Primary health centre/Level

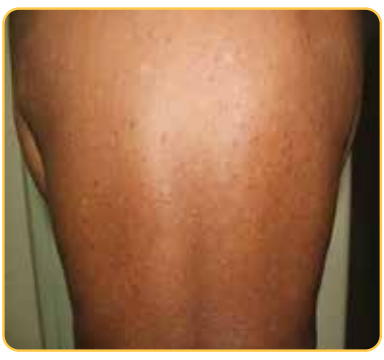
- Antibiotics for streptococcal infection

Secondary Level

- Same as primary level care
- Psoralen ultraviolet A Solar (PUVAsol)

Tertiary Level

- Same as primary level care
- Narrow band UVB
- Refractory cases- consider systemic treatments including novel small molecules



PALMOPLANTAR PSORIASIS

Chronic erythematous well defined plaques symmetrically on palms and soles, and occassional nail involvement to be differentiated from palmoplantar eczema

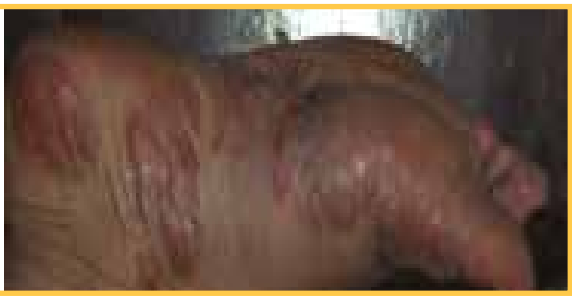
REFER TO GENERAL PRINCIPLES OF MANAGEMENT*

PRIMARY HEALTH CENTER

- Topical petrolatum at least twice daily
- Add antibiotics if signs of infection
- Potent steroid-salicylic acid combination Refer to higher center if not responding in 6-8 weeks

SECONDARY CARE HOSPITAL AND TERTIARY CARE HOSPITAL

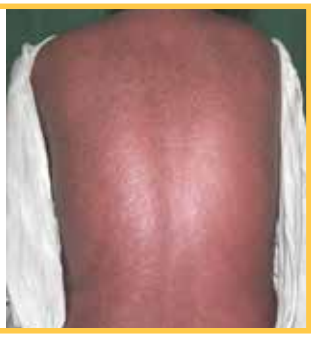
- In addition to those treatment prescribed at primary care
- Tar based applications/ steroid-salicylic acid with occlusion (if very thick plaques) for 2-4 weeks
- Phototherapy- Hand and foot NB UV-B/ PUVA soaks
- Systemic therapy - refer to treatment overview



ERYTHRODERMIC PSORIASIS

CLINICAL FEATURES

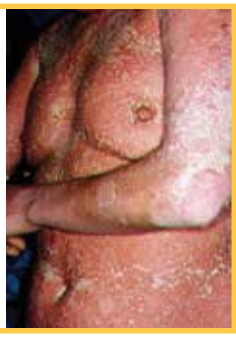
- Generalised erythema and scaling involving >90% of the BSA
- Triggered by withdrawal of systemic corticosteroids/ potent topical steroids or HIV infection
- Common D/D- dermatitis, drug reactions, pityriasis rubra pilaris, idiopathic erythroderma



PUSTULAR PSORIASIS

CLINICAL FEATURES

- Crops of localized or generalised sterile pustules and lakes of pus with surrounding erythema, often associated with fever
- In pregnancy- presents as impetigo herpetiformis,may lead to intrauterine growth retardation or still birth



GENERAL MANAGEMENT AT PRIMARY CARE

- Stabilize patient & treat secondary infection
- Maintain temperature/ fluid and electrolyte balance
- Admit if febrile & unstable vitals
- High protein diet
- Lab investigations: Complete Hemogram, Liver & Kidney Function test
- Refer to higher center for specific management

SPECIFIC MANAGEMENT

- Skin biopsy, if in doubt
- Methotrexate or Cyclosporine A
- Maintenance- Acitretin/ NbUVB/ PUVA
- If patient fails to respond, consider biologics

SPECIFIC MANAGEMENT

- Assess patient
- Take drug history (particularly Beta-lactams, Macrolides, Calcium channel blockers) to rule out acute generalized exanthematous pustulosis
- Generalized pustular psoriasis - admit the patient and follow general measures as for psoriatic erythroderma
- In addition to blood tests as listed previously, serum calcium (patients may have hypocalcemia) should also be estimated
- Acitretin/ Methotrexate/ Cyclosporine

PSORIASIS IS COMPLETELY TREATABLE BUT HAS A CHRONIC COURSE

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: (**stw.icmr.org.in**) for more information.

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

RATIONAL USE OF TOPICAL MEDICATIONS

TOPICAL CORTICOSTEROIDS (TCS)

- Most commonly prescribed topical medication in dermatology
- Because of quick results, it has high abuse potential
- Unmonitored use can cause both local and systemic adverse effects

GENERAL PRINCIPLES FOR TCS USE

- Before prescribing, make sure the dermatosis is steroid responsive
- Rule out fungal and bacterial infections at the local site
- Super potent and potent TCS usually, for a maximum duration of 2 weeks
- For children and over face- only low potency TCS
- For larger surface area, use finger tip unit (FTU) method for application of TCS
- For use over smaller area, less than 1 FTU maybe required; advise not to apply beyond the lesion

COMMON TOPICAL FORMULATIONS AND THEIR USAGE

Topical formulation	Key aspects of usage
Cream	Emulsion of oil and water; preferred for oozy/wet lesions
Ointment	Semi-solid, greasy, occlusive; preferred for better penetration, especially over thick keratotic lesions
Gel	Aqueous or alcoholic monophasic emulsion Liquefies upon contact with skin Preferred for greater cosmetic acceptance, and hairy areas
Lotion	Usually thicker than a solution and likely to contain oil/water/alcohol Use lotions over hairy areas and larger body surface areas
Aerosol foam/spray	A solution with pressurized propellant; alternative to lotion
Powder	Solid, for example, talc/corn starch; doubtful penetration/efficacy

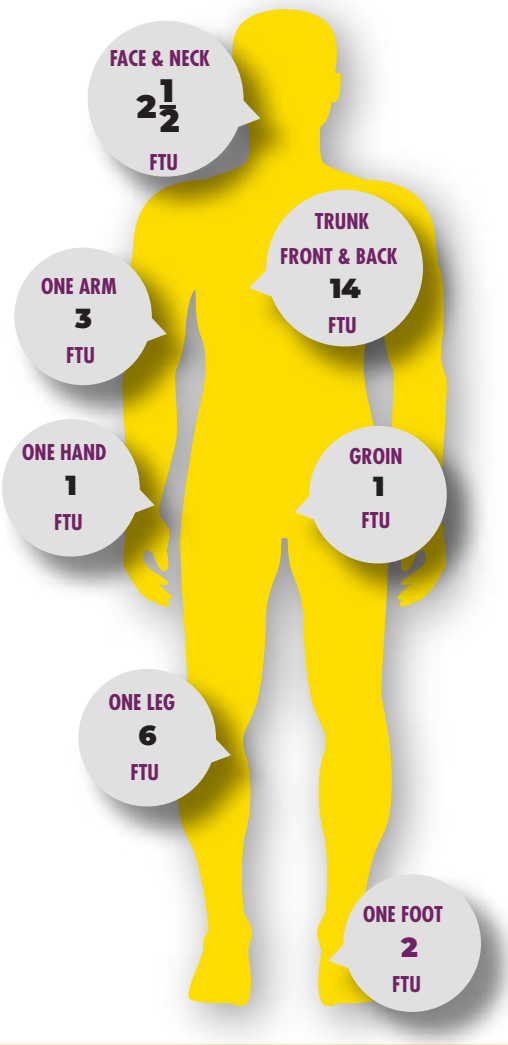
DOSE AND AMOUNT

- Educate the patient about the optimum quantity (in grams) of TCS required
- A single application to the whole body of an adult will require 20 to 30 g of product (cream/ointment/lotion)
- An area of one hand (palm and digits) will require 0.3 g per application
- No more than 45 g/week of potent or 100 g/week of a moderately potent TCS should be applied
- Treatment under occlusion should be avoided; only prescribed by specialists

FINGERTIP UNIT (FTU) METHOD FOR WIDESPREAD ECZEMA

1. Open the tube of medication
2. Extend your index finger facing up
3. Squeeze out a line of medication from the tip of your finger to the first skin crease. This is one fingertip unit (see below)

4. Apply the medication or the affected area

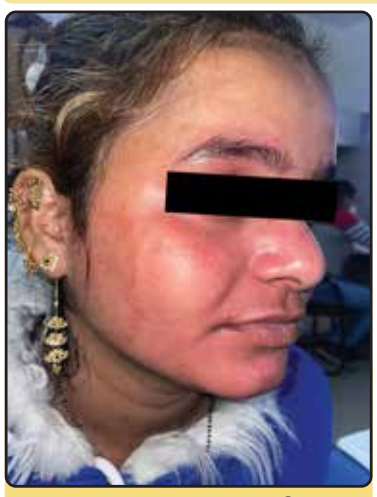


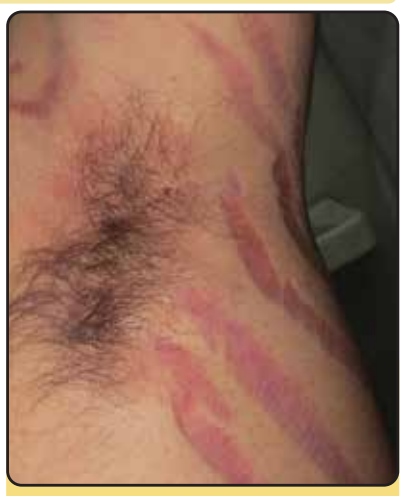
The figure shows the number of FTUs required for different areas of the body

FEW ACCEPTABLE COMBINATIONS WITH TCS

Should be used only in specific situations and under strict supervision

- TCS+ Fusidic acid 2% cream/ointment (for impetiginized eczematous lesions)
- TCS + Salicylic Acid (3-6%) ointment (for thick hyperkeratotic eczema/psoriasis)
- Topical Calcipotriene-TCS (for mild to moderate psoriasis)
- Hydroquinone 2% + Tretinoin 0.025% + Fluocinolone Acetonide 0.1% Cream (use with great caution in melasma – high abuse potential)


TCS 'damaged' face


TCS induced striae

RATIONAL TOPICAL COMBINATIONS FOR ACNE

- Clindamycin 1%+Tretinoin 0.025% gel
- Adapalene 0.1% +Clindamycin phosphate 1%
- Clindamycin 1% + Benzoyl peroxide 5% cream
- Adapalene 0.1% + Benzoyl peroxide 2.5% gel

GENERAL PRINCIPLES FOR TOPICAL ANTIBIOTIC USE IN ACNE

- Benzoyl peroxide (BPO) alone, or in combinations with Retinoids/ Clindamycin are effective for mild acne, or in conjunction with a topical retinoid, or systemic antibiotic therapy for moderate to severe acne
- BPO is effective in the prevention of bacterial resistance and is recommended for patients on topical or systemic antibiotic therapy
- Topical antibiotics like Clindamycin are effective acne treatments, but are not recommended as monotherapy because of the risk of bacterial resistance

MOISTURIZERS

- One of the most commonly applied topical preparations for normal skin care and in diseased skin to improve barrier function of skin
- Moisturizer alone are therapeutic in conditions like eczema and psoriasis
- Bland, fragrance-free moisturizer should be preferred
- Moisturizers in common use – white soft paraffin/light liquid paraffin, glycerin with water, coconut oil

GENERAL PRINCIPLES FOR TOPICAL SUNSCREEN USE

- For photosensitive dermatoses like lupus erythematosus, liberal uniform film of sunscreen (2 mg/cm^2) should be applied on sun-expoxed sites, and application should be atleast 15 minutes before sun exposure
- Routine topical sunscreen use is not essential except in special situations with intense, prolonged sun exposure, such as mountaineering

TOPICAL STEROIDS ARE A DOUBLE EDGED SWORD - USE JUDICIOUSLY

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

SCABIES

ICD-10-B86

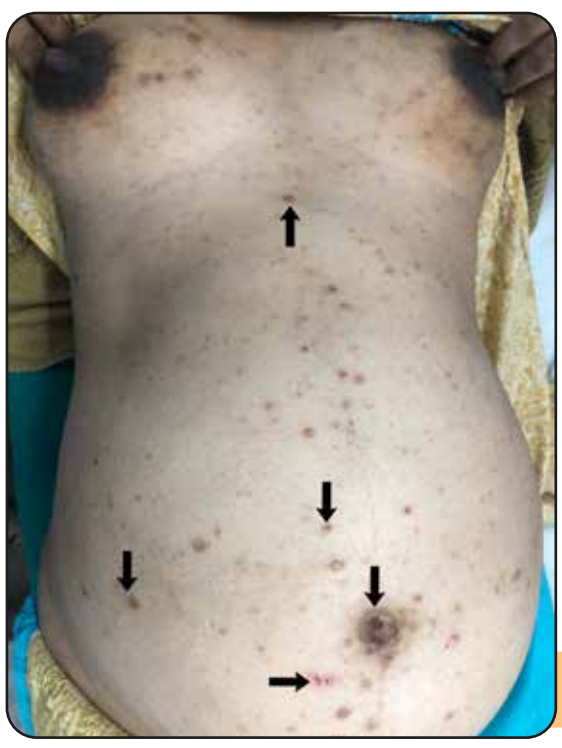
- Scabies is an infestation by a mite - *Sarcoptes Scabiei var hominis*
- Transmission occurs by skin to skin contact, sexual contact and infested fomites (like towels, clothes, beddings)
- Symptoms start 3-6 weeks after primary infestation but faster (2-3 days) after a re-infestation
- Multiple cases may occur in schools /orphanages and other such cluster settings

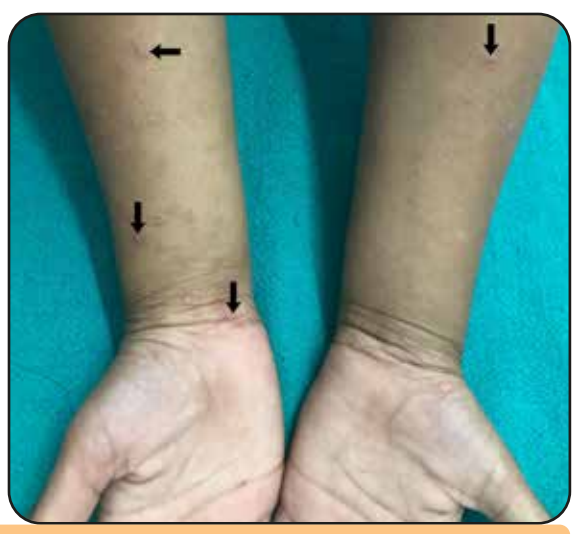
SYMPTOMS AND SIGNS

- Intense itch that is worse at night
- Other members of the family are often also affected
- Red, itchy papules and excoriations are seen mainly over fingers (interdigital spaces), wrists, periumbilical area, breasts, buttocks, axillary folds, waist, genitalia, and extensor aspects of the limbs
- The face, palms and soles are usually spared in adults; but typically involved in young children
- Burrow is the most characteristic lesion of scabies, but is often not observed
- Burrows should be looked for in web spaces and wrists and appear as thin, brown-grey lines of 0.5–1 cm
- Sometimes, vesicles are also seen
- Lesions may be sparse in those with a good hygiene

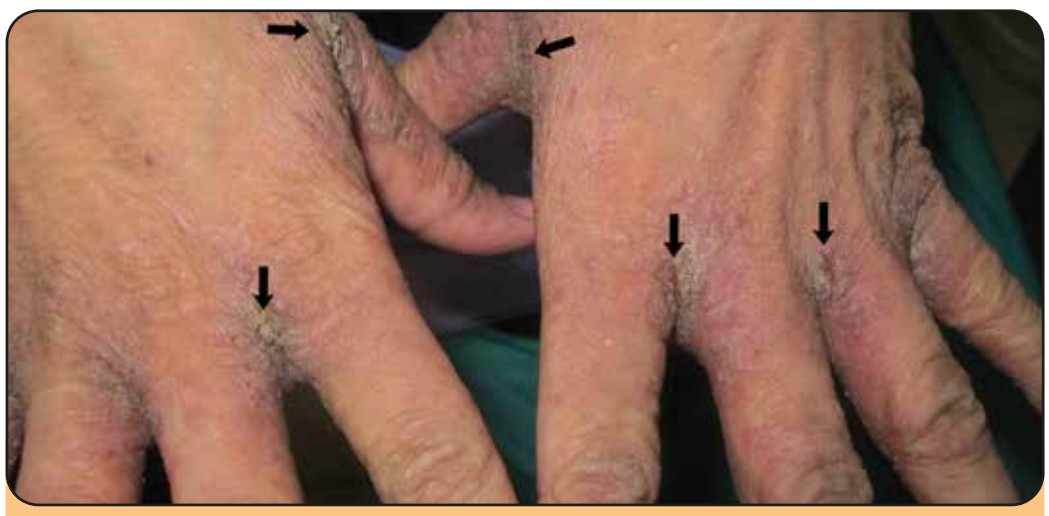
OTHER PRESENTATIONS

- Extremely itchy, persistent nodules may develop over male genitalia
- Secondary bacterial infection can occur in those with poor hygiene, especially in children
- CRUSTED SCABIES
  - Severe form of scabies that develops in those with predisposing factors such as immunosuppression (due to disease or drugs - including topical steroids), neurological disorders, or physical incapacitation or mental retardation- associated inability to scratch
  - Thick, yellow brown crusts form that are densely packed with mites
  - The thick crusts may be localised to hands and feet (including nails)





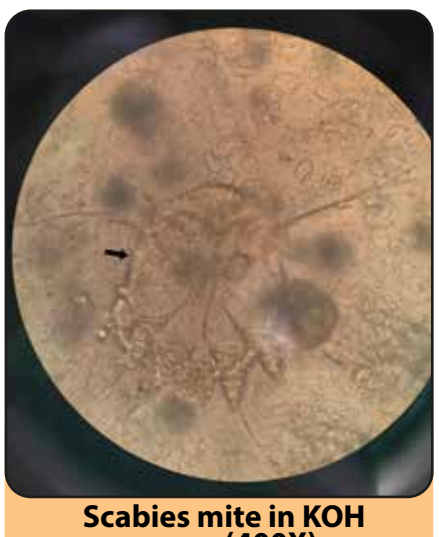
Excoriated papules at the typical sites – breasts, abdomen, web spaces of fingers and wrists



Crusting in finger webs in localised crusted scabies

DIAGNOSIS

- Diagnosis is usually clinical
- Demonstration of mite, mite eggs, or mite faeces (scybala) may be attempted from burrows (if visible) or by dermoscopy (if available) and from the thick crusts in case of crusted scabies (where mite is easily demonstrable)



Scabies mite in KOH smear (400X)

TREATMENT

GENERAL MEASURES

- All family members and close contacts must be simultaneously treated to prevent re-infestation
- The clothes and other fabrics such as towels and bed linen used by the patient in preceding three days must be washed with hot water and dried in the sun
- The items may also be kept sealed in a plastic bag for atleast 3 days (also useful for shoes and other non washable items)

Most patients are treated with topical alone

- **Permethrin 5% cream:** Apply over the whole skin surface (neck downwards) on dry and clean skin; wash off after 8-12 hours (advice to apply late evening and keep overnight)
- In infants, the face and scalp must also be treated
  - **Special attention** must be given to **interdigital webspaces, axillae, area under the fingernails and toenails the wrists the external genitalia and the buttocks**
  - To ensure 8 hours of contact time, Permethrin should be re-applied if hands are washed
  - **About 30 grams of cream is used for one application in adults and children ≥ 5 years; 15 grams for children < 5 years**
  - The application is to be repeated after 7–14 days
- **Alternatively, 1% Gamma Benzene Hexa-Chloride (GBHC/ lindane):** may be used for application as above for permethrin. Avoid use in infants

Oral treatment for patients with poor compliance or response to topicals therapy

- **Oral Ivermectin:** at a dose of 200 mcg/kg (upto 12 mg); two doses 1 week apart; taken with food
- **Avoid Ivermectin in infants, children < 5 years old or <15 kg, and in pregnancy. Permethrin has been safely prescribed in these situations**
- Antihistamines should be prescribed as per the patient's requirement

- **Treatment of secondary infection (Staphylococcal/ Streptococcal):** Refer to Bacterial skin infection STW
- **Treatment of crusted scabies:** Ivermectin on days 1, 2, 8,9 and 15 (additionally on days 22, 29 days in severe cases) with Permethrin 5% cream daily for 7 days, then twice weekly until cure. A keratolytic such as 3-6% Salicylic acid may be used over crusts
- **Nodular lesions:** Potent topical steroid (Clobetasol propionate) or intralesional steroid (Triamcinolone acetonide 10 mg/mL) may be required for persistent nodules

POST TREATMENT ADVISE

- *The patients must be explained that itching can continue for several weeks after successful treatment and repeated applications are not required; continue antihistamines for symptomatic management*
- *However, if itching persists for more than 3-4 weeks/ or if new lesions are noted - a reinfestation is likely. This can occur if all close contacts were not simultaneously treated*

TREAT THE ENTIRE SKIN, NOT LESIONS ALONE; TREAT THE FAMILY/CONTACTS, NOT THE PATIENT ALONE

July/ 2022

सत्यमेव जयते

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

URTICARIA AND ANGIOEDEMA

ICD-10-L50.9

URTICARIA-CLINICAL APPEARANCE

- **Urticaria** -sudden appearance of wheals, angioedema, or both
- **A wheal**- A sharply circumscribed superficial central swelling of variable size and shape, surrounded by reflex erythema
  - Associated with itching / burning sensation and of fleeting nature- resolves within 1–24 hours
  - Chronic urticaria implies duration for more than 6 weeks
- **Angioedema**
  - Sudden, pronounced, erythematous or skin-colored swelling of lower dermis and subcutis with frequent involvement of mucous membranes
  - Associated pain, rather than itching /resolution is slower and can take up to 72 hours

HISTORY

- Time to onset
- Frequency / duration
- Diurnal variation
- Associated angioedema
- Associated pain, itch
- Induction by physical agents or exercise
- Family history
- Previous allergies
- Surgical implantations
- Gastric / intestinal problem
- Drug history
- Correlation with food
- Correlation with menses
- Smoking
- Work profile
- Hobbies
- Stress
- Quality of life impact
- Response to therapy

CLASSIFICATION OF CHRONIC URTICARIA SUBTYPES
(presenting with wheals, angioedema, or both)

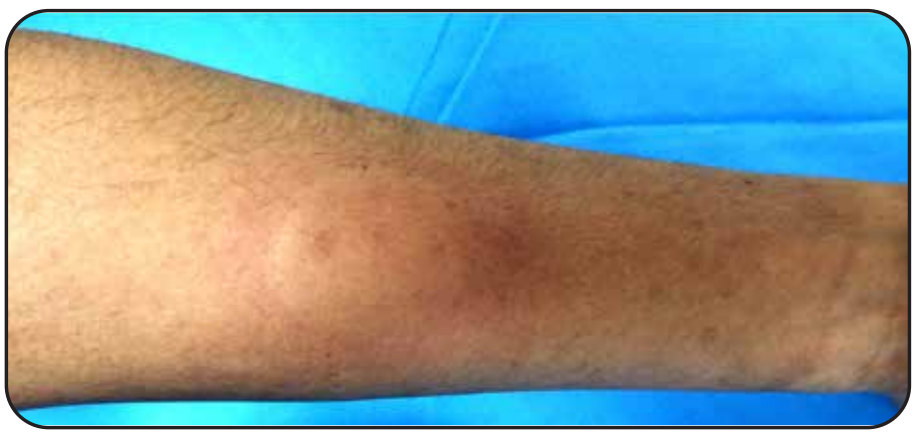
Chronic spontaneous	Inducible (mostly physical)
• Spontaneous appearance of wheals, angioedema, or both for ≥6 weeks	• Symptomatic dermographism • Delayed pressure urticaria • Cholinergic urticaria • Cold/Heat urticaria • Solar urticaria • Aquagenic urticaria • Contact urticaria

EXAMINATION

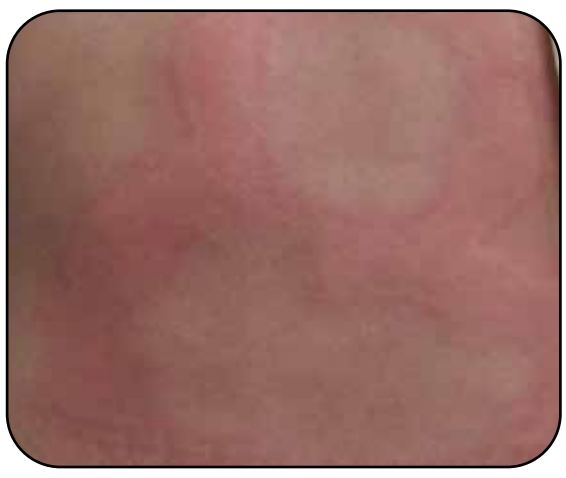
- Due to evanescent nature the examination may not show any lesions
- Presence of wheals of various sizes and shapes
- The lesions are non-scaly but show an intense erythema and a trailing clearing region in older areas which may lead to a target configuration in expanding plaques

DIFFERENTIAL DIAGNOSES OF URTICARIA

- Insect /Bedbug bites
- Urticarial vasculitis- painful, persist for 24-48 hours and fade to leave bruising; ± fever and arthralgia
- Pre bullous phase of bullous pemphigoid
- Maculopapular drug/ viral rash



URTICARIA



URTICARIAL VASCULITIS

INVESTIGATIONS

INVESTIGATIONS

Generally, no investigations are needed to confirm the diagnosis

- Skin biopsy may be indicated if other diagnoses are being suspected
- C4 and C1 inhibitor quantitation to detect C1 inhibitor deficiency may be done in suspected hereditary angioedema (Angioedema without urticaria)
- Tests for current or past viral, bacterial or parasitic infections should be guided by history and clinical findings
- Lab tests may be needed if patient is planned for immunosuppressive treatment
- **Certain investigations that are often ordered, but are of limited utility**
  - Thyroid function tests and antithyroid peroxidase (TPO) antibodies
  - Autologous serum skin test (ASST)
  - Skin prick / specific IgE test

GENERAL PRINCIPLES

- Reassure -remits spontaneously in 12-24 months in ~50% patients
- Treat with antihistamines. Reassure that prolonged treatment with long-acting, non-sedating antihistamines is not harmful
- Non-sedating antihistamines (e.g. Cetirizine 10mg, Levocetirizine 5mg, Loratadine 10mg, or Fexofenadine 180mg once daily) mainstay of treatment. Dose can be increased 4-fold safely if needed
- Long-term first generation antihistamines e.g. Chlorphenamine, Hydroxyzine avoided if possible due to risk of sedation and psychomotor impairment
- Avoid triggers including drugs such as NSAIDs, PCM, ACE inhibitors if history is suggestive of drug induced or exacerbated urticaria/ angioedema

TREATMENT

TREATMENT OF URTICARIA/ANGIOEDEMA* AT PRIMARY CARE LEVEL

First Line:
2nd generation non-sedating antihistamines

↓ *If symptoms persist after 2 weeks*

Second Line:
Increase dosage (upto fourfold) of 2nd generation antihistamines

↓ *If symptoms persist after 2–4 further weeks*

Refer to higher centre

- Severe urticaria with respiratory distress- maintain airway; injectable Hydrocortisone and Pheniramine (Avil) may be required
- Intra-muscular Adrenaline of 1:1000 dilution (1 mg in 1 mL), 0.2 to 0.5 mg (0.01 mg/kg in children; maximum dose: 0.3 mg) administered intramuscularly every 5 to 15 minutes if choking/respiratory distress/shock

** Angioedema with respiratory or laryngeal symptom requires emergency management -refer to higher center after vital stabilization; oral Prednisolone may be initiated to take care of biphasic response*

REFER TO A HIGHER CENTRE

- Patients whose urticaria is difficult to control with antihistamines despite fourfold higher dosage than the licensed doses of Cetirizine, Levocetirizine or Fexofenadine
- Patients with polypharmacy
- Unusual urticaria e.g. long lasting lesions >24-48 hours with bruising
- Associate angioedema that is unresponsive or presents with choking/ dyspnoea
- Investigations not available

MANAGEMENT AT SECONDARY CARE LEVEL

First Line:
2nd generation antihistamines

↓ *If symptoms persist after 2 weeks*

Second Line:
Increase dosage (upto fourfold) of 2nd generation antihistamines

↓ *If symptoms persist after 2–4 further weeks*

Add third line on to second line:
Cyclosporine A (3-5 mg/Kg) or Montelukast (10 mg HS)
Short course (max 10 days) of corticosteroids
(Prednisolone-0.3-0.5 mg/kg)#

MANAGEMENT AT TERTIARY CARE LEVEL

First Line:
2nd generation antihistamines

↓ *If symptoms persist after 2 weeks*

Second Line:
Increase dosage (upto fourfold) of 2nd generation antihistamines

↓ *If symptoms persist after 2–4 further weeks*

Third line:
Add on to second line Omalizumab (300mg s/c every 4 weeks)
or Cyclosporine A or Montelukast
Short course (max 10 days) of corticosteroids #

#Oral or injectable conticosteroids are generally not used, except in uncontrolled disease or with associated respiratory symtoms

URTICARIA TREATMENT GOAL IS DISEASE REMISSION-NOT CURE

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: (**stw.icmr.org.in**) for more information.

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

VARICELLA & HERPES ZOSTER

ICD-10-B01-02

VARICELLA (CHICKEN POX)

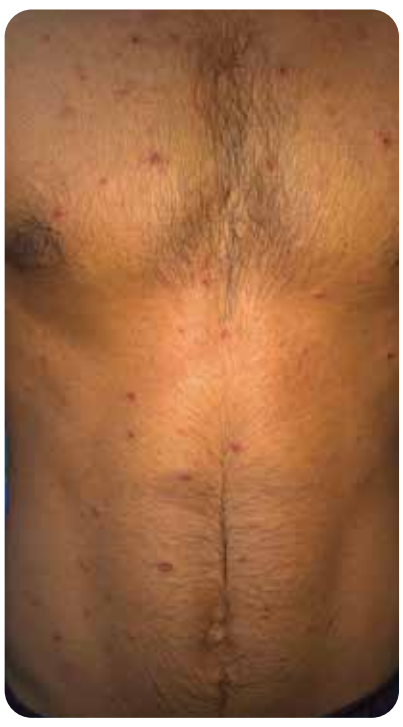
WHEN TO SUSPECT?
- Fever, malaise
- Generalized vesicular lesions on erythematous base (dew drop on a rose petal sign)
- Skin lesions in different stages of evolution: erythematous macules, papules, vesicles and crusted lesions

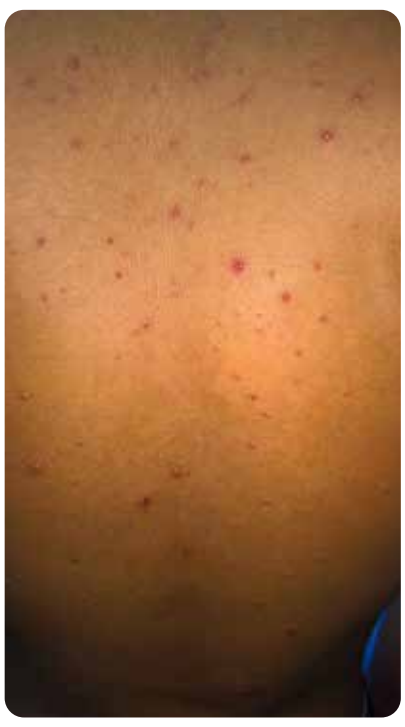
TAKE HISTORY OF
- Recent contact with a patient with varicella
- Past history of varicella/ varicella vaccination
- Immunosuppression (especially if second episode of varicella): malignancy, HIV/AIDS, transplant recipient

PREGNANCY AND VARICELLA
- Infection in 1st 20 weeks may lead to congenital varicella syndrome
- Treat with acyclovir
- Maternal perinatal varicella may lead to neonatal varicella; initiate treatment and refer to a specialist

RED FLAG SIGNS AND SYMPTOMS
- Hemorrhagic vesicles
- Difficulty in breathing
- Chest pain
- Abdominal pain
- Stiff neck, confused behaviour (CNS symptoms)
- Hemodynamic instability

INVESTIGATIONS
- As per availability and need:
  - Tzanck smear: from a fresh vesicle- will show multinucleate giant cells and acantholysis
  - Symptom directed: Chest X-ray, ECG, ECHO, transaminases, renal function test, brain imaging
- Optional
  - VZV PCR – skin swab
  - Skin biopsy





TREATMENT
- General measures
  - Isolate the patient from high risk contacts
  - Daily bath with soap
  - Antipyretics: Paracetamol; avoid aspirin as it is associated with Reye's syndrome in children
  - Antihistamines
- Specific treatment*
  - Adults/children >40kg: Oral Acyclovir- 800mg, 5 times a day for 5-7 days
  - Children <40kg: (20mg/kg/dose) max 800mg four times a day for 7 days
  - Alternative (if available): Valacyclovir (adults-1g TDS)
  - Give intravenous Acyclovir (10mg/kg/dose 8 hourly) if:
    - Systemic complications
    - Hemorrhagic varicella
    - Immunosuppressed patient
    - Neonatal Varicella (higher dose may be required)

**Infants, children >12 years of age, adults, pregnant women and immunosuppressed patients should be treated with specific anti-viral medication because of risk of severe varicella*
**Maximum benefit if acyclovir initiated 24 hours of onset of rash*

COMPLICATIONS
- Secondary skin infections
- Pneumonia
- Encephalitis
- Hepatitis
- Pancreatitis
- Myocarditis
- Reye's syndrome

WHEN TO REFER TO A HIGHER CENTRE
- Diagnosis in doubt
- Systemic complications
- Hemodynamic instability
- Hemorrhagic varicella
- Not responding to oral Acyclovir
- Immunosuppressed patient
- Neonatal varicella syndrome

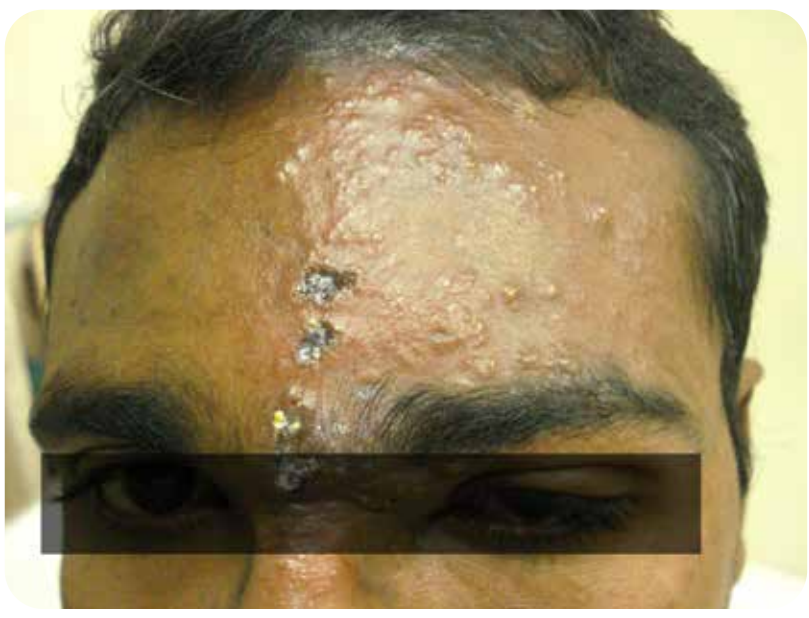
HERPES ZOSTER

WHEN TO SUSPECT?
- Acute, grouped, vesiculo-pustular eruption in a dermatomal distribution
- Dermatomal pain

TAKE HISTORY OF
- Previous varicella
- Previous episode of herpes zoster
- Immunosuppression: Diabetes mellitus, malignancy, transplant recipient, HIV

RED FLAG SIGNS
- V1 dermatomal involvement: forehead, periorbital, nose tip: risk of eye involvement - look for watering of eye, redness, photophobia
- Lesions on the ear or inside the ear canal: risk of facial/vestibulocochlear nerve palsy - look for vertigo, tinnitus, hearing loss, facial asymmetry/weakness
- Multi-dermatomal involvement
- Disseminated herpes zoster
- Hemorrhagic/necrotic lesions

INVESTIGATIONS
- Diagnosis is usually clinical
  - Tzanck smear: from a fresh vesicle- will show multinucleate giant cells and acantholysis
- Optional
  - PCR from vesicular fluid



TREATMENT
- Analgesics: Acute pain relief with NSAIDs.
- If uncontrolled, add the following (step wise):
  a) Pregabalin 150-600mg/day, start with 150mg HS and titrate up as required
  b) Gabapentin: start with 300mg/day, gradually increase upto 1800mg/day; more adverse effects than pregabalin
  c) Amitriptyline: 10-25mg HS
  d) Nortryptyline: start with 10-25mg/day; gradual increase upto 30-75mg/day in divided doses or HS
  e) Carbamazepine 200 mg HS to start with
- Specific treatment*
  - Acyclovir **800mg five times a day x 7 days or
  - Valacyclovir 1gm three times a day x 7 days

**Start <72 hours of onset for maximum benefit, can consider if new lesions are still appearing after 72 hours/ Herpes Zoster ophthalmicus/Ramsay Hunt syndrome*
***Intravenous Acyclovir if multi-segmental involvement or disseminated zoster or systemic complications*

COMPLICATIONS
- Secondary skin infections
- Herpes zoster ophthalmicus: risk when lesions present over side/tip of nose (Hutchinson's sign)
- Ramsay Hunt syndrome: Facial nerve palsy (with vesicles in the ear canal)
- Aseptic meningitis, encephalitis: In elderly and immunosuppressed mainly
- Post-herpetic neuralgia (pain persistent for more than three months, common in elderly)

WHEN TO REFER TO A HIGHER CENTRE
- Multi-dermatomal distribution/ disseminated Herpes Zoster syndrome
- Systemic complications
  - Facial nerve palsy
  - Eye involvement
  - Neurological involvement
- Post-herpetic neuralgia

PREVENTION

VARICELLA
- **Active immunization (live vaccine)**
  - <13 years old: 1st dose at 12-15 months, 2nd dose at 4-6 years
  - >=13 years old: 2 doses weeks apart
- **Passive immunization**
  - Varicella zoster immunoglobulin may be considered where active immunization is contraindicated (pregnant women, immunosuppressed patients)

HERPES ZOSTER
- Active immunization may be offered to patients >50 years old, irrespective of previous history of herpes zoster

INITIATE SPECIFIC ANTIVIRAL TREATMENT AT THE EARLIEST TO PREVENT COMPLICATIONS

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

VITILIGO

ICD-10-L80

Vitiligo is an acquired skin disease characterized by depigmented (white) macules, with a global prevalence of 1-2%

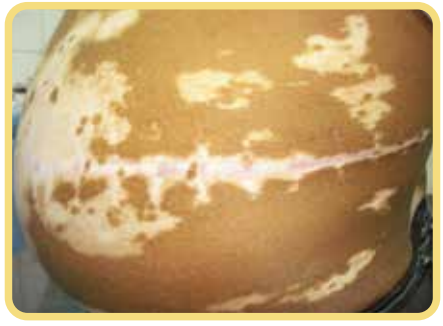
NON-SEGMENTAL VITILIGO

GENERALIZED VITILIGO
- Lesions in a generalized distribution, usually affecting trunk, extremities and face
- No predilection for any specific site; also called vitiligo vulgaris

ACROFACIAL VITILIGO
- Affects the distal extremities and/or face/genitals
- Less responsive to treatment

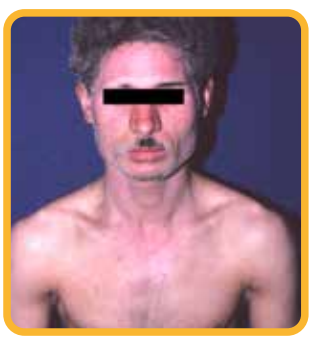
OTHER VARIANTS
- Focal
- Follicular
- Mucosal
- Universal ≥ 80% of body surface area involvement

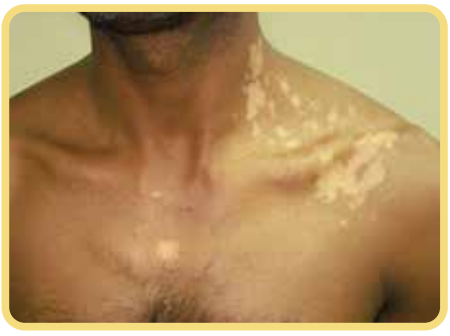
SEGMENTAL VITILIGO
- Unilateral with a midline demarcation
- Onset in childhood
- Leucotrichia both within and beyond the lesion
- Usually stabilizes within a year after an initial period of progression
- Response to medical treatment is variable and most patients may require surgical treatment


Generalized vitiligo


Progressive vitiligo with Koebner's phenomenon


Acrofacial vitiligo


Universal vitiligo


Segmental vitiligo

GENERAL PRINCIPLES OF MANAGEMENT

- Diagnosis is clinical
- Educate patient about the disease
- Assess the psychosocial impact of vitiligo and counsel about the variable/ unpredictable course of disease & expected response to treatment
- In pregnancy, prefer only topical corticosteroids
- **Decide the treatment plan based on**
  - A. **Disease activity**
    - Progressive: new lesions, or spread of existing lesions
      - Rapidly progressive: >5 new lesions in last 1 month, or >15 lesions in last 3 months
      - Slowly progressive: <5 new lesions in last 1 month, or < 15 lesions in last 3 months
    - Stable: no new lesions, no spread of existing lesions
  - B. **Extent of involvement:** limited (≤5%) or extensive (>5%)
- **Limited stable/slowly progressive vitiligo:**
  - Topical treatment- Mid-potent/potent corticosteroids, tacrolimus, topical PUVA/PUVAsol *(Avoid prolonged use)*
- **Extensive stable/slowly progressive vitiligo:**
  - Narrow-band ultraviolet B (NbUVB), oral Psoralen + Ultraviolet A (PUVA)/PUVAsol
  - Rapidly progressive vitiligo (limited or extensive):
  - Oral corticosteroids (minipulse) and/or
  - Azathioprine/ Methotrexate
- **Non-responders:**
  - Consider combining different modalities if unsatisfactory response with monotherapy
  - **Consider** surgical treatment for stable limited vitiligo/ segmental vitiligo (unresponsive to medical treatment)
  - Consider camouflage for poorly responsive vitiligo lesions
- **Monitoring of patients on systemic treatment**
  - Height (children), weight, blood pressure and blood sugar in patients on oral corticosteroids
  - Complete Hemogram, Liver Function Test in patients on drugs such as Azathioprine, Methotrexate

COMMON DIFFERENTIAL DIAGNOSES

- **Leprosy**
  - Hypopigmented, not depigmented macules
  - Overlying sensory loss
  - Enlarged peripheral nerves
- **Pityriasis alba**
  - Hypopigmented scaly lesions usually on a child's face
- **Nevus depigmentosus**
  - Present since birth or early childhood
  - Single hypopigmented macule/ segmental lesion

IMPORTANT COUNSELLING POINTS

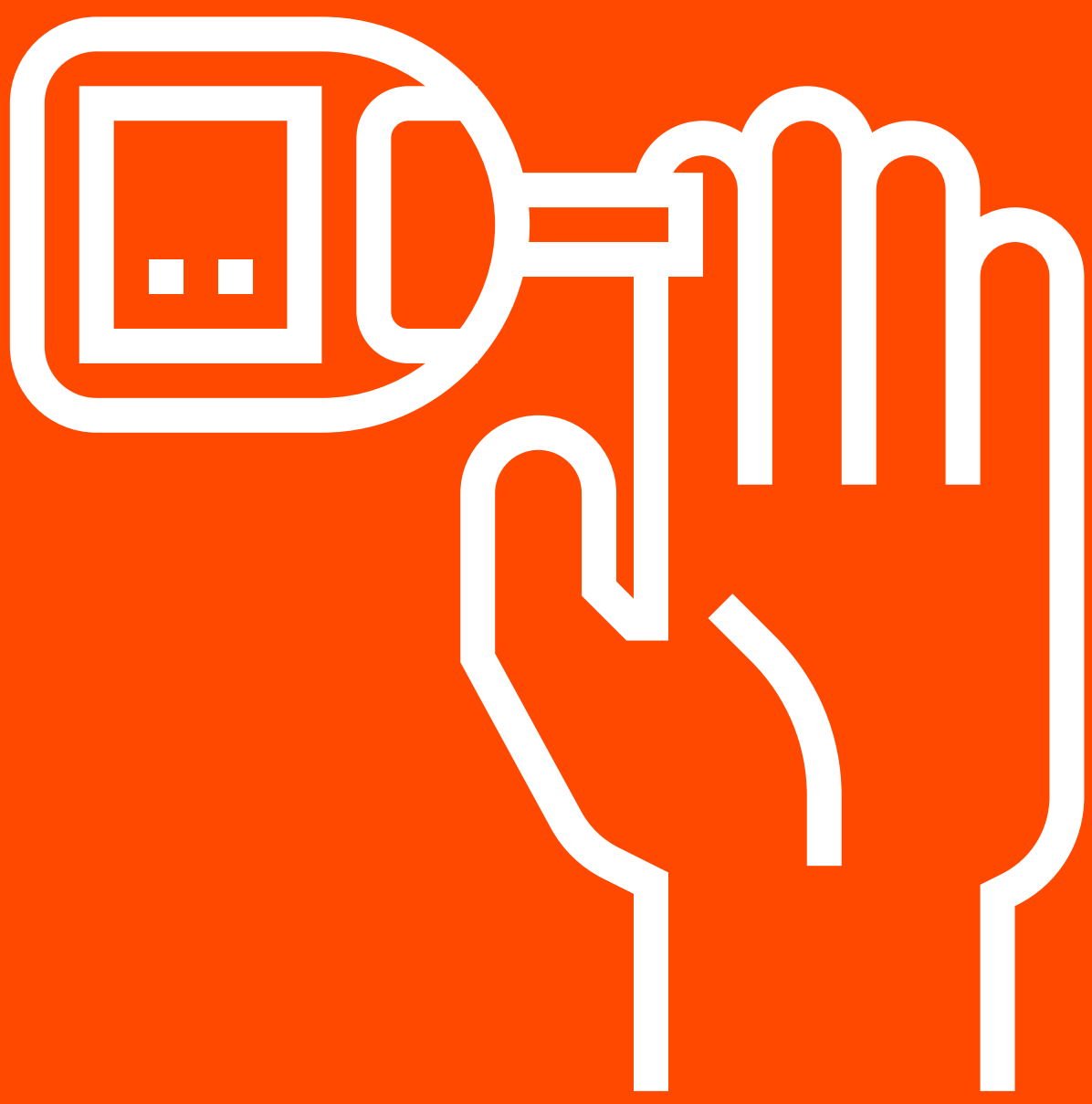
- Not the same as leprosy
- Does not spread by touch
- Not caused by certain foods such as milk, curd, lemon, fish etc
- Treatment is available for vitiligo
- Multifactorial, predominantly autoimmune

TREATMENT

REFER TO GENERAL PRINCIPLES OF MANAGEMENT

		Primary /secondary Level	Tertiary Level
Acrofacial vitiligo	**Stable**	• **Face, flexures, genitals**: Tacrolimus 0.1% ointment BD • **Other body sites**: Betamethasone valerate/ Mometasone/ Fluticasone/ Fluocinolone cream OD (clobetasol NOT to be used) • Refer non-responders to higher center after 3 months	• Same as in primary/secondary care • Topical PUVA/PUVAsol • Handheld NbUVB • Targeted phototherapy/Excimer LASER • Surgical management – minipunch grafting, suction blister epidermal grafting, noncultured epidermal suspension
	Progressive	Refer to higher center	• Topical PUVA/PUVAsol/ Handheld NbUVB (slowly progressive) • Levamisole (slowly progressive) • Oral steroid (minipulse) and/or Azathioprine/Methotrexate (rapidly progressive)
Generalized vitiligo	**Stable**	• **Face, flexures, genitals**: Tacrolimus 0.1% ointment BD • **Other body sites**: Betamethasone valerate/ Mometasone/ Fluticasone/ Fluocinolone cream OD (clobetasol propionate NOT to be used) • Refer non-responders to higher center after 3 months	• Same as in primary/secondary care • Oral PUVA/PUVAsol • Whole body NbUVB
	Progressive	Refer to higher center	• Oral PUVA/PUVAsol/ whole body NbUVB (slowly progressive) • Levamisole (slowly progressive) • Oral steroid (minipulse) and/or Azathioprine/Methotrexate (rapidly progressive)
Universal vitiligo		• Sunscreen/photoprotection • Refer to higher center	• Sunscreen/photoprotection • Depigmenting agent like monobenzyl ether of hydroquinone 20% may be considered if patient wishes for complete depigmentation
Segmental vitiligo		**Face, flexures, genitals**: Tacrolimus 0.1% ointment BD • **Other body sites**: Betamethasone valerate/ Mometasone/ Fluticasone/ Fluocinolone cream OD (clobetasol propionate NOT to be used) • Refer non-responders to higher center after 3 months	• Same as in primary/secondary care • Topical PUVA/PUVAsol • Handheld NbUVB • Targeted phototherapy • Surgical management – minipunch grafting, suction blister epidermal grafting, noncultured epidermal suspension

VITILIGO CAN BE TREATED. TREATMENT DEPENDS ON EXTENT AND ACTIVITY OF DISEASE



ENDOCRINOLOGY

July/ 2022

सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

APPROACH TO HYPONATREMIA

ICD-10-E87.1

Assessment of Volume status

Hypovolemia
- Total body water ↓
- Total body sodium ↓↓

Euvolemia (No edema)
- Total body water ↑
- Total body sodium ↔

Hypervolemia
- Total body water ↑↑
- Total body sodium ↑

Hypovolemia

U_{Na}>20

Renal Losses
- Diuretic excess
- Mineralocorticoid deficiency
- Salt losing deficiency
- Bicarbonaturia with renal tubal acidosis and metabolic alkalosis
- Ketonuria
- Osmotic diuresis
- Cerebral salt wasting syndrome

U_{Na}<20

Extrarenal Losses
- Vomiting
- Diarrhea
- Third spacing of fluids
  - Burns
  - Pancreatitis
  - Trauma

Euvolemia (No edema)

U_{Na}>20

- Glucocorticoid deficiency
- Hypothyroidism
- Stress
- Drugs
- SIADH

Hypervolemia

U_{Na}>20

Renal failure

U_{Na}<20

- Nephrotic syndrome
- Cirrhosis
- Cardiac failure

TREATMENT

Intravenous hydration with isotonic normal saline in hypovolemic hyponatremia

Treatment of underlying disease in hypervolemic hyponatremia

Is Hyponatremia severe? (<125 mmol/L)

Yes

Vomiting, seizures, obtundation, coma, respiratory distress, unstable gait/ falls

Yes

Duration?

Severe hyponatremia treatment Acute < 48 hours

Emergency correction with hypertonic 3% saline 1-2 ml/kg/hr until safe Na target to a total 4-6m/M, this modest increase is sufficient to alleviate severe symptoms. After that corrective guidelines chronic hyponatremia are appropriate

Chronic/Unknown (> 48 hours)

Correction with 3% saline@ 0.5-1ml/kg/hour till resolution of symptoms or until safe ***Na*** target
Correction* not > 8-10 mM within first 24 hours
Oral Tolvaptan 15 mg on day one and then 30-60 mg per day if serum Na remains below 135 or rise is less than 5 mmol per 24 hours. 6 -8 hourly monitoring of serum Na to be done

No

Significant sequelae unlikely

Likely Chronic
Headache, irritability, difficulty in concentration, altered mood, depression

Urgent intervention unnecessary
Assess ECF volume and restrict fluid intake to 500-1000 ml/ 24 hour

No

Assess ECF Volume status

Na deficit = .6x body weight (target Plasma Na-starting Na concentration)
1 litre of 3% hypertonic saline=513mM Na (1ml/kg/ hr increases serum Na by 1mM/hr)
1 litre of isotonic saline= 154 mM Na

*Rapid correction of sodium is not advisable as it may lead to central pontine myelinosis

ABBREVIATIONS

ECF: Extracellular fluid
Na: Sodium
SIADH: Syndrome of inappropriate antidiuretic hormone secretion
U_{Na}: Urinary sodium

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

July/ 2022

सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DIABETES MELLITUS TYPE 1

ICD-10-E10

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

DIAGNOSIS

- Diagnosis of diabetes: Fasting plasma glucose ≥ 126 mg%; post-glucose ≥ 200 mg%; HbA1c ≥ 6.5% (all to be re-confirmed); random glucose ≥ 200 mg% with symptoms
- Characteristic of T1 diabetes; urine/blood ketones: moderate-large (in > 50%)
- Continuous requirement of insulin since diagnosis

INVESTIGATIONS

HbA1c, creatinine, hemoglobin, TSH, tTG (tissue transglutaminase) antibody, lipid profile

AMBULATORY MANAGEMENT

NUTRITION

- Calories should be appropriate to the expected body weight, pubertal status, activity
- Balanced diet including all food groups
- Simple sugars and excessive fats to be avoided
- Meals/snacks to be individualized and reflect insulin schedule (usually 3 meals, 2 snacks)

REGULAR EXERCISE

- Beneficial and should be encouraged

EDUCATION

- Emphasize diabetes related education to patient and caregivers

SMBG

- Check before each meal and at bedtime
- Should be checked more frequently in case A1c is not controlled, frequent hypoglycemia
- Glucose at midnight (12.00-2.00 am) occasionally to rule out nocturnal hypoglycemia
- Ketones should be checked if blood glucose is > 250 mg/dl

TARGET

- Pre-meal 80-130 mg%
- 2 hours post-meal: 120-180 mg%

INSULIN TREATMENT

Insulin administration (0.25 to 1.0U/kg depending on age and pubertal status)

Basal and bolus regimen

- Basal: glargine or detemir or NPH 40-50% of daily requirement
- Bolus: regular or rapid acting 50% of daily requirement/3 injections before each meal

Insulin doses can be adjusted depending upon
1. Pre-meal and post-meal glucose level
2. Carbohydrates in the meal
3. Excercise pattern

REASONS FOR REFERRAL TO HIGHER CENTRES

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

MONITORING

AT EVERY VISIT

- Growth & pubertal development (for children and adolescents)
- Dietary and medication compliance
- BP, Weight monitoring
- Insulin site and injection technique
- Review SMBG record
- Hypoglycemia

EVERY THREE MONTHS

- Glycated hemoglobin (HbA1c)
- Target: <7% (should be individualized)

COMPLICATIONS & COMORBIDITIES (5 YEARS AFTER DIAGNOSIS, THEN ANNUALLY)

- Fundus examination (Retinopathy)
- Foot examination (Neuropathy)
- Urine albumin/creatinine ratio
- Other investigations (S-creatinine, TSH), lipid profile

SICK DAY RULES/DKA

IN CASE OF SICKNESS / INFECTION

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

DKA MANAGEMENT

- As per STW on Diabetic Ketoacidosis (DKA)

HYPOGLYCAEMIA

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

ABBREVIATIONS

BP: Blood pressure
DKA: Diabetic ketoacidosis
SBMG: Self-monitoring of blood glucose
TSH: Thyroid-stimulating hormone
tTG: Tissue transglutaminase

REFERENCES

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DIABETES MELLITUS TYPE 2

ICD-10-E11

SYMPTOMS

May be asymptomatic

- Osmotic symptoms ie., polyuria, polydipsia and polyphagia
- Recurrent infections
- Blurring of vision
- Weight loss
- Non healing wounds
- Paraesthesia

DIAGNOSIS

FPG ≥126 mg/dl (after 8hr fasting)	OR	2-h plasma glucose ≥200 mg/dl during OGTT	OR	HbA1C ≥ 6.5%	OR	Diabetes symptoms + random plasma glucose ≥ 200 mg/dl

PREDIABETES:

Impaired fasting glucose: FPG 100-125 mg/dL; Impaired glucose tolerance: 140-199 mg/dL; HbA1c 5.7-6.4%

ASSESS

CO-MORBIDITIES: Hypertension, Dyslipidaemia, CAD, CKD

EXAMINATION: BMI, waist circumference; BP; Peripheral pulses; Pin-prick sensation, monofilament test ,vibration, DTR; Skin, oral cavity, foot; Fundus (dilated) examination

INVESTIGATION

- HbA1c
- Creatinine
- K^+
- Fasting lipid profile
- Urine routine examination and spot albumin: creatinine ratio#
- LFT/ ALT, AST
- ECG
- Others like Echo, USG abdomen as indicated

#These may best be carried out after initial glycaemic control

TREATMENT

- Dietary modification
- Avoidance of tobacco and restriction/ avoidance of alcohol
- Physical activity
- Pharmacotherapy:
  - HbA1c < 8.5%: Monotherapy- Metformin
  - HbA1c 8.5-10%: Dual therapy- Metformin + SU's/TZD/ DPPIVi/SGLT2i /AGI/GLP-1RA
  - HbA1c > 10%: Basal Insulin+ Metformin + another OAD / triple OAD combination

METABOLIC TARGETS

- HbA1c </= 7 .0% (except elderly and those with significant comorbid conditions) where higher target may be acceptable
- Pre-prandial capillary plasma glucose: 80-130 mg/dl
- Post-prandial capillary plasma glucose: <180 mg/dl
- BP=140/90 (130/80 in CKD) LDL: < 100 mg/dl (< 70mg/dl in CAD)

MONITORING

- Blood glucose; FPG and 2 hours PPG once monthly more frequent as required including SMBG or CGM
- HbA1c every 6-12 months (3 monthly if uncontrolled)
- Annual monitoring : ECG, urine ACR (albumin creatinine ratio),dilated fundoscopy,foot examination

REFERRALS

- Endocrinology: for uncontrolled hyperglycemia
- Ophthalmology: at initial evaluation and every year
- Nephrology: for deranged renal function
- Cardiology: for CAD/HF/arrhythmia

SCREENING FOR DIABETES MELLITUS

IN AN APPARENTLY NORMAL ADULT

- In obese or overweight (BMI ≥ 27.5 or ≥ 23 kg/m^2) with any of the following risk factors
- First degree relative with diabetes
- History of cardiovascular disease
- BP (≥ 140/90 mmHg)
- Dyslipidemia (TG > 250 mg/dL, HDL <40 mg/dl in male, <50 mg/dl in female
- Physical inactivity
- Polycystic ovary syndrome (PCOS)
- Insulin resistance (acanthosis nigricans)
- Adults > 30 years of age
- Previous history of GDM

IN AN ADULT WITH ILLNESS

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

IN PREGNANCY

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

ABBREVIATIONS

ALT: Alanine transaminase
AST: Aspartate aminotransferase
BMI: Body mass index
BP: Blood pressure
CAD: Coronary artery disease
CGM: Continuous glucose monitor
CKD: Chronic kidney disease
DTR: Deep tendon reflex
ECG: Electrocardiogram
FPG: Fasting plasma glucose
GDM: Gestational diabetes mellitus
HDL: High-density lipoprotein
LDL: Low-density lipoprotein
LFT: Liver function test
OAD: Oral antidiabetic drug
OGTT: Oral glucose tolerance test
SMBG: Self-monitoring of blood glucose
TG: Triglyceride

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

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: (**stw.icmr.org.in**) for more information.

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DIABETIC KETOACIDOSIS

ICD-10-E11.10

- May be the initial presentation in T1DM
- Pain abdomen
- Recurrent vomiting
- Rapid/labored breathing
- Altered sensorium

ASSESS

- Sensorium (GCS), pulse rate, blood pressure, respiratory rate, temperature
- Signs of dehydration (dry tongue, sunken eyes, skin turgor, urine output)

ASSESS SEVERITY OF DKA

	Mild	Moderate	Severe
pH	7.25-7.3	7.0-7.25	<7.0
HCO_3	15-18	10-15	<10
Level of Sensorium	Alert	Mild Drowsiness	Stupor/ Coma
Sever case: ICU Admission			

LOOK & ADDRESS FOR PRECIPITATING FACTORS

- Skipping/missing insulin doses
- Fever/cough/loose stools/burning micturition

INVESTIGATIONS

- Spot capillary blood glucose (venous blood preferable in case of shock)
- Serum ketone/urine ketone by dipstick)
- VBG (for pH, bicarbonate, anion gap)
- Na^+/K^+/BUN/Creatinine/ECG

MANAGEMENT

MONITORING

- Strict input/ output charting: every 1 hour
  - Report if urine output is <30ml/hour for 2 consecutive hours
  - One hour after starting the treatment: Till resolution of DKA
  - BP and vital signs: every 1 hour
  - Blood glucose every 1 hour
  - Venous pH, Na, K, HCO_3 : 2-4 hourly
  - Blood ketones (if available)/Urine for ketones: 12 hourly
- After resolution of DKA: Blood glucose monitoring every 4 hours

TREATMENT

- Replace fluids – 1 l of 0.9% saline over first hour followed by 250-500 ml/hour (10-20ml/kg/hour initially for children)
- Administer regular insulin – 0.1 IU/kg IV then 0.1 IU/kg/hour IV infusion
- Double infusion rate if less than 10% fall in blood glucose after 1 hour
- When blood glucose < 250 mg/dl, add 5% dextrose @ 50 ml/hour
- Supplement potassium before insulin if serum K^+ < 3.3 mEq/L (or ECG changes)
- Replace potassium @ 10-20 mEq/hour with insulin infusion if serum K+ < 5.5 mEq/L
- If pH < 7.0, add sodium bicarbonate; 50 mmol in 200 ml sterile water over 2 hour
- Bicarbonate should be given only: if pH is less than 6.9 or if pH is less than 7.1 along with hypotension or if hyperkalemia is present

WHEN TO STOP INSULIN INFUSION?

- Patient accepting orally, blood glucose consistently < 250 mg/dl, normalization of anion gap and correction of metabolic acidosis
- Administer SC dose of long/intermediate-acting & short acting insulin at least 30 mins before stopping insulin infusion. Shift to basal-bolus/pre-mixed insulin regimen

COMMON ERRORS/PITFALLS IN DKA DIAGNOSIS AND MANAGEMENT

- Initiating Insulin therapy before I/V fluid therapy
- Failure to review fluid replacement therapy particularly in elderly patients
- Failure to identify underlying cause
- Search for another cause of obtundation: If the osmolality is <than 320 mOsm/kg H_2O
- Potassium: may be normal despite depletion of body stores due to metabolic acidosis
- Elevated total leucocyte count does not suggest presence of infection until more than >15 X 109/l
- Monitor for cerebral edema especially in childern
- Body temperature cannot be used as a guide to presence of infection
- Hyperamylasemia: Cannot be used as a marker for diagnosis of pancreatitis
- Hypertriglycredemia: can cause pseudohyponatremia and when marked precipitates pancreatitis
- Ketosis may worsen paradoxically with successful treatment initially
- Stopping I/V insulin before S/C insulin given

ABBREVIATIONS

BUN: Blood urea nitrogen
DKA: Diabetic ketoacidosis
ECG: Electrocardiogram
GCS: Glasgow coma scale
I/V: Intravenous
ICU: Intensive care unit
SC: Subcutaneous
VBG: Venous blood gas

KEEP A LOW THRESHOLD FOR TIMELY DIAGNOSIS AND MANAGEMENT OF DKA

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

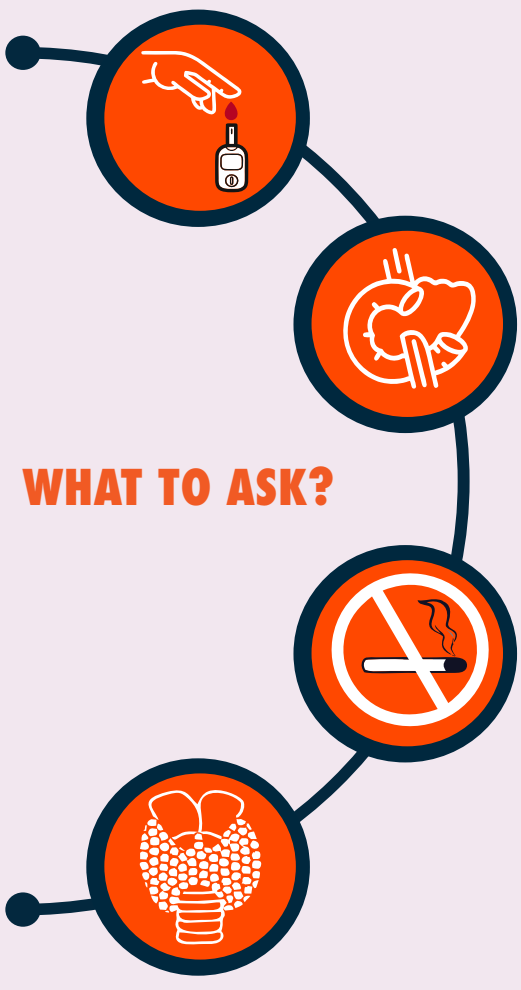
Standard Treatment Workflow (STW)

FRAGILITY FRACTURES

ICD-10-Z87.310

WHAT ARE FRAGILITY FRACTURES

- To be suspected in fractures resulting from trivial trauma or fall from a standing height or less
- For example fracture neck of femur, forearm fracture (Colle's), vertebral fracture



WHAT TO ASK?

Postmenopausal females	Family history of fracture	Previous history of fracture
Renal stone disease	Pancreatitis	Steroid abuse or alternative medications or clinical stigma of cushing's
Premature ovarian failure (less than 40 years)	Diabetes	Chronic diarrhoea or bloating sensation
Use of antiepileptics like phenytoin etc Cushings with hypogonadism	Chronic systemic illnesses like rheumatoid arthritis	Smoking, chronic systemic diseases, CKD, CLD, Endocrine disorders, Thyroid disorders, Hypogonadism

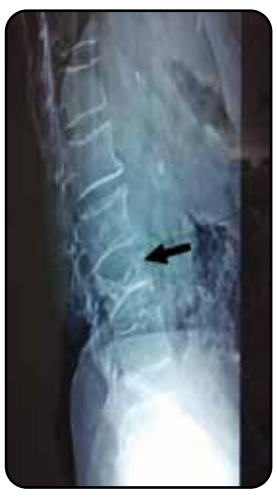
INVESTIGATIONS

Biochemical:
Fasting serum calcium, phosphate, alkaline phosphate and albumin (if available) hemogram
myeloma-proteins in serum or urine
Fasting blood glucose PTH (parathyroid)
25 hydroxy Vitamin D, IgA tTg
Renal function tests, bone markers beta cross LAP

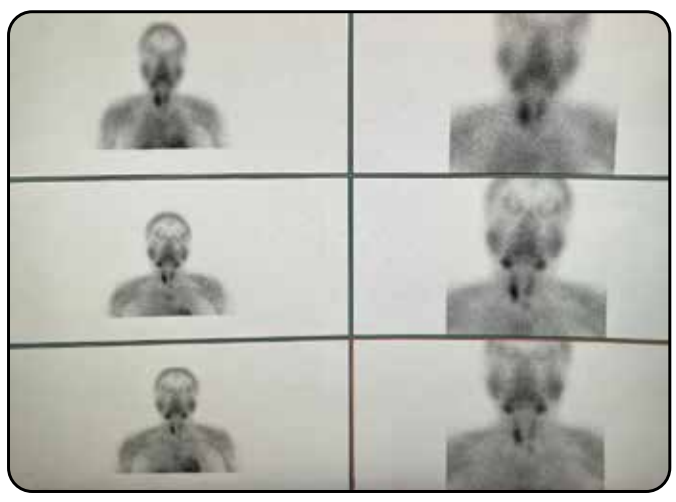
Bone imaging:
DXA scan osteoporosis T score-osteoporosis ≥ -2.5 severe osteoporosis= fracture or T score ≥ -3.0
X-ray of fracture site Use Z score for age less than 50 for men and premenopausal women
X-ray lumbar spine (Lateral), pelvis (AP), skull (lateral), both hands

Ultrasound abdomen, gall stones, renal stones and nephrocalcinosis, Ultrasound neck, enlarged parathyroid
Sestamibi scan for parathyroid enlargement

Fracture neck of the femur



L4 Osteoporotic fracture



Sestamibi Scan for parathyroid adenoma

HOW TO TREAT?

Resuscitate the patient if needed
Stabilize the fracture

WHEN AND WHERE TO REFER?

Refer to orthopaedician for fracture management surgical management

Refer to endocrinologist for evaluation and treatment of osteoporosis

TREATMENT

- Daily oral calcium 1-1.5 gm/day
- Vitamin D supplementation to maintain serum 25OHD levels of 30.0-50 ng/ml
- Stop smoking alcohol
- Inj Zoledronic acid 5mg I/V infusion OR
- Inj Denosumab 60mg S/C every 6 months OR
- Inj rPTH 20 µg S/C daily for maximum 2 years

ABBREVIATIONS

CKD: Chronic kidney disease
CLD: Chronic liver disease
rPTH: recombinant Parathyroid hormone

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

HYPOTHYROIDISM

ICD-10-E03.9

WHEN TO SUSPECT HYPOTHYROIDISM ON CLINICAL GROUNDS?

Primary hypothyroidism	Congenital hypothyroidism	Central (Secondary) hypothyroidism
Symptoms Fatigue / Weight gain with poor appetite / Dry skin and cold intolerance / Hair loss / Constipation / Hoarseness of voice / Dyspnea / Muscle weakness and cramps / Menorrhagia (later oligomenorrhea or amenorrhea) / Infertility / Difficulty concentration and poor memory / Paraesthesia / Impaired hearing **Signs** Dry coarse skin / Cool peripheral extremities / Puffy face, hands and feet (myxoedema) / Diffuse alopecia / Goitre / Bradycardia / Peripheral Oedema / Delayed tendon reflex relaxation / Carpel tunnel syndrome / Serous cavity effusions	New born screening (usually asymptomatic)Prolonged icterus / Edema of the eyelids, hands, and feet / Hypotonia / Inactivity / Gestation > 42 wk / Birth weight > 4 kg / Poor feeding / Hypothermia / Abdominal distention / Open posterior fontanelle (> 5 mm)	Mild-moderate symptoms of hypothyroidism / Signs and symptoms of other pituitary deficits / Manifestations of concomitant hypothalamic pituitary disease Clinical manifestation are less pronounced in secondary hypothyroidism as compared to primary hypothyroidism as there may be multiple pituitary hormone deficiencies which can mask the features of hypothyroidism

Billewicz scoring for diagnosis of Hypothyroidism

Symptoms	Score if present	Physical signs	Score if present
Hearing impairment	1	Slow movement	1
Diminished sweating	1	Periorbital puffiness	1
Constipation	1	Delayed ankle reflex	1
Paraesthesia	1	Coarse skin	1
Haorseness	1	Cold skin	1
Weight increase	1	Add 1 point for women younger than 55 years Total score:12	
Dry skin	1		

Hypothyroid ≥6 points **Intermediate 3-5 points** **Euthyroid ≤2 points**

HOW DOES ONE CONFIRM CLINICAL SUSPICION OF HYPOTHYROIDISM?

Primary hypothyroidism	Congenital hypothyroidism	Central (Secondary) hypothyroidism
Tests to be ordered TSH FT4 or Total T4 TPO antibodies (if available) **Interpretation** Overt hypothyroidism - TSH elevated with low FT4 or T4 levels Subclinical hypothyroidism - TSH elevated with normal FT4 or T4 levels	**Tests to be ordered after 72 hours** TSH FT4 or T4 USG neck, nuclear imaging (Not a must, Do not delay treatment) **Interpretation** Screening - TSH > 30 mU/ L; T4 < 10th centile Confirmatory - TSH > 9 mU/L; FT4 < 0.6 ng/ml	**Tests to be ordered** FT4 or T4 TSH Other pituitary profile Imaging of sella **Interpretation** TSH levels normal or low with low FT4 or T4 levels

INITIATING THERAPY

Primary hypothyroidism	Congenital hypothyroidism	Central (Secondary) hypothyroidism
Levothyroxine 1.6 to 1.8 mcg per kg per day Single dose, fasting status, no calorie intake for 1 hour thereafter Titrate based on TSH levels Elderly and CAD patients: Start with 12.5–25 mcg/d with 12.5 - 25mcg/d incremental dose every 3–4 wk Consider treating subclinical hypothyroidism in presence of - Large goitre / Positive TPO antibody / ASCVD / Heart failure / Dyslipidemia / Infertility / Depression / refractory anaemia / personal or family history of autoimmune disease	Levothyroxine therapy 10 to 15 mcg per kg per day Single daily dosing Given with breast milk in powdered form Titrate based on FT4 levels and TSH initially, later based on TSH levels	Levothyroxine 1.3 mcg per kg per day Treatment to be initiated only after treating co existing adrenal insufficiency with Hydrocortisone replacement as there is risk of precipitating adrenal crisis, Titrate based on FT4 or T4 levels

HOW SHOULD THE PATIENT BE FOLLOWED UP?

Primary hypothyroidism	Congenital hypothyroidism	Central (Secondary) hypothyroidism
Titrate based on TSH levels • Target TSH ‣ Young patient's 1–2.5 mU/L ‣ Middle-aged patients 1.5–3 ‣ Elderly patients ◦ < 60 y: > 4.5 mU/L ◦ 60–70 y: > 6.0 mU/L ◦ 70–80 y: > 7.0 to 8.0 mU/L • Once in 3 to 6 months initially, once stable dose is achieved, annual follow up	**Titrate based on FT4 or T4 levels and TSH** • Titrate based on FT4 or T4 levels and TSH • Target T4: 10 to 16 mcg/dl • Target FT4: 1.4 to 2.3 ng/dl • Target TSH: 0.5 to 2 mU/L • Initial follow up at 2 and 4 weeks • Every 1 to 2 months in first 6 months • Every 3 to 4 months from 6 months to 3 years of age • Every 6 to 12 months till growth is complete	**Titrate based on FT4 or T4 levels** • Target T4 or FT4 Young people - upper half of normal range • Elderly - mid normal range • Once in 3 to 6 months initially, once stable dose is achieved, annual follow up

ABBREVIATIONS

ASCVD: Atherosclerotic cardiovascular disease
CAD: Coronary Artery Disease
TPO: Thyroid peroxidase
TSH: Thyroid-stimulating hormone
USG: Ultrasound sonography

REFERENCES

1. Billewicz WZ, Chapman RS, Crooks J, Day ME, Gossage J, Wayne E, et al. Stastical Methods applied to the diagnosis of hypothyroidism. Q J Med. 1969;38:255–66

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

GASTROENTEROLOGY

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

ACUTE GASTROINTESTINAL BLEED IN ADULTS - PART A

ICD-10-K92.2

Diagnose Acute GI Bleed if there is history of

- Vomiting of blood (Hematemesis)
- Bleeding per rectum (Hematochezia) — RED STOOLS
- Black tarry stools (Melena) — BLACK STOOLS
- Blood in nasogastric tube (NG) (Active GI bleed)

ASSESS FOR HIGH RISK
(Classify as high risk if any of these are present)

- Pulse rate >100/min
- Systolic BP <90 mmHg
- H/O Syncope
- Oxygen saturation <90%
- Altered sensorium
- Age >60 years and/ or significant co-morbid conditions

RESUSCITATE

- Place atleast one IV cannula (minimum 18 G) and start crystalloids (Ringer's lactate or normal saline)
- Place a NG tube and perform lavage
- Start supplemental oxygen at 2 L/min in high risk cases and those in shock
- Stop antiplatelets and anticoagulants. If H/o recent myocardial infarction or stent placed, consult a cardiologist
- Refer all high risk cases after initial resuscitation

TARGETS

- Pulse rate <100/ min
- Systolic BP >90 mmHg
- Oxygen saturation >90%
- Hemoglobin >7 g/dL (in case of heart disease >9g/dL)

CLINICAL EVALUATION

Assess for	History and examination	Points towards
Site of bleed	Hematemesis/ blood in NG tube/ melena	Upper GI bleed
	Fresh blood per rectum/ maroon stools	Lower/Upper GI bleed
Etiology	H/o - alcohol intake/ jaundice/ blood transfusion O/E - jaundice/ ascites/ splenomegaly	Variceal bleed
	H/o epigastric pain/ NSAID intake/ antiplatelets	Ulcer bleed
	If lower GI Bleed: H/o fever/ diarrhea	Infective causes (eg: Typhoid)
	H/o bleeding per rectum with concomitant yellow stools	Hemorrhoids/ rectal lesion
Rate of blood loss	Large volume hematemesis/ fresh blood/ frequent melena/ postural giddiness/ breathlessness/ hypotension	Rapid blood loss
Precipitants	Aspirin/ NSAIDs/ antiplatelets/ anticoagulants	Stop all precipitants
Co-morbid conditions	Cardiovascular disease/ renal disease/ malignancy	Assess functional status

INVESTIGATIONS

Hemoglobin, platelets, TLC, PTL, INR

Blood grouping and cross matching to arrange blood

Desirable Tests:
Prothrombin time/ INR, liver function tests, blood urea and creatinine, HBsAg, Anti HCV ultrasound abdomen

MANAGEMENT

Continue resuscitation
(As detailed above)

Blood transfusion
Give packed RBC/ whole blood if Hb <7 g/dL (or Hb <9 g/dL in case pre-existing heart disease)

Patient may need ICU care depending on the overall general condition. If patient is in altered sensorium and bleeding actively secure airway

PHARMACOTHERAPY

Diagnosis	Class of drugs	Administration regimen
All patients	PPIs	Inj. Pantoprazole or Esomeprazole 80 mg I.V. stat, followed by 40 mg 12 hourly; if I.V. not available, give oral Pantoprazole/ Esomeprazole. Stop if variceal bleed is documented
Suspected variceal bleed	Vasoconstrictors	Inj Terlipressin* 2 mg I.V. stat, followed by Terlipressin 1 mg 6 hourly X 3-5 days OR Inj. Somatostatin 250 µg I.V. stat, followed by 250 µg/ hr infusion X 3-5 days OR Inj. Octreotide 50 µg stat I.V. followed by 50 µg/ hr infusion X 3-5 days
		* Avoid Terlipressin in patients with suspected heart disease or peripheral vascular disease. if patient is on Terlipressin examine for signs of peripheral/ cardiac ischemia regularly
	Antibiotics	Inj Ceftriaxone I.V. 1 g 12 hourly x 3-5 days OR Inj Cefotaxime I.V. 1 g 8 hourly X 3-5 days
Lower GI bleed with fever	Antibiotics	Inj Ceftriaxone 2g I.V. 12 hourly AND Inj Metronidazole 500 mg I.V. 8 hourly — X 5 days

**All cases of acute GI Bleed must undergo endoscopy within 24 hours of initial stabilisation.
Patients with active ongoing bleed may require an earlier endoscopy.
Appropriate informed consent to be taken prior to endoscopy.**

REFER TO PART B OF TREATMENT WORKFLOW FOR ENDOSCOPIC THERAPY AND/ OR SURGERY

ABBREVIATIONS

HCV: Hepatitis C virus
INR: International normalized ratio
NG: Nasogastric
NSAID: Nonsteroidal anti-inflammatory drugs
PPIs: Proton pump inhibitors
PTL: Platelet count
RBC: Red blood cell
TLC: Total leukocyte count

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

ACUTE GASTROINTESTINAL BLEED IN ADULTS - PART B

ICD-10-K92.2

INTERVENTIONAL MANAGEMENT

UPPER GI ENDOSCOPY (UGIE)

PORTAL HYPERTENSION (PHT)

ESOPHAGEAL VARICES:
- Variceal band ligation is preferable
- Sclerotherapy if band ligation not feasible/ available

FUNDAL VARICES:
0.5 - 1 mL of Cyanoacrylate glue injection per varix

FURTHER MANAGEMENT
- LFT and viral markers
- USG abdomen
- Try to ascertain the etiology of portal hypertension

Continue vasoactive drugs for total of 5 days in patients with:
- Active bleeding on endoscopy
- Patients who are Child-Pugh class C status
- Received >4 packed red cell transfusions

Recommendations for transfusion:
- Consider in case of active bleeding
- Transfuse platelets if platelet count is <50000/ mm^3

In case of rebleeding:
Try another attempt to control with endotherapy

Failure to control bleeding:
Fully covered large bore esophageal metal stent or TIPS

TREATMENT AT DISCHARGE

Propranolol (20 mg) 12 hourly, increase incrementally to achieve a heart rate of 60/min unless contraindicated

Repeat endoscopy and assessment for EVL after 2 weeks, continue EVL every 2 to 3 weekly till varices are eradicated.

Plan for long term care of patients for underlying liver disease

GASTRIC OR DUODENAL ULCER

ULCER WITH ACTIVE SPURT/ SLOW OOZING/ VISIBLE VESSEL:

Inject around the ulcer 1:10000 Adrenaline diluted in saline + hemoclips/ thermal device (APC/ electrocoagulation)

FURTHER MANAGEMENT

Continue PPI infusion for 72 hours

Do relook endoscopy after 24 hours if index endoscopy showed active bleeding and if the endoscopic hemostasis was inadequate

If rebleeding:
Try another attempt to control with endotherapy

Failure to control bleeding:
Refer to higher centre where surgical treatment is available

TREATMENT AT DISCHARGE

Pantoprazole/ Omeprazole (40 mg) twice a day for 4 weeks.

Reconsider need for NSAIDs

Repeat endoscopy and ***H. pylori*** testing at 4- 6 weeks and appropriate treatment

PRESENTATION WITH HEMATOCHEZIA OR MELENA (BUT NO HEMATEMESIS) AND UGIE IS NORMAL

IF ACTIVE LOWER GI BLEEDING:
- **After stabilisation, if facility for colonoscopy available:**
  - Prepare bowel with polyethylene glycol solution before colonoscopy
  - Hemostasis can be achieved as in UGI bleeding
  - If colonoscopy is normal, consider small bowel evaluation
- **If facility for colonoscopy not available:**
  - Stabilise & refer to a centre with facility for surgery and colonoscopy

FURTHER MANAGEMENT

Continue I.V. antibiotics for 5 days or longer depending on the nature of infection

Rebleeding:
Refer to a centre with surgery/ angiography

If unidentified source on UGIE and colonoscopy, refer to higher centre

TREATMENT AT DISCHARGE

In case of infectious etiology continue oral antibiotics for a total of 10-14 days

RESTARTING OF ANTI PLATELETS/ ANTICOAGULANTS (IF INDICATED)

- After control of bleed: resume low dose Aspirin on day 1
- Other antiplatelets/ anticoagulants may be resumed by day 3-5
- Consultation with cardiologist should be taken

DISCHARGE CRITERIA

Hemodynamically stable	Heart rate <90/min	Patient is conscious	No bleeding for at least the past 72 hours (as indicated by no further fall in hemoglobin)

ABBREVIATIONS

APC: Argon plasma coagulation
EVL: Endoscopic variceal ligation
GI: Gastrointestinal
H. pylori: *Helicobacter pylori*
LFT: Liver function test
NSAIDs: Non-steroidal anti-inflammatory drugs
PPI: Proton pump inhibitor
TIPS: Transjugular intrahepatic portosystemic shunt
USG: Ultrasonography

☛ IN ELDERLY PATIENTS WITH GI BLEEDING, ENSURE THAT MALIGNANCY HAS BEEN RULED OUT

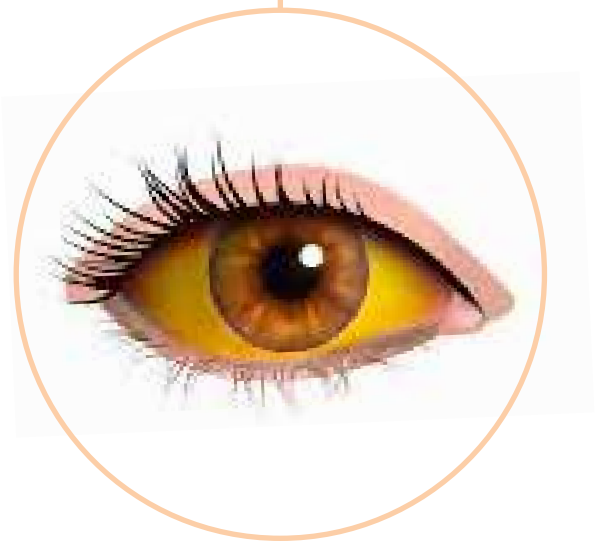
July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

JAUNDICE

ICD-10-R17



SIGNS & SYMPTOMS

- Viral prodrome
- Loss of appetite/ nausea/ vomiting
- High coloured urine
- Pain abdomen
- Fever
- Itching, clay coloured stools

ESSENTIAL TESTS

SERUM BILIRUBIN > 1.5 mg/DL

Anorexia/ nausea/ vomiting Viral Prodrome	Pain Pruritus Clay coloured stool
↑↑LFT/SGOT/SGPT ↑↑ SAP ↑	↑↑LFT/SGOT/SGPT ↑ SAP ↑↑
USG: NO BILIARY DILATATION	USG: BILIARY DILATATION
PARENCHYMAL LIVER DISEASE (HEPATITIS)	**BILIARY OBSTRUCTION**

DIFFERENTIAL DIAGNOSIS: COMMON CAUSES

JAUNDICE (ISOLATED RAISED BILIRUBIN)

- Hemolytic anaemia
- Congenital hyperbilirubinemia

OBSTRUCTIVE JAUNDICE

Benign:
- Common bile duct stone
- Biliary stricture

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

PARENCHYMAL LIVER DISEASE

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

SYSTEMIC INFECTIONS (USUALLY WITH FEVER)

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

SUPPORTIVE LAB EVIDENCE

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

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

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

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

MANAGEMENT

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

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

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

- Treat specific systemic infection
- Normal diet

REFERRAL TRIGGERS

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

ABBREVIATIONS

ATT: Anti tubercular drugs
Bilirubin: Direct=conjugated, indirect=unconjugated
ERCP: Endoscopic retrograde cholangiopancreatography
LFT: Liver function test
GGT: gamma-glutamyl transferase
MRCP: Magnetic resonance cholangiopancreatography
PTBD: Percutaneous transhepatic biliary drainage
SAP: Serum Alkaline Phosphatase
SGOT: Serum Glutamic-Oxaloacetic Transaminase
SGPT: Serum Glutamic Pyruvic Transaminase
TLC: Total Leucocyte Count

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

LIVER FAILURE

ICD-10 K72.90

ACUTE LIVER FAILURE OR ACUTE ON CHRONIC LIVER FAILURE

ACUTE LIVER FAILURE (ALF)
- Acute liver injury
- No underlying liver disease

ACUTE ON CHRONIC LIVER FAILURE (ACLF)
- Underlying liver disease
- Acute precipitating event

DIAGNOSTIC CRITERIA

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

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

CAUSES

- **Primary liver disease:** Viral hepatitis, Drug induced hepatitis (e.g. ATT), Acute Fatty Liver of Pregnancy /HELLP syndrome, Poisoning
- **Systemic infection with secondary liver involvement:** Malaria, Leptospirosis, Typhoid, Rickettsial disease

  Suspect if:
  - Fever is a predominant symptom
  - Rash (Rickettsial)
  - Renal dysfunction
  - Anemia, thrombocytopenia, subconjunctival haemorrhage

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

INVESTIGATIONS

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

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

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

MANAGEMENT

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

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

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

- **If GI Bleeding: Refer to STW on GI bleeding**

TREATMENT AT HIGHER CENTRE

ORGAN FAILURE

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

2. Respiratory Failure
- O_2 inhalation
- Nebulization if bronchoconstriction
- May require ventilation

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

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

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

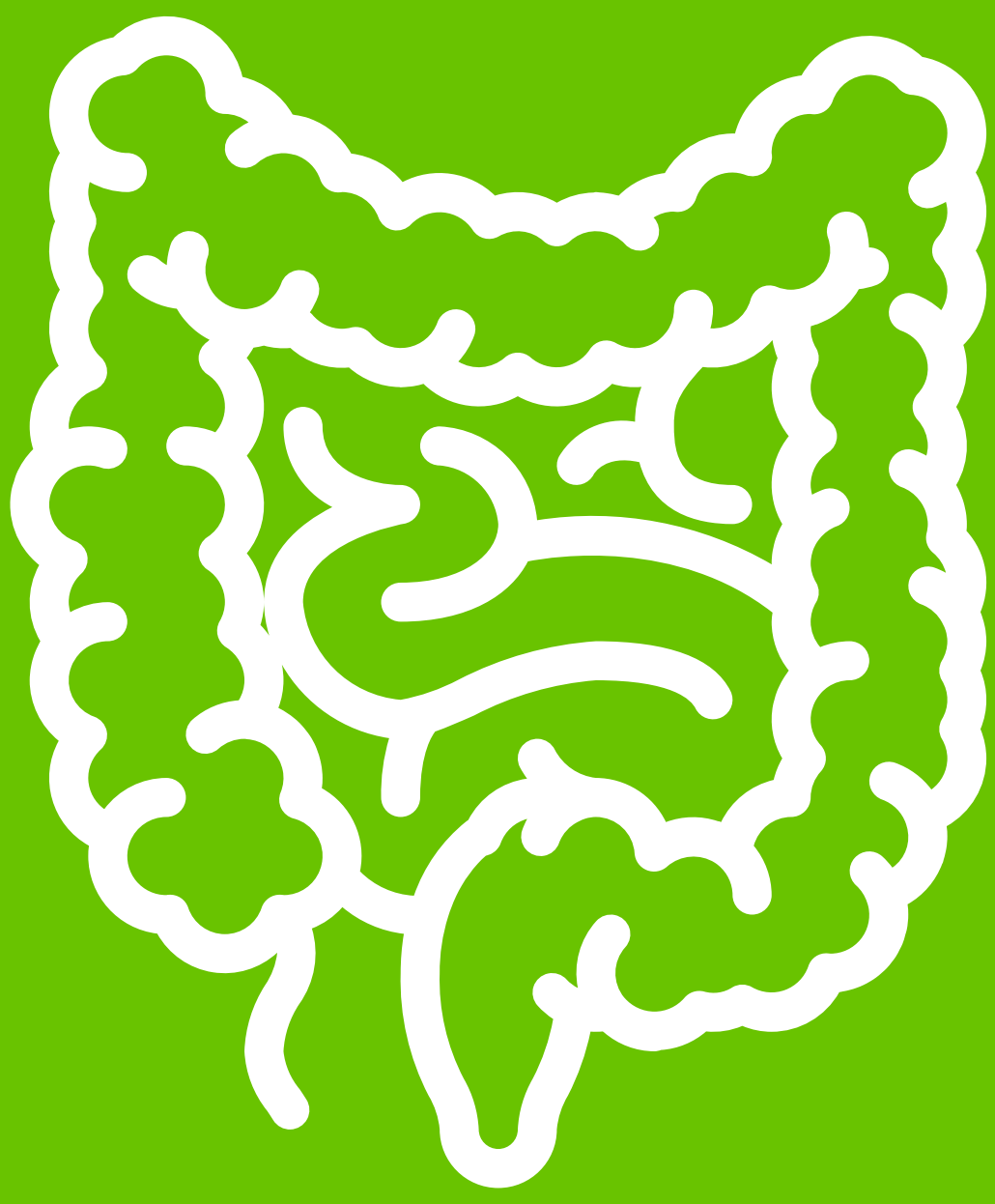
ENCEPHALOPATHY
- Treat the underlying precipitating factor
- Usual care for comatosed patient
- Secure airway if grade 3-4 encephalopathy

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

ABBREVIATIONS

HELLP: Haemolysis, elevated liver enzymes, low platelet count
IgM anti-HAV: Immunoglobulin M antibody to hepatitis a virus
HBsAg: Hepatitis B virus surface antigen
IgM anti-HBc: Immunoglobulin M antibody to Hepatitis B core antigen
IgM anti- HEV: Immunoglobulin M antibody to hepatitis E virus
ATT: Anti-Tubercular treatment
INR: International normalised ratio
UGIE: Upper gastrointestinal endoscopy

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: (**stw.icmr.org.in**) for more information.



GENERAL SURGERY

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

APPENDICITIS

ICD-10-K35

PRESENTATION OF APPENDICITIS MAY BE AS

1) Acute appendicitis
   - early / delayed
2) Appendicular mass
3) Recurrent appendicitis

ACUTE APPENDICITIS
(Early presentation within 72 hours)

SYMPTOMS OF ACUTE APPENDICITIS

1) Pain
a) Periumbilical or epigastric colic (in nonobstructive type the pain may start at RIF)
b) Shifting of pain from periumbilical region or begins from this site
2) Nausea/ vomiting
3) Pyrexia (usually absent in first 6 hours)
4) Loss of appetite

NB:
a) Pain always precedes vomiting (Murphy). Onset of symptom is more acute and abrupt in acute obstructive appendicitis
b) If the patient has rigor and high fever within 24hrs of the onset of pain, appendicitis is most unlikely

SIGNS OF ACUTE APPENDICITIS

1. Pointing sign – The patient points with the index finger the site of maximum pain at region of Mc Burney's point
2. Cough test – C/O pain at right iliac fossa on coughing
3. Tenderness at Mc Burney's point
4. Muscle guard at right iliac fossa (RIF)
5. Rovsing's sign – pain at RIF with sudden thurst of palpation at left flank of abdomen
6. Rebound tenderness – pain at RIF with sudden withdrawal of the maintained pressure with hand
7. Generalised rigidity is a sign of generalized peritonitis; it is less marked if obese, emaciated, extremes of age

NB:
a) When appendix is retrocaecal the signs of appendicitis may be masked
b) Inflamed pelvic type of appendix in contact with urinary bladder or rectum may produce features of cystitis or tenesmus
c) Post ileal appendix may cause diarrhoea and marked retching.
d) With progress of pregnancy, appendicular pain may be up at right flank of abdomen as the caecum and appendix are pushed up
e) Females with inflammatory pelvic organ disease e,g, salpingitis may have history of dysmenorrhoea and purulent vaginal discharge

FACTORS FOR PREPONDENCE COMPLICATIONS

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

INVESTIGATIONS

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

TREATMENT

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

APPENDICECTOMY MAY BE

1) Conventional open surgery
2)Laparoscopic appendectomy

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

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

ACUTE APPENDICITIS (Late presentation beyond ≥ 72 hours)

→ **NO PALPABLE MASS** Appendicectomy open/ laparoscopic

→ **PALPABLE MASS** Ochsner sherren regimen

- S/S Improving conservative treatment continued
- S/S Deteriorating asses by USG for pus collection USG guided aspiration/ open drainage

APPENDICULAR MASS

OCHSNER-SHERREN CONSERVATIVE TREATMENT

(In the presence of appendicular mass, surgery may cause more bleeding, injury to caecum and ileum; faecal fistula may develop). Conservative treatment includes
- IV fluid:
- Broad spectrum antibiotics
- Vitamins
- **No purgative**
- **No Enema**

SIGNS OF IMPROVEMENT IN PRESENCE OF APPENDICULAR MASS

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

CRITERIA FOR STOPPING THE CONSERVATIVE TREATMENT

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

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

RECURRENT APPENDICITIS

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

COMMON BILE DUCT STONE

ICD-10-K 80.5

CLINICAL PRESENTATION OF CBD STONES

WHEN TO SUSPECT CBD STONES IN CASE OF GALL STONE DISEASE

- Deranged LFT
- Dilated CBD on USG
- Raised TLC
- Features of acute cholangitis

ASYMPTOMATIC/ DETECTED ON WORK UP FOR GALLBLADDER STONES

- Abdominal pain → **OBSTRUCTIVE JAUNDICE**
- Abdominal pain
- Fever with chills
- Shock → **ACUTE CHOLANGITIS**
- Pain typically radiating to back
- Increased amylase → **BILIARY PANCREATITIS**

WORK UP OF A PATIENT WITH SUSPECTED CBD STONES

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

Biochemical investigations
- Haemogram (TLC), blood urea, serum creatinine, amylase/ lipase
- **LFT**– Serum bilirubin, AST/ALT, ALP, PT/ INR
- Other investigations depending on comorbidities

→ **USG Abdomen**
- Gall bladder stones
- IHBRD, cholangitic abscess

→ If CBD stones not seen on USG →

MRCP / endoscopic USG - Investigation of choice
- Anatomy of biliary tree, IHBRD, stone size, location and CBD diameter
- Roadmap for intervention

MANAGEMENT OPTIONS
(PREFERABLY AT TERTIARY CARE CENTER)

GALL BLADDER STONES WITH CBD STONES

- Stone > 10 mm → Lap/ open cholecystectomy + CBD exploration
- Stone ≤ 10 mm → ERCP (includes sphincterotomy plus clearance of stones)
- In case of
  1. Cholangitis
  2. Biliary pancreatitis with CBD stones on imaging
  3. Non-dilated CBD with CBD stones
  4. Multiple comorbidities
  5. Limited surgeon experience with CBD exploration

  → Endoscopic stenting followed by ERCP & cholecystectomy → Failure → Lap/ open CBD exploration

POST CHOLECYSTECTOMY CBD STONES

→ ERCP → If ERCP fails → Lap/ open CBD exploration

OPTIONS FOR CBD CLOSURE AFTER CBD EXPLORATION

PRIMARY CLOSURE

PRIMARY CLOSURE WITH ENDOBILIARY STENT
1. Prevents bile leak
2. Needs endoscopy for stent removal within 6 weeks

T TUBE PLACEMENT

INDICATIONS
1. Purulent cholangitis
2. Excessive CBD manipulation
3. Incomplete clearance

→ Removal after T-tube cholangiogram to confirm pathway

DRAINAGE PROCEDURES

INDICATIONS
1. Multiple stones/hepatolithiasis
2. CBD > 2 cm dilated
3. Ampullary stricture

SURGICAL OPTIONS
- Choledochoduodenostomy
- Hepaticojejunostomy
- Transduodenal sphincterotomy/ sphincteroplasty

ABBREVIATIONS

ALP: Alkaline phosphatase
ALT: Alanine Transaminase
AST: Aspartate transferase
CBD: Common Bile Duct
ERCP: Endoscopic Retrograde Cholangiopancreatography
IHBRD: Intrahepatic Biliary Radical Dilatation
INR: International Normalised Ratio
LFT: Liver Function Test
MRCP: Magnetic Resonance Cholangiopancreatography
PT: Prothrombin Time

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DIABETIC FOOT

ICD-10-Z86.31

RED FLAG SIGNS

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

→ Refer to higher centre

EVALUATION OF PATIENT WITH DIABETIC FOOT

A. General condition

1. Vitals
2. Glycaemic control – FBS/ PPBS regularly, HbA1c once in 6 months

B. Local examination

Check both feet for the below mentioned conditions

1. ULCER

Ulcer
↓
See for open infected wound
↓
Check for osteomyelitis with bedside probe-to-bone test or an X-ray

If osteomyelitis not suspected:
- Do moist dressings
- Achieve good glycaemic control
- Off-load the foot

If osteomyelitis is suspected:
Refer to higher centre for further management

Also refer to higher centre with facilities for:
- Surgical debridement of wounds with necrotic tissue
- Cellulitis needing fasciotomy
- Wet gangrene needing amputation
- Cases needing negative pressure wound therapy

2. PERIPHERAL ARTERY DISEASE (PAD)

Peripheral artery disease
↓
- History of intermittent claudication,
- Absent pulsations in Posterior tibial artery and dorsalis pedis artery
- Ankle branchial index < 0.9

↓
Refer to higher centre for further evaluation and consideration for revascularisation

3. LOSS OF PROTECTIVE SENSATIONS (LOPS)

Neuropathy/ loss of protective sensations (LOPS)
↓
History of tingling, numbness, "feels like walking on mattress"
↓
Check for foot sensation using 10gm monofilament
↓
If sensations are absent and patient is asymptomatic, then educate the patient, advise protective footwear, and call for regular follow up as per risk category

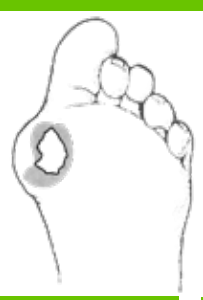
4. DEFORMITIES

Structural foot deformity
↓
Look for gross deformities like
- hammer toes
- claw toes
- hallux valgus
- pes cavus
- rocker bottom foot

↓
Refer to higher centre

PREDISPOSING FACTORS FOR DIABETIC FOOT ULCER

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



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

RISK ASSESSMENT & FREQUENCY OF FOLLOW UP

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

WOUND CARE

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

DON'T USE:
- Hydrogen peroxide, EUSOL, povidone iodine, chlorhexidine etc
- Hyperbaric oxygen, antimicrobial dressings and stem cell therapy has insufficient evidence to be recommended

INFECTION AND ANTIBIOTICS GUIDANCE

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

NON INFECTED WOUND

No antibiotics

MILD INFECTION

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

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

MODERATE INFECTION

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

SEVERE INFECTION

Local findings + systemic findings of SIRS (at least two of)
- Temperature >38°C or <36°C,
- Heart rate > 90/min,
- Respiratory rate > 20/min or PaCO2 <32 mm Hg,
- WBC >12000 or < 4000 or immature bands >10%

→ Refer to higher centre

MANAGEMENT OF OTHER RELATED FOOT CONDITIONS/ COMPLICATIONS

Corns/callosity	Web space fungal infection	In-growing toe nails	Charcot's foot
↓	↓	↓	↓
Scaling in OPD Footwear modification	Topical antifungals Maintain local hygiene	Regular nail trimming	Refer to higher centre

PATIENT EDUCATION

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

DON'T:
- Walk barefoot, even at home
- Remove calluses/ corns at home
- Smoking: delays healing

ABBREVIATIONS

EUSOL: Edinburgh university solution of lime
FBS: Fasting blood sugar
LOPS: Diabetic peripheral neuropathy with loss of protective sensation
PAD: Peripheral arterial disease
PPBS: Post prandial blood sugar
SIRS: Systemic inflammatory response syndrome

☛ ALWAYS KEEP A LOW THRESHOLD FOR REFERRAL TO HIGHER CENTRE

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

GALL STONE DISEASE

ICD-10-K80.20

SYMPTOMS

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

PRESENTATION OF A PATIENT WITH GSD

SYPMTOMATIC | ASYPMTOMATIC | COMPLICATED

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

INVESTIGATIONS

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

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

- USG abdomen–investigation of choice (sensitivity–95%)

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

MRCP

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

EVALUATION OF COMORBIDITIES

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

MANAGEMENT

ASYMPTOMATIC

Laparoscopic Cholecystectomy +/-

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

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

SYMPTOMATIC

Laparoscopic Cholecystectomy

- Acute calculous cholecystitis → Conservative
  - **NON RESOLVING**: Cholecystostomy followed by laparoscopic cholecystectomy by experienced laparoscopic surgeon after 6 weeks
  - **STABLE**: Early LC – within 24-72 hours (if expertise available) OR Delayed LC – after 6 weeks by experienced lap surgeon
- Gangrene/ perforation → Emergency lap/ open cholecystectomy
- Acute pancreatitis → Conservative management
  - Mild/ moderate pancreatitis → Lap cholecystectomy within same hospital admission
  - Severe pancreatitis → Lap cholecystectomy after 4-6 weeks of resolution of pancreatitis
- Acalculous cholecystitis → Conservative management
  - Unstable → Non resolving symptoms → Cholecystostomy → Lap Cholecystecto-my (if required)
  - Stable → Conservative management only → Lap cholecystectomy if symptoms persists after resolution of acute phase
- Concomitant GSD+ CBD stones → Refer to CBD stones STW

COMPLICATED

(If possible patient should be managed in a tertiary centre after initial resuscitation)

MANAGEMENT OF ACUTE CHOLECYSTITIS (CONSERVATIVE)

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

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

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

POST LAP CHOLECYSTECTOMY COMPLICATIONS

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

FOLLOW UP

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

CONVERT EARLY IN CASE OF DOUBT IN LAP CHOLECYSTECTOMY

REFER PATIENT EARLY IN CASE OF ANY DOUBT IN POST OP

ABBREVIATIONS

CBD: Common biles ducts
GSD: Gall stone disease
HPE: Histopathological examination
LC: Laparoscopic cholecystectomy
MRCP: Magnetic resonance cholangiopancreatography

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

INCISIONAL/ VENTRAL HERNIA

ICD-10-K43.9

Symptoms :

1) Swelling on anterior abdominal wall
2) Cough impulse
3) Reduces on lying down (especially during early phase)

Severe local pain or generalized colicky pain

Generally indicative of complications:
- Obstruction
- Incarceration
- Strangulation

Surgical emergency

History of surgery at same site

No

- Primary Ventral hernia
- Epigastric hernia
- Umblical hernia
- Paraumblical hernia

Investigate if:

doubtful diagnosis

Defect size > 2 cm

Mesh hernioplasty

Defect size < 2 cm

Primary anatomical closure

Yes

- Incisional Hernia

USG/ CT scan to determine accurate number and size of defects

Mesh hernioplasty

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

Mesh placement: sublay manner preferred. Drains recommended

CLINICAL EVALUATION

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

MANAGEMENT

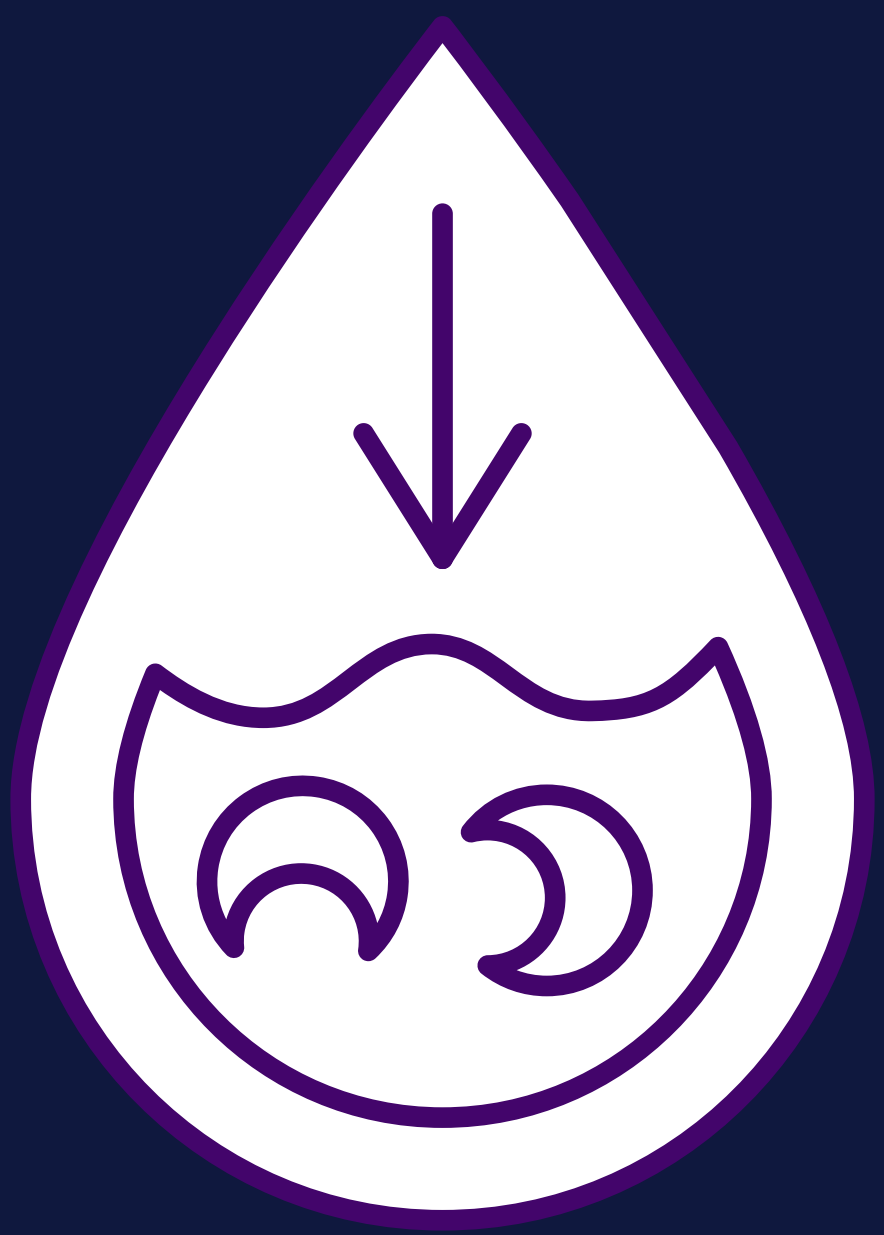
- In general, ventral hernias should be repaired, as untreated hernias are at risk of life threatening complications.
- Exceptions: untreated ascites especially with portal hypertension, severe comorbidities precluding safe surgery, large hernias where repair may cause more morbidity such as bowel injury.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

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

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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: (**stw.icmr.org.in**) for more information.



HAEMOLYTIC ANAEMIA

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

SICKLE CELL DISEASE

ICD-10-D57

GENERAL INTRODUCTION

- Hemolytic anemia, where RBCs sickle under hypoxia or stress. Sickling and inflammation lead to vaso-occlusive crisis (VOC) and organ damage
- Autosomal recessive - mutations in the β-globin gene
- ~88% of sickle homozygous cases in Asia are Indians

SUBTYPES

Carriers/ heterozygous (HbAS)	Disease/ sufferer/ homozygous (HbSS)	Other symptomatic genetic variants
Have only one disease allele, usually asymptomatic	Have both defective alleles, usually symptomatic	HbS-β thalassemia, HbSD-Punjab disease, HbSE disease etc.

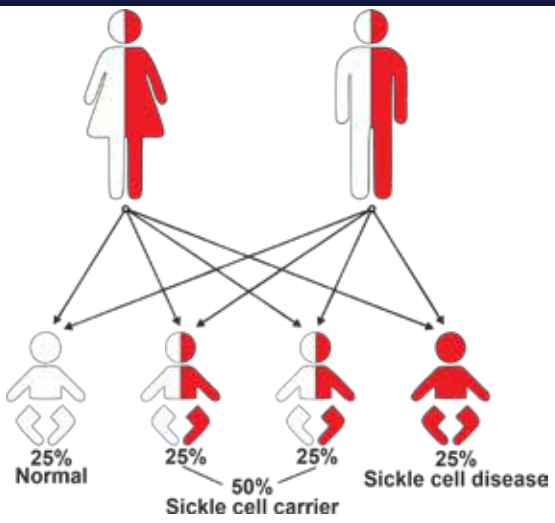
MANIFESTATIONS OF VOC

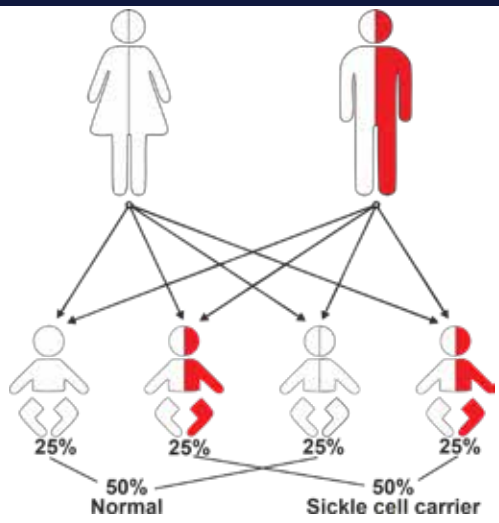
- Experienced as pain, or swelling
- Each VOC can lead to long lasting problems and end-organ damage
- Typical sites - hands and feet, limbs, abdominal viscera, ribs, sternum etc.
- The crisis is usually precipitated by fever, strenuous exercise, dehydration, drenching in rain, surgery, infection etc.

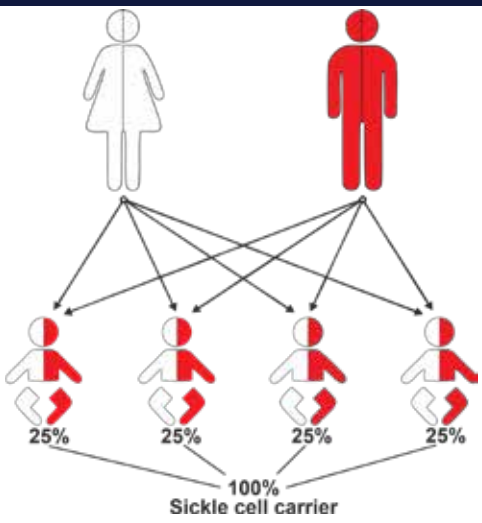
THIS FAMILY TREE SHOWS THROUGH MENDELIAN TRANSMISSION - THE RISK OF HAVING AFFECTED CHILDREN ACROSS GENERATION IN PARENTS WITH SCD - HETEROZYGOUS AND HOMOZYGOUS.

LEGEND

- Half red color – one affected allele - carrier (HbAS)
- Full red color – two affected alleles - homozygous/ diseased (HbSS)
- No red color – both alleles normal







CLINICAL MANIFESTATIONS OF SCD

- Common presentations - Pain, anemia, icterus, increased risk of infection
- Acute morbidity/ events - Splenic sequestration, fatigue, acute chest syndrome, priapism
- Long term complications - End organ damage, hepatopathy, chronic kidney disease, hypersplenism, avascular necrosis of femur, osteomyelitis, pulmonary hypertension, cholelithiasis, functional disability, retinopathy, foot ulcers- refer to a higher center for adequate management

Target group to be screened	Tests / remarks
Antenatal Mothers or pre-pregnancy planning	• CBC all women in first trimester • In endemic pockets/ high risk population: solubility test/ POC tests for sickle cell • Or HPLC and electrophoresis, if available » If mother is a sickle cell carrier/ disease, » Then testing of father is mandatory, » Ideally by HPLC, if not available refer to higher center » If father tests positive, counselling and pre-natal testing should be performed (at centers with necessary facilities) to prevent risk of birth of affected newborn
Newborn	• POC tests to initiate penicillin prophylaxis in baby and enrolling vaccination program • HPLC and electrophoresis, if available or at later date
Population screening/ patient of any age	• In endemic pockets/ high risk population: solubility test/ POC tests for sickle cell

GENERAL PRINCIPALS OF MANAGEMENT

- Carriers are usually asymptomatic and needs no treatment
- The goal of management is to improve quality of life and life expectancy of the affected individuals
- Episodes of fever have to be dealt with early and aggressively
- Early and aggressive management of pain should be advocated, since pain may be indicative of microvascular organ damage. Pain management using paracetamol, diclofenac or tramadol. For severe pain, refer to higher centre
- Malaria in SCD patients will be present with same frequency as endemic prevalence
- Evaluate for anaemia. Iron supplements for anemia to be used cautiously (low dose - not more than 3 months). Other nutritional causes (Vit B12, and Folic acid deficiency) and infectious causes (worm infestations) to be evaluated
- Prophylaxis for infections– penicillin, immunizations and folic acid supplement, disease modifying agents like hydroxyurea (HU) and blood transfusions have specific indications
- Acute morbidity events occur over the lifetime and require management, regular monitoring may help to reduce severity of complications
- Only curative therapy is hematopoietic stem cell transplantation. This is recommended and beneficial in a small subset of patients not responding to HU or newer disease modifying agents

PROPHYLAXIS FOR ALL SCD PATIENTS

New born HbSS till 5 years of age	**Penicillin prophylaxis-** 65mg BD, less than 12 months 125 mg BD till 2 years , then 250mg BD till 5 years lifelong if post splenectomy
To prevent megaloblastic crises	Folic acid- less than 1 year of age, 2.5 mg daily 1 year of age, 5 mg daily
Common recommended vaccinations	Pneumococcal Vaccine H-influenza vaccine Typhoid Vaccine Influenza vaccine COVID 19 vaccine

HOW TO PRESCRIBE HYDROXYUREA

Indications for HU	Baseline Investigations	Dosing	Toxicity
• Above 2 years of Age • All children more than 9 months of age may be offered	• Complete physical Examination • CBC • Liver function test • Renal function • Pregnancy test for relevant population	• Infants and Children: 10-15 mg/kg/day • Adolescents: 15mg/kg/day • Dose escalation by 5 mg/kg; 2-3 months only in definite indications • CBC monitoring 1-3 months when starting the medicine or if dose change	• Common dose dependent toxicity: anaemia, nausea, diarrhoea, gastritis • Nail/ skin hyperpigmentation • Long term toxicity: Mucositis or leg ulcers

Red Flag for hospitalization or referral to higher centre

Acute illness requiring immediate medical care, including emergencies

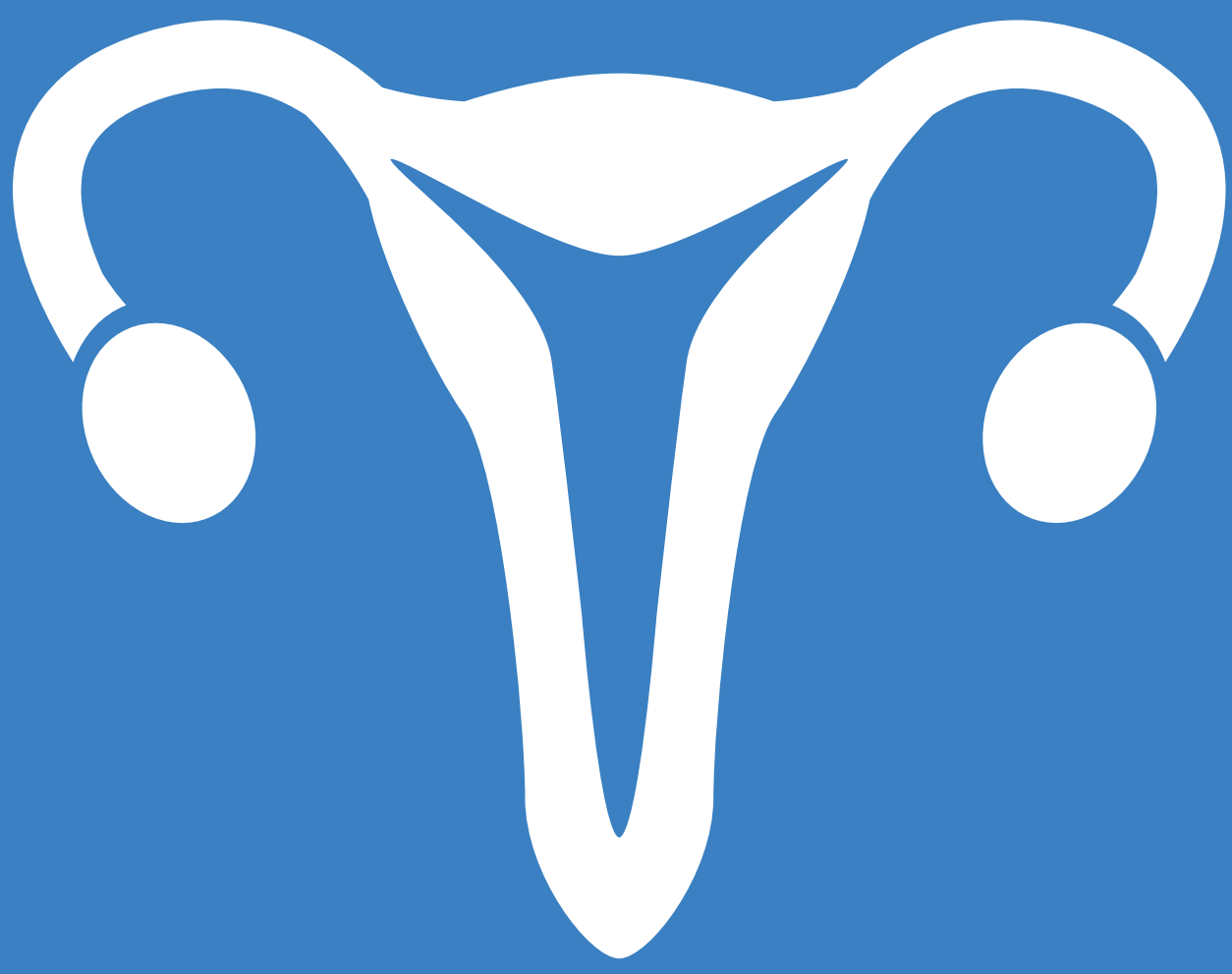
- Persistent Temperature >38 ^{0}C
- Pain inadequately relieved by home measures
- Significant respiratory symptoms (cough, shortness of breath, chest pain) or hypoxia
- Abdominal pain, distention, acute enlargement of spleen
- Any neurological signs or symptoms
- Significant increase in pallor, fatigue, lethargy
- Significant vomiting and diarrhoea

EDUCATION AND GENETIC COUNSELING

- **Medical disease counselling -** Explain the clinical presentation, severity, consequences of the disease. Importance of early diagnosis by newborn screening and comprehensive care. Teach patients and parents –avoid infections, be adequately hydrated, balanced nutrition, avoid over exercise, 9avoid extreme temperatures, importance of penicillin prophylaxis, need for regular clinical follow up of patients
- **Genetic counselling -** Explain carrier state and risk of having an affected child. Document family history, consanguinity, draw a pedigree chart, explain the inheritance pattern and risk of recurrence
- **Preconception care counselling -** for at-risk couples by following recommended practices. Give options and referrals
- **Pre and post test support to the family -** while making decisions and eliminating irrational fears, stigmatization, maintaining confidentiality
- **Cascade screening -** Emphasize the need for screening of extended family members

EARLY AND AGGRESSIVE MANAGEMENT OF PAIN AND INFECTIONS WILL HELP IMPROVE LONG TERM OUTCOME

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: (**stw.icmr.org.in**) for more information.



INFERTILITY

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW) for
FEMALE INFERTILITY
ICD-10-N97

WHAT IS INFERTILITY?

- Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse in women < 35 years of age or within 6 months in women > 35 years of age
- Affects up to 15% of couples

WHEN TO SUSPECT INFERTILITY?

- Any couple who by definition has infertility
- Those with high risk of infertility
  - › Women > 35 years: Expedited evaluation
  - › Women >40 years: Immediate evaluation
  - › Oligomenorrhea or amenorrhea
  - › Known or suspected uterine, tubal, or peritoneal disease
  - › History of tubal/ovarian surgery
  - › History of chemotherapy/ radiotherapy
  - › Any female with endometriosis
  - › Known or suspected male infertility

HISTORY OF THE COUPLE

HISTORY
- Duration of Infertility/ Contraceptive use
- Fertility in previous/current relationships
- Previous fertility investigations/ treatment

MEDICAL HISTORY

MENSTRUAL HISTORY
- Menarche
- Cycle length & duration of flow
- Dysmenorrhea
- Amenorrhea episodes
- HMB/IMB

OBSTETRIC HISTORY
- Number of previous pregnancies (MTP/miscarriage/ectopic preg)
- Time to initiate previous pregnancies

PAST HISTORY
- Chronic illness like chronic hypertension, diabetes mellitus, arthritis, tuberculosis

DRUG HISTORY
- Agents causing increased Prolactin / Chemotherapy/ Radiotherapy/anabolic steroids/ anti-androgens

SURGICAL HISTORY
- Previous abdominal/pelvic/ gynecological surgeries

OCCUPATIONAL HISTORY
- Work patterns including separation from partner
- Exposure to chemicals or high temperature

SEXUAL HISTORY
- Coital frequency, timing, knowledge of fertile period
- Dyspareunia
- Postcoital bleeding

PERSONAL HISTORY
- History of smoking, alcohol intake, substance abuse
- Vigorous exercise/eating disorder

PHYSICAL EXAMINATION OF FEMALE

General
- Height
- Weight
- BMI
- Waist circumference
- Blood pressure
- Fat & Hair distribution
- Acne
- Acanthosis nigricans
- Thyroid examination
- Breast examination

Abdominal
- Abdominal mass & tenderness
- Type and site of scars

Pelvis
- Assess state of hymen, clitoris and labia
- Look for vaginal infection, septum, endometriotic deposits
- Check for cervical polyps
- Accessibility of cervix for insemination
- Uterine size, position, mobility and tenderness
- Adnexal fornices tenderness
- Cervical smear

PHYSICAL EXAMINATION OF MALE

Refer to STW for the management of male infertility (ICD-10-N46.9), STW Volume 1, 2019

EVALUATION OF FEMALE

ESSENTIAL INVESTIGATIONS

Baseline ultrasound (Transvaginal ultrasound) to assess
- **Uterus**: Look for endometrial thickness, pattern, any space occupying lesions like fibroid, adenomyosis, polyp or mullerian anomalies
- **Adnexa**: Look for any hydrosalpinx or para-ovarian cyst
- **Ovary**: Note the antral follicle count (Day 2-5 of menstrual cycle), volume, position, characterization of cyst if present
- **POD:** Note presence of free fluid

Test for tubal patency
- Hysterosalpingography (HSG)

OPTIONAL INVESTIGATIONS
- Endometrial aspiration for AFB/PCR: to rule out tuberculosis
- Serum AMH
- Viral markers: HIV, HBsAg, HCV
- VDRL
- Rubella IgM/IgG
- Day 2/3 FSH, LH,
- Serum TSH, Prolactin

MANAGEMENT

DEPENDING UPON THE FACTOR OF INFERTILITY

Caution: **Always keep in mind age of the female as it is the most important prognostic factor**

Tubal status

- Bilateral tubes blocked → **Confirmatory test**: Laparoscopy with chromo-pertubation
  - Bilateral tubes blocked → **IVF/ICSI**
  - Tubes patent → OS ± IUI x 3-6 cycles
    - **If failed** → **IVF/ICSI**
- Tubes patent → OS ± IUI x 3-6 cycles
  - **If failed** → **IVF/ICSI**
- Hydrosalpinx present → Prior counselling, consent, discussion regarding future fertility treatment plan and cost is required.
  - Salpingectomy/ Clipping
    - OS ± IUI (if other tube patent)
    - IVF (if other tube not patent)
    - IVF (if b/l salpingectomy/ clipping done)

Ovulatory status

- Documented ovulation
- Day 2-5 AFC normal (≥5)
- Serum AMH ≥1.2 ng/ml
  - OS ± IUI x 3-6 cycles
    - **If failed** → **IVF/ICSI**
- Anovulation
  - Hypogonadotropic hypogonadism → Gonadotropins with/without IUI/IVF
  - Normo-gonadotropic normogonadism → OVI ± IUI x 3-6 cycles
    - **If failed** → **IVF/ICSI**
  - Hypergonadotropic hypogonadism or poor ovarian reserve (AFC<5; AMH<1.2) → IVF/ICSI (individualized with either self or donor oocyte)

Uterine factor

- Cavity pathology → Hysteroscopic management like -Polypectomy -Septum resection -Adhesiolysis → **OVI/OS ± IUI or IVF/ICSI (Individualized treatment)**
- Myometrium pathology → Laparoscopic/open surgery like* -Myomectomy if distorting the cavity -Adeno-myomectomy *If required → **OVI/OS ± IUI or IVF/ICSI (Individualized treatment)**
- Surgical correction failed/ → IVF followed by surrogacy

Level 1 ART: Coded in Blue
Level 2 ART: Coded in Yellow

ABBREVIATIONS

AFB: Acid fast bacilli
AFC: Antral follicle count
AMH: Anti-mullerian hormone
ART: Assisted reproductive technology
BMI: Body mass index
FSH: Follicular stimulating hormone
HBsAg: Hepatitis B antigen
HCV: Hepatitis C Virus
HIV: Human immunodeficiency virus
HMB: Heavy menstrual bleeding
ICSI: Intracytoplasmic sperm injection
IMB: Inter menstrual bleeding
IUI: Intrauterine insemination
IVF: In vitro fertilization
LH: Luteinizing hormone
OS: Ovarian stimulation
OVI: Ovulation induction
PCR: Polymerase chain reaction
POD: Pouch of Douglas
TSH: Thyroid stimulating hormone
VDRL: Venereal disease research laboratory test

REFERENCES

1. World Health Organization (WHO). International Classification of Diseases, 11th Revision (ICD-11) Geneva: WHO 2018
2. NICE 2017. Fertility problems: assessment and treatment. 2017; 51
3. Penzias A et al. Fertility evaluation of infertile women: a committee opinion. Fertility and Sterility. 2021

FOLLOW EVIDENCE BASED INDIVIDUALIZED TREATMENT

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

NEONATOLOGY

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

NEONATAL TRANSPORT

INDICATIONS FOR TRANSPORT IN NEONATES

REFERRAL TO HIGHER CENTRE

Any newborn who is assessed by the Health Care Provider as sick and needs referral

NBCC/NBSU TO SNCU

- Birth weight <1800 grams and/or gestational age <34 weeks
- Neonates with:
  - Apnea or gasping
  - Respiratory distress with retractions or grunt, or not maintaining SpO_2 with oxygen
  - Persistent Hypothermia or Hyperthermia
  - Severe jaundice requiring intensive phototherapy
  - Vomiting or abdominal distention
  - Central cyanosis
  - Need of positive pressure ventilation>60 seconds at birth
  - Non-passage of stool or urine for more than 24 hours after birth
  - Shock (Cold periphery with CFT > 3 seconds, and weak/fast pulse)
  - Refusal to feed, less movement, abnormal movements
  - Significant bleeding

SNCU TO NICU

- Birth weight <1000 grams and/or gestational age < 28 weeks
- Neonates with:
  - Respiratory distress requiring mechanical ventilation
  - Unresponsive shock
  - Jaundice requiring exchange transfusion, if facility is not available
  - Refractory seizures
  - Need for surgical intervention
  - Birth asphyxia qualifying for therapeutic hypothermia
  - Multiorgan failure
  - Refractory hypoglycemia
  - Acute kidney injury needing dialysis

PREPAREDNESS AND PRE-TRANSPORT STABILIZATION

- Identify and communicate with the referral facility
- Check availability of the services and bed in the referral facility (e.g. Ventilator)
- Explain the condition of the patient, need for transport to higher facility, the expected plan and prognosis to the family
- Discuss with parents the possible expenses
- Take informed consent of the parents prior to transport
- Share the contact numbers of both referring and the receiving facility including the concerned doctor
- Enclose (1) Complete summary (2) All investigations (3) Mother's blood sample
- Identify the transport team with appropriate skilled persons
- Ensure the logistics and the vehicle are organised
- If shock present - start treatment before transport
- All doses of antibiotics and drugs should be timed prior to transport
- Check temperature and blood glucose prior to transport
- Ensure clear airway, appropriate respiratory support and secure IV access

MONITORING AND MANAGEMENT DURING TRANSPORT

MONITORING DURING TRANSPORT

- **Parameters to be monitored:** Temperature, Heart rate, Respiratory rate, Air entry, SpO_2, GI Aspirates, Position of tubes (ET, OG, Catheter, ICD, IV cannula), Ventilator/ Continuous positive airway pressure (CPAP) settings
- **Frequency of monitoring:** Every 30 minutes depending on the sickness of the baby
- **Communication:** Parents and the receiving doctor should be informed of any change in the condition of the baby by the transport team

MANAGEMENT DURING TRANSPORT

- Maintain temperature and warmth (incubator / clothing / Kangaroo Mother Care)
- Position, clear the secretion and assess for need of intubation
- Assist with appropriate respiratory support (Oxygen, CPAP, Neonatal ventilation). Stop the vehicle if needed for urgent care, e.g. intubation
- Manage shock by titrating the fluids and inotropes
- Appropriate quantity, frequency and modality of feeding should be followed during transport (preferably breastfeeding or expressed breastmilk)

TRANSFER (HANDING OVER) TO THE RECEIVING CENTER BY TRANSPORT TEAM

Transport team should assist the transfer of the baby to the SNCU/ NICU in the receiving center

Once transferred to the SNCU/ NICU bed, the baby should be stabilized by both the teams

The recieving doctor should have a one to one discusssion with the handing over team

All the documents viz. discharge summary, investigations, mothers' samples, list of awaited investigations that will be intimated later etc. should be handed over

The family should be introduced to the new team in person

ABBREVIATIONS

CFT: Capillary filling time
ET: Endo tracheal
ICD: Intercostal drain
NBCC: Newborn care corner
NBSU: Newborn stabilization unit
NICU: Neonatal Intensive care unit
OG: Orogastric
SNCU: Special Newborn care unit
SpO_2: Pulse Oxygen saturation

REFERENCE

1. Transport of a sick neonate. Evidence-based clinical practice guidelines. National Neonatology Forum India. Available at www.nnfi.org/cpg

☛ AVOID INVASIVE PROCEDURES DURING TRANSPORT

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: (**stw.icmr.org.in**) for more information.

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

NEONATAL EMERGENCY TRIAGE ASSESSMENT AND MANAGEMENT

SICK OR AT-RISK NEONATE PRESENTING TO HEALTH FACILITY

- Place under radiant warmer
- Attach temperature probe and pulse oximeter
- Assess for emergency signs using TABCD
  - **T**emperature
  - **A**irway and **B**reathing
  - **C**irculation (CFT, pulse, BP)
  - **C**oma/**C**onvulsions
  - **D**ehydration

EMERGENCY SIGNS
- Apnea or gasping
- Severe respiratory distress (severe retractions, grunt, RR>70)
- Central cyanosis/oxygen satuation <91%
- Shock (Cold peripheries, mottled/grey skin, CFT>3 sec, weak & fast pulse, low BP)
- HR > 200/min
- Coma or convulsions
- Severe dehydration(in cases of diarrhoea)
- Severe Hypothermia (< 32°C)

PRIORITY SIGNS
- Weight < 1800 g or > 3.8 kg
- Respiratory distress(RR>60, no retractions)
- Severe jaundice (onset < 24 h /palm or sole staining/ duration > 2 weeks)
- Severe pallor
- Bleeding
- Major malformation (tracheo-esophageal fistula, meningomyelocele, gastroschisis, anorectal malformation)
- Abdominal distension
- Irritable/Restless
- Refusal to feed
- Moderate (32-35.9°C) or mild (36-36.4°C) hypothermia

NON-URGENT SIGNS
- Jaundice
- Transitional stools
- Minor birth trauma
- Minor malformations
- Superficial infections
- Breastfeeding difficulty
- Regurgitation

INITIATE EMERGENCY TREATMENT AND STABILIZE
- Resuscitation as per NRP
- Maintain TABC
- Check SpO_2 and start oxygen if < 91%
- Start CPAP if respiratory distress
- Start IV fluids as per weight and postnatal age (Refer to STW on Feeds & Fluids)
- Check blood glucose, draw CBC and blood culture, and give first dose of antibiotics(Refer to STW on Sepsis in neonates)

ASSESS AND ACT RAPIDLY
- Maintain TABC
- Check SpO_2 and start oxygen if < 91%
- Check blood glucose
- Start IV fluids (if abdominal distension/GI malformation) or gavage feeds (Refer to STW on Feeds & Fluids)
- Elicit perinatal risk factors for sepsis and evaluate if sepsis workup is needed (refer to STW on Sepsis in neonates)
- Investigations as per clinical findings

ASSESS AND COUNSEL
- Assessment and treatment as per requirement
- Explain danger signs
- Counsel for breastfeeding

Follow specific STWs
A neonate may have more than one condition

SPECIFIC MANAGEMENT WORKFLOWS

SHOCK
- Provide warmth
- IV NS 10mL/kg bolus over 30-60 min
- May repeat bolus if evidence of volume deficit
- Consider inotropes

HR> 200/MIN
- Urgent ECG-look for p waves
- If SVT, consider ice-pack and IV adenosine
- Check for and correct hyperthermia if present

SEVERE DEHYDRATION (Diarrhoea plus any two of lethargy, very slow skin pinch and sunken eyes)
- Provide warmth
- IV 30 mL/kg of RL or NS in 1 hour followed by 70 mL/kg in next 5 hours (WHO plan C)
- If IV not possible, give ORS at 20 mL/kg/h for 6 hours
- Assess 1-2 hourly and titrate the volume of fluids

HYPOTHERMIA (Refer to STW on thermal care of newborn)
- Mild (36-36.4°C): Warm environment, skin-to-skin contact, breastfeeding
- Moderate (32-35.9°C): Place under servo-controlled warmer; skin-to-skin contact till arranged
- Severe(< 32°C): As for moderate hypothermia plus IV fluids and inj. vitamin K

HYPOGLYCEMIA (Refer to STW on neonatal hypoglycemia)
- Blood glucose < 45mg/dL and asymptomatic : supervised breastfeeding or EBM
- Blood glucose < 20 mg/dL OR symptomatic : 2mL/kg 10% dextrose IV followed by infusion @ 6mg/kg/min

JAUNDICE (Refer to STW on neonatal jaundice)
- Serious jaundice (onset at < 24 h of age, palm or sole staining, or signs of acute bilirubin encephalopathy): Intensive phototherapy, consider IV fluids if suspicion of dehydration, prepare for exchange blood transfusion

SEIZURES (Refer to STW on neonatal seizures)
- Maintain TABC
- Check blood glucose by glucometer: If < 45 mg/dL, 2mL/kg 10% dextrose IV followed by infusion @ 6mg/kg/min
- If not controlled, 2 mL/kg 10% calcium gluconate IV, diluted 1:1 with D5, D10 or DW, over 10 min under cardiac monitoring
- If not controlled, Inj. Phenobarbitone 20 mg/kg IV over 15 mins. If seizures persist after 15 min. consider another bolus of 10mg/kg phenobarbitone over 10 min

SURGICAL
- Cover any skin defects with warm saline sterile gauze
- Maintain hydration
- Consult surgeon

BREASTFEEDING DIFFICULTY
- Observe and look for proper positioning and attachment of baby during breastfeeding
- Counsel mother

ABBREVIATIONS

CFT: Capillary filling time
CPAP: Continuous positive airway pressure
ECG: Electrocardiogram
EBM: Expressed breastmilk
NRP: Neonatal resuscitation protocol
NS: Normal saline
RL: Ringer lactate
SpO_2: Pulse oxygen saturation
SVT: Supraventricular tachycardia
STW: Standard treatment workflow
TABC: Temperature, airway, breathing, circulation

REFERENCE

1. Guideline for Paediatric emergency triage, assessment and treatment. World Health Organization 2016. Available at https://apps.who.int

☛ IDENTIFICATION AND PROMPT TREATMENT OF EMERGENCY AND PRIORITY SIGNS IS THE KEY TO PREVENT MORTALITY

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: (**stw.icmr.org.in**) for more information.

July/ 2020

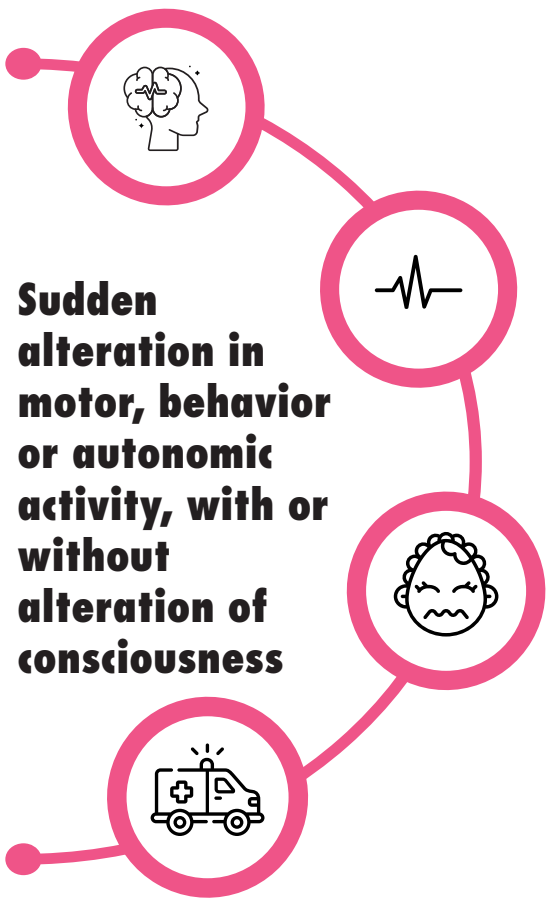
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

NEONATAL SEIZURES

ICD-10-P90



NEONATES AT RISK FOR SEIZURES

- Birth asphyxia
- Sepsis
- Meningitis
- Preterm
- Small for gestational age
- Metabolic or electrolyte abnormalities
- Major bleeding

IDENTIFICATION OF SEIZURES

Motor manifestations
- Rhythmic jerks of limb(s) or facial part(s)
- Tonic contraction of limb(s)
- Stereotypical movements of limbs, face, eyes
  - **Limbs:** Pedalling, rowing, swimming, cycling, stepping
  - **Oral:** Pouting of lips, mouthing, repeated sucking
  - **Eyes:** Vacant stare, transient eye deviation, nystagmoid movements, repeated blinking

Behavioural manifestations
- Sudden change in consciousness or cry characteristic

Autonomic manifestations
- Fluctuations in heart rate, sudden change in BP, sudden appearance of unexplained apneic episodes

HISTORY

Antenatal: First trimester viral illness, PIH, diabetes, PROM/ chorioamnionitis, STDs, drugs or substance abuse, decreased fetal movements
Intrapartum: Fetal distress, difficult delivery, cord complications, mode of delivery, instrumentation
Postnatal: Resuscitation, other organ system involvement, feeding history, Seizure details: onset, duration, description (review videos)
Family: Consanguinity, early neonatal deaths, mental retardation, epilepsy

EXAMINATION

Vital signs: Temp, BP, HR, RR, CFT, SpO2
General: pallor, icterus, rash, skin lesions
Head to toe : Head circumference , bulging fontanelle, needle marks on scalp, dysmorphism, malformations, petechie, ecchymoses
Systemic exam : Level of alertness, cranial nerve and motor exam, examination of all systems
Fundus examination

INVESTIGATIONS

In all neonates: Blood glucose, Serum electrolytes, hemogram, ionized calcium, blood urea/ creatinine, liver function tests, blood gas analysis, cranial ultrasound
Specific circumstances
Suspected sepsis: cerebrospinal fluid examination
Suspected TORCH infections : paired mother and baby serology (for toxoplasma, CMV, rubella), body fluids for PCR (urine for CMV), CSF for toxoplasma, CMV, herpes
Suspected intracranial bleed: Ultrasound or CT or MRI head, Platelet count and Coagulogram
Electroencephalography

ACUTE MANAGEMENT OF SEIZURES

Goal of the treatment is the total or near total elimination of seizures. However, with higher doses and addition of more anti-epileptic drugs, the neonate requires intensive respiratory and cardiac monitoring. If recurrent seizures, isolated twitches may be just monitored

Neonate with seizure

Ensure TABC, IV access
Check blood glucose by Glucometer

BG < 45 mg/dL — Yes → 10% dextrose 2 mL/kg bolus, followed by infusion @ 6 mg/kg/min → Follow STW on Neonatal Hypoglycemia

No → 2 mL/kg 10% calcium gluconate IV, diluted 1:1 with D5, D10 or DW over 10 min under cardiac monitoring

If available, measure ionized Calcium (iCa). If iCa <1.0 mmol/L and seizures persist, repeat Calcium dose

Seizures persist

Inj. Phenobarbitone 20 mg/kg IV over 15 mins. If seizures persist after 15 min. consider another bolus of 10mg/kg phenobarbitone over 10 min. Assess seizure control after 15 min

Seizures persist

Phenytoin or Fosphenytoin 20 mg/kg PE: infuse over 20 min under cardiac monitoring. Assess seizure control after 30 min → Consider referral. Follow STW on Neonatal Transport

Seizures persist

Give Lorazepam 0.05 mg/kg IV over 2-5 mins
Can repeat dose once if seizures persist

Seizures persist

- Midazolam 0.1 mg/kg IV bolus, followed by continuous infusion (1µg/kg/min) increasing by 0.5 to 1 µg/kg/min every 2 min until a favorable response or max. 18 µg/kg/min
- Levetiracetam 40 mg/kg IV bolus followed by 40-60 mg/kg/day IV or oral in 2-3 divided doses

DURATION OF ANTICONVULSANTS

- Maintenance therapy is not needed in case of a single brief seizure that needs only one loading dose of phenobarbitone
- If more than one loading dose OR more than one drug is needed to control seizures - start the maintenance dose 24 h after the loading dose of the respective drugs. Prefer oral route if no contraindication
- After a seizure-free period of 72 h, stop all other anticonvulsants one by one, except phenobarbitone
- After one week or at discharge (whichever is earlier), stop phenobarbitone if neurological examination and EEG are normal. If the neurological examination or EEG is abnormal (electrical seizure activity or a burst-suppression background): discharge on maintenance therapy
- Review at monthly intervals and taper anticonvulsants if neurological examination and EEG become normal
- If anticonvulsants are required beyond 3 months, consult a neurologist and switch to other drugs

ABBREVIATIONS

BG: Blood glucose
BP: Blood pressure
CFT: Capillary filling time
CSF: Cerebrospinal fluid
DW: Distilled water for injection
EEG: Electroencephalography
HR: Heart rate
iCA: Ionised calcium
PIH: Pregnancy induced hypertension
RR: Respiratory rate
SGA: Small for gestational age
SPO2: Pulse oxygen saturation
STD: Sexually transmitted diseases
TABC: Temperature, airway, breathing, circulation

REFERENCES

1. Guidelines on neonatal seizures . World Health Organization 2011. Available at https://apps.who.int
2. Management of Seizures in the Newborn. Evidence Based Clinical Practice Guidelines. National Neonatology Forum India 2011. Available at www.nnfi.org/cpg

NEONATES WITH SEIZURES REQUIRE LONG TERM NEURODEVELOPMENTAL FOLLOW-UP AND HEARING ASSESSMENT

July/ 2020

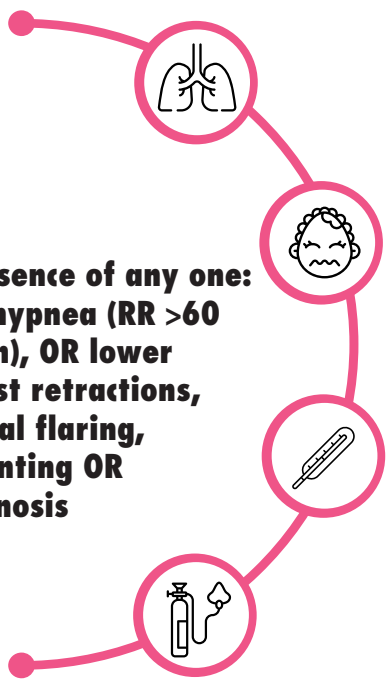
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

RESPIRATORY DISTRESS IN NEONATES

ICD-10-P22.0



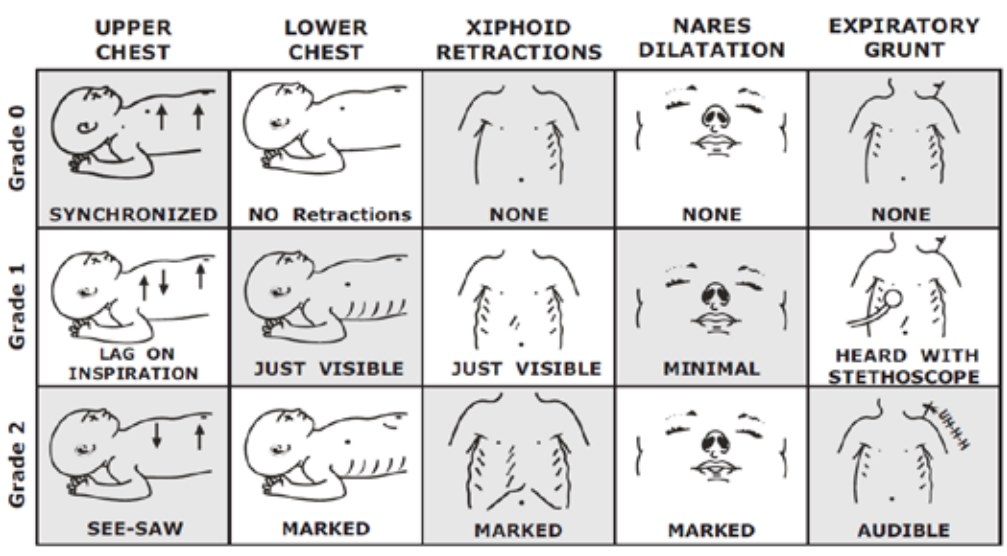
Presence of any one: Tachypnea (RR >60 bpm), OR lower chest retractions, nasal flaring, grunting OR cyanosis

ACTIONS

- Rapid assessment of TABC (temperature, airway, breathing, circulation) and stabilize the baby
- Admit the baby in SNCU/NICU
- Nurse in a radiant warmer/incubator; monitor with continuous pulse oximetry
- Quantify the severity of RD using Silverman Anderson Score [SAS]
- Closely monitor RR, SAS, SpO2, and CFT
- Most neonates with RD can be fed enterally (by breastfeeding [if RR<70 bpm and not on respiratory support] or orogastric tube). Those with severe distress or any contraindication to enteral feeding should be given IV fluids

GOALS

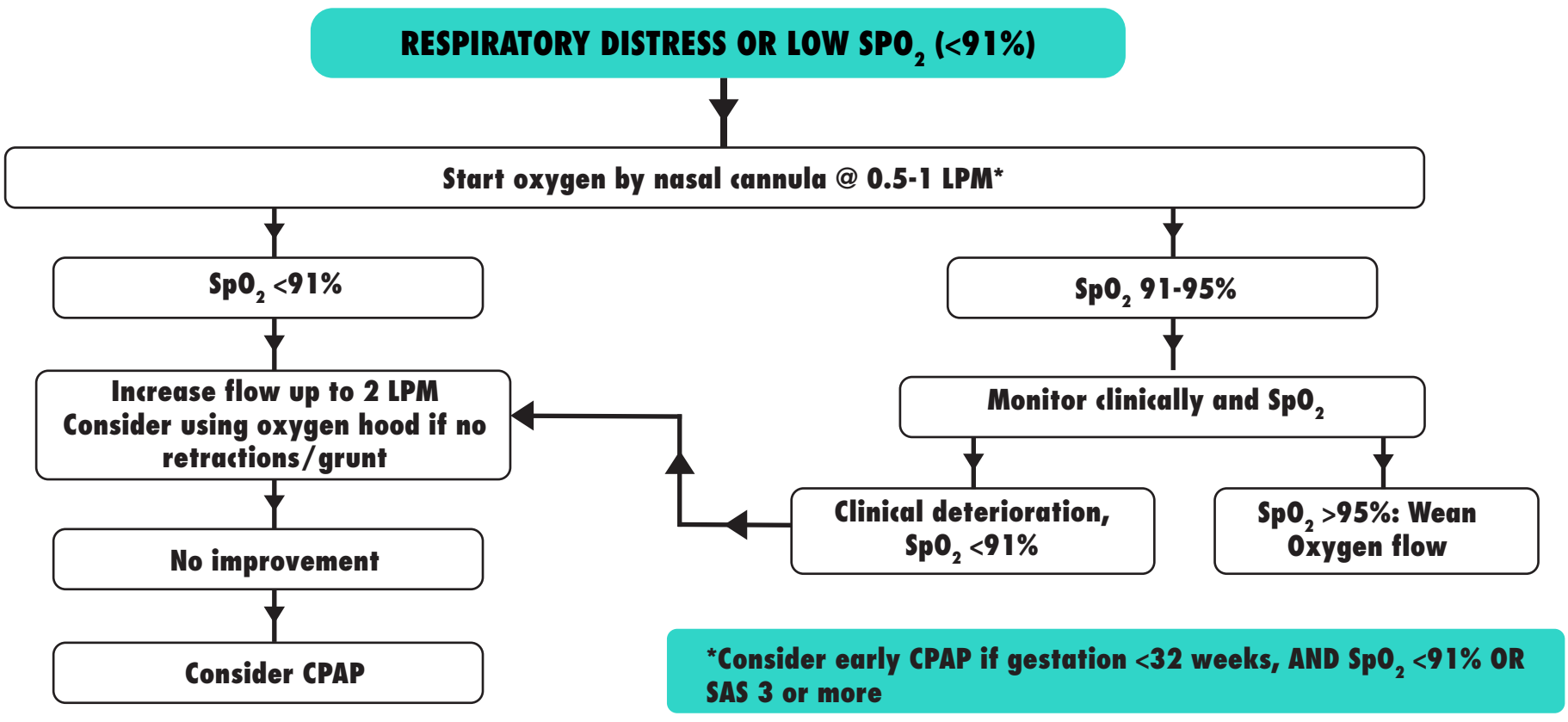
- To alleviate the work of breathing by providing appropriate respiratory support
- To maintain oxygen saturations from 91% to 95%
- Identify and treat the underlying cause



SILVERMAN ANDERSON SCORE (SAS)

RESPIRATORY SUPPORT

- SpO_2< 91%: Oxygen by nasal prongs(NP) 0.5 -1.0 Lpm (max. 2 Lpm)
- Gestation ≥ 32 weeks: CPAP if SAS 4 >, OR no improvement with NP oxygen
- Gestation < 32 weeks: CPAP if SpO_2< 91% OR SAS 1-3
- Those with severe RD (SAS of 5 >; FiO2 of more than 60-70%), unresponsive to CPAP, having shock or repeated episodes of apnea, may require mechanical ventilation and referral (See STW on Transport)



ASSESS AND TREAT THE UNDERLYING CAUSE

- **RESPIRATORY DISTRESS SYNDROME (RDS):** Consider surfactant replacement therapy as per indication
- **PNEUMONIA-SEPSIS:** Treat with antibiotics as per unit's protocol (refer to sepsis STW)

WHAT NOT TO DO

- DO NOT let SpO_2 exceedc 95% while supplementing oxygen. High oxygen saturation is a risk factor for retinopathy of prematurity
- DO NOT give unnecessary IV fluids, antibiotics, blood products or drugs
- DO NOT perform unnecessary investigations (CBC, CRP, routine ABG)
- DO NOT do routine chest X-ray in all neonates with RD. Perform chest X-ray if RD is persisting beyond 6 hours of age, there is worsening or a diagnostic dilemma

ABBREVIATIONS

BW: Birth weight
CPAP: Continuous positive airway pressure
CFT: Capillary filling time
GA: Gestational age
IV: Intravenous
RD: Respiratory distress
RR: Respiratory rate
SAS: Silverman Anderson score

REFERENCES

1. Oxygen therapy in neonates, and Surfactant Replacement therapy in neonates. Evidence-based Clinical Practice Guidelines. National Neonatology Forum India. Available at www.nnfi.org/cpg

☛ PREVENT HYPOXIA AND HYPEROXIA

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

THERMAL CARE OF NEWBORN

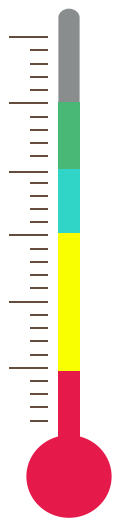
ICD-10-P81.8

Temperature measurement for neonates is mandatory in the given settings to diagnose hypothermia

- Delivery room - in the first hour after delivery
- Prior to and during transport
- At the time of admission
- Continuous monitoring for all babies nursed in radiant warmer/ incubator
- At-risk neonates staying with mother e.g. - LBW, preterms - every 4 hourly

STANDARD TECHNIQUE FOR MEASUREMENT OF TEMPERATURE

- Use a standard digital thermometer
- Place the tip in the neonate's axilla keeping it parallel to the neonate's trunk
- Read once the beep sound is heard



REGULARLY MONITOR TEMPERATURE AND DOCUMENT

Is it <36.5 °C?

NO

YES

- Check for possible cause of hypothermia
- Assess for risk factors & clinical features of sepsis (Refer to sepsis STW)
- Check room temperature

YES

MILD HYPOTHERMIA: 36 °C- 36.4 °C

- Ensure room temperature 25-28 °C
- Provide skin-to-skin (STS) contact
- Continue breastfeeding
- If sick, nurse under radiant warmer

• RECHECK TEMPERATURE IN 1 HOUR:

- If normal, wrap properly
- If still <36.5 °C then treat as moderate hypothermia

MODERATE HYPOTHERMIA: 32 °C- 35.9 °C

- Nurse under radiant warmer in servo mode with temperature probe attached to neonate
- Continue skin-to-skin contact till warmer is available ensuring mother-neonate dyad is covered with pre-warmed linen
- Start O_2 if SpO_2<91%
- Check blood sugar, if <45 mg/dL then follow STW on Hypoglycemia
- Recheck temperature every 15 minutes till it normalizes
- Continue feeding if stable and abdominal examination is normal

SEVERE HYPOTHERMIA: <32 °C

- Manage as per moderate hypothermia
- Make nil per oral
- Start IV fluids (refer to STW on Feeds and fluids)
- Give Inj. Vitamin K
- Refer to higher centre if develops shock or respiratory failure (refer to STW on Neonatal Transport)

PREVENTION OF HYPOTHERMIA- MAINTENANCE OF WARM CHAIN

DELIVERY ROOM (DR)

- Radiant warmer is must in Neonatal Care Corner
- Area should be air draught free
- All DRs should have room thermometer
- Maintain DR temperature >25 °C
- Switch on radiant warmer 20-30 minutes before delivery
- Radiant warmer should be in manual mode with heater output being 100%
- Pre-warm two to three sterile towels by keeping them under radiant warmer for 20 minutes
- Practice early skin-to-skin contact for stable neonates for 1 hour or at least till first breastfeeding
- Dry newborn immediately after birth
- Remove wet linen immediately
- Weighing and checking temperature should be done after breastfeeding

POSTNATAL WARDS

- Cover neonate adequately
- Practice rooming-in 24x7
- Avoid air draughts by closing windows, doors, and switching off fans and air conditioners
- Start Kangaroo Mother Care (KMC) as early as possible for eligible neonate
- Promote exclusive breastfeeding
- Delay bath till after discharge
- Remove wet clothes as early as possible
- Educate mother regarding identification of hypothermia using touch method

WARM CHAIN DURING TRANSPORT

Without external heat source:

- A fully wrapped neonate with cap can be transported in an adult's arms in a closed vehicle
- Neonate can be transported in skin-to-skin contact
- Ensure that the neonate is in upright position and covered snuggly with the person's clothes and a blanket

With external heat source:

- A thermal mattress or a transport incubator
- Indigenous insulated boxes can be used in resource-limited settings
- No neonate should be placed naked in a trolley or bed without an external heat source

Early skin-to-skin contact

Adequate clothing & rooming-in

Kangaroo Mother Care

Radiant warmer

HYPERTHERMIA

- Neonates may become hyperthermic due to high environmental temperature and/ or overclothing
- Differentiate from sepsis: If both trunk & extremities are hot, an environmental cause is likely. If trunk is hot & extremities are cold, consider sepsis
- If baby is hyperthermic, move to cooler environment and decrease clothing. Ensure adequate breastfeeding and check weight loss
- If still hyperthermic, needs further evaluation

REFERENCES

1. World Health Organization. Maternal Health and Safe Motherhood Programme & Meeting of Technical Working Group on Thermal Control of the Newborn (1992 :Geneva, Switzerland). (1993). Thermal control of the newborn : a practical guide. World Health Organization. https://apps.who.int/iris/handle/10665/60042

☛ HYPOTHERMIA IN NEWBORNS INCREASES MORTALITY. PREVENT HYPOTHERMIA - MAINTAIN WARM CHAIN

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: (**stw.icmr.org.in**) for more information.

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

NEONATAL HYPOGLYCEMIA

ICD-10-P70.4

WHOM TO SCREEN FOR HYPOGLYCEMIA?

- Preterm infants (< 37 weeks gestational age)
- Low birth weight Infants (< 2500 g)
- Small for gestation age (SGA): birth weight < 10th percentile
- Large for gestation age (LGA): birth weight > 90th percentile
- Infant of diabetic mother (IDM)
- Sick infants (eg: sepsis, asphyxia, respiratory distress, shock,polycythemia, seizure)
- Post exchange blood transfusion
- Infants on intravenous fluids and parenteral nutrition

Do not monitor blood glucose routinely in term healthy AGA infants

SCHEDULE OF BLOOD GLUCOSE (BG) MONITORING (PREFEED)

CATEGORY	TIME SCHEDULE
At-risk infants	At 2, 6, 12, 24, 48, 72 hours of life
Infants on IV fluids/ parenteral nutrition	Every 6-8 hours

HOW TO MONITOR BLOOD GLUCOSE (BG)?

- Use Glucose reagent strips along with a glucometer
- Low value (< 45 mg/dL) – Send a blood sample to the lab for confirmation
- Do not delay treatment

BLOOD GLUCOSE <45 mg/dL

LOOK FOR FOLLOWING SYMPTOMS AND SIGNS

- Stupor, lethargy, limpness
- Jitteriness, tremors, convulsions
- Episodes of cyanosis, apnea or tachypnea
- Weak and high-pitched cry
- Difficulty in feeding

ASYMPTOMATIC

- Immediate supervised feeding
- Breastfeeding or a measured volume of expressed breast milk (formula milk if EBM not available) by paladai or gavage

RE-CHECK BG AFTER 1 HOUR

If BG ≥ 45 mg/dL
- Continue feeds
- Continue BG monitoring every 6 hourly for 24 hours

Start IV glucose infusion if:
BG < 45 despite one attempt of feeding
OR
Baby becomes symptomatic

SYMPTOMATIC OR BG < 20mg/dL

- IV bolus: 2 mL/kg 10% dextrose
- Start IV infusion of dextrose at a glucose infusion rate (GIR) of 6 mg/kg/min

Re-check BG every 30 mins till 2 values ≥ 45 mg/dL & then every 6 hrs

BG < 45 mg/dL

Increase GIR @ 2 mg/kg/min till max GIR 12 mg/kg/min

Refractory hypoglycemia: High (>12 mg/kg/min for 24 hours) or persistent (> 7 days) GIR requirement

CONSIDER DRUGS* AND REFER TO HIGHER CENTRE

BG ≥ 45 mg/dL

Euglycemic for 24 hours on IV fluids

- Wean @ 2 mg/kg/min every 6 hourly
- Increase oral feeds
- Monitor BG every 6 hourly

Stop IV fluids when euglycemic on GIR 4 mg/kg/min

PREVENTION OF HYPOGLYCEMIA

- Support mother for early initiation and regular breastfeeding
- Maintain normothermia
- Do not feed 5%, 10% or 25% dextrose as a substitute for breast milk

PRACTICAL POINTS

- Avoid > 12.5-15% dextrose infusion through a peripheral vein
- Use a syringe/ infusion pump to deliver glucose
- Avoid frequent dextrose boluses
- Send blood in fluoride or oxalate vial for laboratory glucose estimation
- Always search for an underlying cause - polycythemia, sepsis, meningitis, hypothermia, IUGR
- Do not give antibiotics unless sepsis is suspected (refer to STW on sepsis)

*DRUGS FOR REFRACTORY HYPOGLYCEMIA

- Hydrocortisone: 5 mg/kg/day IV in two divided doses
- Diazoxide: 10-25 mg/kg/day PO in three divided doses
- Glucagon: 300 µg/kg SC or IM
- Octreotide: 2-10 µg/kg/day SC

ABBREVIATIONS

AGA : Appropriate for Gestational Age
EBM : Expressed breast milk
IV : Intravenous
IM: Intramuscular
PO : Per oral
SC : Subcutaneous
IUGR: Intra uterine growth retardation

☛ SYMPTOMATIC AS WELL AS ASYMPTOMATIC HYPOGLYCEMIA CAN LEAD TO PERMANENT BRAIN DAMAGE

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

FEEDS & FLUIDS IN NEONATES

ICD-10-R63.3

PART A
Nutritional plan for infants not on enteral feeds at admission

IF ANY OF THE FOLLOWING ARE PRESENT

- Gestation <35 wks & REDF in antenatal USG → NPO for 24 h → Re-assess → Abdomen soft, no distension → Start feeds @ 10-20 ml/kg/d → If tolerates, increase @ half of weight/ gestation specific increments
- OR
- Gestation <35 wks and birth weight <3rd centile or AEDF in antenatal USG, need for extensive resuscitation, HIE, 5 minute Apgar <7, has RED signs (Part B) → Keep NPO for 6 h → Re-assess → Abdomen soft, no distension & recovery from red signs → Start feeds as per gestation/ weight specific protocol
- OR
- Suspected GI malformation or suspected NEC → Keep NPO → Take pediatric surgery consultation*

NO

GA <26 weeks* BW < 750 g	GA 26-27 weeks* BW 750-999 g	GA 28-30 weeks BW 1000-1250 g	GA >30 weeks BW >1250 g
NPO for 24 h Trophic feeds @ 10 ml/kg/d for 48 h Increase @ 10-15 ml/kg/d	NPO for 24 h Start feeds @ 20 ml/kg/d Increase @ 15-20 ml/kg/d	Start feeds @ 30 ml/kg/d Increase @ 30 ml/kg/d	All fluid as feeds from D1

- For total daily fluid requirement see table 1. Remaining fluid requirement after accounting for feed volume, should be given as IV fluids and if feasible as PN in neonates born at less than 28 weeks or 1000 g*
- IV fluids can be stopped once infant is tolerating feeds @ 120 mL/kg/d, if blood glucose is maintained.
- Preferred mode of feeding: < 32 weeks: Oro-Gastric tube; 32-34 weeks: Spoon/Paladai; and ≥ 35weeks: Breast feeds
- Choice of milk in order of preference: Expressed breast milk (EBM) >> pasteurized donor human milk >> formula milk
- Frequency of feeds: q 2 h if PMA < 32 weeks/ weight <1500g and q 3 h if ≥ 32weeks/ weight ≥1500g
- Add supplements as per Table 2

**Indicates conditions which need admission/referral to tertiary care health facility*

PART B
Nutritional plan for infants on partial or full enteral feeds at admission

ARE ANY OF THESE RED SIGNS PRESENT?

- Significant respiratory distress (Silverman/ Downe score>6)
- Ongoing hypoxia or moderate to severe apneas
- Ongoing seizures
- Severe hypothermia
- Shock needing inotropes
- Feed intolerance (abdominal distension with vomiting, bilious or bloody gastric aspirates)

NO → Continue feeds and advance as given in flow chart in part A

YES → Keep NPO and start IV fluids
Consider PN if gestation < 28 weeks or weight <1000 g*
Take Pediaric surgery consultation if suspecting GI obstruction or peritonitis* → Every 12-24 h re-assess for readiness of feed by presence of soft abdomen, no distension and absence of red signs → Restart at 50% of the volume of feed being tolerated before making NPO and make increment as per chart in part A

TABLE 1
Maintenance volume (Enteral + IV, mL/kg/d) and type of IV fluids

BIRTH WEIGHT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
<1000 g or Gestation <28 weeks	80-100	Advance strictly as per clinical and lab hydration status					
1000-1250g 28 to 30 weeks	80	100	120	140	150	150-160	150-160
>1250 g >30 weeks	60	80	100	120	140	150	150-160
Type of IV fluids	Start with D10 Titrate dextrose concentration as per blood glucose	N/5 in D10 with KCl					

TABLE 2
Supplements

- Start when infant is on 100ml/kg/day of enteral feeds
- Start Iron at 2 weeks of age

Weight <1800 gram or Gestation <35 weeks
- If on EBM Or Donor Milk: HMF + Iron + Vitamin D3
- If on Breastfeeds: Iron + Calcium + Phosphorus + Multivitamins + Vitamin D3
- If on Preterm Formula: Iron and Vitamin D3

Weight >=1800 gram and Gestation >=35 weeks
- Vitamin D 3 and Iron (only for gestation <37 weeks)

Dose	Duration
Iron: 2mg/kg/day Vit -D3: 400 IU to 800 IU/day Calcium: 120mg/kg/day Phosphorus: 60mg/kg/day	Iron and Vit-D3: till 1 year Calcium and Phosphorus: till term PMA Multivitamins: till 6 months

- Table 1 is a general guide and daily increments may be based on daily weight change, urine output, serum sodium and co-morbidities such as PDA or sepsis
- Daily increments of feed should be based on tolerance and weight gain.
- Monitor growth by regular measurement of weight and head circumference. Once full feeds have been achieved, preterm neonates are expected to gain weight @ 10-20 g/kg/day. Plot the growth parameters on intergrowth 21st postnatal charts for preterm neonates
- If not gaining weight adequately on exclusive enteral feeds, after 2 weeks of life, feed volume may be increased gradually upto 200-250 mL/kg/d as per tolerance

ABBREVIATIONS

AEDF: Absent end diastolic flow
HIE: Hypoxic ischemic encephalopathy
HMF: Human milk fortifiers
NEC: Necrotizing enterocolitis
PDA: Patent ductus arteriosus
PMA: Post menstrual age
PN: Parenteral nutrition
REDF: Reversed end diastolic flow

☛ EARLY AND AGGRESSIVE ENTERAL FEEDING BY BREASTMILK DECREASES MORTALITY AND MORBIDITY

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

NEONATAL JAUNDICE IN INFANTS ≥ 35 WEEKS

ICD-10-P59.9

Approach to neonatal jaundice

VISUAL ASSESMENT

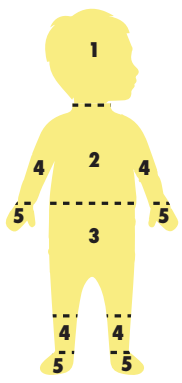
- Examine the baby in bright natural/ white fluorescent light
- Make sure the baby is naked and no yellow/ off white background
- Examine blanched skin
- Assess severity of jaundice

LOOK FOR THESE RISK FACTORS

- Gestation < 38 weeks
- Previous sibling requiring treatment for jaundice
- Blood group incompatibility (ABO/Rh)
- High prevalence of G6PD deficiency
- Exclusively breast fed baby with weight loss >3% per day; or >10% cumulative
- Total serum bilirubin (TSB) / Transcutaneous bilirubin (TcB) value in the high/ high-intermediate risk zone

ASSESSMENT OF SEVERITY OF JAUNDICE

Clinical examination every 12 hrs during the initial 3 to 5 days of life; use TcB if available



KRAMER ZONES		APPROX SERUM BILIRUBIN
1	Face and neck	4 to 6 mg/dL
2	Chest and upper abdomen	8 to 10 mg/dL
3	Lower abdomen and thighs	12 to 14 mg/dL
4	Legs and arms/ forearms	15 to 18 mg/dL
5	Palms and soles	>15 to 20 mg/dL

ASSESS IF THE BABY HAS SERIOUS JAUNDICE*?

SERIOUS JAUNDICE

- Visible jaundice in first 24 hrs OR
- Yellow palms and soles anytime OR
- Signs of acute bilirubin encephalopathy (ABE) like poor suck/feeding, lethargy, hypotonia OR
- Abnormal posturing such as arching, retrocollis, opisthotonus, convulsion, fever, high pitched cry

MANAGEMENT

Does the infant have serious jaundice?

YES

Start Intensive Phototherapy
- Document serum bilirubin simultaneously
- Prepare for exchange blood transfusion (EBT) if signs of ABE are present

As per TSB, determine if baby requires phototherapy/ EBT if TSB at/more than cut-off?

YES

Continue phototherapy/prepare for EBT and determine the cause

Investigation:
- Blood type and DCT (if mother is 'O' or Rh -ve
- G6PD status
- Peipheral smear and reticulocyte count

Stop phototherapy
TSB falls below 13-14 mg/dL or 2 mg/dL below cut-off

NO

Stop phototherapy

NO

Does the infant require TSB measurement ?
- Jaundice in first 24 hrs ?
- Beyond 24 hrs: more than 12-14 mg/dL on visual assessment / TcB or near PT cut-off ?
- Unsure about visual assessment ?

YES

NO

Continue visual assessment/TcB (if available) every 12 to 24 hrs till discharge

ENSURING OPTIMAL PHOTOTHERAPY

- Keep the baby naked (only small nappy to cover the genitalia and eye covers)
- Place the baby close to the lights
- Phototherapy can be interrupted for feeding & clinical procedures
- Encourage frequent breastfeeding
- Monitor temperature regularly
- Maintain equipment as per manufacturer's instructions
- Frequency of repeat TSB measurement depends on cause, severity, age and gestation
  - **Hemolytic jaundice :** 6 to 8 hourly during initial 24 to 48 hrs
  - **Non-hemolytic jaundice :** 12-24 hourly

ENSURING OPTIMAL EXCHANGE BLOOD TRANSFUSION (EBT)

- Immediate EBT is recommended if infant shows signs of ABE or if TSB is above the recommended age and risk specific cut off
- Exchange volume = Twice the estimated blood volume of 80-100 mL/kg

DISCHARGE ADVICE

- Reinforce breastfeeding at discharge
- If discharged before 72 hrs; follow up at 48 to 72 hrs after discharge

SOME IMPORTANT DO'S ✓	SOME IMPORTANT DON'TS ✗
Encourage frequent breastfeeding	Sunlight should not be used for treatment of hyperbilirubinemia
Avoid exposure to naphthalene balls	Do not rely on visual assessment/ TcB while the baby is under phototherapy
Complete evaluation of newborn is important to evaluate for risk factors and underlying causes	Do not give phenobarbitone for treatment of hyperbilirubinemia
Do pre-discharge risk assessment	Do not stop breastfeeding

ABBREVIATIONS

ABE: Acute bilirubin encephalopathy
DCT: Direct coombs test
EBT: Exchange blood transfusion
G6PD: Glucose-6-phosphate dehydrogenase
TcB: Transcutaneous bilirubin
TSB: Total serum bilirubin

REFERENCES

1. Screening, Prevention and Management of Neonatal Hyperbilirubinemia. Clinical Practice Guidelines. National Neonatology Forum India 2020. www.nnfi.org/cpg
2. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. American Academy of Pediatrics Practice Guidelines . www.cdc.gov

☛ HYPERBILIRUBINEMIA IS A PREVENTABLE CAUSE OF BRAIN DAMAGE

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

POST-ASPHYXIAL MANAGEMENT OF NEONATES

ICD-10-P21.0

IMMEDIATE MANAGEMENT OF AN ASPHYXIATED NEONATE

Need for Positive pressure ventilation (PPV) at birth
OR
Referred with history of delayed cry at birth

- PPV for <60 seconds OR
- Delayed cry and resuscitation details not available

Assess 15 minutes after birth OR at admission

1. Lethargy/coma or irritability?
2. Absent spontaneous movements?
3. Absent Suck and Moro's reflex ?
4. Abnormal movements (limb jerks, cycling, swimming, chewing, sucking movements which are persistent and monotonous) ?
5. Respiratory distress ?
6. Features of shock ?

No

- Shift to mother's side
- Initiate breastfeeding
- Skin-to-skin contact
- Observe every 15 minutes for 1 hour

- PPV for 60 seconds or more OR
- Needed intubation or medications OR
- Cord pH <7.1 (if available)

At risk of hypoxic-ischemic encephalopathy (HIE)

Yes

Check vitals and blood glucose

- Temperature, heart rate, respiratory rate, oxygen saturation (SpO_2), capillary refill time
- Check blood glucose

If any value is abnormal, follow appropriate STW for Neonatal Triage

Stabilization and Supportive Treatment

- Secure airway
- If SpO_2 <91%, start O_2 by prongs/ hood
- If respiratory distress persists, follow STW for respiratory distress; consider CPAP if chest retractions or persistent hypoxia
- Start IV 10% dextrose at 60 mL/kg/day
- Maintain normal temperature; avoid hyperthermia
- Target blood glucose of 50-125 mg/dL
- If infant has seizures, follow STW for seizure

Assess for moderate to severe HIE

Lethargic or comatose with ANY ONE of the following:

1. Seizures
2. Decreased muscle tone
3. Absent /weak Suck or Moro's reflex

Yes → Moderate or severe HIE → Needs further assessment; may need therapeutic hypothermia

No → **No HIE or Mild HIE**

- Initiate feeds once vitals are stable
- Switch to breastfeeding as early as possible.
- Continue monitoring for 24hrs

NEONATE WITH MODERATE OR SEVERE HYPOXIC-ISCHEMIC ENCEPHALOPATHY

FULFILLS ALL OF THE FOLLOWING CRITERIA?

- ≥ 36 weeks gestational age
- ≥ 1800g birth weight
- < 6 hrs old
- Admission temperature 36-37.4 ^{0}C

NO →

PROVIDE SUPPORTIVE TREATMENT

- Secure airway
- If SpO_2 <91%, start O_2 by prongs/ hood
- Start IV 10% dextrose at 60 mL/kg/day
- Maintain normal temperature; avoid hyperthermia
- Target blood glucose of 50-125 mg/dL
- If infant has seizures, follow STW for seizures

YES

All of the following are fulfilled:

- pH <7 or base excess ≥16 on cord or arterial blood gas done within 1 h of life **AND**
- Apgar score< 5 at 10 minutes or at least 10 min of PPV **AND**
- History of acute perinatal event (such as but not limited to placental abruption, uterine rupture, cord prolapse)

NO →

YES

Moderate to Severe HIE

NO →

YES

Written protocol and facility for therapeutic hypothermia and level-3 intensive care available?

NO → **REFER TO HIGHER CENTRE**

YES

Initiate whole body cooling using a servo-controlled mattress / phase-change material (PCM) based device / ice or gel packs.

- If using gel or ice packs/PCM - ensure presence of nurse in 1:1 ratio for the neonate being cooled
- Whatever the device used, the cooling targets and monitoring are similar:
  - Continuous rectal temperature monitoring is required from initiation until 8 hrs after rewarming
  - Target rectal temperature is 33-34 °C
  - Induction: aim to attain target temperature in the first 30 minutes
  - Maintenance: continue to maintain target temperature for 72 hrs after initiation
  - Rewarming: increase rectal temperature to 36.5 °C over 6-12 hrs, at a rate ≤ 0.5 °C per hour

ABBREVIATIONS

BE: Base excess
CBC: Complete blood count
CRP: C reactive protein
CSF: Cerebrospinal fluid
HIE: Hypoxic-ischemic encephalopathy
NICU: Neonatal intensive care unit
PPV: Positive pressure ventilation
SNCU: Special newborn care unit

REFERENCES

1. NNF Working Group. Position Statement and Guidelines for Use of Therapeutic Hypothermia to treat Neonatal Hypoxic Ischemic Encephalopathy in India. New Delhi: National Neonatology Forum, India; 2021 Oct.
2. Sarnat HB, Sarnat MS. Neonatal Encephalopathy Following Fetal Distress: A Clinical and Electroencephalographic Study. Arch Neurol-chicago. 1976; 33(10):696–705.
3. Abate BB, Bimerew M, Gebremichael B, Kassie AM, Kassaw M, Gebremeskel T, et al. Effects of therapeutic hypothermia on death among asphyxiated neonates with hypoxic-ischemic encephalopathy: A systematic review and meta-analysis of randomized control trials. Plos One. 2021; 16(2):e0247229.

FREQUENT MULTI-SYSTEM MONITORING IS A MUST

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: (**stw.icmr.org.in**) for more information.

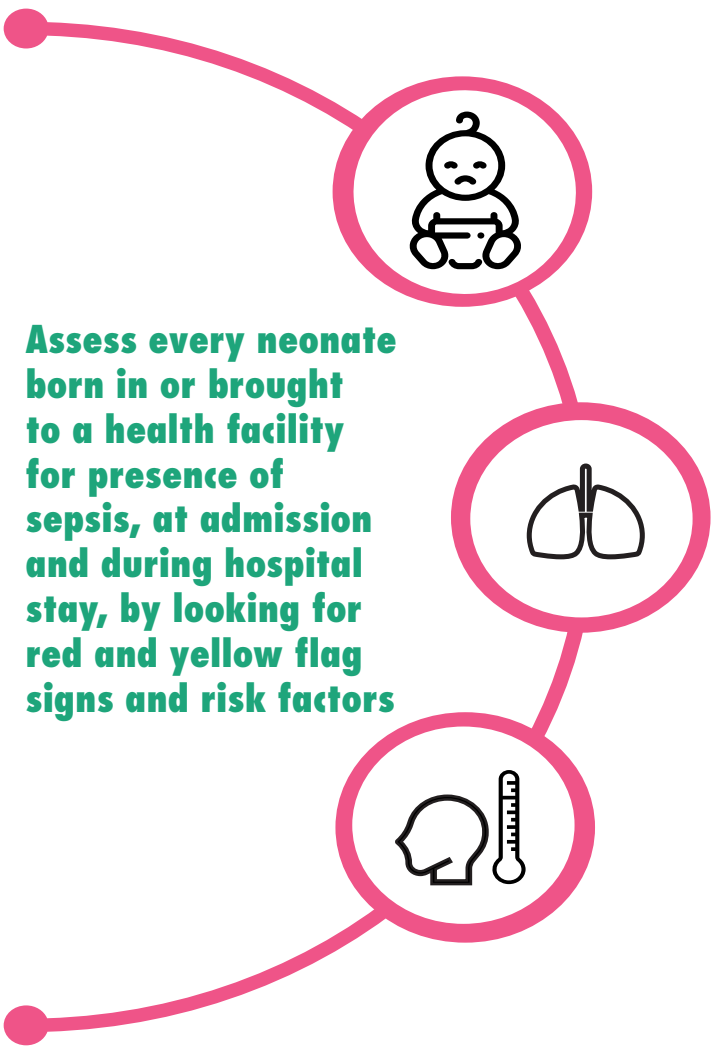
July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

SEPSIS IN NEONATES

ICD-10-P36



Assess every neonate born in or brought to a health facility for presence of sepsis, at admission and during hospital stay, by looking for red and yellow flag signs and risk factors

RED FLAG SIGNS

- Shock
- Bleeding from multiple sites
- Hardening of skin so that it cannot be pinched off the underlying tissue or bone (look at cheeks and thighs)
- Respiratory distress onset more than 6 hrs after birth
- Respiratory distress needing intubation or Silverman's score >6
- If age of baby is less than 7 days and mother has foul smelling discharge or chorioamnionitis

YELLOW FLAG SIGNS

Seizures	Refusal to feed	HR>160 persisting for one hour despite normal temperature	Respiratory distress	Floppiness
Lethargy	Feed intolerance	New or increased apneic episodes	Fever or hypothermia not due to environmental temperature	

Any of the maternal risk factors: If age of baby is less than 7 days and mother has

Dai handling or unclean vaginal examination	Rupture of membranes ≥18 hrs	pPROM	Urinary tract infection	Diarrhea	Fever

HIGH PROBABILITY OF SEPSIS

Start treatment and investigate

- Any RED flag sign is present
- Two YELLOW signs/ maternal risk factors are present
- One YELLOW sign or maternal risk factor is present AND baby's gestation at birth is ≤ 32 weeks

- Admit in the NICU/SNCU
- Obtain blood sample for culture and sensitivity
- Start empirical antibiotics as per local/unit policy pending reports
- Provide supportive care and do appropriate laboratory investigations as indicated clinically (Chest X-ray, CBC, platelet count, RBS, serum electrolytes, renal functions)
- Perform lumbar puncture (LP) for CSF analysis when baby is hemodynamically stable

AT-RISK/SUSPECT SEPSIS

Observe

- One YELLOW sign or maternal risk factor is present AND
- Baby's gestation at birth is >32 weeks

- Keep baby under close observation for 48-72 hrs
- Start antibiotics if another yellow/ red sign appears during observation
- Obtain sample for blood culture and sensitivity before starting antibiotics
- Perform LP for CSF analysis if starting antibiotics or if the blood culture is positive

REVIEW AT 48 HRS

SIGNS OF SEPSIS DISAPPEARED AND CRP <12 MG/L

- Stop antibiotics
- Keep under observation till blood culture is reported as sterile after 48 hrs of incubation

SIGNS OF SEPSIS IMPROVING BUT STILL PRESENT

- Continue antibiotics
- Antibiotic duration based on blood culture and LP report

SIGNS OF SEPSIS WORSENED, OR A RED SIGN APPEARED AFTER STARTING TREATMENT

- Upgrade antibiotics as per antibiotic local/unit policy
- Antibiotic duration based on blood culture and LP report

If antibiotics are continued, review again at 5 days: If baby is now well from last 48 hrs, blood culture is sterile and CSF is normal: Stop antibiotics

If blood culture was not done, a negative CRP or Procalcitonin at 24-48 hrs after starting antibiotics, can help in early stopping of antibiotics

DURATION OF ANTIBIOTICS

CONDITION	DURATION
Pneumonia	5-7 DAYS
Sepsis with CRP >12 mg/L AND sterile blood culture AND normal CSF analysis	5-7 DAYS
Blood culture positive	10-14 DAYS
CSF suggestive of meningitis	21 DAYS

REMEMBER

Do not start antibiotics without indication. Clinical features in neonates are non-specific. Looking for alternative reasons for sickness and careful serial observations are important ways to avoid unnecessary use of antibiotics.

Believe a negative blood culture report and stop antibiotics if baby has recovered.

Main utility of both CRP and procalcitonin is to rule-out sepsis. A positive test may also be due to several non-infective conditions. Therefore, a positive CRP or procalcitonin should be interpreted carefully giving due weightage to clinical course of the baby.

ABBREVIATIONS

CBC: Complete blood count
CRP: C-reactive protein
CSF: Cerebrospinal fluid
LP: Lumbar puncture
NICU: Neonatal intensive care unit
pPROM: Preterm premature rupture of membranes
RBS: Random blood sugar
SNCU: Special newborn care unit

REFERENCES

1. Sankar MJ, Agarwal R, Deorari AK, Paul VK. Sepsis in the newborn. Indian J Pediatrics. 2008; 75(3):261–6.
2. The Young Infants Clinical Signs Study Group. Clinical signs that predict severe illness in children under age 2 months: a multicentre study. Lancet. 2008; 371(9607):135–42.
3. Neonatal infection: antibiotics for prevention and treatment. London: National Institute for Health and Care Excellence (NICE); 2021 Apr 20. (NICE Guideline, No. 195.). Available from: https://www.nice.org.uk/guidance/ng195 Last access on 20/04/2022

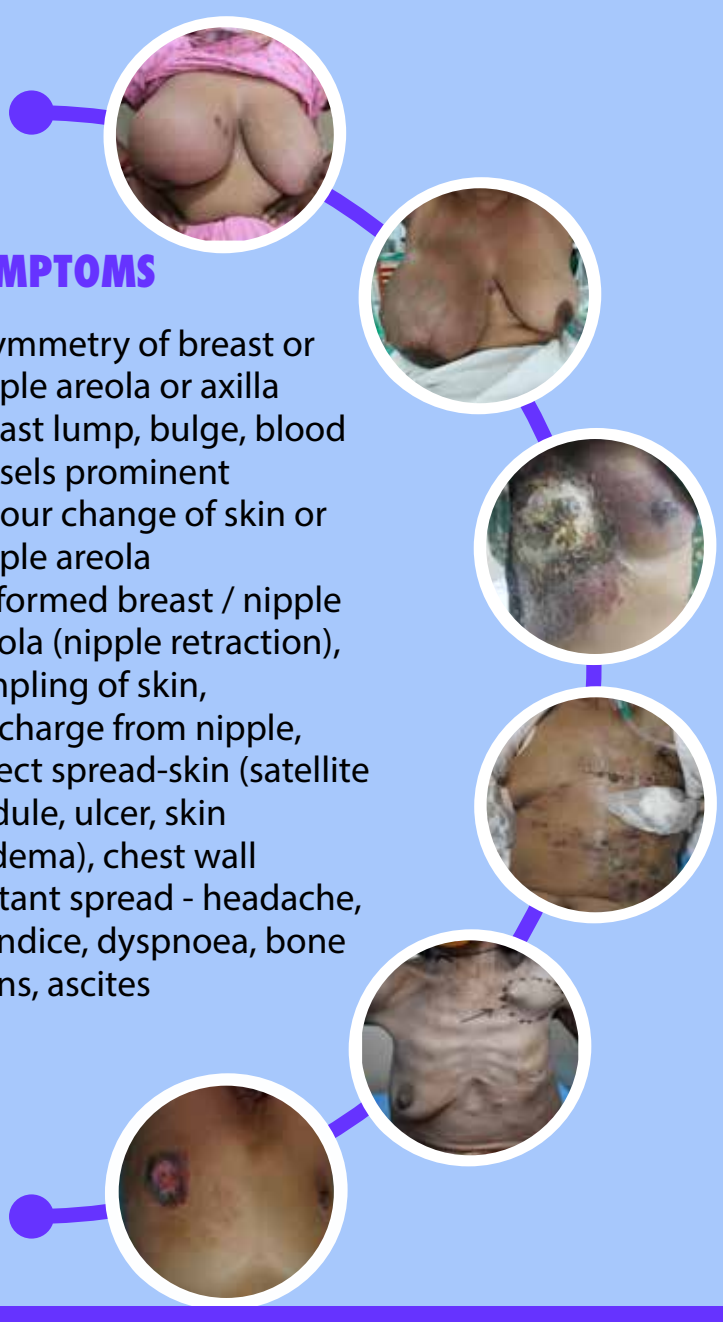
PREVENT SEPSIS BY ENSURING HAND HYGIENE, ASEPSIS DURING PROCEDURES AND DILIGENT HOUSEKEEPING

ONCOLOGY

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

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



SYMPTOMS

A. **A**symmetry of breast or nipple areola or axilla
B. **B**reast lump, bulge, blood vessels prominent
C. **C**olour change of skin or nipple areola
D. **D**eformed breast / nipple areola (nipple retraction), dimpling of skin,
Discharge from nipple,
Direct spread-skin (satellite nodule, ulcer, skin oedema), chest wall
Distant spread - headache, jaundice, dyspnoea, bone pains, ascites

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

SIGNS

A Breast changes
- Asymmetry in shape/size of breast or nipple areola complex
- Breast lump
- Nipple retraction/ulcer
- Change in skin - puckering, dimpling, thickening, ulcer, redness, edema & satellite nodules
- Fixity to underlying muscles or chest wall

B Lymph node
- lymph node(s) in axilla or supra-clavicular fossa

C Systemic changes
- Enlarged liver, ascites, bony tenderness, dyspnoea, pleural effusion

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

CLINICAL BREAST EXAMINATION

IMAGING
- Bilateral mammogram: for women >30 years
- Ultrasound: breast and axilla
- MRI breast in selected cases

STAGING- T1, T2 N0 N1
Upto Stage 2A no metastatic work up
Stage 2B upwards
- Chest radiograph
- Ultrasound whole abdomen
- Bone scan
- CECT chest and abdomen
- PET-CT (optional)

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

DO NOT
- Ignore any lump or changes in breast & nipple areola complex
- Perform excision biopsy for diagnosis
- Perform FNAC or core needle biopsy before imaging.

MULTIDISCIPLINARY CARE

MANAGEMENT OF BREAST CANCER

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

EARLY BREAST CANCER
T1, T2, N0, N1, M0
- Surgery followed by adjuvant therapy
- Metastatic work-up usually not indicated

For breast
- Surgery → Discuss adjuvant therapy in MDT
- Primary systemic therapy → Surgery → Discuss adjuvant therapy in MDT

For axilla (clinico-radiological assessment)
- Node -ve → SLNB/axillary sampling
  - -ve → No ALND
  - +ve → ALND
- Node +ve → ALND

ADJUVANT THERAPY (AT)

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

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

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

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

ADVANCED BREAST CANCER
T3, T4, any N Any T, N2, N3

Metastatic work up: Chest X-ray, ultrasound abdomen, bone scan
OR
CECT thorax abdomen, bone scan OR PET-CECT whole body

No metastasis

Locally Advanced Breast Cancer
Intent of treatment: curative
- Neoadjuvant systemic therapy
- Discuss extent of surgery MRM or Breast conservation surgery
- Adjuvant systemic treatment therapy +RT surgery

Yes metastasis

Metastatic Breast Cancer
Intent of treatment: palliative care
- Consider hormone therapy chemotherapy targeted therapy as clinically indicated

Treatment of metastatic breast cancer

Chemotherapy
- Consider - Anthracyclines taxanes, platinum, capecitabine, cyclophosphamide, methotrexate, etc.
- Sequential single agents preferred over combinations when possible

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

HER2 targeted therapy
- Consider - trastuzumab, lapatinib, pertuzumab, add trastuzumab-emtansine

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

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

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

Pain control and palliative care

ABBREVIATIONS

ALND: Axillary lymph node dissection
CECT: Contrast-enhanced computed tomography
ER/PR: Estrogen receptor/Progesterone receptor
FISH: Fluorescence in situ hybridization
HER2: Human epidermal growth factor receptor 2
IHC: Immunohistochemistry
MBC: Metastatic breast cancer
PET-CT: Positron emission tomography-computed tomography scan
RT: Radiotherapy
SLNB: Sentinel lymph node biopsy

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

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

LUNG CANCER

ICD-10-C34.90

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

PRESENTATION

- Cough
- Chest pain

- Hemoptysis
- Hoarseness

- Breathlessness
- Non resolving pneumonia

- Mass lesion
- Symptoms persist even after treating pneumonia

IMPORTANT ASSESSMENT PARAMETERS

- Pulmonary function
- Age and comorbidities
- Performance status

Clinical examination:

- Palpable lymph nodes
- Chest wall tenderness
- Skeletal tenderness
- Pleural effusion

INITIAL EVALUATION

- CXR
- Sputum cytology
- Pulmonary reserve:
  - Effort tolerance
  - Walk test
  - Pulmonary function tests (PFT)

DIAGNOSTIC CONFIRMATON

LIMITED DISEASE

- CECT thorax and upper abdomen
- Obtain tissue for diagnosis percutaneously by image guidance or by bronchoscopy

ADVANCED DISEASE

- Pleural fluid cytology
- Pleural biopsy (image guidance if available)
- Cervical lymph node aspiration cytology / biopsy

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

PATHOLOGY ASSESSMENT

Biopsy/ cell block/ smear

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

SMALL CELL LUNG CARCINOMA

Do CECT thorax and abdomen

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

NON SMALL CELL LUNG CARCINOMA

Do CECT thorax and abdomen

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

MANAGEMENT OF NSCLC

METASTATIC WORKUP* PET-CT SCAN AND MRI BRAIN

Early localized : T1-3, N0-2

EBUS/ EUS ± mediastinoscopy

<N2

N2

N3

Lung resection- lobectomy with SMLND

If operated without NACT Stage II and III A, T>4 cm:
- Adjuvant RT for positive cut margins & pN_2
- Adjuvant chemotherapy
- Consider Osimertitinib if EGFR mutation+

Oral TKI

NACT

Unfit or patient refuses surgery

SBRT/ RFA T1-2, N0-2

Concurrent CT+ RT

Locoregionally advanced : T4, N3

Concurrent CT+ RT

Metastatic disease. any T, any N, M1

Brain/ symptomatic bone metastases

Pallative radiation; Bisphosphonates for bone metastases

Other visceral metastases

Histology

Non- Squamous

EGFR/ ALK testing/ ROS-1/ NGS Platform

EGFR +ve

Oral TKI

ALK +ve/ ROS-1

Oral TKI

EGFR/ ALK -ve/ ROS-1

Platinum doublet chemotherapy or chemoimmunotherapy

Squamous carcinoma

Driver mutation test

Mutation -ve

Platinum doublet chemotherapy or chemoimmunotherapy

Mutation +ve

Oral TKI or platinum doublet chemotherapy

AVAILABLE TREATMENT OPTIONS

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

PALLIATIVE CARE

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

ABBREVIATIONS

ALK: Anaplastic lymphoma kinase
ATT: Anti tubercular therapy
CECT: Contrast-enhanced computed tomography
COPD: Chronic obstructive pulmonary disease
CT: Computed tomography
CXR: Chest X Ray
EBUS: Endobronchial ultrasound
EGFR: Epidermal growth factor receptor
NACT: Neoadjuvant chemotherapy
NGS: Next generation sequencing
NSCLC: Non-small cell lung cancer
PET CT: Positron emission tomography
PFT: Pulmonary function test
pN2: Pathological node
RFA: Radiofrequency ablation
ROS: Ros proto-oncogene 1
RT: Radiotherapy
SBRT: Stereotactic body radiotherapy
SMLND: Systematic lymph node dissection
T, N, M: Tumour (T), Nodes (N), and Metastases (M)
TKI: Tyrosine kinase inhibitors

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES.

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: (**stw.icmr.org.in**) for more information.

July/ 2020

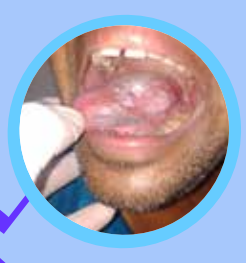
Department of Health Research
Ministry of Health and Family Welfare, Government of India

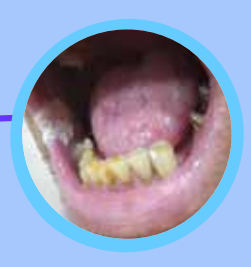
INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

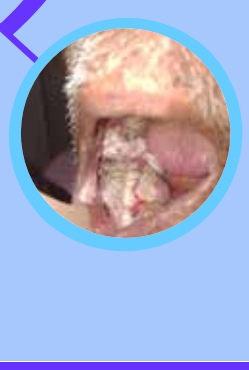
Standard Treatment Workflow (STW)

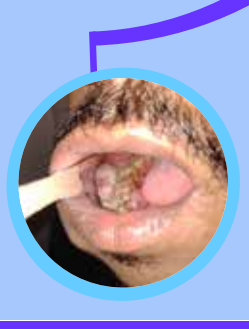
LIP AND ORAL CANCER

ICD-10-C 06.9









- **Tobacco**
- **Alcohol**
- **Areca nut**
- **Sharp tooth**
- **Ill-fitting dentures**

Non healing ulcer/ sore in the mouth especially in a tobacco chewer or smoker

Neck mass

Difficulty in opening mouth

Difficulty in protrusion of tongue

Pain referred to ear

Oral premalignant disorders (OPMD): leukoplakia/ erythroplakia/sub mucous fibrosis, lichen planus

Screening can detect OPMD and invasive cancer early and improve outcome. Treatment of oral cancer is ideally delivered by a multidisciplinary team(MDT)

EVALUATION

- Clinical examination, +/- examination under anaesthesia (EUA), assess pain, nutritional status, & oro-dental hygiene
- USG neck / CT scan head & neck
- Evaluate upper aerodigestive tract for second primary
- Biopsy from primary site, FNAC from neck node
- CBC, LFT, RFT, blood sugar, chest X-ray, ECG
- Tobacco cessation for patient and care givers
- Pure tone audiometry (PTA)
- Speech and swallowing assessment
- Define clinical and radiological staging, goals of treatment

TREATMENT

T1 T2, N0 CANCER

OPTIONS WITH CURATIVE INTENT

Initial surgery **preferred** (wide excision with 1 cm margins & supra-omohyoid neck dissection (Level I – III) with reconstruction
OR
Radical radiation therapy

T3 T4A, N0 N1 N2

OPTIONS WITH CURATIVE INTENT

Initial surgery: wide excision with 1 cm margins + comprehensive neck dissection and reconstruction
OR
Chemoradiation
OR
Neo-adjuvant CT followed by surgery

T4B N3 (TONGUE AND BUCCAL CANCERS WITH SKULL BASE/ INTERNAL CAROTID ARTERY INVOLVEMENT

AIM OF TREATMENT IS PALLIATION

- Palliative chemotherapy
- RT
- Immunotherapy
- Best supportive care

INDICATIONS FOR ADJUVANT RT

Close margin, positive node(s), or presence of any two of following: LVI, PNI, high grade

INDICATIONS FOR ADJUVANT CT-RT:

Metastatic nodes with extracapsular extension, involved margins

THE DRUG OF CHOICE FOR CONCURRENT CHEMOTHERAPY IS CISPLATIN

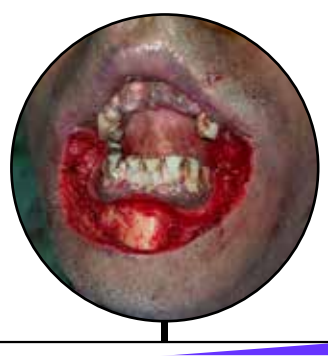
Adjuvant radiation

The minimum post-operative radiation dose is 60 Gy/ 6 weeks/ 30# or equivalent to the primary and nodal areas using conventional treatment planning, 3DCRT or IMRT

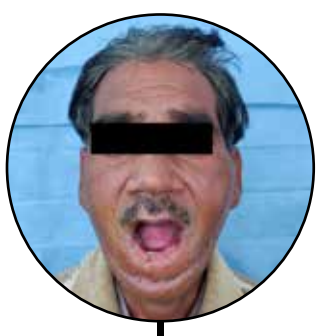
Radical radiation

66-70 Gy is delivered using conventional planning / 3DCRT/IMRT through a telecobalt machine or a LINAC at 1.8 to 2 Gy per fraction over 7-8 weeks (or a biologically equivalent dose) with adequate margins all around the lesion and including level I, II and III nodes

Large SCC lower Lip



Intraoperative image following tumor excision



Postoperative results following reconstruction

FOLLOW UP

Follow up: 3 monthly for the first 3 years, 6 monthly for years 4 & 5 and annually thereafter with clinical examination at every visit, evaluation of symptoms as they present and endoscopy of the upper aerodigestive tract annually

To identify recurrences and second primary cancers

Treatment of common side effects - xerostomia, speech and swallowing issues, nutrition and physical rehabilitation, dental care should be looked after by the members of multidisciplinary team

Emphasize tobacco cessation for patients

- Set a quit date, tell your family
- Remove tobacco / cigarettes from your home, car, and work

- **Tobacco withdrawal symptoms:**
  - Trouble sleeping
  - Feeling irritable, anxious, or restless
  - Getting frustrated or angry
  - Having trouble thinking clearly
- **Counsellor's help is available to deal with the cravings and triggers**
- **Can combine nicotine replacement with or ± bupropion**

ABBREVIATIONS

CBC: Complete blood count
CT: Chemotherapy
EUA: Examination under anaesthesia
FNAC: Fine needle aspiration cytology
IMRT: Intensity-modulated radiation therapy
LFT: Liver function tests
LVI: Lymphovascular invasion
MDT: Multidisciplinary team
OPMD: Oculopharyngeal muscular dystrophy
PNI: Perineural invasion
PTA: Pure tone audiometry
RFT: Renal function tests
RT: Radiotherapy
USG: Ultrasound sonography test

PREVENT ORAL CANCER BY TOBACCO CONTROL

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: (**stw.icmr.org.in**) for more information.

OPHTHALMOLOGY

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

CATARACT

ICD-10-H25.9

SYMPTOMS
Decrease in vision, progressive change in power of glasses, glare, uniocular polyopia, white pupillary reflex

SIGNS
VA ≤ 6/9*, not improving with pinhole or glasses, along with lens opacity

SYSTEMIC ASSESSMENT
Detailed medical history including history of allergy and review of records if available and assessment of general health status

OPHTHALMIC EXAMINATIONS

PRELIMINARY EXAMINATION
Torch, distant direct ophthalmoscopy

ESSENTIAL
Vision and refraction, intraocular pressure (IOP), slit lamp examination, pupillary reflexes, pressure over lacrimal sac area, fundus examination (if fundus examination is not possible due to dense cataract then ultrasound B-scan is advisable)

DESIRABLE
Slit lamp-specular reflection, ultrasound-B scan (if there is any clinical indication such as suspected associated vitreous haemorrhage or retinal detachment)

CATARACT PRESENT

ESSENTIAL INVESTIGATIONS
- Blood pressure
- Blood sugar (FBS, PPBS/RBS)
- Ophthalmic biometry (Axial length and keratometry for IOL power calculation)

DESIRABLE INVESTIGATIONS
- Lacrimal sac syringing
- ECG

OPTIONAL INVESTIGATIONS
- Xylocaine sensitivity test dose if h/o allergy
- Specular microscopy
- Serology testing**
- Other investigations based on existing ocular & systemic disease

INDICATIONS FOR SURGERY
1. Clinically significant cataract causing visual loss enough to warrant surgery (BCVA in affected eye < 6/12 or patient feeling visually handicapped even with BCVA ≥ 6/12). Advanced cataracts with severe visual loss BCVA <6/60 or worse should be operated on priority
2. Clinically significant cataract enough to account for other visually disturbing symptoms such as glare, loss of contrast or polyopia which are bothersome enough for the patient to undergo surgery
3. Significant cataract hampering visualization of fundus for examination or treatment of retinal disorders
4. Cataract with narrow angle glaucoma where cataract surgery is required to improve control of IOP

PROCEED FOR SURGERY IF INDICATED
Discussion with patient about cataract, need for surgery, possible surgical options, expected outcome and prognosis

Advice for follow up as needed

CATARACT WITH CO-MORBIDITY

CATARACT WITH OCULAR COMORBIDITY
- Explain implications of associated corneal opacity/glaucoma/uveitis/ retinal disease/optic nerve disease/ amblyopia/squint/uncontrolled systemic disease
- Prioritize care according to the severity of the disease and need for treatment
- Refer to specialist for consultation/ opinion/management and follow up

CATARACT WITH SYSTEMIC COMORBIDITY
- **Medicine specialist referral essential:**
- Ischaemic heart disease (with request for monitored anaesthetic care and decision on withholding anticoagulant/fibrinolytics)
- Systemic malignancy
- **Medicine specialist referral desirable:**
- Hypertension
- Diabetes mellitus
- Chronic renal disease
- Collagen vascular diseases
- Thyroid disease

CATARACT ABSENT

LOOK FOR OTHER CAUSES OF VISION IMPAIRMENT AND REFER AS NECESSARY
- Corneal pathology
- Glaucoma
- Retinal disease
- Optic nerve disease
- Amblyopia

MANAGEMENT

PHC/PRIMARY LEVEL
- Detailed examination
- Refraction for BCVA
- Preliminary diagnosis
- Referral to Ophthalmologist if BCVA, vision with pinhole ≤ 6/12
- Postoperative follow up and compliance
- Timely referral in case of drop in vision or development of fresh symptoms after last follow up visit for post-operative complications such as PCO(VAO)/CME/Corneal decompensation/raised intraocular pressure/ uveitis/ displaced IOL/delayed endopthalmitis/ scleritis/ wound dehiscence etc.

INDICATIONS FOR URGENT REFERRAL :
White cataract, shallow AC, sluggish pupil, sudden vision loss with cataract, bilateral advanced cataract.

SECONDARY LEVEL
- Cataract surgery
- Diagnose, manage or refer comorbidities such as Glaucoma, Diabetic Retinopathy, Corneal opacity, etc.
- Postoperative follow up, refraction and ensure compliance
- Manage PCO(VAO)/other complications or refer

TERTIARY LEVEL
- Cataract surgery
- Diagnose and manage comorbidities such as Glaucoma, Diabetic Retinopathy, Corneal opacity, etc.
- Postoperative follow up, refraction and ensure compliance
- Manage PCO/VAO/other complications

FITNESS FOR SURGERY
- General health stable
- BP ≤ 150/90mm Hg
- Blood sugar (mg/dl) FBS < 150, PPBS < 200 / RBS < 200

PRE-OPERATIVE PREPARATION Topical broad spectrum antibiotics, QID for 1-3 days advisable

Surgery to be performed in sterile OT following strict aseptic procedures and universal precautions.

SURGICAL PREPARATION Periocular cleaning with 10% povidone iodine followed by instillation of 5% povidone iodine in conjunctival sac, rinse after 3 minutes. sterile surgical eye drape to be used

SURGICAL OPTIONS
1. Small Incison Cataract Surgery (SICS) with PMMA IOL.
2. Phacoemulsification (Phaco) with Indian foldable IOL (as per expertise, feasibility and availability)
3. Phaco with imported or premium foldable IOL (wherever indicated, as per expertise, availability and feasibility)
4. ECCE (large incision) with PMMA IOL

QUALITY ASSESSMENT PARAMETERS TO BE RECORDED
- Patient identifiers (age, gender, address)
- Preoperative vision, diagnosis of the eye to be operated
- Date of surgery, procedure name, implanted IOL
- Follow up vision
- Post operative visit date (2 -4 weeks post op visit), refractive status
- Cause of BCVA ≤ 6/12
- Positive indicator :BCVA ≥ 6/9 at 2-4 weeks or regains full visual potential
- Negative indicator: vision worse than pre-op or unexplained lack of improvement or serious complications (endophthalmitis/irreversible corneal decompensation/dropped nucleus/IOL dislocation/resurgery)

POST OP CARE
- Topical broad spectrum antibiotics, QID for 1-2 weeks or longer if required
- Topical steroids 4-6 times per day for 2 Weeks then taper over 2-4 weeks
- Follow up: 1 day, 1-2 weeks (optional) & 2-4 weeks after cataract surgery
- Prescription of glasses at 2-4 weeks after cataract surgery
- Refer to higher centre in case of adverse event

** If vision does not improve with refraction, a clinical assessment must be made to assess if this is purely due to cataract, or ocular co-morbidity such as corneal pathology, glaucoma, retinal disease, optic nerve pathology or amblyopia. A decision must be taken based on history and clinical features and further referral to higher centre if necessary.*

- *Any patient with cataract and BCVA < 6/12 in better eye qualifies is visually impaired and should be offered surgery.*
- *Patients with cataract and BCVA ≥ 6/12 may also be offered surgery depending on symptoms and visual needs.*

*** A risk assessment by history and review of any risk factors for possible carrier of transmissible diseases such as HIV/HBsAg/HCV should be done and serology testing may be done if any risk factor is identified. In general, standard universal precautions must be taken in all cases.*

ABBREVIATIONS

BCVA: Best corrected vbisual acuity
CME: Cystoid macular edema
ECCE: Extra capsular cataract extraction
FBS: Fasting blood sugar
IOL: Intraocular lens
IOP: Intraocular pressure
PCO: Posterior capsular opacification
PMMA: Polymethyl methacrylate
PPBS: Post prandial blood sugar
RBS: Random blood sugar
SICS: Small incision cataract surgery
VAO: Visual axis opacification

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

DIABETIC RETINOPATHY (DR)

ICD-10-E11.31

KEY POINTS

- Diabetic retinopathy can be asymptomatic in early as well as advanced stages
- Every newly diagnosed diabetic should be screened for retinopathy at the point of detection of diabetes and thereafter annually or more frequently as required by the retinopathy grade

PRELIMINARY SCREENING

HISTORY

- Duration of diabetes.
- Compliance with treatment and blood sugar monitoring
- Any visual complaints
- Any other systemic illness

EXAMINATION

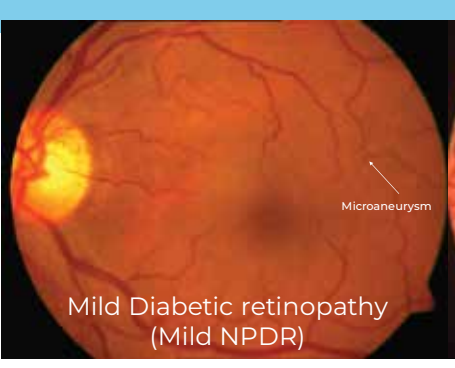
Vision, refraction, ophthalmic examination including pupillary reflexes , IOP, dilated fundus examination with a direct/ indirect ophthalmoscope

DEFINITIVE DIAGNOSIS

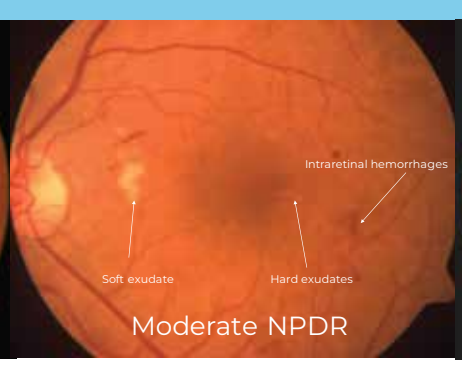
ESSENTIAL
Slit lamp bio microscopy (retinal exam) , ultrasound-B scan (when fundus not visible)

DESIRABLE
Indirect ophthalmoscopy
Fundus photography

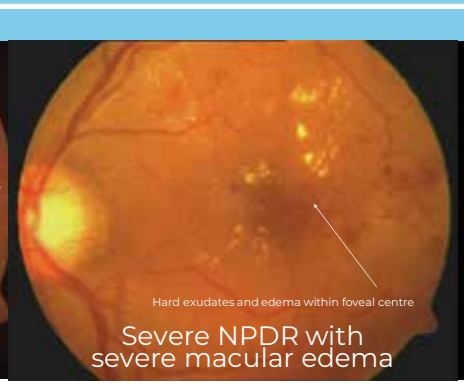
OPTIONAL
OCT, FFA, OCTA if indicated



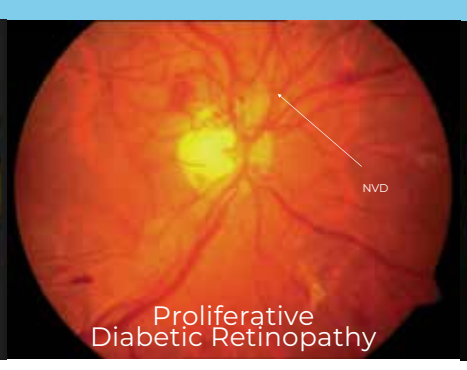
Mild Diabetic retinopathy (Mild NPDR)



Moderate NPDR



Severe NPDR with severe macular edema



Proliferative Diabetic Retinopathy

Proliferative Diabetic Retinopathy- Advanced

TABLE 1: CLASSIFICATION OF DIABETIC RETINOPATHY

DIABETIC RETINOPATHY	FINDINGS OBSERVABLE ON DILATED OPTHALMOSCOPY	REFERRAL*
No Apparent retinopathy	No Abnormalities	
Mild non proliferative DR	Micro aneurysms only	Refer to retina specialist
Moderate non proliferative diabetic retinopathy	More than just micro aneurysms, but less than severe non proliferative DR	Refer to retina specialist
Severe non-proliferative DR	Any of the following: • Intra-retinal haemorrhages (≥20 in each quadrant) • Definite venous beading (in 2 quadrants) • Intra retinal micro vascular abnormalities (in 1 quadrant) and • No signs of proliferative retinopathy	Refer to retina specialist
Proliferative DR	Severe non proliferative DR and 1 or more of the following: • Neovascularization • Vitreous/ pre retinal haemorrhage	Refer to retina specialist

*For non ophthalmologist , any DR should be referred to retina specialist

TABLE 2: CLASSIFICATION OF DIABETIC MACULAR EDEMA

DIABETIC MACULAR OEDEMA	FINDINGS OBSERVABLE ON DILATED OPHTHALMOSCOPY	REFERRAL*
DME Absent	No retinal thickening or hard exudates in posterior pole	Review in 1 year
DME Present	Retinal thickening or hard exudates in posterior pole	Refer to retina specialist
Mild DME	Retinal thickening or hard exudates in posterior pole but outside the central subfield of the macula (diameter 1000 µm)	Refer to retina specialist
Moderate DME	Retinal thickening or hard exudates within the central subfield of the macula but not involving the centre point	Refer to retina specialist
Severe DME	Retinal thickening or hard exudates involving the centre of the macula	Refer to retina specialist

INDICATIONS FOR URGENT REFERRAL
- Vision loss
- Hard exudates
- Haemorrhages
- Non - dilating pupil
- Blurred disc margins
- No view of fundus
- Absent Foveal Reflex

MANAGEMENT

PHC/PRIMARY LEVEL
- Detailed history & examination
- Refraction for BCVA
- Preliminary diagnosis
- Referral to Ophthalmologist (as per Table no. 1 and 2)
- Counselling regarding metabolic control
- Preventive advice, counselling and regular follow up

SECONDARY LEVEL
- Refraction for BCVA
- Detailed work up including indirect ophthalmoscopy
- Diagnose, classify, advice (as per Table no. 1 and 2)
- Point to point guided referral
- Ensure follow up and compliance
- Counselling regarding metabolic control and systemic comorbidities (hypertension, and nephropathy)

TERTIARY LEVEL
- Diagnose, classify, advice (as per Table no. 1 and 2)
- Intravitreal injections/laser photocoagulation/ vitreoretinal surgery
- Ensure postoperative follow up and compliance including collaboration with district hospital ophthalmologists
- Counselling regarding metabolic control

INDICATION FOR SURGERY
- Sudden vision loss
- Clinically recognizable macular edema
- Rubeosis iridis
- Proliferative DR

FITNESS FOR SURGERY:
- General health stable
- BP ≤ 150/90mm Hg
- Blood sugar (mg/dl) FBS < 140, PPBS < 180 / RBS < 200

INTERVENTION: Pre-op topical broad spectrum antibiotics, QID for 1-3 days

SURGICAL PREPARATION: Periocular cleaning with 10% povidone iodine followed by instillation of 5% povidone iodine in conjunctival sac, rinse after 3 minutes, wipe, aseptic precautions, Sterile surgical eye drape

QUALITY ASSESSMENT PARAMETERS
- Patient identifier, age/ gender
- Grade of DR
- Pre operative vision, diagnosis
- Follow up vision

ABBREVIATIONS

BCVA: Best corrected visual acuity
DME: Diabetic macular edema
FFA: Fundus fluorescein angiography
IOP: Intra ocular pressure
OCT: Optical coherence tomography
OCTA: Optical coherence tomography angiography

REFERENCE

1. Guidelines for diabetic care in India, International Council of Opthalmology, January 2015 (https://www.iapb.org/wp-content/uploads/ICO-Guidelines-for-Diabetic-Eye-Care-Adapted-to-India_VISION-2020-India.pdf)

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

GLAUCOMA

ICD-10-H40.9

KEY POINTS

- Glaucoma can be asymptomatic
- Can lead to irreversible vision loss if not treated in time
- Everybody ≥ 40 years age to be screened
- Everybody with a family history of Glaucoma to be screened

SCREENING CRITERIA

HISTORY TAKING

- Unilateral intermittent headache, blurring of vision, eye pain, coloured haloes
- Previously diagnosed /glaucoma suspect
- Treatment history - medical/surgical/laser and compliance with medication/follow up

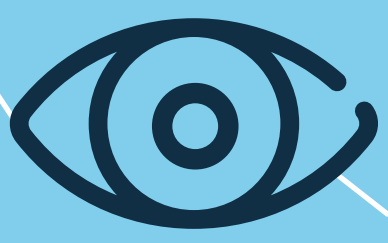
SIGNS

- Abnormalities of optic nerve head(Cup to disc ratio > 0.7; asymmetry > 0.2)
- IOP* >20mmHg
- Evidence of ocular co-morbidities that could lead to secondary glaucoma
- Torch light examination : on shadow test - shallow anterior chamber and Iris changes (Iris atrophy and sphincter pupil atrophy)
- Visual field defects
- Evidence of previous surgery or laser
- Evidence of intermittent angle closure glaucoma

*if normal but associated with other features think of normal-tension glaucoma

HISTORY

- Highest baseline IOP before any treatment
- Systemic Hypertension, Cardiovascular diseases, Transient ischemic attacks, DM
- Systemic and ocular medications used
- Any OTC medication especially steroid for allergy
- Any ocular trauma



DEFINITIVE DIAGNOSIS

EXAMINATION

- Vision
- Refraction
- Ophthalmic examination including pupillary reflexes
- IOP
- Fundus examination
- Anterior chamber depth with direct ophthalmoscope/ slit lamp biomicroscope with 90D

ESSENTIAL

Slit lamp bio microscopy, AC Depth, gonioscopy, Pupillary reflex, Estimation of IOP (3 measurements), Visual field assessment

DESIRABLE

Diurnal variation. Central Corneal thickness

OPTIONAL

UBM, OCT, HRT, GCC for RNFLthickness

EXAMINATION IN OPD

Cupping >0.7, Asymmetry >0.2, Notch

Shallow AC

TONOMETRY (repeat twice) + Gonioscopy

- IOP 14-18 mmHg
  - Open angles POAG Suspect
  - Narrow angles PACS/PAC
- IOP >20 mmHg
  - Narrow angles + PAS PACG
  - Open Angles POAG

BE Yag PI

Perimetry + baseline IOP (preferably morning and evening) to determine 'Target' IOP

SUGGESTED MANAGEMENT PROTOCOL BASED ON IOP

<25 mmHg	25-30 mmHg	> 30mmHg
First line drug-Prostaglandins/ β-Blocker (look for 15% IOP)	First line drug-Prostaglandins/β Blocker	Prostaglandins + β-Blocker+ Tab Diamox 250mg TDS only x3 days
Review 2 weeks/ switch to another drug if nonresponder	Review 10 days+another drug if required	Review 10 days add brimonidine if required
Review after every 4 mths if 'target' IOP achieved	Review after every 3 mths if 'target' IOP achieved	Review after every 3 mths if 'target' IOP achieved

Fitness for Surgery

- General health stable
- BP ≤ 150/90mm Hg
- Blood sugar (mg/dl) FBS < 140, PPBS < 180 / RBS < 200

MANAGEMENT

PHC

- Evaluate for open angle(deep AC), narrow angle (shallow AC) with torchlight
- Detailed history and examinations
- Refraction for BCVA
- Preliminary diagnosis
- Referral to Ophthalmologist as soon as possible if IOP > 21, shallow anterior chamber or cup-disc ratio > 0.7
- Counselling regarding spacing and phasing of glaucoma medication and reporting of side effects if any
- Counsel that surgery is not a cure but a means to lower IOP to stabilize the disease. The follow up is mandatory and will remain, regardless
- Counsel that stabilization of disease is available with regular treatment and follow up

DISTRICT HOSPITAL

- Refraction for BCVA
- Detailed work up including, Slit lamp examination& AC Depth , IOP, Optic nerve head examn
- Gonioscopy ,fields and Diagnose, classify, advice as per Flow chart. point to point guided referral
- Surgical intervention such as Yag PI and Trabeculectomy
- Counselling regarding spacing and phasing of glaucoma medication and reporting of side effects if any.
- Counsel that surgery is not a cure but a means to lower IOP to stabilize the disease. The follow up is mandatory and will remain, regardless
- Counsel that stabilization of disease is available with regular treatment and follow up

TERTIARY CARE

- Detailed work up as above
- Optional investigations such UBM, OCT, HRT, GCC for RNFL thickness when necessary
- Surgical intervention, YAG Pi, Trabeculectomy, any other advanced procedure such as tube shunts.
- Ensure Postoperative Follow up and compliance including collaboration with district hospital ophthalmologists
- Counselling regarding spacing and phasing of glaucoma medication and reporting of side effects if any.
- Counsel that surgery is not a cure but a means to lower IOP to stabilize the disease. The follow up is mandatory and will remain, regardless
- Counsel that stabilization of disease is available with regular treatment and follow up

RED FLAG SIGNS FOR URGENT REFERRAL

- Acute angle closure attack*
- IOP* > 30.
- Loss of pupillary reflex with visual impairment.
- Single eyed patient with glaucoma

* initiate initial therapy for acute attack of angle closure glaucoma oral diamox, iv mannitol and pilocarpine 2 percent tds if confirmed narrow angle before yag PI

Intervention: Consult flowchart, pre-op topical broad spectrum antibiotics, QID for 1-3 days

Aim of Glaucoma Management

- Achieve target IOP with minimal fluctuation (Refer NPCB Guidelines)
- Iridotomy in all primary angle closure patients
- Trabeculectomy or referal to higher center if target IOP not achievable

Special instruction for glaucoma medication:

- Punctal Occlusion'
- Not to squeeze eyesafter instillation
- 1 drop in conjunctival sac

INDICATIONS FOR SURGERY

- IOP above target despite maximal tolerated medical therapy
- Inability to review regularly
- Unable to affford medications
- Progession of the disease on maximal tolerated medical therapy
- Non compliance

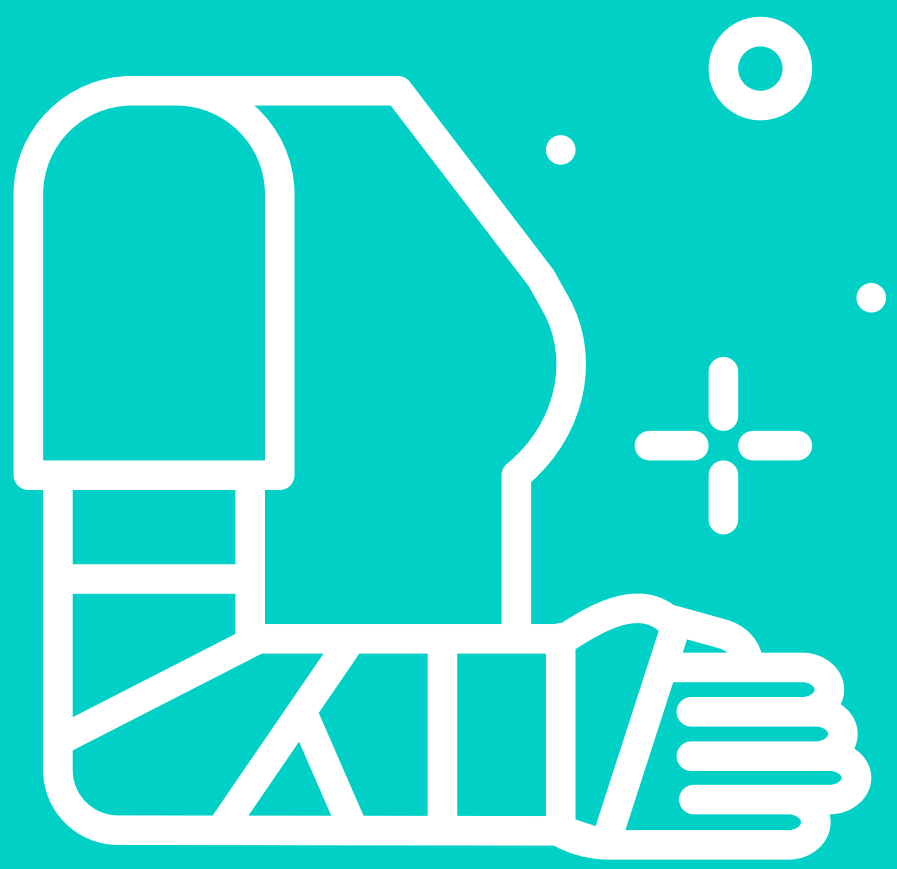
QUALITY ASSESSMENT

- Patient identifier, Age/ Gender
- Compliance with Follow up schedule and medications

ABBREVIATIONS

AC: Anterior chamber
GCC: Ganglion cell complex
HRT: Heidelberg retina tomograph
OCT: Optical coherence tomography
NPCB: National Programme for Control of Blindness
PI: Peripheral iridectomy
POAG: Primary open angle glaucoma
RNFL: Retinal nerve fiber layer
UBM: High-frequency ultrasound biomicroscopy

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES



ORTHOPAEDICS

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

SEPTIC (PYOGENIC) ARTHRITIS

ICD-M00

SYMPTOMS

Fever with pain, swelling and inability to move the joint

Malaise and/ or listlessness, irritability, poor feeding, immobility and joint dysfunction

SIGNS

- Swelling, erythema, tenderness, painful limitation of joint motion, painful limp
- Patients may or may not appear acutely ill or toxic (especially malnourished/ immunocompromised patients)

ASSESSMENT

Detailed medical history to look for primary focus of infection including history of antecedent mild trauma

INVESTIGATION

Essential

- Hemogram with ESR
- C-reactive protein (CRP)
- Blood culture
- Joint fluid aspirate for examination (Gram stain, aerobic and anaerobic culture and sensitivity (C&S) testing)

Optional

- Serum Procalcitonin
- CE-MRI (contrast-enhanced magnetic resonance imaging)

Desirable

- Plain radiographs of affected joint
- Ultrasound of affected joint
- Doppler to rule out DVT
- Renal and liver function
- ELISA serology for HIV, HBsAg, HCV
- Blood sugar (FBS, PPBS/RBS)
- Synovial fluid for fungal and mycobacterial staining with C&S for suspected cases
- Synovial fluid for polarising microscopy
- Synovial fluid examination for synovial sugar and protein levels

WHEN TO SUSPECT SEPTIC ARTHRITIS

- Cloudy or purulent synovial fluid:
- Synovial fluid white blood cell count >100,000 cells/ mL (neutrophils > 90%) and Gram's staining
- Synovial fluid glucose level 50 mg/ dL less than serum glucose levels

MANAGEMENT

Clinical impression of septic arthritis

Primary Care
Refer immediately to higher centre after:
1. Adequate analgesia
2. Immobilisation of the part
3. First dose IV broad spectrum antibiotic (only if access to higher centre will take more than 2-3 hours)

Higher Centre
- Same as above, plus
- Joint aspiration for Gram stain + C&S
- Radiograph and ultrasound of affected joint
- IV antibiotic to be continued, change according to C&S report
- Surgical treatment as mentioned below
- If requiring repeated surgery or atypical organism obtain specialist's consultation
- IV antibiotic to be continued for two weeks, followed by oral antibiotics for four weeks
- Conversion to oral antibiotics based on
  1. Clinical improvement
  2. Fall in inflammatory markers (CRP, ESR levels to be monitored every 2 days during hospital stay)
  3. And resolution of systemic symptoms
- Consult with microbiologist whenever available
- Manage complications like DVT, osteomyelitis, pathological fracture

No definite alternative diagnosis

Primary Care
Refer immediately to higher centre after:
1. Adequate analgesia
2. Immobilisation of the part

Higher Centre
- Same as above, plus
- Aspirate and investigate joint fluid
- Radiograph of affected joint

Septic arthritis

Treatment as per septic arthritis protocol

Definite alternative diagnosis

NOT SEPTIC

- Inflammatory arthritis
- Crystal arthritis
- Haemarthrosis
- Trauma
- Bursitis or cellulitis
- Transient synovitis

Treat as appropriate

SURGICAL TREATMENT

Surgical decompression: Arthrotomy + thorough saline lavage +/- suction drainage

If surgery is contraindicated: Serial aspiration and lavage preferably under ultrasound guidance

CLINICAL IMPROVEMENT

YES

Continue antibiotic

INADEQUATE RESPONSE TO TREATMENT OR NO RESOLUTION OF SYMPTOMS

- Incorrect causative organism - stop antibiotics and re-culture
- Modification of antibiotic treatment - seek microbiological advice
- Alternative foci of infection or systemic sepsis
- Further imaging (eg, MRI) - osteomyelitis might need surgical intervention

NO

- Re-evaluate clinically and radiologically
- Repeat arthrotomy
- Debridement
- Repeat culture
- Consider microbiologist opinion
- Think atypical infection

REFERENCES

1. *Mathews CJ, Coakley G. Septic arthritis: current diagnostic and therapeutic algorithm. Curr Opin Rheumatol. 2008 Jul;20(4):457-62*
2. *Mathews CJ, Kingsley G, Field M, Jones A, Weston VC, Phillips M, Walker D, Coakley G. Management of septic arthritis: a systematic review. Ann Rheum Dis. 2007 Apr;66(4):440-5*
3. *Hassan AS, Rao A, Manadan AM, Block JA. Peripheral Bacterial Septic Arthritis: Review of Diagnosis and Management. J Clin Rheumatol. 2017 Dec;23(8):435-442*
4. *Mathews CJ, Weston VC, Jones A, Field M, Coakley G. Bacterial septic arthritis in adults. Lancet. 2010 Mar 6;375(9717):846-55*

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

July/ 2020

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

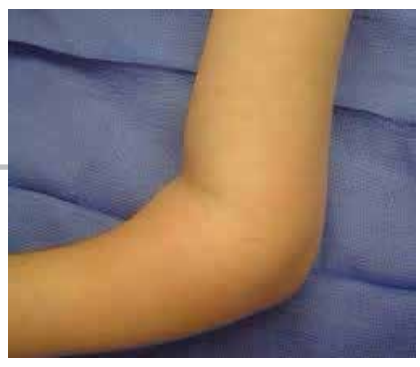
Standard Treatment Workflow (STW)

SUPRACONDYLAR FRACTURE OF HUMERUS IN CHILDREN

ICD-10-S42.413A

CLINICAL PRESENTATION

Pain, swelling and loss of movement at elbow

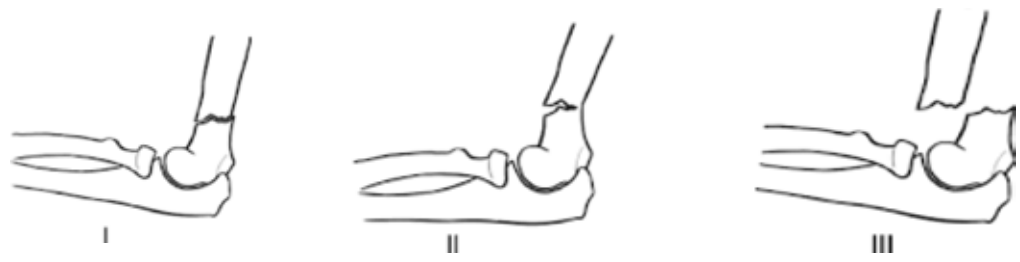


Most commonly in children aged 5-7 years

Fall on outstretched arm

Fracture is just above the epicondyles of humerus (upper limb)

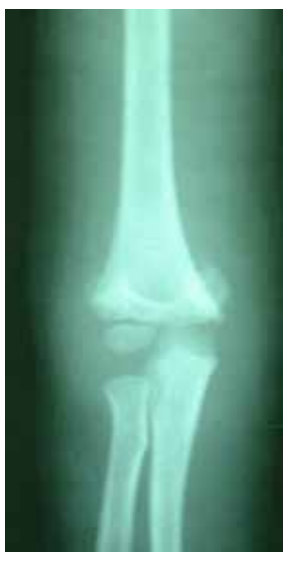
GARTLAND CLASSIFICATION OF SUPRACONDYLAR FRACTURES



TYPE I: Undisplaced fracture

TYPE II: Displaced fracture with variable angulation, posterior cortical continuity of humerus preserved

TYPE III: Completely displaced fractures with cortical discontinuity. Soft tissue gap variable



AP X-ray of type III supracondylar fractures

Lateral X-ray of type III supracondylar fractures

EXAMINATION

EXAMINATION

- Swelling
- Deformity
- Ecchymosis
- Limited active and passive elbow motion

DISTAL NEUROVASCULAR EXAMINATION (ALWAYS COMPARE WITH NORMAL LIMB)

VASCULAR EXAMINATION

- Assess radial pulse
- Assess vascular perfusion

WELL PERFUSED	POORLY PERFUSED
Warm and pink	Cold and pale

If vascular injury is suspected it should be treated as an emergency

NEUROLOGICAL EXAMINATION

- Median nerve
- Radial nerve
- Ulnar nerve

Detailed examination of these nerves should be carried out if suspected

INVESTIGATIONS

ESSENTIAL

Radiographs: AP and lateral x-ray elbow. The comparative x-ray of contralateral elbow should be done, if suspicion is strong and x-ray of injured elbow appears normal

DESIRABLE

Immediate arterial doppler/ CT angiography (in case of suspected vascular injury)

TREATMENT

MANAGEMENT OF OPEN FRACTURES

PRIMARY CARE

1. Inj Tetanus toxoid
2. Pain management
3. Liberal saline wash
4. Removal of visible dirt and debris
5. Sterile dressing and splintage
6. First dose antibiotic after test dose (Broad spectrum antibiotics)
7. Refer to higher center

SECONDARY/ TERTIARY CARE

All of above plus
Reassess patient

MANAGEMENT OF CLOSED FRACTURES (IF X-RAY NOT AVAILBALE FOLLOW THE SIMILAR MANAGEMENT IN SITUATIONS OF SUSPICION)

PRIMARY CARE

1. Pain management
2. Splintage using triangular sling/ lateral elbow sling/ well padded moulded cramer wire splint in the position of deformity
3. If vascular injury is suspected it should be treated as an emergency
4. Refer to higher centre

SECONDARY/ TERTIARY CARE (X-RAY AVAILABLE)

TYPE I:
Immobilise: Above elbow well padded cast with 90 degree elbow flexion for three weeks
Follow-up: X-ray at 1 week to assess for displacement

TYPE II: One attempt of closed reduction under anaesthesia with radiological control
a) Closed reduction possible: above elbow plaster cast in flexion of elbow (10 degrees short of radial pulse) and pronation of forearm. Observe the patient for distal neuro-vascular deficits and swelling for at least 24 hours. Follow-up Xray should be done at 5 days for any displacement
b) Closed reduction failed/ impossible: Open reduction and pinning

TYPE III: supracondylar fractures/ flexion type/ medial column collapse
a) Neurovascular deficit absent: Closed reduction and percutanous pinning (CRPP)
b) Neurovascular deficit present: Open Reduction and pinning;
C) Nerve injury without Vascular Injury: reduce fracture and observe for recovery of nerve injury for 3 weeks
in case of suspected/ proved distal neurovascular injury refer to tertiary centre. Emergent closed reduction of displaced pediatric supracondylar fractures must be performed in patients with decreased perfusion of the hand

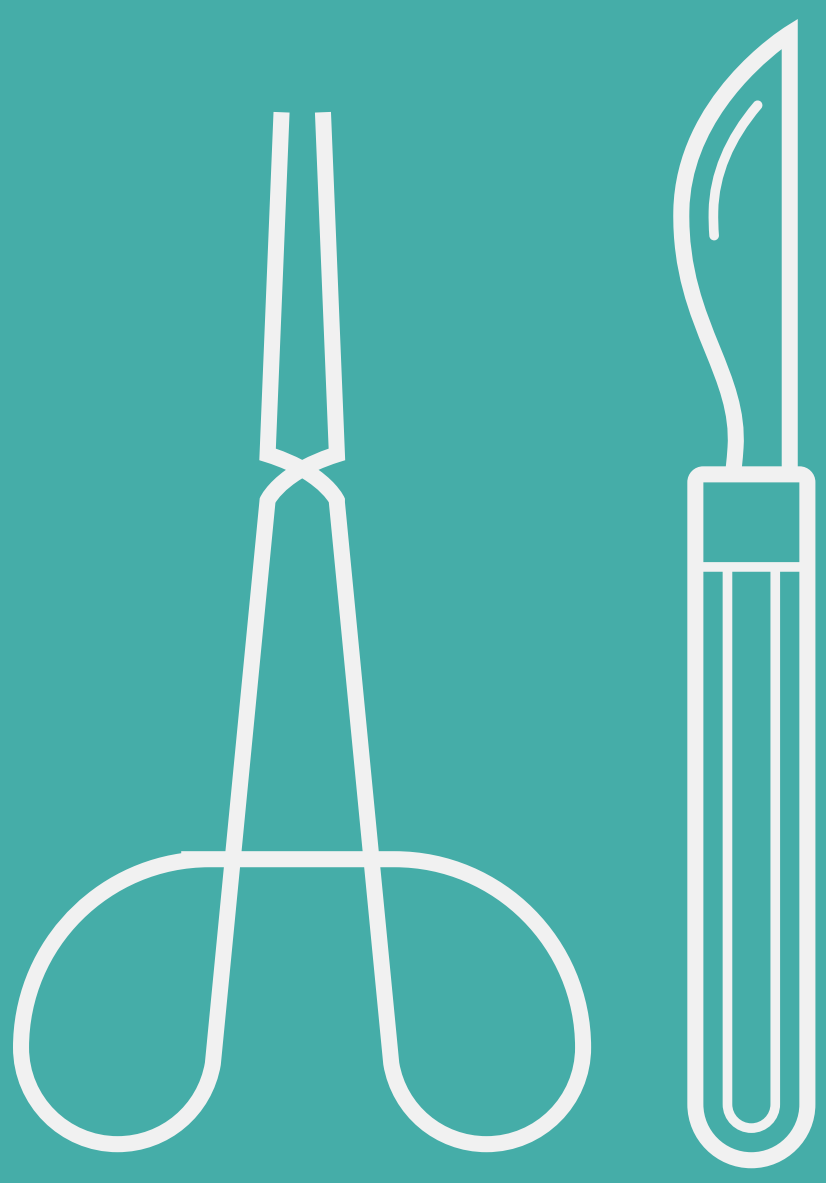
These are signs of Compartment syndrome (Volkmann's ischaemia) and may require urgent fasciotomy, along with management of vascular injury and fracture fixation

RED FLAG SIGNS FOR REFERRAL

- Pain on passive stretching
- Pallor
- Paresthesia
- Pulselessness
- Paralysis

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.



PAEDIATRIC SURGERY

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

ACUTE SCROTUM IN CHILDREN

ICD-10-N50.8

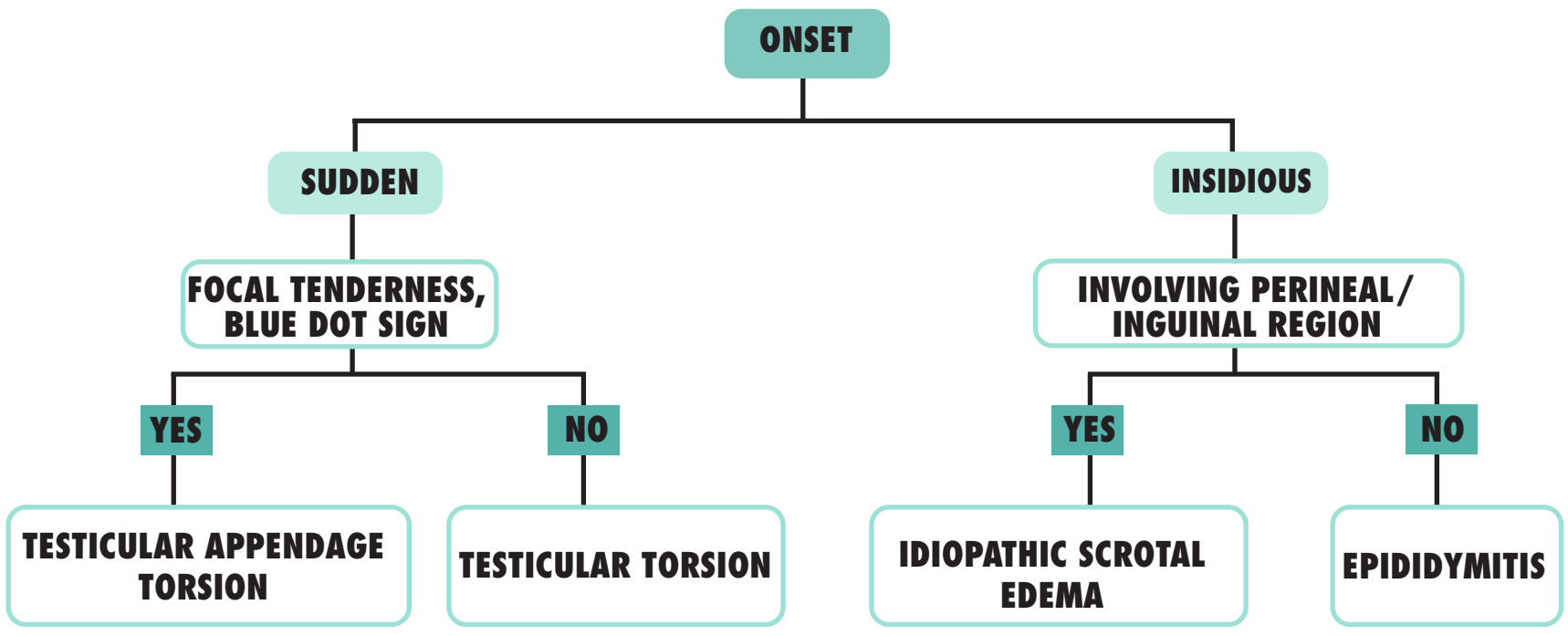
DEFINITION

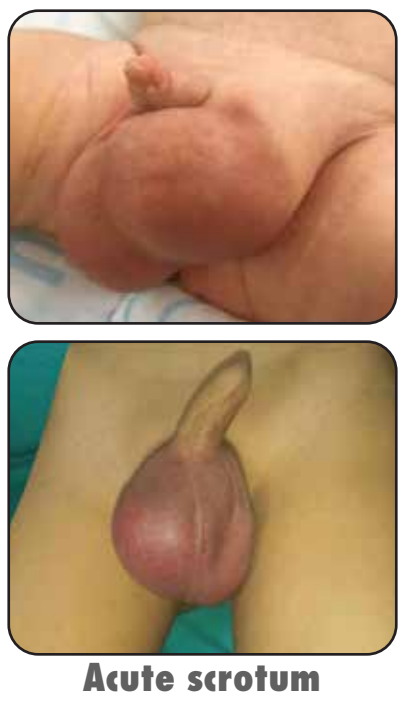
Acute painful swelling of the scrotum or its contents. Accompanied by local signs and general symptoms

DIFFERENTIAL DIAGNOSIS OF ACUTE SCROTUM

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

PAINFUL SCROTAL SWELLING - DECISION TREE





Acute scrotum

DIFFERENTIATING CLINICAL FEATURES

TORSION TESTIS
- Sudden onset of pain in testis, lower abdomen or groin
- Associated with nausea and vomiting
- Local palpation – Very painful
- Hemiscrotum - Red and edematous , bluish discoloration (Infarction of testis)
- Transverse lie of testis
- Absent cremastric reflex

TORSION OF TESTICULAR APPENDAGE
- Sudden onset pain but of less severe degree.
- A bluish black spot (blue-dot) seen at the upper pole of the testis through the skin
- Palpation of the testis less painful

EPIDIDYMITIS/EPIDIDYMO-ORCHITIS
- Inflammatory condition of the scrotum
- Epididymis alone is usually affected before puberty (0-6 months)
- Epididymo-orchitis is more common after puberty
- History suggestive of -Urinary tract abnormalities or urethral instrumentation
- Infecting organism - Usually *Escherichia coli*

MUMPS ORCHITIS
- Affects post-pubertal testis

IDIOPATHIC SCROTAL EDEMA
- Confused with torsion of testis or its appendages
- Edema of scrotum with spread to or from inguinal region, penis, or perineum
- Cause of edema - may be bacterial cellulitis or a topical allergy

FAT NECROSIS
- Sudden appearance of tender bilateral lumps in scrotal skin
- Affected boys are often obese
- History of swimming in cold water

HENOCH SCHONLEIN PURPURA
- Present with signs of acute scrotal swelling
- Before or after other systemic signs and symptoms
- Most commonly bilateral and rarely painful

INVESTIGATIONS

TESTICULAR TORSION IS MOST IMPORTANT CONDITION TO RULE OUT
- Unequivocal cases
  - No investigations- Immediate scrotal exploration
- Equivocal cases
  - Doppler study of scrotum
  - Radionuclide testicular scan

TORSION OF TESTICULAR APPENDAGE
- Mandatory- USG scrotum and Doppler scrotum
- Desirable-Urine analysis

EPIDIDYMO-ORCHITIS
- Mandatory- Urine analysis
- Desirable - Ultrasonography of scrotum

TESTICULAR TRAUMA
- Mandatory: USG scrotum

TREATMENT

TESTICULAR TORSION
- Immediate scrotal exploration in golden window of 4-8 hours if investigative facilities not available
- Clinical exploration if bell clapper deformity seen
- Contralateral orchiopexy if bell clapper anomaly on affected side
- Orchidectomy preferable in older children if other testis is normal
- Refer if no surgical facility available
- Testicular prosthesis at a later date

TORSION OF TESTICULAR APPENDAGE
- Restricted activity
- Warm compression
- Anti inflammatory drugs
- If not differentiable from torsion testis- Exploration and excision of necrotic appendage

IDIOPATHIC SCROTAL EDEMA
- Anti-histaminics
- Topical corticosteroids

HENOCH-SCHONLEIN PURPURA
- Supportive treatment
- Rarely systemic corticosteroids

TESTICULAR INJURY
- Mostly supportive
- Surgery if large hematoma/ tunica albuginea rupture on USG

REFERENCES

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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: (**stw.icmr.org.in**) for more information.

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

CONSTIPATION

ICD 10- K59.0

WHAT IS CONSTIPATION?

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

CONSTIPATION IN < 1YEAR OLDS.

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

CONSTIPATION IN CHILD OLDER THAN 1 YEAR

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

RED FLAG SIGNS

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

BRISTOL STOOL FORM SCALE

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

HISTORY

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

PHYSICAL EXAMINATION

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

INVESTIGATIONS

- Abdominal and rectal examination
- Serum T3, T4, TSH
- X-ray erect abdomen
- X-ray spine: AP and Lateral
- Contrast enema
- Anorectal manometry
- Rectal biopsy

MEDICAL MANAGEMENT

- ***Disimpaction of stools:*** manual or with retention enemas
- ***Laxatives:*** Sodium picosulfate, Bisacodyl, Polyethylene glycol, Lactulose , Senna, Docusate sodium
- ***Dietary modifications:*** proper weaning, no dilution of milk, reduce milk and increase roughage

Constipation → X-ray erect abdomen → Fecaloma → Stool softeners, Enema → Not responding to stool softeners or enema → Refer to higher center for contrast enema → Contrast enema for persistent constipation → Rectal biopsy

INDICATIONS FOR RECTAL BIOPSY

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

↓

Colostomy

↓

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

MANAGEMENT

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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: (**stw.icmr.org.in**) for more information.

July/ 2022

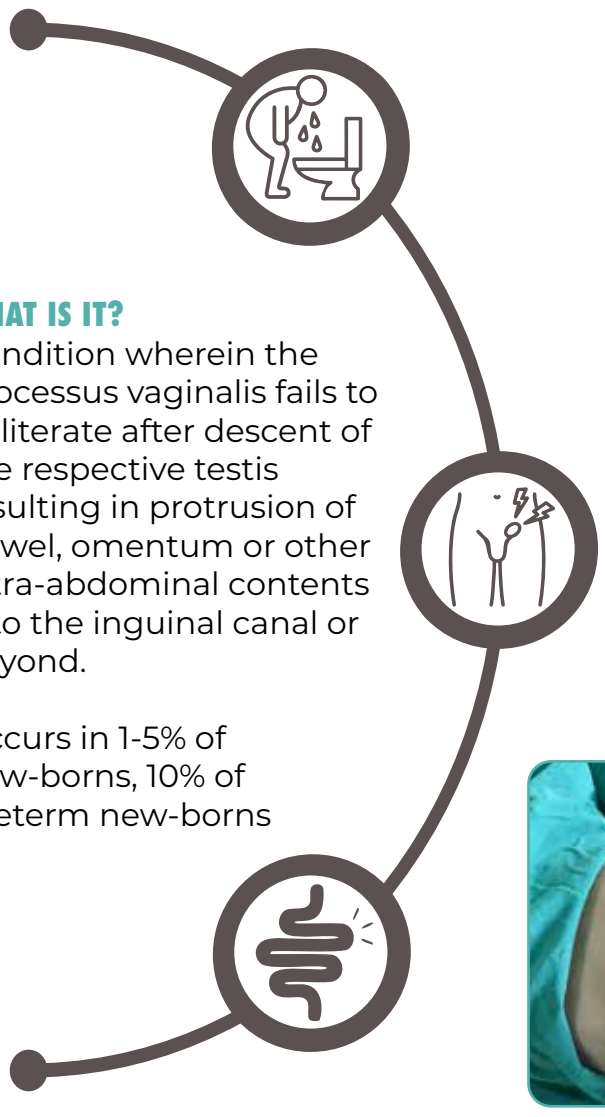
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

CONGENITAL INGUINAL HERNIAS

ICD-10-K46



WHAT IS IT?

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

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

PRESENTATION

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

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

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

Obstructive inguinal hernia

EXAMINATION

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

SILK GLOVE SIGN: Palpable silky thickening of cord

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

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

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

LOOK FOR DANGER SIGNS

DANGER SIGNS

Irreducibility of swelling in isolation or associated with:

- Irritable, inconsolable child
- Distention of abdomen and obstipation
- Bilious vomiting
- Unilateral, swollen and erythematous labia: may suggest torsion of ovary
- Peritonitis

INVESTIGATION

PRE-ANAESTHESIA ASSESSMENT

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

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

TREATMENT (SURGERY)

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

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

MANDATORY FACILITIES IN THE CENTER

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

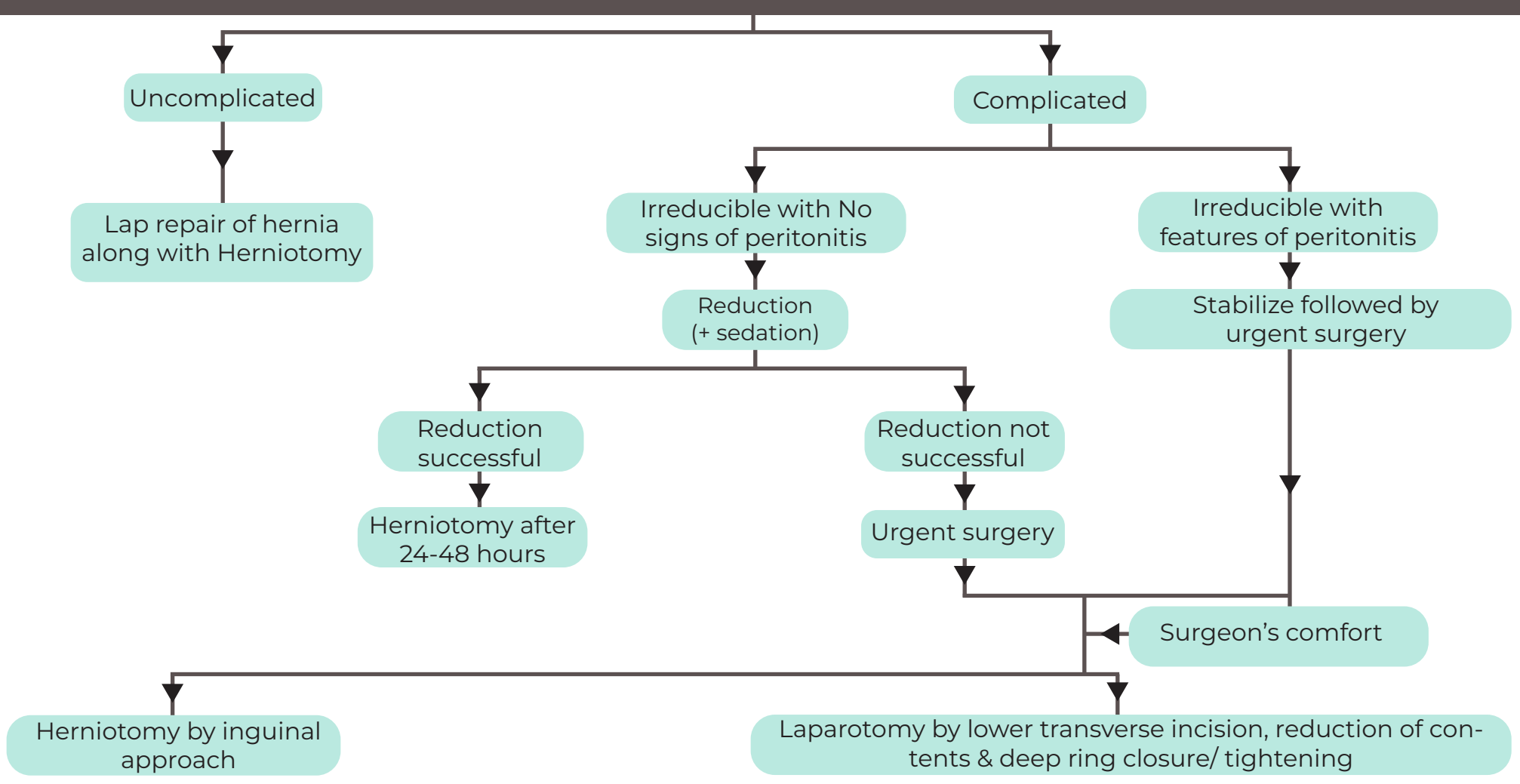
TIMING AND PLACE OF SURGERY

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

FOLLOW-UP: WITH WHOM?

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

INGUINAL HERNIA DECISION TREE



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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

EMPYEMA THORACIS IN CHILDREN

ICD-10-J86

DEFINITION

- Presence of pus or microorganism in the pleural fluid, observed on smear examination or on culture.
- Criteria for diagnosis in the absence of microorganism:
  - (a) Pleural fluid pH< 7.0
  - (b) Lactic dehydrogenase (LDH) > 1000 IU/L
  - (c) Glucose <40 mg/dL or
  - (d) Lactate > 5 mol/L or 45 mg/dL

CLINICAL FEATURES

SYMPTOMS
- Fever
- Chest pain
- Cough
- Respiratory distress
- Abdominal pain and vomiting

SIGNS
- Auscultation - decreased breath sounds & crackles
- Dullness to percussion

CAUSE OF EMPYEMA
- Bacterial pneumonia (develop in 50-70% cases of complicated pneumonia)
- Tubercular empyema
- Chest wall trauma
- Lung Abscess / Aspiration
- Common organisms: S pneumoniae, Saureus, and group A streptococci

PHASES OF EMPYEMA
The treatment depends on the stage of empyema
- Exudative phase (1-3days)
- Fibrino-purulent phase (4-14days)
- Organising phase (>14days)

Any child with diagnosed pneumonia with no improvement and spiking fever after 48 hours of antibiotic treatment may signal empyema

INVESTIGATIONS:
- **Blood:** Blood counts, Blood Culture, ASO Titre, CRP
- **Sputum:** Sputum AFB, Gram Staining and Culture
- **Radiological:**
  - Chest X-ray: PA . Obliteration of Costophrenic angle or Meniscus sign are early signs of pleural effusion.
  - USG Chest: Amount of fluid & echogenicity of fluid, loculation and pleural thickening. It can be a guide for thoracocentesis or ICD placement.
  - CT Chest: Role only in complicated cases and to detect underlying lung problems. HRCT is ideal before surgery
- **Pleural fluid Analysis:**
  - Microbiology - Gram stain, Culture (aerobic & anaerobic)
  - Cytology to see for type of cells
  - Biochemistry- LDH, PH, Glucose

TREATMENT
- Child not sick; investigation reveals a small effusion- IV fluids, Oxygen, IV Antibiotics, Analgesics
- Child looks sick; investigation reveals larger effusions & respiratory compromise - IV Antibiotics and Intercostal Chest tube Drainage

Antibiotics : 3rd Gen Cephalosporins/Extended Penicillins like Co-Amoxiclav, for 1-4 weeks
- Change based on cultures, Continue until afebrile/ ICD removed

ICD INSERTION
- Adequate sized tubes under USG guidance preferably in the mid axillary line through the safe triangle under IV sedation for children with adequate monitoring
- If USG is not available: needle aspiration, confirmation of pus and insertion of tube maybe done
- Maximum fluid to be drained:
  - 10ml/kg in small children
  - 1.5 litres in older children
- Tube to be removed at complete clinical resolution or changed when blocked

ROLE OF SURGERY
- Thoracoscopy if facilities available
- If not, thoracotomy

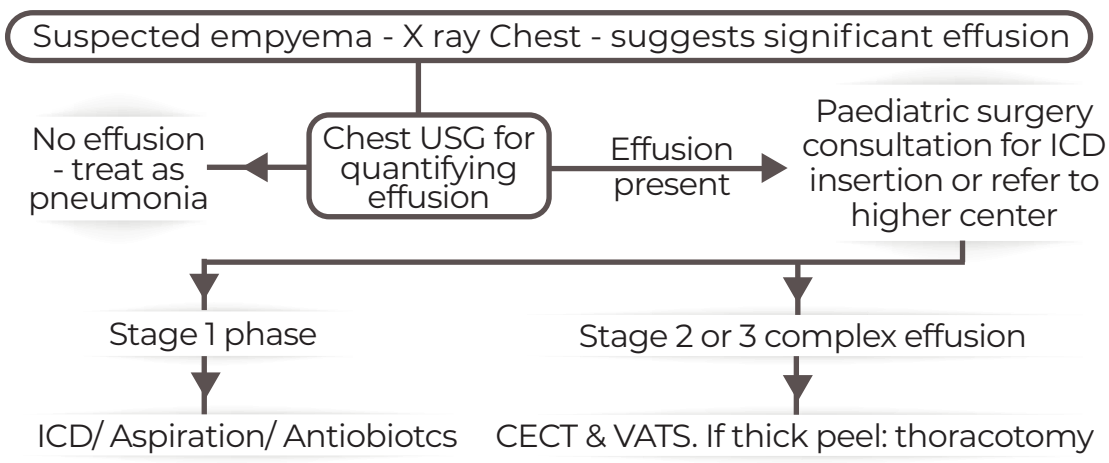
Indications for surgery:
1. Failure of ICD, Antibiotics
2. Persisting sepsis beyond 7 days of antibiotics, pleural collection despite chest tube drainage or complex or delayed empyema (with loculation)

THORACOSCOPY VS THORACOTOMY

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

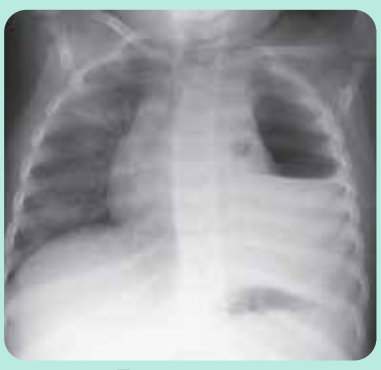
THORACOTOMY
- Formal Thoracotomy and Decortication indicated in Stage 3 and delayed cases where there is
  - Thick peel
  - Thick pyogenic material
  - Inability to develop a pleural window
  - Complex and chronic empyema
  - Underlying diseased lung

ALGORITHM OF MANAGEMENT OF CHILDHOOD EMPYEMA



FIBRINOLYTICS IN STAGE II EMPYEMA
- Safe and cost effective treatment modality that avoids surgery

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


Empyema

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

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

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

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

ICD is removed: drain output is <10mL/kg/day, chest X-ray shows good expansion
- Discharged with standard antibiotic cover of 1-2 weeks

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

REFERENCES

1. *Meenu Singh, Saroj Kumar Singh, Sujit Kumar Chowdhary.Management of Empyema Thoracic in Children -Indian Pediatrics 2002; 39:145-157 .*
2. *IAPS guidelines for treatment of Empyema in Children. 2018. www.iapsonline.org*
3. *Balfour-Lynn I. BTS guidelines for the management of pleural infection in children. Thorax. 2005;60(suppl_1): i1-i21.*
4. *Prospective randomized controlled study conducted at Indira Gandhi Institute of Child Health, Bengaluru, under review for publication(Clinical Trials Registry of India, vide CTRI/2018/03/012403)*

☛ KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

July/ 2022

Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Standard Treatment Workflow (STW)

UNDESCENDED TESTIS (CRYPTORCHIDISM)

ICD-10-Q53.9

WHAT IS CRYPTORCHIDISM?

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

WHAT TO ASK?

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

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

WHAT TO SEE?

- Testis palpable anywhere along normal line of descent:
  - Superficial inguinal ring, Inguinal canal, Deep inguinal ring
- Testis palpable outside the normal line of descent:
  - Pubic tubercle, Perineum, Thigh, Opposite scrotum, Penis
- Testis not palpable (impalpable undescended testis)

- Associated anomalies: hernia, hydrocele, hypospadias, ambiguous genitalia, poorly developed ipsilateral scrotum, contralateral testicular hypertrophy
- Rule out retractile testis (which does not require surgery): If testis manoeuvrable into the scrotum and stays there by itself. Needs regular follow up to confirm continuing descended position of testis

RED FLAGS REQUIRING SPECIAL MANAGEMENT

Possibility of Disorders of Sexual Differentiation (DSD) to be considered if:
- Bilateral undescended testis with hypospadias
- Unilateral undescended testis with severe hypospadias

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

Undescended testis with large inguinal hernia

INVESTIGATIONS

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

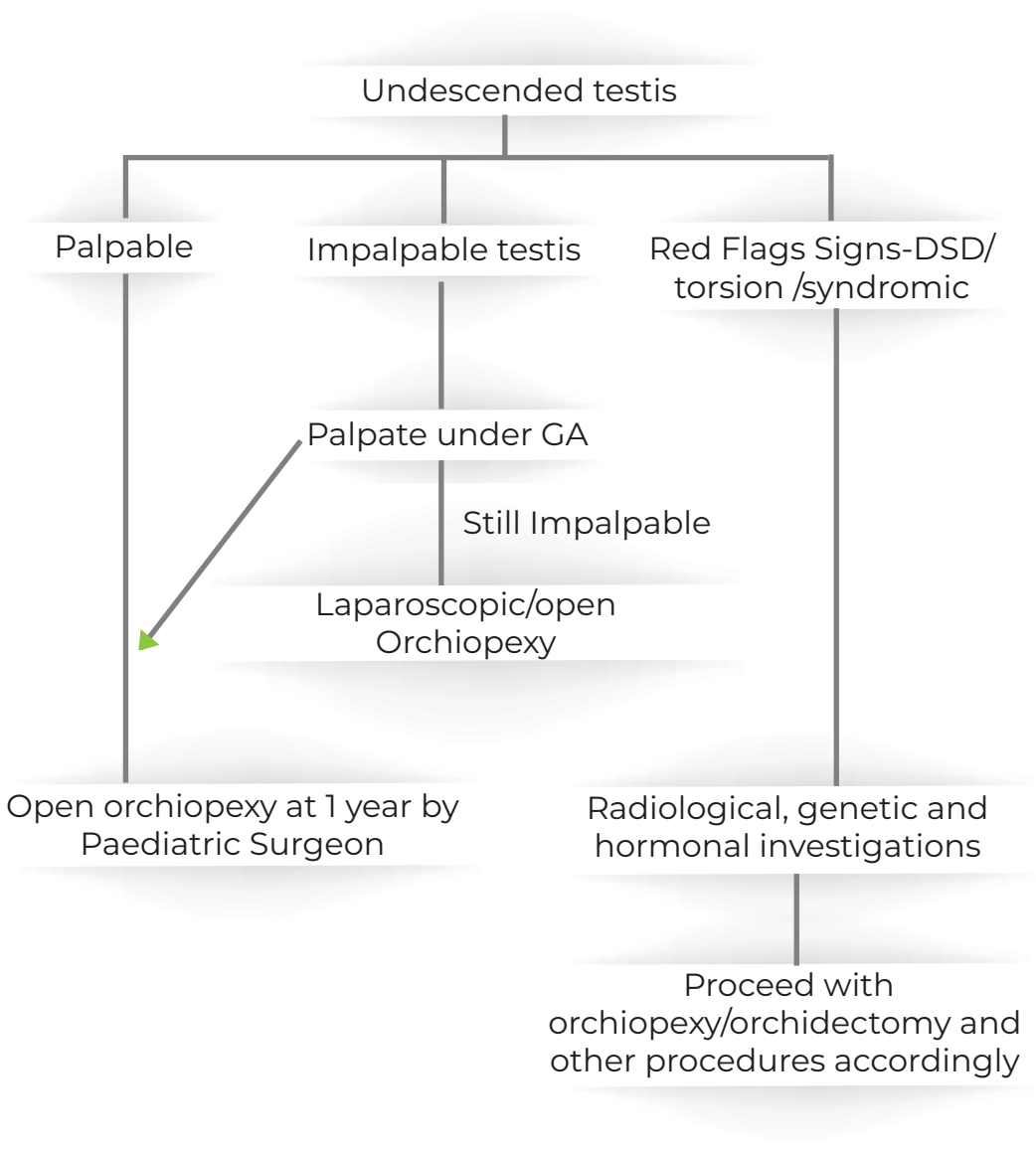
OPTIONAL INVESTIGATIONS
- Hormonal test (HCG stimulation test for bilateral undescended testis)
- MRI scan in cases suspected to be DSD
- Diagnostic laparoscopy in impalpable UDT (can be combined with therapeutic procedure)

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

MANAGEMENT

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

UNDESCENDED TESTIS MANAGEMENT FLOWCHART



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

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

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

MANAGEMENT AT

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

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

SPECIAL SITUATIONS

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

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

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

FOLLOW UP

Open orchiopexy- Discharge same evening/ next day

Laparoscopic orchiopexy- Discharge within 24-48 hours

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

ABBREVIATIONS

UDT: Undescended testes
DSD: Disorders of sexual differentiation
FU: Follow up
GA: General anaesthesia

KEEP A HIGH THRESHOLD FOR INVASIVE 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: (**stw.icmr.org.in**) for more information.

CONTRIBUTORS

ADVISORY COMMITTEE

CHAIRMAN

Prof. (Dr.) Balram Bhargava, Secretary-DHR and DG-ICMR

VICE CHAIRMAN

Dr. Nikhil Tandon, AIIMS, New Delhi

MEMBERS

Dr. Anil Bhansali, Endocrinology, PGIMER, Chandigarh
Mrs. Anu Nagar, Jt. Secretary, Dept. of Health Research, MoHFW, Govt. of India
Dr. Ashok Deorari, Neonatology, AIIMS, New Delhi
Dr. Binod K Khaitan, Dermatology, AIIMS, New Delhi
Dr. Pramod Garg, Gastroenterology, TISHTI, Faridabad
Dr. Radhika Tandon, Ophthalmology, AIIMS, New Delhi
Dr. Rajdeep Singh, General Surgery, MAMC, New Delhi
Dr. S. C. Goel, Orthopaedics, BHU, Varanasi
Dr. Sandeep Agarwala, Paediatrics, AIIMS, New Delhi
Dr. Sudeep Gupta, Oncology, TMC, Mumbai
Dr. T. Sundararaman, Former Executive Director, NHSRC, New Delhi
Dr. Usha Dutta, Gastroenterology, PGIMER, Chandigarh
Ex officio Additional Secretary & MD (NHM), MoHFW, Govt. of India
Ex officio Director General Health Services / Representative

EDITORIAL BOARD

EXTERNAL COMMITTEE

Dr. Anil Bhansali, Endocrinology, PGIMER, Chandigarh
Dr. Anurag Srivastava, Oncology, AIIMS, New Delhi
Dr. Deepika Pandhi, Dermatology, UCMS, New Delhi
Dr. Neeraj Gupta, Paediatrics, AIIMS, Jodhpur
Dr. Radhika Tandon, Ophthalmology, RP Centre, AIIMS, New Delhi
Dr. Rajdeep Singh, General Surgery, MAMC, New Delhi
Dr. Usha Dutta, Gastroenterology, PGIMER, Chandigarh
Dr. Vijay Jain, Orthopaedics, RML, New Delhi

INTERNAL COMMITTEE

Dr. R S Dhaliwal, Scientist G & Head (NCD), ICMR
Dr. Ashoo Grover, Scientist F, ICMR
Dr. Lokesh Kumar Sharma, Scientist E, ICMR
Dr. Aparna Mukherjee, Scientist E, ICMR
Dr. Jerin Jose Cherian, Scientist D, ICMR
Dr. Saumya Srivastava Aggarwal, Project Scientist C, ICMR

EXPERT GROUPS

DERMATOLOGY

CHAIR
Dr. Binod K Khaitan, AIIMS, New Delhi

CO-CHAIR
Dr. Deepika Pandhi, UCMS, New Delhi

MEMBERS
Dr. Ananta Khurana, RML, New Delhi
Dr. Dipankar De, PGIMER, Chandigarh
Dr. Rahul Mahajan, PGIMER, Chandigarh
Dr. Renu George, CMC, Vellore (Retired)
Dr. Vishal Gupta, AIIMS, New Delhi

ENDOCRINOLOGY

CHAIR
Dr. Anil Bhansali, PGIMER, Chandigarh

CO-CHAIR
Dr. Eesh Bhatia, SGPGI, Lucknow

MEMBERS
Dr. B Ganpathi, St. JMCH, Bengaluru
Maj. Gen. Dr. Narendra Kotwal, AHRR, New Delhi
Dr. Rajesh Rajput, PGIMS, Rohtak
Dr. Ravinder Goswami, AIIMS, New Delhi
Dr. Subhankar Choudhary , IPGMER, Kolkata
Dr. V Mohan, Dr. Mohan's DSC, Chennai

GASTROENTEROLOGY

CHAIR
Dr. Usha Dutta, PGIMER, Chandigarh

CO-CHAIR
Dr. Vineet Ahuja, AIIMS, New Delhi

MEMBERS
Dr. Ashwini Setya, Max Hospital, Delhi
Dr. Brij Sharma, IGMC, Shimla
Dr. CE Eapen, CMC, Vellore
Dr. Jimil Shah, PGIMER, Chandigarh
Dr. Kaushal Madan, Max Hospital, Delhi
Dr. Madhumita Premkumar, PGIMER, Chandigarh
Dr. Peush Sahni, AIIMS, New Delhi
Dr. Pratap Mouli, GMC, Guntur (Retired)

GENERAL SURGERY

CHAIR
Dr. Rajdeep Singh, MAMC, New Delhi

CO-CHAIR
Dr. Virinder Kumar Bansal, AIIMS, New Delhi

MEMBERS
Dr. Anurag Mishra, MAMC, New Delhi
Dr. Monty Khajanchi, KEM, Mumbai
Dr. Rajiv Sharma, GMCH, Chandigarh
Dr. Sanjay Gupta, GMCH, Chandigarh
Dr. Sukumar Maiti, GMC, Kolkata

Department of Health Research
Ministry of Health and Family Welfare, Government of India

icmr
INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

Department of Health Research
Ministry of Health and Family Welfare, Government of India

icmr
INDIAN COUNCIL OF MEDICAL RESEARCH

SICKLE CELL DISEASE

CHAIR

Dr. Tulika Seth, AIIMS, New Delhi

MEMBERS

Dr. Dipty Jain, GMC, Nagpur
Dr. Manisha Madkaikar, ICMR-NIIH, Mumbai
Dr. N S Chatterjee, ICMR, New Delhi
Dr. P K Patra, CCMMC, Durg
Dr. Roshan Colah, ICMR-NIIH, Mumbai (Retired)

INFERTILITY

CHAIR

Dr. Neeta Singh, AIIMS, New Delhi

MEMBERS

Dr. Garima Patel, AIIMS, New Delhi
Lt Col (Dr.) Prashant Sharma, AHRR, New Delhi
Dr. Rajapriya Ayyappan, SPH, Chennai
Dr. Reema Mukherjee, ICMR, New Delhi
Dr. Shalini Gainder, PGIMER, Chandigarh
Dr. Sonu Balhara, ARTEMIS, Gurgaon

NEONATOLOGY

CHAIR

Dr. Ashok K Deorari, AIIMS, New Delhi

CO-CHAIR

Dr. Praveen Kumar, PGIMER, Chandigarh

MEMBERS

Dr. Adhisivam B, JIPMER, Puducherry
Dr. Anu Sachdeva, AIIMS, New Delhi
Dr. Ashish Jain, MAMC, New Delhi
Dr. Ashish Mehta, ANCC, Ahmedabad
Dr. Asim Kumar Mallick, NRSMH, Kolkata
Dr. Damera Yadaiah, GGH, Nalgonda
Dr. Deepak Chawla, GMC, Chandigarh
Dr. Geeta Gathwala, Pt. BDS PGIMS, Rohtak
Dr. Gopal Agrawal, CH, Gurgaon
Dr. J Kumutha, SMC, Chennai
Brigadier (Dr.) K Venkatnarayan, NITI Ayog, New Delhi
Dr. M JeevaSankar, AIIMS, New Delhi
Dr. Mangala Bharathi S, MMC, Chennai
Dr. Nandkishor S Kabra, SH, Mumbai
Dr. Neelam Kler, SGH, New Delhi
Dr. Neeraj Gupta, AIIMS, Jodhpur
Dr. Nishad Plakkal, JIPMER, Puducherry
Dr. Poorva Gohiya, GMC, Bhopal
Dr. Ramesh Agarwal, AIIMS, New Delhi
Dr. Rhishikesh Thakre, NCH, Aurangabad
Dr. Ruchi N. Nanavati, KEM, Mumbai
Dr. S. Giridhar, CHRI, Chennai
Dr. Sandeep Kadam, KEM Hospital, Pune
Dr. Sarita Verma, TISS, Mumbai

Dr. Shiv Sajan Saini, PGIMER, Chandigarh
Dr. Siddarth Ramji, MAMC, New Delhi
Dr. Sindhu Sivanandan, JIPMER, Puducherry
Dr. Sridhar Santhanam, CMC, Vellore
Dr. Srinivas Murki, PCH, Hyderabad
Dr. Suja Mariam G, SRH, Coimbatore
Dr. Suksham Jain, GMC, Chandigarh
Dr. Suman Rao PN, St. JMCH, Bengaluru
Dr. Sushma Nangia, LHMC, New Delhi
Dr. Tapas Som, AIIMS, Bhubaneswar
Dr. Venkataseshan Sundaram, PGIMER, Chandigarh

ONCOLOGY

CHAIR

Dr. Sudeep Gupta, TMC, Mumbai
Dr. Anurag Srivastava, AIIMS, New Delhi (Retired)

MEMBERS

Dr. Ashish Singh, CMC, Vellore
Dr. Diptendra K Sarkar NH, Kolkata
Dr. Geeta K, Max Healthcare, New Delhi
Dr. Harit Chaturvedi, Max Healthcare, New Delhi
Dr. Ravi Kannan, CCH, Silchar
Dr. Sandeep Mathur, AIIMS, New Delhi
Dr. Sanjay Thulkar, AIIMS, New Delhi
Dr. Sushmita Ghoshal, PGIMER, Chandigarh

OPHTHALMOLOGY

CHAIR

Dr. Radhika Tandon, AIIMS, New Delhi

CO-CHAIR

Dr. Prashant Garg, LVPEI, Hyderabad

MEMBERS

Dr. Haripriya, AEH, Chennai
Dr. M Vanathi, AIIMS, New Delhi
Dr. Manisha Acharya Shroff, Dr SCEH, New Delhi
Dr. Noopur Gupta, AIIMS, New Delhi
Dr. Pradeep Venkatesh, AIIMS, New Delhi
Dr. Sangeeta Abrol, VMMC, New Delhi
Dr. Sushmita Kaushik, GSAEC, PGIMER, Chandigarh

ORTHOPAEDICS

CHAIR

Dr. S C Goel, BHU, Varanasi

CO-CHAIR

Dr. R Arya, VMMC & SJH, New Delhi

MEMBERS

Dr. Alok C Agarwal, AIIMS, Raipur
Dr. C P Pal, SNMC, Agra
Dr. Rohit Jindal, GMCH, Chandigarh
Dr. S Rajshekaran, GH, Chennai
Dr. Sanjeev Gaur, GMC, Bhopal
Dr. Vijay Jain, RML, New Delhi
Dr. Vineet Sharma, KGMU, Lucknow

PAEDIATRIC SURGERY

CHAIR

Dr. Sandeep Agrawala, AIIMS, New Delhi

MEMBERS

Dr Anand Alladi, BMC, Bengaluru
Dr. Deepak Mittal, DCSC, Hisar
Dr. Hemonta Dutta, AMC, Dibrugarh
Dr. Jai Mahajan, PGIMER, Chandigarh
Dr. Manish Pathak, AIIMS, Jodhpur
Dr. Manoj Mohanty, AIIMS, Bhubaneshwar
Dr. Nidhi Sugandhi, VMMC & SJH, New Delhi
Dr. Prakash Agarwal, SRMC, Chennai
Dr. Rajeev Redkar, LH, Mumbai
Dr. Ramesh S, IGICH, Bengaluru
Dr. Suhasini Gazula, ESIC-MCSH, Hyderabad
Dr. Vishesh Jain, AIIMS, New Delhi

Note: Member's name arranged in alphabetical order by name

CHIEF PATRON

Dr Mansukh Mandaviya
Union Minister for Health & Family Welfare

PATRON

Dr Bharati Pravin Pawar
Union Minister of State for Health & Family Welfare

ADVISOR

Prof. Dr Balram Bhargava
Secretary, DHR & Director General, ICMR

ICMR STW TEAM

Dr R S Dhaliwal, Scientist G & Head(NCD), ICMR
Dr Ashoo Grover, Scientist F, ICMR
Dr Lokesh Kumar Sharma, Scientist E, ICMR
Dr Jerin Jose Cherian, Scientist D, ICMR
Mr Neeraj Parmar, Technical Officer A, ICMR
Dr Saumya Srivastava Aggarwal, Project Scientist C, ICMR
Mr Dhiraj Kumar, Project Graphics Designer, ICMR

ADMINISTRATION

Shri R. Ramakrishnan, Sr DDG (Admin.), ICMR
Shri Rajeev Roy, Sr FA, ICMR
Dr R Lakshminarayanan, DDG(Admin.), ICMR
Shri Jagdish Rajesh, ADG (Admin.), ICMR
Shri Vinod Sharma, ADG(Finance), ICMR

STANDARD
TREATMENT
WORKFLOWS
of India

Scan to access Standard Treatment Workflows

Web Portal

Google Play

App Store

सत्यमेव जयते
Department of Health Research
Ministry of Health and Family Welfare, Government of India

INDIAN COUNCIL OF MEDICAL RESEARCH
NEW DELHI

icmr
INDIAN COUNCIL OF MEDICAL RESEARCH
Serving the nation since 1911

STANDARD TREATMENT WORKFLOWS *of India*

PARTNERS

national health authority

World Health Organization India

2022 EDITION

VOLUME III