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Ministry of Health and Family Welfare, Government of India

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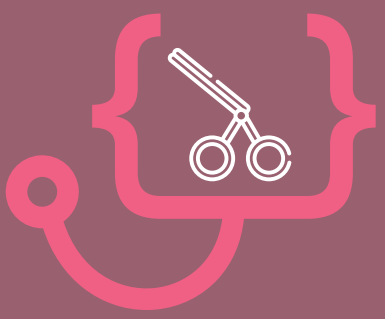

2019 Edition, Vol. I

STANDARD TREATMENT WORKFLOWS

of India

PARTNERS

national health authority

World Health Organization

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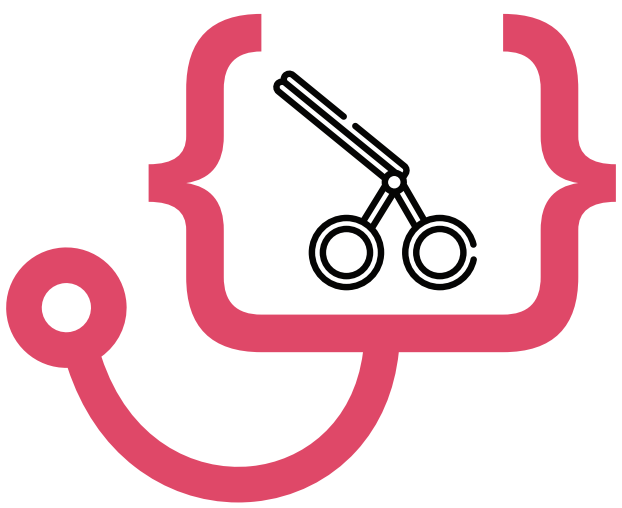

STANDARD TREATMENT WORKFLOWS of India

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CONTENTS

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INTRODUCTION

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GOAL

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

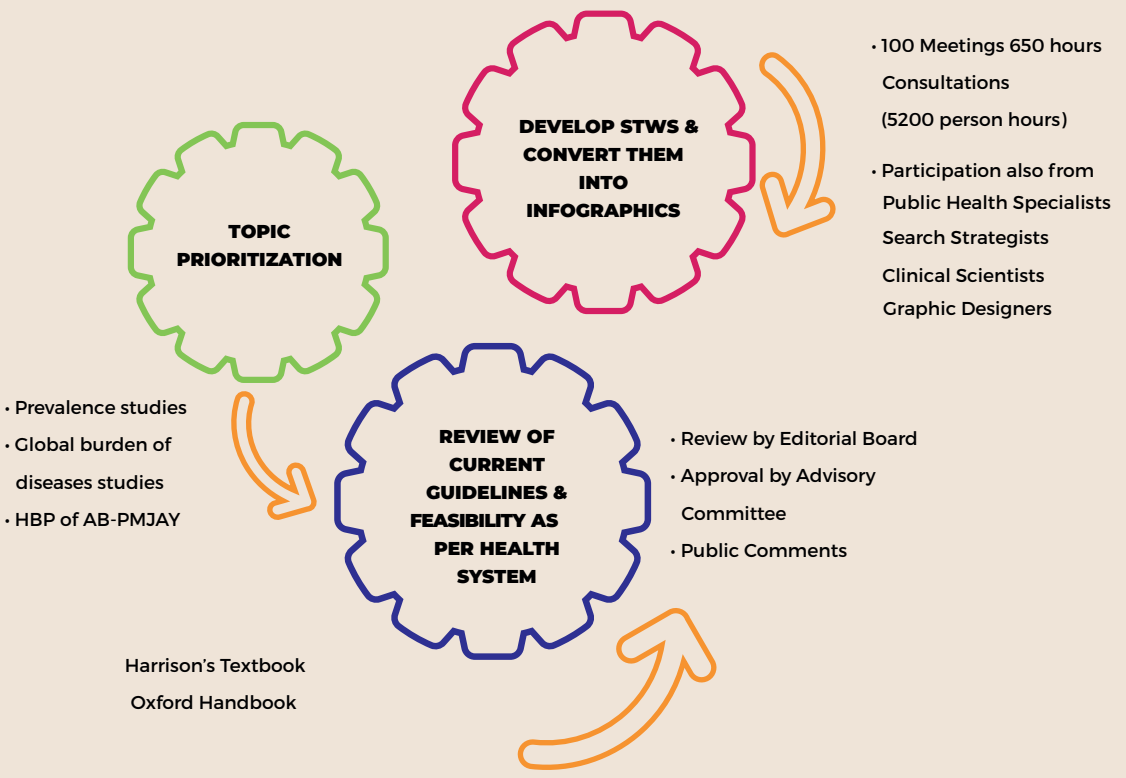
OBJECTIVES

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

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

METHODOLOGY

PROCESS OVERVIEW



NEPHROLOGY

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Standard Treatment Workflow (STW) for the Management of

ACUTE KIDNEY INJURY

ICD-10-N17.9

WHAT IS AKI?

Increase in Serum creatinine by >0.3 mg/dl in 48 hours AND/OR Urine output <0.5 ml/kg/h for 6–12 hours

SYMPTOMS

- Reduced urine output
- Dark, concentrated urine
- Swelling over feet/face
- Breathlessness

LOOK OUT FOR AKI IN THE PRESENCE OF

- Hypotension
- Volume loss (eg: vomiting, diarrhea, bleeding); heat exposure or heat stroke
- Pregnancy-related complications
- Multiple organ failure
- Nephrotoxic medication use
- In neonates - oligohydramnios/ birth asphyxia, respiratory distress

PRINCIPLES OF ASSESSMENT

- Determine whether pre-renal, renal or post-renal
- Identify and correct reversible factors
- Look out for occult causes (e.g. envenomations, poisoning)
- Determine severity of AKI
- Identify complications
- Decide need for dialysis

PRELIMINARY ACTIONS

- Monitor urine volume & body weight
- Identify and treat life-threatening complications
- Correct hydration status
- Stop nephrotoxic drugs
- Exclude urinary outlet obstruction
- Stabilize blood pressure
- Treat infection
- Assess for dialysis need

DESIRABLE ACTIONS/INVESTIGATIONS

- Stage AKI (KDIGO criteria*)
- Check electrolytes, acid-base status
- Urinalysis
- Rule out pre-existing kidney disease
- Ultrasound of KUB region
- Assessment for infection
- Laboratory investigation for specific cause

AKI IN SPECIFIC SETTINGS

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

TREATMENT OF HYPERKALEMIA

- Calcium gluconate 1000 mg slow IV under ECG monitoring, can be repeated upto 3 times
- Salbutamol : 10 to 20 mg in 4 mL of saline by nebulization
- Insulin-dextrose: 10 to 20 units of regular insulin in 100 ml 25% or 50% dextrose

MANAGEMENT

PRIMARY CARE

- Detailed history and physical examination
- Identify and correct volume deficit
- Stop nephrotoxic agents
- Identify and correct bladder outlet obstruction
- Give anti-snake venom if indicated
- Identify hyperkalemia and start treatment
- Identify pulmonary edema- start intravenous furosemide and oxygen
- PD if indicated
- Timely referral after stabilisation

SECONDARY CARE

- Detailed history and physical examination
- Identify and correct volume deficit
- Stop nephrotoxic agents
- Identify and treat hyperkalemia, metabolic acidosis and pulmonary edema
- Identify and correct urinary tract obstruction (USG, CT)
- Detailed investigation for infections
- Manage pregnancy complications - deliver if indicated
- Look for underlying CKD
- Dialysis (PD or HD)

TERTIARY CARE

- Detailed history and physical examination
- Identify and correct volume deficit
- Stop nephrotoxic agents
- Identify and correct urinary tract obstruction (USG, CT scan)
- Identify and treat hyperkalemia, metabolic acidosis and pulmonary oedema
- Detailed investigation for infections
- Manage pregnancy complications- deliver if indicated
- Look for underlying CKD
- Investigations for specific cause (including imaging, genetic tests)
- Kidney biopsy
- Dialysis (PD or HD)

RED FLAGS FOR URGENT REFERRAL

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

INDICATIONS FOR DIALYSIS

- Fluid overload
- Pericarditis
- Hyperkalemia
- Severe metabolic acidosis
- Encephalopathy
- Severe uraemia
- To create space for fluids or blood products

FOLLOW-UP OF AKI

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

ABBREVIATIONS

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

REFERENCE

***KIDNEY DISEASE:** Improving Global Outcomes (KDIGO) Acute Kidney Injury Work Group. KDIGO Clinical Practice Guideline for Acute Kidney Injury. Kidney Int, Suppl. 2012; 2: 1–138

☛ KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

CHRONIC KIDNEY DISEASE (CKD)

ICD-10-N18.3

WHAT IS CKD?

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

WHEN TO LOOK FOR CKD

- History of long-standing nocturia, or constitutional symptoms
- Edema, hematuria, proteinuria or renal stones
- Long-term intake of painkillers or herbal medicines
- Family history of kidney disease
- Growth retardation, rickets, or proximal myopathy
- Unexplained hypertension or anemia
- Longstanding diabetes, hypertension, CVD, stroke, PVD
- Systemic diseases (e.g. connective tissue disease)

EVALUATION OF NEWLY DIAGNOSED PATIENT WITH CKD

- Serum creatinine, electrolytes, bicarbonate
- Estimate glomerular filtration rate using CKD-EPI equation
- Urinalysis (examine sediment, proteinuria quantitation)
- Ultrasound of kidneys and urinary tract
- Calcium, phosphate, alkaline phoshatase, albumin
- CBC including peripheral blood film
- Iron profile - Serum iron, TIBC, TSAT
- HBsAg, anti-HCV

INITIAL ASSESSMENT FOR

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

LIFESTYLE MEASURES FOR ALL CKD PATIENTS:

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

BP CONTROL (TARGET <130/80, 120/80 IF PROTEINURIA)

- Restrict dietary salt to < 5 g/day
- Use any anti-HT available in local pharmacy
- Diuretics - eGFR > 45 : thiazide, <45 ml/min: furosemide; <30 ml/min: do not use potassium sparing agents
- ACEI/ARB preferred* for proteinuric patients (> 1 g/d)

*caution/do not use if eGFR <30 ml/min, or Potassium >5.5 mEq/L

VACCINATION SCHEDULE FOR NEWLY DIAGNOSED CKD PATIENT

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

ANEMIA MANAGEMENT

- Establish iron replete state
- If not iron replete, give oral iron
- Consider IV iron for dialysis patients and those not tolerating orally
- If Hb still <8 g/dl – start erythropoietin, titrate to Hb 10-11 g/dl

MANAGEMENT OF HYPERPHOSPHATEMIA (PO4>5.5)

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

DIABETES CONTROL (TARGET HBA1C <7%)

- Do not use metformin if eFGR <30

NUTRITION

- Salt restriction < 5g/d. Protein 0.6-0.8 g/kg/day.
- DO NOT restrict proteins unless documented high protein user (dairy, white meat are good protein sources, mix different types of dal).
- Restrict green leafy vegetables if eGFR <30 ml/min
- Avoid fruit juices, coconut water and carbonated beverages
- For children: ensure adequate protein intake appropriate for age.

LOW POTASSIUM FRUITS/ VEGETABLES:

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

VITAMIN D THERAPY

- Supplement 60,000 units cholecalciferol q2W
- Correction of acidosis with oral sodium bicarbonate
- Activated vitamin D if hyperparathyroidism

MANAGEMENT

PRIMARY CARE

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

INDICATIONS FOR REFERRAL

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

ADMISSION CRITERIA

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

DISTRICT HOSPITAL

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

TERTIARY CARE

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

PREPARATION FOR RENAL REPLACEMENT THERAPY

- eGFR < 30 : Preserve veins in the non-dominant arm for AV Fistula
- eGFR < 30 : discuss RRT options.
- eGFR < 15 : May need dialysis soon, counsel for AV fistula, list for transplant
- Dialysis start : depends on symptoms or eGFR <5 ml/min
- Look for contraindications to HD or PD : discuss choice in those suitable for either

CONSERVATIVE CARE

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

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of

GLOMERULONEPHRITIS

ICD-10-N05.9

WHAT IS GN?

Glomerulonephritis refers to an inflammation of the glomerulus hence it is not strictly a single disease, its presentation depends on the specific disease entity. It may present as symptomatic urinary abnormalities/ nephrotic syndrome/ nephritic syndrome/ AKI/ CKD

IDENTIFY THE PRESENTING CLINICAL SYNDROME

- Acute nephritic syndrome: Sudden onset, hematuria, oliguria, edema, hypertension, reduced eGFR
- Nephrotic syndrome: proteinuria (>3.5 g/1.73m2/d; 50 mg/kg/d in children), edema, hypoalbuminemia, hyperlipidemia
- Asymptomatic urinary abnormalities: proteinuria, hematuria
- RPGN: doubling of serum creatinine over days to weeks

EVALUATION OF A PATIENT WITH GN

- Full history and clinical examination
- Urinalysis: urine routine exam, microscopy
- proteinuria quantitation: 24 h UP; ACR/PCR for follow up
- Assess eGFR using age-appropriate formula
- Renal imaging
- Serologic testing
- Kidney biopsy

KIDNEY BIOPSY

- Age <1 y or >12 y
- Steroid resistant state
- Family history of kidney disease
- Features suggestive of systemic disease
- Diagnosis unclear, therapeutic uncertainty
- Doubling of serum creatinine over days-weeks

SEROLOGY

- ASO
- HIV (high risk)
- ANA
- Anti-GBM antibody
- Anti-PLA2R
- HBsAg, anti-HCV
- C3
- ANCA
- SPEP (>50 y)

IN CHILDREN <12 Y WITH NEPHROTIC SYNDROME

DO NOT

- Give any vaccine while on steroids or within 3 months of stopping
- Prescribe bed rest unless indicated
- Restrict salt in children with nephrotic syndrome
- Restrict fluids
- Use ACE inhibition in children with renal dysfunction, or in steroid sensitive nephrotic syndrome

BEFORE STARTING STEROIDS IN CHILDREN, REMEMBER TO

- Look for latent TB (Mantoux test, Chest X-ray)
- Start 6 months INH therapy (5mg/kg day) if asymptomatic Mantoux +ve
- Be on the lookout for common infections (e.g. peritonitis, pneumonia and skin infections)

CAUTION

- Non-nephrotic proteinuria: rule out orthostatic cases
- Isolated hematuria: rule out urological causes

LOOK FOR COMPLICATIONS

- Malnutrition
- Hypovolemia
- AKI
- Thromboembolism
- Infections

TREATMENT

- Lifestyle modifications
- Avoid nephrotoxic agents
- Sodium restriction (not in children)
- BP control (<130/80 mm Hg in adults, <95th centile for age in children)
- Diuretics - loop needed, reverse edema slowly
- ACE inhibition (see exceptions under DO NOT)

RECOMMENDED PHARMACOLOGICAL TREATMENT

CHILDREN

- Prednisolone 2 mg/kg x 6 w followed by 1.5 mg/kg A/D x 6w
- In case of relapse- Prednisolone 2 mg/kg x 2w followed by 1.5 mg/kg A/D x 4w

ADULTS

- Treatment Depends on diagnosis (biopsy, serology)
- Therapeutic choices include
  - Corticosteroid (Prednisolone, IV methylprednisolone)
  - CNIs (cyclosporine/tacrolimus)
  - Cyclophosphamide
  - Azathioprine
  - Mycophenolate mofetil
  - Levamisole
  - Rituximab

THROMBOSIS PROPHYLAXIS

- Evaluate bleeding risk: Do not use if risk high
- S alb <2 ± non-ambulatory: start aspirin, OAC if high risk

MANAGEMENT

PHC/CHC

- Detailed history and clinical examination
- Urine dipstick test
- Serum creatinine, electrolytes
- Stabilize
- Start antihypertensives and diuretics if needed

INDICATIONS FOR REFERRAL

- All cases >12 years old and less than 1 year old
- In children:
  - Frequent relapses (=>3 per year)
  - Steroid dependent or resistant state
- Recent rise in serum creatinine
- Appearance of complications related to disease or treatment
- Pregnancy
- Persistent asymptomatic urinary abnormalities (>6 months)

DISTRICT HOSPITALS

- Detailed history and clinical examination
- 24-hr urinary protein estimation
- Serum creatinine, electrolytes, serum albumin, lipid profile
- Imaging of kidneys
- Evaluate for secondary causes
- Look for and treat complications
- Start general treatment
- Can treat
  - Uncomplicated NS in 1-12 y old
  - Infrequent relapses
- Prepare treatment plan and refer back to primary care

ADMISSION CRITERIA: Initial evaluation, kidney biopsy, or management of complications

TERTIARY CARE HOSPITALS

- Detailed history and clinical examination
- 24-hr urinary protein estimation
- Serum creatinine, electrolytes, serum albumin, lipid profile
- Imaging of kidneys
- Evaluate for secondary causes
- Look for and treat complications
- Start antihypertensives and diuretics
- Kidney biopsy
- Prepare treatment plan and refer back to primary care

RED FLAG SIGNS

- Cold Peripheries
- Accelerated hypertension
- **DO NOT USE DIURETICS** ALBUMIN can be given in severe Hypoalbuminemia
- Seizures
- Increased capillary filling time
- Altered Sensorium

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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Standard Treatment Workflow (STW) for the Management of
URINARY TRACT INFECTIONS
ICD-10-N39.0

WHAT IS UTI?
At least 3 Symptoms (dysuria, frequency, urgency, suprapubic pain)
OR
Dipstick +ve for leucocyte esterase and nitrite if <3 symptoms
OR
- CUE >10 WBC/HPF in uncentrifuged urine +
- Urine culture >105 CFU of single species/ml in Mid stream urine (multiple species indicate contamination)

DETERMINE UTI TYPE

SIMPLE CYSTITIS/ LOWER UTI
- Dysuria, urgency, frequency

PYELONEPHRITIS/ UPPER UTI
- Fever
- Chills and rigors
- Loin pain, pelvic pain
- Renal angle tenderness
- Toxic and sick appearance

COMPLICATED UTI
- History of stones, congenital anomalies, obstruction
- Diabetes
- Immunosuppression

WHEN TO DO URINE CULTURE?
- Complicated UTI
- Pyelonephritis
- Special situations
  - All males (except simple cystitis)
  - Children
  - Pregnancy
  - Recurrent UTI (> 2 episodes/ 6 months)
  - Catheter associated UTI

MANAGEMENT

PRIMARY CARE
- History and Examination
- Look for red flag signs and refer
- Refer special groups
- Treatment in primary care
  - Acute cystitis females
  - Acute cystitis males
- Treatment
  - Nitrofurantoin
  - Trimethoprim sulphamethoxazole
- Symptomatic relief

MALE UTI
Acute cystitis/ simple UTI
- Rx Men for 7 days
- Nitrofurantoin* 100 mg PO BD x 7d
- TMP/SMX 1 DS tab PO BD x 7d
- Ciprofloxacin 500 mg BD x 7 days
- Levofloxacin 750 mg OD x 5 day
- Acute cystitis is not to be referred

ALL OTHER UTI IN MALES-REFER
- Pyelonephritis or complicated UTI
- Pelvic/perineal pain (prostatitis)

PRIMARY/ SECONDARY LEVEL

INITIAL ASSESSMENT
- History
  - Symptoms
  - Recurrent UTI
  - Diabetes
  - Congenital malformations
  - Stones
  - Immunosuppression
- Examination
  - Temperature, renal angle tenderness, genital exam

CYSTITIS/UTI IN FEMALES
- Empirical RX (only symptoms no tests needed)
- Nitrofurantoin* 100 mg PO BD x 5d
- TMP/SMX 1 DS tab PO BD x 3d
- If no response refer to higher centre

*Avoid if GFR <45,caution in elderly

SYMPTOMATIC TREATMENT

Plenty of water	Urine alkalinizer recommended eg citrate - Avoid if patient on nitrofurantoin	Phenazopyridine 200mg tid for 2 days	Local Estrogen creams for recurrent UTI in post menopausal women	Paracetamol for pain	Cranberry can be used

RED FLAG SIGNS - REFER

- Pyelonephritis
- Complicated UTI
- Special situations (Children, pregnancy, males except simple cystitis, catheter UTI)
- Non response within 3 days of AB
- Recurrent UTI

TERTIARY LEVEL

- Send for culture
- Imaging if no response to antibiotics in 48 hrs
- Urology services if obstruction

Rx Pyelonephritis/ complicated UTI | Rx pregnancy UTI | Rx all male UTI including prostatitis | Rx recurrent UTI | Rx non-resolving UTI

PYELONEPHRITIS

Empiric Outpatient:
- Urine c/s
- Consider initial dose of a parenteral agent
  - Ceftriaxone 1-2 g IV/IM x 1
  - Gentamicin 5 mg/kg IV/IM x 1
- Followed by
  - Ciprofloxacin 500 mg PO BD x 7d
  - Levofloxacin 750 mg PO OD x 5 d
  - Cefuroxime 500 mg PO BD x10-14d
  - Amoxy clav x10-14 days
  - TMP-SMX 1 DS BD x 7-10 days

Empiric Inpatient :
- Ceftriaxone 1-2 g IV once daily+ /-AMP
- Gentamicin +/-AMP
- Others as per c/s- Carbapenem, Piperacillin Tazo

IV therapy required until afebrile x 48 hrs, then switch to PO If no response in 3 days imaging

PREGNANCY UTI
- Urine culture at 1st antenatal visit
- For asymptomatic bacteriuria/acute cystitis:
  - Nitrofurantoin 100 mg PO BD x 5-7 d (avoid near-term)
  - Cephalexin 500 mg PO QID x 5-7 d
  - TMP/SMX 1 DS tab PO BD x 5-7 d (avoid in 1st trimester & near term; supplement with multivitamin containing folic acid)
- Check repeat urine c/s 7days after Rx to confirm clearing
- Repeat urine culture in each antenatal visit
- If recurrent- Antibiotic prophylaxis till term

CATHETER UTI
- Rx of asymptomatic CAUTI NOT recommended
- Urinary catheters should be removed as soon as not required
- If indwelling catheter for >2 weeks and is still indicated, replacing the catheter is recommended
- Symptomatic CAUTI
  - (Fever, back pain, new onset delirium, rigors)
  - Send culture
  - Rx as complicated UTI
- No role of routine antibiotic prophylaxis for prevention

MALES WITH PROSTATITIS
- UTI symptoms+ pelvic pain/ fever
- Refer
- Urine culture & MSU
- Digital rectal exam- tender prostate
- Older >35 yrs-
  - Septran DS BD
  - Levofloxacin 500mg OD, ciproflox 500 mg BD
  - Avoid nitrofurantoin
- Young males-
  - Doxy 100mg bd /azithro 1 gm / oflox 300mg BD for chlamydia + Single dose of Ceftrioxone 250mg IM for gonorrhoea
- Rx- 6 weeks
- Imaging to rule out abscess

RECURRENT UTI
- Uncomplicated RUTI
  - post coital voiding and post coital antibiotic
  - Low dose nitrofurantoin 50 mgX 6 months
  - Single strength septran x 6 months
  - Or norflox 200mg, ciproflox200mg , cephalexin 250mg
  - Vaginal cream in post menopausal
- Complicated RUTI
  - Urology referral
  - Cystoscopy, urodynamics (post menopausal)

ASYMPTOMATIC BACTERIURIA
- No symptoms
- Bacteria in urine culture >105CFU/ml
- No treatment required
- Exceptions when you should treat
  - Pregnancy
  - Before any urological intervention

* Pregnancy UTI, Catheter UTI may also be managed at secondary level.

LONG TERM CONSEQUENCES
- Renal scars
- Hypertension
- CKD
- Poor quality of life

CHILDREN

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

TREATMENT
- Infants <3months as upper UTI (PN) with IV antibiotics
  - Urinary bladder catheterisation for infants with upper tract UTI
- Older children
- Upper UTI- IV antibiotics gentamicin, amikacin, ceftriax one
- Lower UTI- oral cefixime, oflox, ciproflox, amoxyclav
- Duration of Rx
  - Upper UTI- 10-14 days
  - Lower UTI 7-10 days
  - Adolescents 3-5 days

REFER
Upper UTI(PN), infants UTI, recurrent UTI

PREVENTION
Avoid constipation, clean washrooms

FIRST URINARY TRACT INFECTION*

Age <1 yr
- Ultrasound
- MCU
- DMSA renal scan

Age 1-5 yr
- Ultrasound
- DMSA scan

MCU if ultrasound or DMSA scan is abnormal

Age >5 yr
- Ultrasound

If ultrasound abnormal: MCU and DMSA scan

All patients with recurrent UTI need detailed evaluation with ultrasonography DMSA scan and MCU

KEEP A HIGH THRESHOLD FOR INVASIVE PROCEDURES

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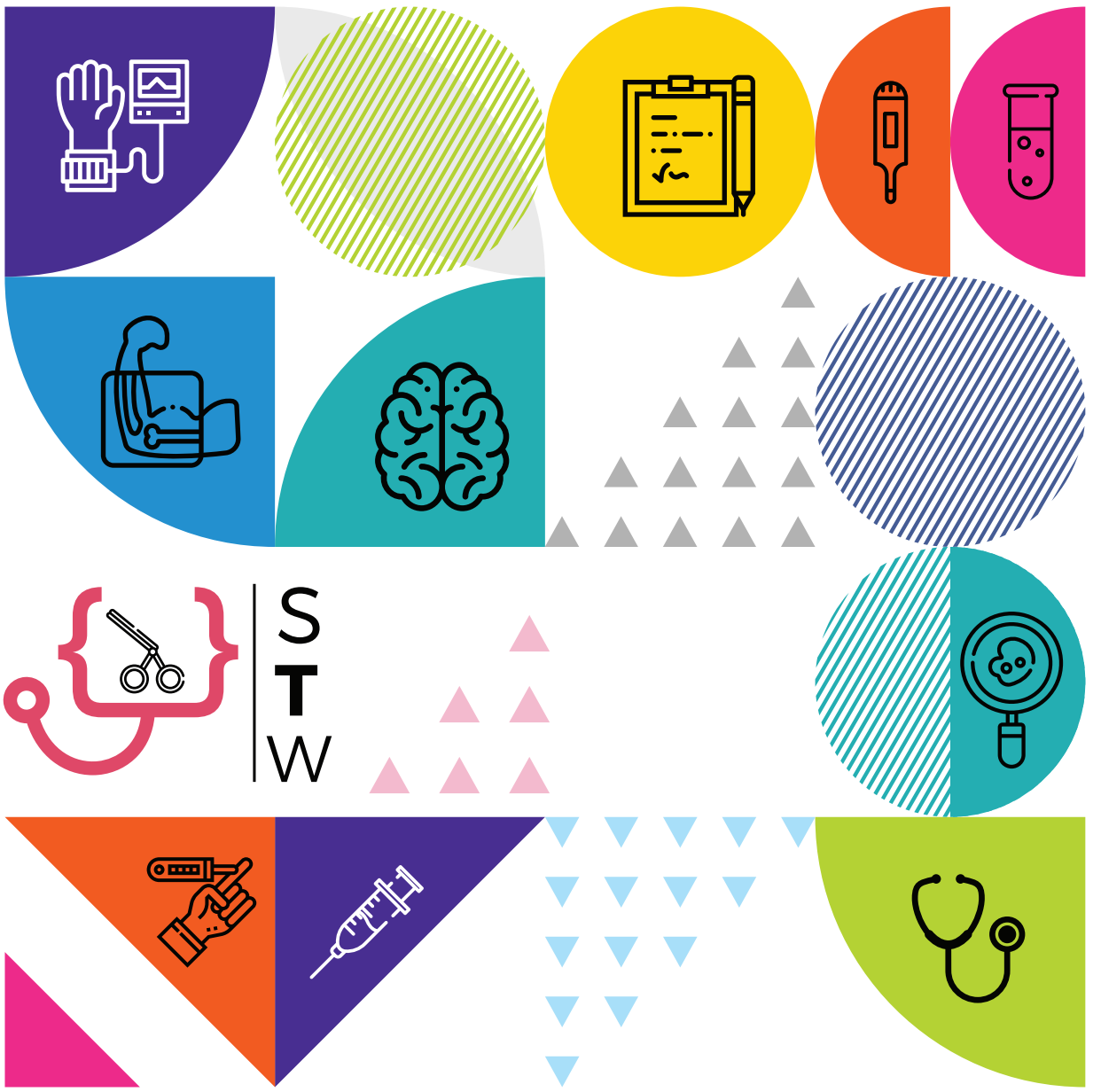

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