CHACHA NEHRU BAL CHIKITSALAYA

Antibiotic Policy

Hospital Infection Control Committee,
Surveillance and Infection Control Division

SAFE CARE SAVE LIVES

2016

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Antimicrobial resistance no action today, no cure tomorrow. Use Antibiotics rationally

CHACHA NEHRU BAL CHIKITSALAYA

GOVT OF NCT OF DELHI

Antibiotic Policy

2016

ANTIMICROBIAL RESISTANCE – NO ACTION TODAY, NO CURE TOMORROW, USE ANTIBIOTICS RATIONALLY

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The work has been done with the tireless work of team CNBC. Despite all odds and workload we at CNBC strive hard to practice evidence based medicine and work towards practicing and promoting rational use of antibiotics.

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Introduction and Principles of Antimicrobial Therapy

AIMS OF ANTIMICROBIAL THERAPY

1. To provide a simple, best empirical/specific treatment of common infections
2. To promote the safe, effective, economic and rational use of antibiotics
3. To minimise the emergence of bacterial resistance in the community

PRINCIPLES OF TREATMENT

1. These guidelines are based on the best available evidence.
2. A dose and duration of treatment is suggested but can be modified by consultants based on clinical scenarios
3. Prescribe an antibiotic only when there is likely to be a clear clinical benefit.
4. Do not prescribe an antibiotic for viral sore throat, simple coughs and colds and viral diarrhoea.
5. Use simple generic antibiotics first whenever possible. Avoid broad spectrum antibiotics (e.g. Amoxycillin+Clavulanate, quinolones and cephalosporins) when standard and less expensive antibiotics remain effective, as they increase risk of *Clostridium difficile*, MRSA and resistant UTIs.
6. Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations).
7. Clarithromycin is an acceptable alternative in those who are unable to tolerate erythromycin because of side effects.
8. Test dose to be given for beta-lactam antibiotics.

STEPS TO FOLLOW THE PROTOCOLS

1. Identify the type of infection — bloodstream, respiratory, intra-abdominal or urinary tract,
2. Define the location — OPD, ICU or floor patient
3. Identify the patient type based on described parameters — Type 1, Type 2 or Type 3.
4. Refer to the empiric/specific therapy for that patient type 1, 2 or with first second or third line antibiotic respectively.
5. Wait for atleast 48hrs of antimicrobial therapy before labelling patient as non-responding to the therapy and to switch to the higher next line of therapy. Also consider if patient condition deteriorates.
6. Send respective cultures and or primary set of investigations before starting antibiotic therapy
7. Once culture / sensitivity report available initiate specificantimicrobial therapy. Antimicrobial may require to be changed/de-escalted.

PATIENT TYPES

Patient Type 1: No contact with health care system. No prior antibiotic treatment No procedures done Patient with few co-morbid conditions

Patient Type 2: Contact with health care system (e.g. recent hospital admission, nursing home, dialysis) without invasive procedure - within last 90 days Recent antibiotic therapy -within last 90 days Minimum procedures done. Patient with multiple comorbidities.

Patient Type 3: Long hospitalization and or invasive procedures –within last 90 days.
Recent & multiple antibiotic therapies - within last 90 days
Major invasive procedures done.
Cystic fibrosis,, structural lung disease, advanced AIDS, neutropenia, other severe immunodeficiency.

PEDIATRIC MEDICINE

General ward, Emergency & Pediatric Intensive Care Unit (PICU)

COMMUNITY ACQUIRED PNEUMONIA

Investigative pathway

Primary set of investigations:

1. **Blood culture** (atleast 1ml blood)
2. EDTA Vial (2vials – 1ml each)
   - Complete Blood counts and ESR
   - PCR for (bacterial pneumonia cases for *S. pneumoniae* and *H. influenza*e) (specimen may be collected and sent to laboratory with initial test – test may be performed in case of culture negative specimens).
3. Plain vial (Serum) (1vial – 1ml)
   - C-reactive protein
   - (Procalcitonin – selective cases only)
4. **Chest Radiogram** (NOT necessary as primary investigation – should be done ONLY in case of severe pneumonia)
5. **Pleural fluid** for effusions/empyema for culture, cytology and biochemistry (pH, protein, sugar, LDH)*. Serum protein and LDH must be ordered when ordering pleural fluid protein or LDH respectively.

Secondary set of investigations:

1. Blood culture
2. Repeated blood cultures to document resolution of bacteremia should be obtained in children with bacteremia caused by *S. aureus*, regardless of clinical status
3. Repeated blood cultures in children with clear clinical improvement are NOT necessary to document resolution of pneumococcal bacteremia.

Chest Radiograph

Out patients -Routine chest radiographs are NOT necessary for the confirmation of suspected CAP
Inpatients –Posteroanterior and lateral, should be obtained in patients with suspected or documented hypoxemia or significant respiratory distress and in those with failed initial antibiotic therapy to verify the presence or absence of complications of pneumonia, including parapneumonic effusions, necrotizing pneumonia, and pneumothorax repeat only if patient not responding to 48-72hrs of therapy

Aspirates

If child is intubated or at the time of initial endotracheal tube placement in children requiring mechanical ventilation.– Aspirates for gram stain and culture along with testing for viral pathogens, including influenza virus.
[diagnosis of influenza A and B from upper respiratory tract samples such as a nasal wash or aspirate (sensitivities 50–70%; specificities 90–95%)]
Bronchoscopic or blind protected specimen brush sampling, bronchoalveolar lavage (BAL), percutaneous lung aspiration, or open lung biopsy should be reserved for the immunocompetent child with severe CAP if initial diagnostic tests are not positive.

Urine - tests may be performed in children with severe CAP
Antigen tests can be performed on urine *for:*

a) *S. pneumoniae* (sensitivity 50–80%;specificity 90%)
b) *L. pneumophila* serogroup 1 (sensitivity 70–90%; specificity 99%)

Polymerase chain reaction (PCR) testing for:

a) *M. pneumoniae*
b) Respiratory viral panel from either nasopharyngeal or lower respiratory tract secretions and uses PCR to identify common respiratory viruses (e.g., influenza, adenovirus, parainfluenza, and RSV). (Sensitivity of 90% to 100% and specificity of 87% to 100%)

*__***Pleural fluid chemistry***__:
The identification of frank purulence requires no chemistry evaluation. Hence ordering pleural fluid chemistry important variables to be measured include:

a) **pH measurement**. Helps to determine need for chest drainage. For improved accuracy the sample should be collected under anaerobic conditions (the presence of air falsely elevates the pH) in a heparinized blood gas syringe and measured on a blood gas analyzer immediately. Additionally, contamination of the pleural fluid sample with lidocaine can falsely reduce the pH value.
b) **Glucose.** This is the second most important variable that determines the need for chest drainage. A pleural fluid glucose value less than 60 mg/dL should indicate the need for chest drainage.
c) **Protein and LDH levels.** Commonly ordered but specific values do not accurately predict the need for chest tube drainage.
d) **Amylase level.** An elevated level of salivary amylase usually indicates an esophageal leak or rupture.

According to ***Light's criteria***, the pleural fluid is exudative if:

- Pleural fluid protein/serum protein ratio is greater than 0.5

OR

- Pleural fluid LDH/serum LDH ratio is greater than 0.6

OR

- Pleural fluid LDH is greater than two-thirds the upper limits of the laboratory's normal serum LDH

Common Pathogens causing pneumonia in children

Common Bacterial Pathogens

- *Streptococcus pneumoniae*
- *Staphylococcus aureus*
- *Klebsiella pneumoniae*
- *Haemophilus influenzae*
- *Moraxella catarrhalis*
- *Pseudomonas aeruginosa* is a rare pathogen in CAP except in patients with structural lung disease such as cystic fibrosis and bronchiectasis

Atypical pneumonia microorganisms

- *Mycoplasma pneumoniae*
- *Chlamydophila pneumoniae*

Respiratory viruses most commonly include influenza A and B

Hospital-Acquired Pneumonia and Ventilatory-Associated Pneumonia- Related Microorganisms

- *Acinetobacter baumannii*
- *Klebsiella pneumoniae, Escherichia coli*, Enterobacter spp, Serratia spp
- *Stenotrophomonas maltophilia*
- *Staphylococcus aureus*, especially MRSA

Complications associated with community acquired pneumonia

Pulmonary

- Pleural effusion or empyema
- Pneumothorax
- Lung abscess
- Bronchopleural fistula
- Necrotizing pneumonia
- Acute respiratory failure

Metastatic

- Meningitis
- Central nervous system abscess
- Pericarditis
- Endocarditis
- Osteomyelitis
- Septic arthritis

Systemic

- Systemic inflammatory response syndrome or sepsis
- Hemolytic uremic syndrome

COMMUNITY ACQUIRED PNEUMONIA – Antimicrobial Therapy

Antimicrobial therapy is not routinely required for preschool-aged children with CAP, because viral pathogens are responsible for the great majority of clinical disease

Treatment on out-patient basis-
Amoxicillin (30-50 mg/kg/day in 2-3 divided doses for 5-7 Days)
Penicillin allergic patients OR where suspicion of Mycoplasma pneomoniae: Erythromycin (40 mg/kg/day in 3 doses) OR Azithromycin (10 mg/kg on day 1, followed by 5 mg/kg/day once daily on days 2–5)

In Patients (Severe and Very Severe Pneumonia)
When initiating empirical therapy based on age group and clinical details not suggestive for specific microorganisms:

Age	1st Line	2nd Line	3rd Line
Neonatal under NICU	See Under NICU		
1-3 Month	**Ampicillin** (150-200 mg/kg/day in 4 div doses) + **Gentamicin** (5-7.5 mg/kg/day in 2 div doses) for 10-14 days	**Ceftriaxone** (100 mg/kg/day in 1-2 div doses)+ **Amikacin** (15-20 mg/kg/day in1- 2 divided doses) for 10-14 days.	**Piperacillin/Tazobactam** (200-300 mg/kg/day in 3 div doses)+Amikacin (15-20 mg/kg/day in1-2 divided doses) for 10-14 days. OR **Meropenem** (60 mg/kg/day in 3 div doses) AND **Vancomycin** (40 mg/kg/day in 4 div doses) for 10-14 days
3 months-5 yr	**Amoxycillin + Clavulanic Acid** (80-90 mg/kg/day) OR **Ceftriaxone** (100 mg/kg/day in 1-2 div doses for 10-14 days)	**Ceftriaxone** (100 mg/kg/day in 1-2 div doses) for 10-14 days) + **vancomycin** (40 mg/kg/day in 4 div doses) for 10-14 days	**Meropenem** (60 mg/kg/day in 3 div doses) AND **Vancomycin** (40 mg/kg/day in 4 div doses) for 10-14 days
> 5 yr	**Ampicillin** (150-200 mg/kg/day in 4 divided doses) followed by oral Amoxycyllin (30-40 mg/kg/day) for 7-10 days.	IV **Amoxycillin + Clavulanic Acid** (80-90 mg/kg/day for 7-10 days) OR **Ceftriaxone** (100 mg/kg/day in 1-2 div doses) for 10-14 days)	**Ceftriaxone** (100 mg/kg/day in1- 2 div doses for 10-14 days)+ Vancomycin (40 mg/kg/day in 4 div doses) for 10-14 days
* **Cloxacillin** is initiated instead of other beta lactam/ Beta-lactam inhibitor combination agents in a dose of 50-100 mg/kg/day q 6 h in patients with an evidence of staphylococcal infection, as presence of pyoderma or pneumatocele on chest x-ray. (Avoid using third generation cephalosporin combination with cloxacillin). **parenteral therapy is continued till fever has subsided and patient starts taking orally, followed by oral medication. Total duration of therapy is for 10-14 days. In case of gram negative and staphylococcal infection duration of therapy is increased to 3-4 weeks.			
Patient Education: • Explain the sings of pneumonia, i.e. rapid respiratory rate, chest indrawing, difficulty in feeding, etc. • Explain the danger signals in a child suffering from pneumonia and to report back to hospital immediately.			

When patient' clinical details provide clue to causative organisms. **Specific Therapy for Known Pathogens**:

Haemophilus influenzae pneumonia

Amoxicillin +clavulanate (amoxicillin component, or 90 mg/kg/day in 2 doses)

Staphylococcal Pneumonia

MSSA

Intravenous - Cloxacillin (150–200 mg/kg/day every 6–8 hours) OR IV Amoxycillin + Clavulanic Acid (80-90 mg/kg/day for 7-10 days) Iin penicillin allergic patients- Clindamycin (40 mg/kg/day every 6–8 hrs)

Oral – Preferred: Oral Cephalexin 50-100mg/kg/day in 3-4 divided doses OR PO Cloxacillin (75–100 mg/kg/day in 3 or 4 doses) OR (in penicillin allergic) PO clindamycin (30–40 mg/kg/day in 3 or 4 doses).Total duration of therapy is 3-4 weeks.

MRSA

Intravenous - Vancomycin (40–60 mg/kg/day every 6–8 hours OR Clindamycin (40 mg/kg/day every 6–8 hours OR Linezolid (30 mg/kg/day every 8 hours for children ,<12 years old and 20 mg/kg/day every 12 hours for children ≥12 years old)

Oral Therapy - Preferred: Oral Clindamycin (30–40 mg/kg/day in 3 or 4 doses) OR oral Linezolid (30 mg/kg/day in 3 doses for children <12 yrs and 20 mg/kg/day in 2 doses for children ≥12 years)

Atypical pneumonia (Mycoplasma or Chlamydophila)

Erythromycin (40 mg/kg/day in 4 doses) OR Azithromycin (10 mg/kg on day 1, followed by 5 mg/kg/day once daily days 2–5)

Antivral therapy (Influenza pneumonia) (H1N1)

Drug preparations available: Oseltamivir (Tamiflu) :75-mg capsule; 60 mg/5 mL Suspension

Body Weight (Kg)	Age	Dose for 5 Days	#Bottles of Oral Suspension Needed by the 5 Days Regimen	# of Capsules Needed for the 5 Days Regimen
-	3-5 months	20 mg (1.6ml) Twice Daily	1	-
-	6-11 months	25 mg (2ml) Twice Daily	1	-
≤ 15	1-2 Year	30 mg Twice Daily	1	10 capsules (30 mg)
> 15-23	3-5 Year	45 mg Twice Daily	2	10 capsules (45 mg)
> 23-40	6-9 Year	60 mg Twice Daily	2	10 capsules (30 mg)
> 40	10-12 Year	75 mg Twice Daily	3	10 capsules (75 mg)

Body Weight (Kg) Dosing for infants younger than 1 Year not based on weight

Dose By Age	Recommended treatment Does for 5 days (Dose in volume is based on the concentration (12 mg/ml) of commercially manufactured Oseltamivir Oral Suspension)
< 3 months	12 mg (1ml) Twice Daily
3-5 months	20 mg (1.6ml) once Daily
6-11 months	25 mg (2ml) once Daily

EMPYEMA

Etiology not known/Emperical Therapy

1st line	2nd Line
IV Amoxycillin + Clavulanic Acid (80-90 mg/kg/day in 2-3 divided doses for 2 Weeks followed by Oral Amoxycillin + Clavulanic Acid (40-50mg/kg/day) for a total duration of 4-6 weeks.	Ceftriaxone (100 mg/kg/day IV in 2 div doses) + Vancomycin (40 mg/kg/day IV in 4 div doses) for 2 weeks or longer, followed by oral therapy with Amoxycillin + Clavulanic Acid (40-50mg/kg/day) for a total duration of 4-6 weeks.

MSSA (Community acquired/ Typically first episode/No history of hospitalisation)

Intravenous - Cloxacillin (150–200 mg/kg/day every 6–8 hours) **OR** IV Amoxycillin + Clavulanic Acid (80-90 mg/kg/day in 2-3 divided doses in penicillin; allergic patients Clindamycin (40 mg/kg/day every 6–8 hours) for atleast two weeks. Therapy is continued with oral Cloxacillin (see below) OR oral co-Amoxyclav (40-50 mg/kg/day)OR Oral Clindamycin (30–40 mg/kg/day in 3 or 4 doses)for total duration of 4-6 weeks.

MRSA (typically history of recurrent infections/history of recent hospitalisation/ recurrent pyoderma)

Intravenous - Vancomycin (40–60 mg/kg/day every 6–8 hours **OR** clindamycin (40 mg/kg/day every 6–8 hours OR linezolid (30 mg/kg/day every 8 hours for children <12 years old and 20 mg/kg/day every 12 hours for children >12 years old)

Oral Therapy - Preferred: oral clindamycin (30–40 mg/kg/day in 3 or 4 doses) **OR** oral linezolid (30 mg/kg/day in 3 doses for children <12 yrs and 20 mg/kg/day in 2 doses for children >12 years)

Non-responding cases of MSSA should be treated like MRSA cases. Non-responding cases of MRSA should be checked for proper pleural drainage and positioning before contemplating terapy revision to second line therapy.

2nd Line therapy:

Ceftriaxone (100 mg/kg/day IV in 2 div doses) + Vancomycin (40 mg/kg/day IV in 4 div doses) for 2 weeks or longer, followed by oral therapy with Amoxycillin + Clavulanic Acid (40-50mg/kg/day) for a total duration of 4-6 weeks.

LUNG ABSCESS

1st Line	2nd Line	3rd Line
Ceftriaxone(100 mg/kg/day IV in 2 div doses) AND **Clidamycin** (30 mg/kg/day in 3 div doses)	**Ceftriaxone** (100 mg/kg/day IV in 2 div doses) AND **Vancomycin** (40 mg/kg/day IV in 4 div doses) for 4-6 weeks	**Linezolid** (30 mg/kg/day IV in 3 div doses) AND **Meropenem** 40 mg/kg/dose every 8 hrs I.V infusion over 30 min

*parenteral therapy is given for 2-3 weeks followed by oral antibiotics for total duration of 4-6 weeks.

ACUTE MENINGITIS

Investigation Pathway for meningitis in children

Primary set of investigations:

1. Blood culture
2. EDTA whole blood (2vials of atleast 1ml)
   a) Total Blood Count
   b) PCR for *S. pneumoniae, H. influenzae* and *N. meningitidis* (Specimen should be send with initial set – will be processed based on microscopic and biochemical profile among culture negative cases)
3. CSF
   a) Container 1 (1.5ml): Culture, Gram stain, Latex agglutination (PCR for bacterial pathogens – *S. pneumoniae, H. influenzae* and *N. meningitidis* – will be processed based on microscopic and biochemical profile among culture negative cases)
   b) Container 2 (0.5ml): Cytology
   c) Container 3 (1 ml): Biochemical Profile
4. Serum tube (1ml) : Serum procalcitonin (quantitative)

Secondary Investigations:

- CSF - Herpes Simplex PCR/IgM if encephalitis is suspected
- CSF - Cryptococcal antigen
- Serum - RPR/VDRL
- AFB/fungal cultures and stains
- CSF PCR for viral pathogens – Enterovirus, HSV, VZV
- CT head [consider if child is immunocompromised, has new onset seizure , history of CNS disease (mass lesion, focal infection), papilledema, altered level of consciousness, or has focal neurological deficit]

Common Pathogens causing meningitis

Bacterial

- *Streptococcus pneumoniae*
- *Haemophilus influenzae* type B
- *Neisseria meningitidis*
- *S. aureus*
- *Listeria monocytogenes*
- *Streptococcus pyogenes* (group A beta-hemolytic streptococci)
- *Streptococcus agalactiae* (group B beta-hemolytic streptococci)
- Gram-negative bacilli (Enteric pathogens).
- Mycobacterium tuberculosis (MTB)

Viral

- Enteroviruses (eg, coxsackie A and B, echovirus, poliovirus, and enterovirus 71)
- Herpes simplex virus (HSV-1, HSV-2).
- Varicella-zoster virus (VZV)
- Human immunodeficiency virus (HIV)
- Mumps, measles, and rubella (MMR).
- Arthropod-borne viruses and West Nile virus.
- Lymphocytic choriomeningitis virus and Hantavirus

Antimicrobial Therapy for specific infections in confirmed bacterial meningitis	
Children and young people aged 3 months or older	Treat ***H influenzae*** **type b meningitis** with intravenous ceftriaxone for 10 days
	Treat ***S pneumoniae*** meningitis with intravenous ceftriaxone for 14 days
Children younger than 3 months	Treat **Group B streptococcal** meningitis with intravenous cefotaxime for at least 14 days.
	Treat ***L. monocytogenes*** meningitis with intravenous amoxicillin or ampicillin for 21 days in total, plus gentamicin for at least the first 7 days
	Treat bacterial meningitis due to Gram-negative bacilli with intravenous cefotaxime for at least 21 days unless directed otherwise by the results of antibiotic sensitivities plus plus and iv amikacin (dose - 15-20 mg/kg/day) in two divided dose for 10-14 days
All children	With confirmed **meningococcal disease**, treat with intravenous ceftriaxone for 7 days
Antimicrobial Therapy for **unconfirmed bacterial meningitis**	
In children aged 3 months and older	i.v. ceftriaxone (100 mg/kg/day in 2 div doses) **OR** Iv Cefotaxime (200 mg/kg/day in 4 divided doses) for 10-14days
In children younger than 3 months	i.v. cefotaxime (50 mg/kg/dose I.V infusion by syringe pump over 30 min) plus and iv amikacin (dose -15-20 mg/kg/day) in two divided dose for 10-14 days Ampicillin (100 mg/kg/day in 4 divided doses) or amoxicillin for at least 14 days may be added in place of Amikacin incase GBS is not ruled out.
Patient Education : Explain to the relative that in unconscious patient nothing should be administered orally until patient recovers his level of consciousness. Patient should be lying in left lateral position during this period.	

Where ceftriaxone is used, do not administer it at the same time as calcium-containing infusions. Instead, use cefotaxime

2nd line therapy: Meropenem (120 mg/kg/day in 3 div doses) + Vancomycin(60 mg/kg/day in 4 div doses) for 10-14 days **(In Type 2 or 3 patients)**

Chemoprophylaxis for Meningococcal Disease Contacts (including non-vaccinated Hospital Staff): To be effective in preventing secondary cases, chemoprophylaxis must be initiated as soon as possible (i.e. not later than 48 hours after diagnosis of the case). Mass chemoprophylaxis not needed.

Drug	Dose (Adults)	Dose (Children)	Route	Duration
Rifampicin	600mg/12hr	10mg/kg/12hr	Oral	Two Days
Ciprofloxacin	500mg	-	Oral	Single Dose
Ceftriaxone	250mg	<15yr – 125mg	IM	Single Dose
Azithromycin	500mg	10mg/kg	Oral	Single Dose

ACUTE ENCEPHALITIS

Investigative Pathway for Acute Encephalitis

Primary set of investigations:

1. **Blood culture** (atleast 1ml) (Immediately after admission, before antibiotic administration)
2. **Cerebrospinal fluid** (CSF) (Four containers) (within first two hours of admission)
   Container 1 (1ml): Culture, Gram's Stain, India Ink
   Container 2 (0.5ml): Direct Microscopy
   Container 3 (1ml) : Biochemical Profile (Protein, Sugar)*
   Container 4 (2ml) : CSF Immunoglobulin profile (HSV IgM, JE IgM) and/OR
   CSF PCR (HSV, VZV, CMV) coxsackievirus, echovirus, and enterovirus 71)
3. Complete Blood Count with peripheral smear
4. Liver function tests
5. Serum Sodium Levels
6. MRI Brain#

Secondary set of Investigations:

- Serology – EBV, Rickettsial Serology, Serum IgG for *Toxoplasma gondii*
- CSF AFB smear and culture
- CSF FTA-ABS
- Serum RPR and FTA-ABS

*A CSF-elevated RBC count (greater than or equal to 500 cells/mm^3) is typically associated with hemorrhagic and necrotizing encephalitis (eg, HSV, listeria, or amoebic encephalitis)

MRI of brain:
The image test of choice for evaluation of a patient suspected of encephalitis. Characteristic changes from MRI include:

a. HSV: HSV1 -. Medial temporal lobe edema and edema of the orbital surface of frontal lobes, insular cortex, and cingulate gyrus.
   HSV2 – (Neonatal) – Brain involvement in generalized.
b. CMV. Periventricular changes.
c. Japanese encephalitis virus. Hypodense lesions in the thalamus as well as basal ganglia and midbrain.
d. Eastern equine encephalitis. Focal lesions of thalamus, basal ganglia, and midbrain.
e. Enteroviruses. Hyperintense lesions in midbrain, pons, and medulla.
f. Hendra and Nipah viruses. Small-vessel vasculitis (diffuse).

Antimicrobial Therapy for Herpes Simplex Virus Encephalitis (other than neonates)	
Herpes Simplex Virus Therapy (viral encephalitis)	Begin acyclovir 10-20mg/kg IV every 8 hours for 2-3 weeks (In case of positive HSV serology OR positive PCR , give higher dose for longer duration

Valacyclovir was not found to be more effective than acyclovir, nor did a higher dose of valacyclovir make a difference.

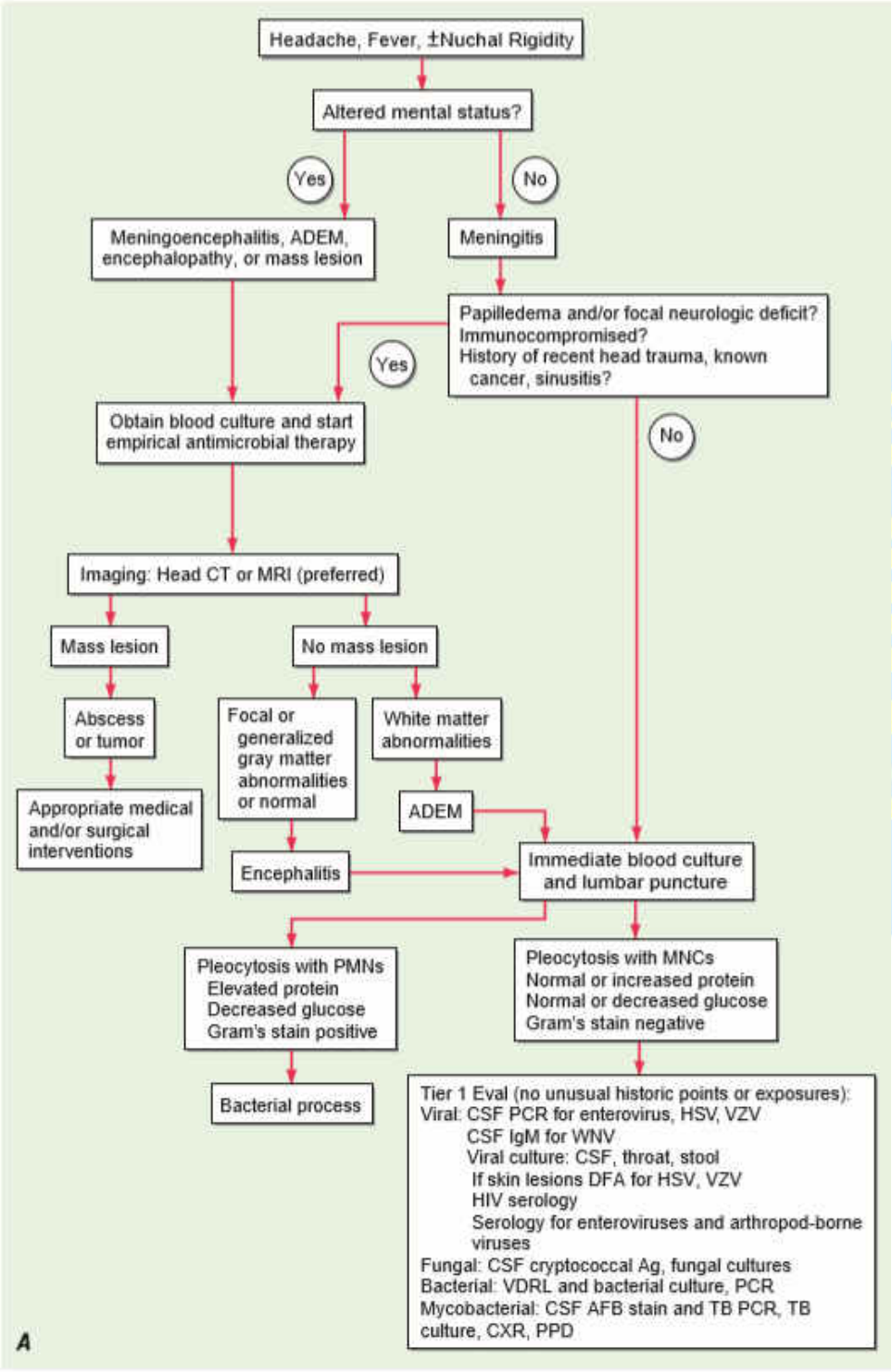
Neonatal herpes simplex encephalitis
Acyclovir in doses of 20 mg/kg IV every 8 hours (60 mg/kg/d). This dosage is higher than that used in older children and adults (30 mg/kg/d), but, in neonates, it has been shown to improve mortality and morbidity when compared with the lower dosage. Because the higher dosage is associated with neutropenia, the white blood cell (WBC) count should be monitored closely.

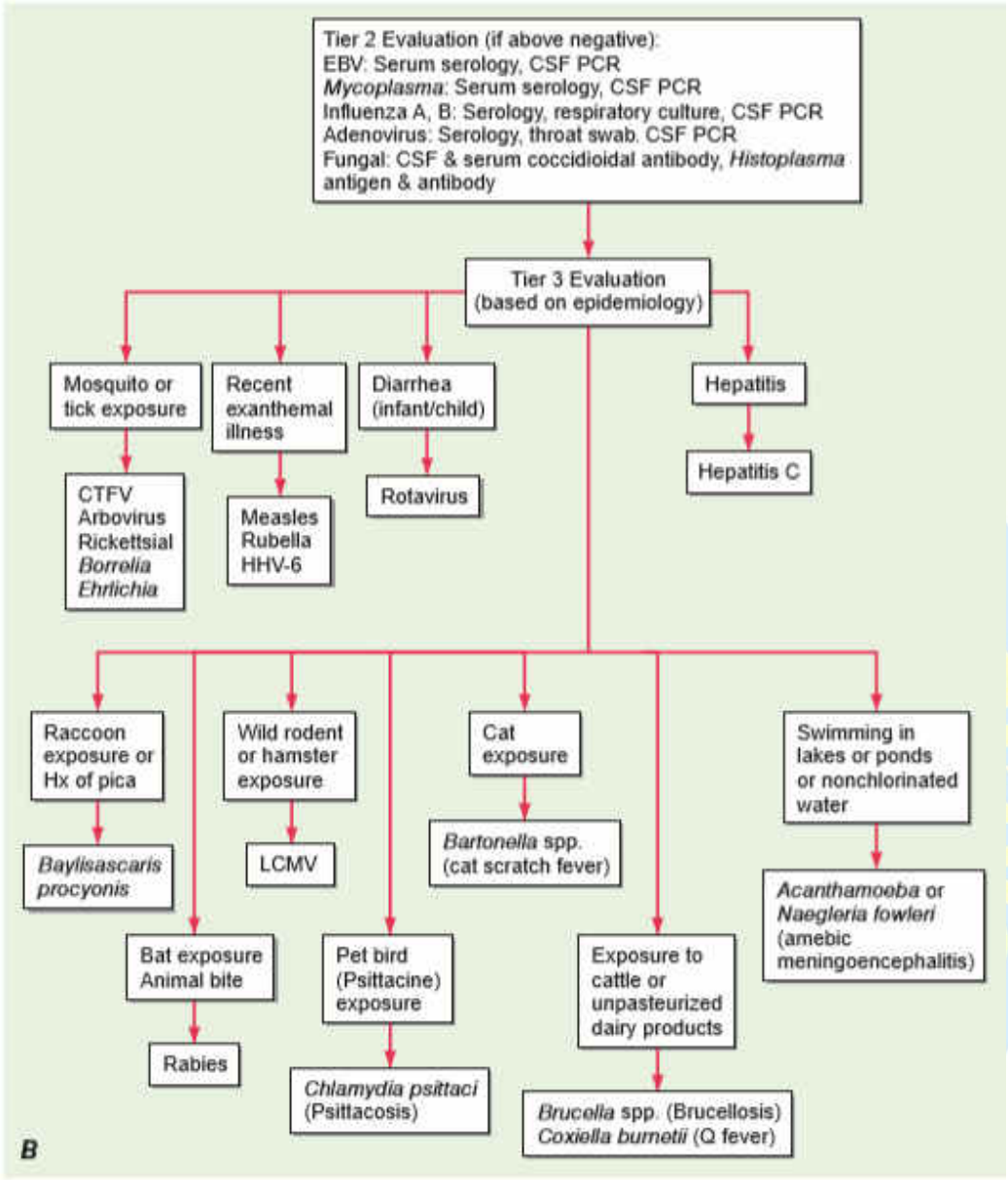
Salient points regarding antiviral therapy in specific common viral encephalitis:

- Herpes simplex virus: acyclovir is recommended
- Varicella-zoster virus: acyclovir is recommended ganciclovir can be considered an alternative
- Cytomegalovirus: the combination of ganciclovir plus foscarnet is recommended.

- Epstein-Barr virus: acyclovir is NOT recommended; the use of corticosteroids may be beneficial, but the potential risks must be weighed against the benefits.
- Influenza virus: oseltamivir can be considered
- Measles virus: ribavirin can be considered, intrathecal ribavirin can be considered in patients with subacute sclerosing panencephalitis

Diagnostic algorithm for suspected cases of encephalitis and meningitis




Tier 2 Evaluation (if above negative):
EBV: Serum serology, CSF PCR
Mycoplasma: Serum serology, CSF PCR
Influenza A, B: Serology, respiratory culture, CSF PCR
Adenovirus: Serology, throat swab. CSF PCR
Fungal: CSF & serum coccidioidal antibody, Histoplasma antigen & antibody
Tier 3 Evaluation (based on epidemiology)
Mosquito or tick exposure
Recent exanthemal illness
Diarrhea (infant/child)
Hepatitis
CTFV
Arbovirus
Rickettsial
Borrelia
Ehrlichia
Measles
Rubella
HHV-6
Rotavirus
Hepatitis C
Raccoon exposure or Hx of pica
Wild rodent or hamster exposure
Cat exposure
Swimming in lakes or ponds or nonchlorinated water
Baylisascaris procyonis
LCMV
Bartonella spp. (cat scratch fever)
Acanthamoeba or Naegleria fowleri (amebic meningoencephalitis)
Bat exposure Animal bite
Pet bird (Psittacine) exposure
Exposure to cattle or unpasteurized dairy products
Rabies
Chlamydia psittaci (Psittacosis)
Brucella spp. (Brucellosis)
Coxiella burnetii (Q fever)
B

Skin and Soft Tissue Infections

Investigative pathways for Skin and soft tissue infections
Purulent skin and soft tissue infections • Gram stain and culture of pus from carbuncles and abscesses are recommended • Gram stain and culture of pus from inflamed epidermoid cysts are not recommended **Recurrent skin abscesses** • Pus- Gram stain and culture **Erysipelas and Cellulitis** • Blood Culture and culture of cutaneous aspirates, biopsies, or swabs are NOT routinely recommended. • Cultures of blood are recommended and cultures and microscopic examination of cutaneous aspirates, biopsies, or swabs should be considered in patients with malignancy on chemotherapy, neutropenia, severe cell-mediated immunodeficiency, immersion injuries, and animal bites. **Surgical site infections** • Gram stain and culture from suture wound (Avoid surface wound swabs) **Necrotizing fasciitis** • Blood cultures • Gram stain and culture of deep tissue obtained during surgery or through direct needle aspiration of an area of cutaneous inflammation (both aerobic and anaerobic cultures) • CT and MRI to demonstrate oedema extending along the fascial plane • Biopsy for frozen section analysis **Pyomyositis** • Blood culture • Culture of abscess material • MRI (recommended), CT and USG

LIVER ABSCESS

Investigative Pathway for diagnosus of liver abscess
Primary set of investigations: • Liver ultrasonography • Amoebic serology • Aspirate – In sterile container for culture and microscopy (direct microscopy, wet mount and H&E staining) • In blood culture bottle – direct inoculation from aspirate syringe • If suspecting anaerobic pathogen contact your microbiologist

Antimicrobial Therapy for liver abscess

1st Line	2nd Line	3rd Line
IV Amoxycillin + Clavulanic Acid (80-90 mg/kg/day in 2-3 divided doses **for 2 Weeks followed by Oral Amoxycillin + Clavulanic Acid (40-50mg/kg/day) for a** total duration of 4-6 week.. AND **Metronidazole** (35-50 mg/kg day in 3 div doses for 7-10 days)	**Ceftriaxone** (100 mg/kg/day IV in 2 div doses) AND **Vancomycin** (40 mg/kg/day IV in 4 div doses)	**Meropenem** 40 mg/kg/dose every 8 hrs I.V infusion over 30 min AND **Vancomycin** (40 mg/kg/day IV in 4 div doses)

URINARY TRACT INFECTIONS (UTI)

Investigative Pathway for UTI
Primary set • Urine for Routine (includes albumin, sugar, leuckocyte esterase and Nitrite test)/ Microscopy • Urine for Culture and Sensitivity • Secondary set • Complete blood counts • Blood culture *Please note:* • In comparison with SPA results, cultures of urine specimens obtained through catheterization (NOT indwelling catheter) are 95% sensitive and 99% specific. • Cultures of bag specimens are difficult to interpret. Sensitivity is approx 100% but the specificity of bag cultures was shown to range between 14% and 84%. Thus are strongly discouraged. • Urine microscopy with centrifuged urine is useful for detection of casts and crystals – first morning specimen is preferred. • Urine microscopy with uncentrifued urine is useful for detection of pus cells and microorganisms – mid stream urine specimen as fresh as possible is preferred. • For urine culture – mid stream urine specimen as fresh as possible is preferred.

–**Simple UTI* - Antimicrobial therapy**

1st Line	2nd Line
Oral **Amoxycillin** (40-50 mg/kg/day) OR Oral **Amoxycillin+Clavulanic Acid** (30-50 mg of Amoxicillin)for 7-10 days.	**Cefixime** (8-10 mg/kg/day in 2 divided doses for 7-10 days)

– **Complicated UTI** - Antimicrobial therapy**

Age	1st Line	2nd Line	3rd Line
In all age groups	**Ceftriaxone** (75-100 mg/kg/day) OR **Amikacin** (10-15 mg/kg/day I/M or I/V in single dose for 10-14 days)	**Piperacillin + Tazobactam** (300-400 mg/kg/day of piperacillin in 3 div doses) + Amikacin (10-15 mg/kg/day I/M or I/V in single dose) for 10-14 days	**Meropenem** (60 mg/kg/day in 3 div doses) 10-14 Days

*UTI with low grade fever, dysuria, frequency and urgency, absence of signs of complicated UTI

**Presence of fever ≥39°C, systemic toxicity, persistent vomiting, renal angle tenderness and raised creatinine

(Children less than 3 months of age and those with complicated UTI should be hospitalized and treated with parenteral antibiotics.)

ENTERIC FEVER

Investigative Pathway

Primary Set

- Blood culture
- Blood counts
- SGOT & SGPT

Secondary set

- Typhi IgM antibodies
- Widal Test
- Urine Culture
- Stool Culture
- Blood PCR

Please note:

- ***Irrespective of days of onset of fever/illness blood culture must be collected from ALL suspected cases of enteric fever***.
- In cases of suspected complicated enteric fever cases, 2ml of whole blood specimen may be sent in EDTA vial to be used for molecular diagnosis of enteric fever in an event culture is not found positive in next 24hours.

Antimicrobial Therapy for enteric therapy

Complicated enteric fever

1st Line	2nd Line
Ceftriaxone- 100 mg/kg/day IV in 2 div doses till patient is afebrile and starts taking orally (for atleast 48hrs) followed by oral cefixime (20 mg/kg/day) for total 14 days.	**ADD** Azithromycin (15-20 mg/kg/day in single dose for 10-14 days) if child remains febrile despite 7 days of first line therapy.

Uncomplicated enteric fever

1st line	2nd line
Oral cefixime (20 mg/kg/day) for total 14 days.	ADD Azithromycin (15-20 mg/kg/day in single dose for 10-14 days)

FEBRILE NEUTROPENIA

1st Line	2nd Line	3rd Line
Ceftazidime (150 mg/kg/day in 3 div doses)+ Amikacin (15-20 mg/kg/day in 2 or 3 div doses)	Piperacillin + Tazobactam (200-300 mg/kg/day IV in 3-4 div doses)+ Vancomycin (40 mg/kg/day IV in 4 divided doses)	Meropenem (60 mg/kg/day in 3 div doses) + Amphotericin B (1 mg/kg/day IV for 2 weeks) or liposomal Amphotericin B 1-5 mg kg/day, usually 3 mg/kg/day

- Patients without an identified etiology who become afebrile within first 3-5 days of therapy and are clinically well with ANC of >100 cells/cmm can be shifted to oral antibiotics (cefixime or Amoycillin_Clavulanic acid) and therapy should be continued for minimum 7 days.
- However, if fever persists or ANC remains <100 parenteral therapy should be continued with 2nd line antibiotics
- In clinically stable patients without an identified etiology but with persistent neutropenia, therapy can be stopped after 2 weeks.

SEPSIS (SEPTICEMIA/BACTEREMIA)

Investigative Pathway- Sepsis

Primary Set

- Blood Culture
- Complete blood count with peripheral smear
- CRP/Procalcitonin
- Urine Culture

Secondary set

- Kidney Function Test
- Electrolytes
- Liver function test
- Coagulation profile
- Localizing systemic sampling
- Serological tests based on clinical profile

Please note:

- *Irrespective of days of onset of fever/illness blood culture must be collected from ALL suspected cases of sepsis requiring admission.*
- In cases of suspected severe sepsis, 2ml of whole blood specimen may be sent in EDTA vial to be used for molecular diagnosis in an event culture is not found positive in next 24 hours.

Antimicrobial Therapy - Sepsis

Age	1st Line	2nd Line	3rd Line
Neonatal	Cefotaxime + Amikacin	Piperacillin + Tazobactam (200-300 mg/kg/day IV in 3-4 div doses) + Amikacin	Meropenem
Post-neonatal	Ceftriaxone (100 mg/kg/day in 2 div doses) AND Amikacin (15-20 mg/kg/day in 2 div doses) for 10-14 days	Piperacillin + Tazobactam (200-300 mg/kg/day IV in 3-4 div doses) AND Amikacin (15-20 mg/kg/day in 2 div doses) for 10-14 days	Meropenem (60 mg/kg/day in 3 div doses) AND Vancomycin (40 mg/kg/day in 4 div doses) for 14 days.

BRAIN ABSCESS

1st Line	2nd Line
Ceftazidime (150 mg/kg/day in 3 div doses) AND Vancomycin (40 mg/kg/day IV in 4 divided doses) AND Metronidazole ((35-50 mg/kg day in 3 div doses) for 4-6 weeks	Meropenem (60 mg/kg/day in 3 div doses) AND Vancomycin (40 mg/kg/day IV in 4 divided doses) for 4-6 weeks.

INFECTIVE ENDOCARDITIS

Antibiotic regimens for prophylaxis of endocarditis in children with high-risk cardiac lesions

A. Standard oral regimen
    a. Amoxicillin: 50 mg/kg PO (maximum 2 g) PO 1 h before procedure
B. Inability to take oral medication
    a. Ampicillin: 50 mg/kg (maximum 2 g) IV or IM within 1 h before procedure
C. Penicillin allergy
    a. Clarithromycin 15 mg/ kg PO 1 h before procedure
    b. Cephalexin: 50 mg/kg PO (maximum 2 g) PO 1 h before procedure
    c. Clindamycin: 20 mg/kg PO 1 h before procedure
D. Penicillin allergy, inability to take oral medication
    a. Cefazolin: 25mg/kg IV or ceftriaxone: 1 g IV or IM 30 min before procedure

High-risk cardiac lesions for which endocarditis prophylaxis is advised

- Prosthetic heart valves
- Prior endocarditis
- Unrepaired cyanotic congenital heart disease, including palliative shunts or conduits
- Completely repaired congenital heart defects during the 6 months after repair
- Incompletely repaired congenital heart disease with residual defects adjacent to prosthetic material
- Valvulopathy developing after cardiac transplantation

Unknown organism	Common known etiologies
Ceftriaxone (2 g q12h) plus vancomycin (15 mg/kg q12h) according to Harrison it is empirical T/t Ceftriaxone (100mg/kg/d in 2 div doses) for4- 6 weeks AND Gentamicin (3 mg/kg/d IV in single dose or 3 div doses) for 2 weeks	Ceftriaxone (100mg/kg/d in 2 div doses) for 6 weeks AND Vancomycin (40 mg/kg/day IV in 4 divided doses) for 4 weeks AND Gentamicin (3 mg/kg/d IV in single dose) for 2 weeks

In case of Staphylococcal endocarditis replace ceftriaxone with Cloxacillin (100 mg/kg/d iv in 4 div doses) for 4- 6 weeks

DYSENTRY

Injection ceftriaxone (50-75 mg /kg /day) followed by oral cefixime for total 7 days

CHOLERA

Children >8 years of age- Oral Doxycycline 6 mg/kg single dose in
In children <8 years old- Oral Azithromycin 20mg/kg/, single dose

HOSPITAL ACQUIRED PNEUMONIA **(Type 3 Patient)**

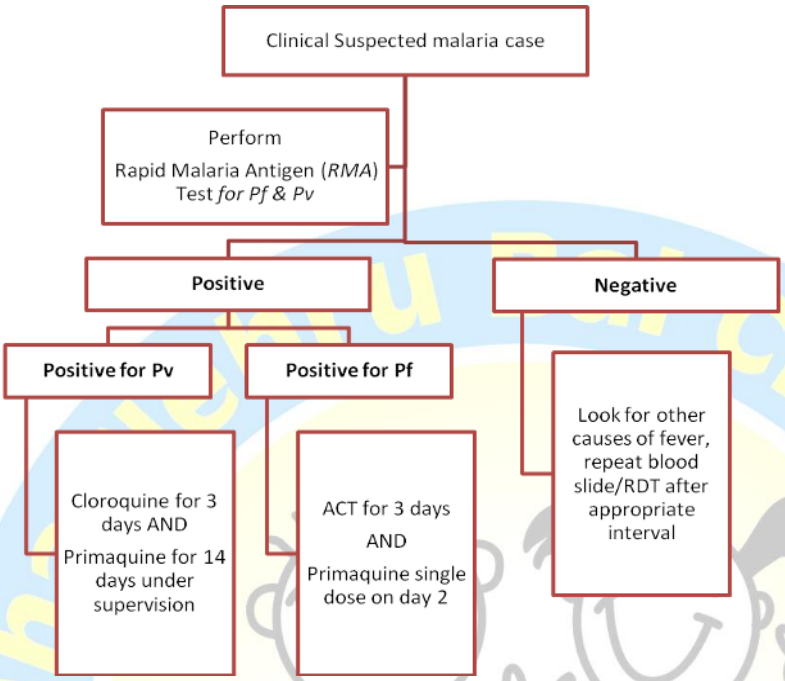
1st Line	2nd Line
Meropenem – 60 mg/kg/day I/V every 8 hrly AND Vancomycin - 40 mg/kg/day I/V every 6 - 8 hrly	Colistin base IV., 2.5 – 5 mg/kg/day I/V every 6 – 12 hrly (1mg= 30000 IU) AND Vancomycin - 40 mg/kg/day I/V every 6 - 8 hrly

HEALTHCARE ASSOCIATED BLOOD STREAM INFECTION **(Type 3 Patient)**

1st Line	2nd Line
Meropenem – 60 mg/kg/day I/V every 8 hrly AND Vancomycin - 40 mg/kg/day I/V every 6 - 8 hrly	Colistin base IV., 2.5 – 5 mg/kg/day I/V every 6 – 12 hrly (1mg= 30000 IU) AND Vancomycin - 40 mg/kg/day I/V every 6 - 8 hrly

MALARIA

Recommended Algorithm for Management of Malaria



Severe Malaria Features

Severe malaria is characterized by one or more of the following features:

- Impaired consciousness/coma
- Repeated generalized convulsions
- Renal failure (Serum Creatinine >3 mg/dl)
- Jaundice (Serum Bilirubin >3 mg/dl)
- Severe anaemia (Hb <5 g/dl)
- Hypoglycaemia (Plasma Glucose <40 mg/dl)
- Pulmonary oedema/Acute respiratory distress syndrome
- Metabolic acidosis
- Haemoglobinuria
- Hyperpyrexia (Temperature >106°F / >42°C)
- Hyperparasitaemia (>5% parasitized RBCs)
- Circulatory collapse/shock (Systolic BP <80 mm Hg, <50 mm Hg in children)
- Abnormal bleeding and Disseminated intravascular coagulation (DIC)

Treatment of uncomplicated malaria

A. Treatment of *P. vivax* malaria

- Confirmed *P. vivax* cases should be treated with **chloroquine** in full therapeutic **dose of 25 mg/kg divided over three days**.
- *P. vivax* may cause **relapse** due to a form of *P. vivax* parasites called as **hypnozoites** remain dormant in the liver cells. For prevention from relapse, **primaquine** should be given at a **dose of 0.25 mg/kg** body weight daily for 14 days under supervision.
- Primaquine is contraindicated in known G6PD deficient patients, infants and pregnant women. Primaquine can lead to hemolysis in G6PD deficiency. Patient should be advised to stop primaquine immediately if he/she develops symptoms like dark coloured urine, yellow conjunctiva, bluish discolouration of lips, abdominal pain, nausea, vomiting etc.

B. Treatment of *P. falciparum* malaria

- Artemisinin Combination Therapy (ACT) should be given to all confirmed *P. falciparum* cases found positive by microscopy or RDT.

- This is to be accompanied by single dose primaquine (0.75 mg/kg body weight) on Day 2.
- ACT consists of an artemisinin derivative combined with a long acting antimalarial (amodiaquine, lumefantrine, mefloquine or sulfadoxine-pyrimethamine). The ACT recommended in the national programme in India is artesunate + sulfadoxine-pyrimethamine (SP).
- Oral artemisinin monotherapy is banned in India. Artemisinin derivatives must never be administered as monotherapy for uncomplicated malaria. These rapidly acting drugs, if used alone, can lead to development of drug resistance.

C. Treatment of mixed infections

Mixed infections with *P. falciparum* **should be treated as falciparum malaria**. However, antirelapse treatment with primaquine should be given for 14 days, if indicated.

Treatment based on clinical criteria without laboratory confirmation

Suspected malaria cases not confirmed by RDT or microscopy should be treated with chloroquine in full therapeutic dose.

General recommendations for the management of uncomplicated malaria

1. Avoid starting treatment on an empty stomach. The first dose should be given under observation.
2. Dose should be repeated if vomiting occurs within 30 minutes.
3. The patient should be asked to report back, if there is no improvement after 48 hours or if the situation deteriorates.
4. The patient should also be examined for concomitant illnesses.

Treatment failure/Drug resistance

After treatment patient is considered cured if he/she does not have fever or parasitaemia till Day 28. Some patients may not respond to treatment which may be due to drug resistance or treatment failure, especially in falciparum malaria. If patient does not respond and presents with following, he/she should be given alternative treatment.

1. **Early treatment failure (ETF):** Development of danger signs or severe malaria on Day 1, 2 or 3, in the presence of parasitaemia; parasitaemia on Day 2 higher than on Day 0, irrespective of axillary temperature; parasitaemia on Day 3 with axillary temperature ≥37.5°C; and parasitaemia on Day 3 ≥ 25% of count on Day 0.
2. **Late clinical failure (LCF):** Development of danger signs or severe malaria in the presence of parasitaemia on any day between Day 4 and Day 28 (Day 42) in patients who did not previously meet any of the criteria of early treatment failure; and presence of parasitaemia on any day between Day 4 and Day 28 (Day 42) with axillary temperature ≥37.5°C in patients who did not previously meet any of the criteria of early treatment failure.
3. **Late parasitological failure (LPF):** Presence of parasitaemia on any day between Day 7 and Day 28 with axillary temperature <37.5°C in patients who did not previously meet any of the criteria of early treatment failure or late clinical failure.

Such cases of falciparum malaria should be given alternative ACT or quinine with Doxycycline. Doxycycline is contraindicated in children up to 8 years. Thus younger children may be treated alone. Treatment failure with chloroquine in P. vivax malaria is rare in India.

Treatment of severe malaria

Following steps should be taken:

1. Drugs - Parenteral antimalarials, antipyretics, antibiotics, anticonvulsants
2. Hydration: Intravenous infusion facilities
3. Consider blood transfusion, if required
4. Oxygen by face mask

Specific antimalarial treatment of severe malaria

Severe malaria is an emergency and treatment should be given promptly. Parenteral artemisinin derivatives or quinine should be used irrespective of chloroquine sensitivity.
• **Artesunate**: 2.4 mg/kg body weight i.v. or i.m. given on admission (time=0), then at 12 hours and 24 hours, then once a day (Care should be taken to dilute artesunate powder in 5% Sodium bicarbonate provided in the pack).
• **Quinine**: 20 mg quinine salt/kg body weight on admission (i.v. infusion in 5% dextrose/dextrose saline over a period of 4 hours) followed by maintenance dose of 10 mg/kg body weight 8 hourly; infusion rate should not exceed 5 mg/kg body weight per hour.
Loading dose of 20 mg/kg body weight should NOT be given, if the patient has already received quinine. NEVER GIVE BOLUS INJECTION OF QUININE. If parenteral quinine therapy needs to be continued beyond 48 hours, dose should be reduced to 7 mg/kg body weight 8 hourly.
• **Artemether**: 3.2 mg/kg body weight i.m. given on admission then 1.6 mg/kg body weight per day.
• **Arteether**: 150 mg daily i.m. for 3 days in adults only (not recommended for children).
Intravenous preparations should be preferred over intramuscular preparations. Parenteral treatment should be given for minimum of 24 hours once started.

Consideration for conversion to oral therapy:
Once the patient can take oral therapy, further follow-up treatment should be as below:

1. Patients receiving parenteral quinine should be treated with oral quinine 10 mg/kg body weight three times a day to complete a course of 7 days, along with clindamycin 10 mg/kg body weight 12 hourly for 7 days should be used.
2. Patients receiving artemisinin derivatives should get full course of oral ACT. However, ACT containing mefloquine should be avoided in cerebral malaria due to neuropsychiatric complications.

Severe malaria due to *P. vivax*

Severe malaria caused by *P. vivax* should be treated like severe *P. falciparum* malaria.

Chemoprophylaxis

Chemoprophylaxis is recommended for vulnerable populations.

A. Short-term chemoprophylaxis (less than 6 weeks)
Doxycycline: 100 mg daily in adults and 1.5 mg/kg body weight for children more than 8 years old. The drug should be started 2 days before travel and continued for 4 weeks after leaving the malarious area. Doxycycline is contraindicated in pregnant and lactating women and children less than 8 years.

B. Long-term chemoprophylaxis (more than 6 weeks)
Mefloquine: 5 mg/kg body weight (up to 250 mg) weekly and should be administered two weeks before, during and four weeks after leaving the area. Mefloquine is contraindicated in cases with history of convulsions, neuropsychiatric problems and cardiac conditions.

Table 1. Chloroquine for *P. vivax*

Age in years	Number of tablets		
	Day 1 (10 mg/Kg)	Day 2 (10 mg/Kg)	Day 3 (5 mg/Kg)
<1	½	½	¼
1 – 4	1	1	½
5 – 8	2	2	1
9 – 14	3	3	1½
15 & above	4	4	2

Table 2. Primaquine for *P. vivax* (Daily Dosage for 14 days)

Age in years	Daily dosage (in mg base)	No. of tablets (2.5 mg base)
< 1	Nil	Nil
1 – 4	2.5	1
5 – 8	5.0	2
9 – 14	10.0	4
15 & above	15.0	6

Note: Primaquine should be given for 14 days under supervision. Do not give Primaquine to pregnant women and infants and G6PD deficiency cases.

Table 3. ACT (Artesunate + SP) dosage schedule for *P. falciparum*

Age in years		Number of tablets		
		1st Day	2nd Day	3rd Day
< 1	AS	½	½	½
	SP	¼	Nil	Nil
1 – 4	AS	1	1	1
	SP	1	Nil	Nil
5 – 8	AS	2	2	2
	SP	1½	Nil	Nil
9 – 14	AS	3	3	3
	SP	2	Nil	Nil
15 and above	AS	4	4	4
	SP	3	Nil	Nil

AS – Artesunate 50 mg, SP – Sulfadoxine 500 mg + Pyrimethamine 25 mg

Table 4. Primaquine for *P. falciparum* (Single dose on Day 2)

Age in years	Dosage (in mg base)	No. of tablets (7.5 mg base)
< 1	Nil	0
1 – 4	7.5	1
5 – 8	15	2
9 – 14	30	4
15 & above	45	6

Note: Do not give Primaquine to pregnant women, infants and G6PD deficiency cases.

Ref: Guidelines on Diagnosis and Treatment of Malaria in India, 2010. National Vector Borne Disease Control Programme

LEISHMANIASIS

Investigative Pathway for Leishmaniasis

Primary Set

"A case presenting to a clinician with a fever of more than two weeks duration, with splenomegaly and not responding to the full course of anti-malarials, should be subjected to rK39 test."

rK39 . Rapid Diagnostic Test:

- Based on the recombinant K39 protein. K39 is an epitope apparently conserved on amastigotes of Leishmania species that cause visceral infection;
- Circulating anti-K39, IgG is detectable in 95%-100% of patients who have kala-azar.
- Has an estimated sensitivity of 100% and a specificity of 97%.
- Useful to initiate treatment for visceral leishmaniasis

"

Exclusion Criteria: The rK39 is not to be used in the following cases:

- Kala-azar relapses
- In cases of kala-azar re-infection
- Kala-azar and HIV co-infection

Other measures/tests to consider diagnosis in cases where rk39 test is not recommended

(a) Hematological examination:

1) Haemoglobin estimation
2) RBC indices
3) Total Leukocyte Count
4) ESR
5) Platelet Count
6) Peripheral smear

"Progressive leucopenia and severe anemia are striking features of L donovani infection. There is a progressive decline in total leucocyte count. Differential leucocyte count gives a higher monocyte and lymphocyte count. The total erythrocyte and platelet counts also decline but the decline in erythrocyte count is not comparable to the extent of leuocopenia. There is severe anemia and as such the haemoglobin contents must be estimated."

(b) Detection of Leishmania donovani :
Examination of spleen or bone marrow aspirates

Diagnosis of post Kala-azar Dermal Leishmaniasis : Skin Biopsy

The parasite demonstration in the dermal lesions is the diagnostic criteria for PKDL. The skin biopsy material can be collected with the help of sterilized needle from the nodular and erythematous areas. A homogenous smear is prepared on a clean slide and well-stained preparations are examined under the microscope for the presence of amastigotes or leishmania stages (LD bodies).

Treatment of visceral leishmaniasis

First Line

(i) **Primary Therapy**

Conventional AmB deoxycholate is administered in doses of 0.75–1.0 mg/kg on alternate days for a total of 15 infusions.
Liposomal AmB the regimen is 3 mg/kg daily on days 1–5, 14, and 21 (total dose, 21 mg/kg), the total-dose requirement for different regions of the world varies widely. In Asia, it is 10–15 mg/kg total dosage.
Routes: Through intravenous infusion in 5 per cent dextrose after mixing the drug in water for injection, very slowly in 6 to 8 hours.
Criteria for cure: Absence of leishmania amastigotes bodies in aspirated material after 6 weeks and 6 months of the last dose.
Contraindication: Kidney disease, severe liver and heart disease.
Precautions: Stop the drug when signs of renal failure and those of hypokalaemia appear. Make available emergency drugs as in SSG to guard against hypersensitivity reactions. Drugs are also responsible for renal and cardiac toxicity. Therefore, the treatment of the patients under strict supervision and on indoor basis should be undertaken.

(ii) Post Kala-Azar Dermal Leishmanoid : 4 to 6 courses of SSG each comprising of 20 days as per the response with 10 days interval in the courses.

Second Line

Sodium Stibogluconate (SSG): 20mg/kg body weight (maximum 850 mg/day) by single injection.
Route Intra-mascular (IM) or Intravenous (IM). Duration 20 days, if partial response to 20 days treatment, then continue upto 30 days.
Check for parasite load in splenic or Bone Marrow smear at 20 days or 30days as the case maybe.
Criteria for cure: Absence of L.D. bodies in aspirated material
Contraindication: Severe kidney, liver and heart disease.
Precautions: Make drugs like Adrenaline, hydrocortisone hemisuccinate and other resuscitative measures available to guard against hypersensitivity reactions, etc.

(ii) SSG nonresponsive : No response to supervised SSG in 20 days and in areas of partial response in 30 days and/ or two courses of SSG in fresh cases, start second line of treatment.

(i) Miltefosine: Miltefosine (hexadecylphosphocholine) is an oral drug that was originally studied as an antitumor agent. Subsequent to the serendipitous laboratory finding that miltefosine was active against Leishmania in vitro and, after oral administration in laboratory animals, the drug was developed for the treatment of visceral leishmaniasis or kala-azar.

Inclusion criteria:

a) A clinical diagnosis of active VL or PKDL with consistent signs and symptoms (e.g., fever, splenomegaly, anemia).
b) Confirmed diagnosis with rK39 or with splenic/ bone marrow smear examination.
c) Male or female of ages 2 years and above

Exclusion criteria:

a) HIV positive serology
b) Infants

Mode of Treatment : The treatment to be provided as a Directly Observed Therapy (DOTS). The patient will be induced to report for treatment twice a week.

Dosages : After enrollment oral miltefosine treatment should be administered as per following dosage schedule:

i. Children (>12 years) weighing > 25kg: 100mg miltefosine daily as one capsule (50 mg) in the morning and one capsule in the evening, after meals for 28 days.

ii. Children (>12 years) weighing < 25kg: 50mg, miltefosine daily as one capsule (50 mg) in the morning, after meals for 28 days.

iii. Children (2-11 years): miltefosine will be given at 2.5 mg/kg daily after meals for 28 days, i.e., 50mg daily once a day.

iv. The drug is not to be used in the case of children below 2 years of age.

Clinical Response : The response will be judged on clinical grounds, i.e., absence of fever, splenomegaly and anemia.

INVASIVE YEAST INFECTIONS

- Invasive Candiadiasis encompasses severe and invasive Candida infections that include candidemia, disseminated candidiasis, endocarditis, meningitis, endophthalmitis, and other deep tissue involvement. It excludes more superficial and less severe diseases such as oropharyngeal and esophageal candidiasis.
- Risk factors for invasive candidiasis include: prolonged and broad-spectrum antibiotics, central venous catheters, total parenteral nutrition, renal replacement therapy, neutropenia, hematologic malignancies, premature birth, gastrointestinal surgery, burns, implanted prosthetic devices, immunosuppressive agents (including glucocorticoids, chemotherapy,and immunomodulators), and prolonged intensive care unit (ICU) stay.
- Risk factors for non-albicans species include glucocorticosteroid use, central venous catheter placement, prior fluconazole therapy, and preexisting candiduria.
- A prediction rule can help to determine the likelihood of individual patients developing invasive candidiasis. Pertinent risk factors identified included:
    - Currently receiving broad-spectrum antibiotics (BSAbx), defined as carbapenems, fluoroquinolones, 2nd, 3rd, and 4th generation cephalosporins, beta-lactam/beta-lactamase inhibitor combinations, and tigecycline,
    - Presence of a central venous catheter (CVC),
    - Receipt of total parenteral nutrition (TPN),
    - Abdominal surgery within the last 7 days,
    - Steroid use, and
    - Length of stay (LOS) in the hospital.

To calculate the risk of candidemia in an individual patient use the formula below and interpret as indicated. If the patient has the risk factor, then the value of that risk factor is 1 (i.e. Yes=1), if the patient does not have the risk factor, then the value is 0 (i.e. No=0). LOS should be *entered as the exact number of days* continuously hospitalized during current assessment.

Prediction Rule = (1.54 x BSAbx) + (0.87 x CVC) + (0.92 x TPN) + (0.40 x Steroid) + (0.88 x Abdominal Surgery) + (0.04 x Pre-ICU LOS in days) =

Total < 2.45: No need for antifugals as probability of not developing candidemia (NPV=99.4%).

Total ≥ 2.45: Consider antifungals on individual basis as probability of developing candidemia (PPV 4.7%).

Recommended interpretation of the decision rule is if <2.45 no empiric antifungal is recommended as the risk for candidemia is exceedingly low. If result is ≥2.45 empiric therapy should be considered on an individual basis. The incidence level of candidemia in patients in this group does not meet the current guidelines standard of offering empiric therapy to patients who have a greater than 10% incidence of candidemia. Thus, the decision rule is more useful in determining who would not benefit from empiric therapy.

- Length of therapy: Without obvious metastatic complications, duration of antifungal therapy for IC is 2 weeks (3 weeks for neonates) after documented clearance of Candida species from the bloodstream and resolution of symptoms.

Spectra of Activity Against Candida Species of Various Antifungal agents

	Fluconazole	Voriconazole	Posaconazole	Itraconazole	Echinocandins	Amphotericin	Flucytosine
C. albicans	S	S	S	S	S	S	S
C. parapsilosis	S	S	S	S	S to R	S	S
C. tropicalis	S	S	S	S	S	S	S
C. glabrata	S-DD to R	S-DD to R	S-DD to R	S-DD to R	S	S to I	S
C. krusei	R	S	S	S-DD to R	S	S to I	I to R
C. lusitaniae	S	S	S	S	S	S to R	S
C. dubliniensis	S	S	S	S	S	S	S
C. gulliermondii	S	S	S	S	S	S to I	S
I = intermediately susceptible; R = resistant; S = susceptible; S-DD = susceptible dose - dependent							

Proven / Suspected Candidiasis Treatment			
	Preferred General Initial Therapy	Alternative Therapy	Definitive Therapy/Notes
CANDIDEMIA			
Treatment Candidemia Non-neutropenic Patient	• Fluconazole for less critically ill & without recent (3 months) azole exposure (Type 1 patients) • Amphotericin B for patients with moderately severe to severe illness or with recent azole exposure. (Type 2 and 3 patients) • Transition from Amphotericin B to fluconazole for isolates likely susceptible (*C. albicans*) if patient clinically stable. • Cather removal strongly recommended.	• Amphotericin B deoxycholate for intolerance or limited availability of preferred antifungals. • Fluconazole/Voriconazole is recommended as step-down therapy for selected cases of candidasis due to susceptible *C. krusei* or *C. glabrata*. • Voriconalzole is generally reserved for aspergillosis.	• *C. glabrata*: micafungin preferred therapy if available. • Transition to fluconazole or voriconazole not recommended without confirmation of isolate susceptibility. If initially received flucconazole or voriconazole with clinical improvement and negative follow-up cultures, continuation of azole to therapy completion is reasonable. • Candida parapsilosis: Fluconazole preferred. If initially received micafungin with clinical improvement and negative follow-up cultures, continuation is reasonable. • *C. krusei*: micafungin, , or voriconazole preferred. • C. lusitaniae: fluconazole or micafungin preferred over amphotericin. • Document fungus clearance from bloodstream. • Treat for 2 weeks AFTER documented clearance from bloodstream and resolution of symptoms.

			• Ophthalmology evalution/fundoscopic examination for all patients. • Consider trans-esophageal echocardiogram to rule out endocarditis if blood cultures are persistently positive.
Treatment Candidemia Non-neutropenic Patient	• Micafungin recommended for most. • Catheter removal strongly recommended.	• Fluconazole reasonable for less critically ill without recent azole exposure. • Voriconazole if additional mold coverage needed.	
CANDIDIASIS			
Empiric Treatment Suspected Invasive Candidiasis in Nonneutropenic	• Similar to proven candidemia. Avoid azoles if recent exposure. • Consider for the critically ill with risk factors for IC and no other known cause of fever based on clinical assessment, serologic markers for IC, and/or culture data from nonsterile sites.	• Amphotericin B deoxycholate	• See above for prediction rule for invasive candidiasis.
Empiric Treatment Suspected Invasive Candidiasis in Neutropenic	• Micafungin • AmphotericinB • Voriconazole	• Fluconazole/Itraconazole Do not use if recent azole exposure.	
Neonatal Dissminated Candidiasis Treatment	• Amphotericin B deoxycholate (1mg/kg daily) • Fluconazole (12mg/kg daily) • Treat for 3 weeks • IV catheter removal strongly recommended.	• Amphotericin B if urinary tract involvement excluded. • Micafungin should be used with caution and limited to situations in which resistance or toxicity precludes use of other agents.	• Lumber puncture and ophthalmology evaluation recommended with sterile body fluid and/ or urine cultures positive for candida species. • Imaging of genitourinary tract, liver and spleen should be performed if results of sterile body fluid cultures are persistently positive.
Chronic disseminated	• Stable patients: Fluconazole • Severely ill: Amphotericin B deoxycholate 0.5-0.7mg/kg daily then switch to	• Micafungin then step down to fluconazole	• Transition from amphotericin or micafungin to fluconazole is preferred after several weeks or treatment. • Duration of treatment: until lesions resolved (usually months)

	fluconazole once stable.		• Treatment should be continued through periods of immunosuppression (chemotherapy or transplant)
CNS	• Amphotericin B and flucytosine for several weeks, then fluconazole daily	• Fluconazole (if patient cannot tolerate amphotericin)	• Treat until signs and symptoms, CSF abnormalities, and radiologic abnormalities have resolved. • Remove intraventricular devices if possible.
Endocarditis	• Amphotericin B and flucytosine • Amphotericin B deoxycholate 0.6-1mg/kg daily and flucytosine, micafungin	• Stable patients with susceptible organisms and negative blood culture: step down to fluconzole	• Valve replacement, including prosthetic valves, strongly recommended. • If valvular replacement not feasible, chronic suppression with fluconazole is recommended.
Pericarditis myocarditis, suppurative thrombophlebitis	• Amphotericin B • Fluconazole • Micafungin	• If Amphotericin B or micafungin used: step down to fluconazole once stable	• Several months of therapy is usually warranted for pericarditis or myocarditis: pericardial window or pericardiectomy recommended. • At least 2 weeks of treatment after 1st negative blood culture is recommended for suppurative thrombophlebitis. Adjunctive surgical incision and driange or vein resection is recommended for thrombopholebitis.
Osteomyelitis	• Fluconazole • Amphotericin B and for several weeks, then fluconazole	• Micafungin	• Transition from amphotericin or micafungin to fluconazole is preferred after several weeks of treatment. • Duration 6-12 months • Surgical debridement often necessary.
Septic arthritis	• Fluconazole • Amphotericin B for several weeks, then fluconazole	• Micafungin	• Transition from amphotericin or micafungin to fluconazole is preferred after several weeks of treatment. • Duration 6 weeks • Surgical debridement for all cases and removal of infected prosthesis is recommended in most cases.
Endophthalmitis	• Amphotericin B (0.7-1mg/kg) AND fluconazole	• Voriconazole • Micafungin	• Surgical intervention is desired for patients with severe disease or vitreitis. • Duration: at least 4-6 weeks with resolution

	• Fluconazole		of infection based on serial ocular exams. • Diagnostic vitreal aspiration required if etiology unknown.
Candida from respiratory secretions	• Rarely indicates invasive candidiasis and should not be treated.		• Candida pneumonia and lung abscess are very uncommon, however colonization of bronchial tree is common in patients on ventilator. • Diagnosis of Candidia pneumonia requires histopathological confirmation.
Candiduria: asymptomatic	• Treatment is generally not indicated with few exceptions noted below. • Upper pole or bladder wall invasion or obstruction • Neutropenic and immunosuppressed individuals • Low birth weight babies and neonates: manage as per invasive candidiasis outlined above • Urologic procedures: fluconazole 200-400 mg (3-6 mg/kg) daily for several days before and after procedure	• Urologic procedure: Amphotericin B (0.3-0.6 mg/kg) daily for several days before and after the procedure	• Remove urinary catheter if present. • Treat only high risk patients: neutropenic patients, infants with low birth weight, and patients who will undergo urologic manipulations. • If persistent or recurrent, image kidneys and collecting system to exclude abscess, fungus ball, or urologic abnormality.
Candiduria: symptomatic	• Complicated by disseminated candidiasis: treat as described for candidemia. • Cystitis: Fluconazole susceptible: Fluconazole 200 mg (3mg/kg)PO daily for 2 weeks • Pyelonephritis: Fluconazole-susceptible: Fluconazole PO 200-400	• Cystitis: Fluconzole resistant: Amophotericin B IV 0.3-0.6 mg/kg daily for 1-7 days OR flucytosine for 7-10 days. • Pyelonepohritis: Fluconazole resistant: Amphotericin B deoxycholate IV 0.5-0.7 mg/kg daily OR flucytosine for 2 weeks.	• Remove urinary catheter if present. • Amphotericin B deocycholate bladder irrigation, although not recommended, may be useful for fluconazole – resistant *C. glabrata* or *C. krusei*. • Fluconazole is mainstay. No other currently available azole is useful, because of minimal excretion of active drug into urine. • Echinocandins are not useful because of minimal excretion into urine. • Alternatives are oral flucytosine, systemic amphbotericin B deoxycholate, and bladder

	mg (3-6mg/kg) daily for 2 weeks • Fungus balls: Surgical intervention strongly recommended in non-neonates. Fluconazole 200-400 mg (3-6mg/kg) daily. Treat until symptoms resolved and trine cultures no longer yield Candida species.	• Fungus ball: Amphotericin B IV 0.5-0.7 mg/kg daily # flucytosine Adjunct to systemic therapy: amphotericin B deoxycholate 50 mg/L of sterile water irrigation.	irrigation with amphotericin B deoxycholate. • Avoid lipid amphotericin B formulations.
Peritonitis	• Micafungin (preferred if critically ill) • Fluconazole	• Amphotericin B deoxycholate +flucytosine	• **Use of antifungals for empiric therapy of peritonitis usually not warranted.** Consider in the setting of recurrent peritonitis following recent antibiotic treatment for bacterial peritonitis. • Peritoneal dialysis catheter removal with temporary hemodialysis is strongly recommended. • If *C. parapsilosis* is isolated, fluconazole preferred. • If *C. glabrata* is isolated, micafungin is preferred until fluconazole susceptibility can be confirmed.

GENERAL DOSING AND ADMINISTRATION STRATEGIES

1. Ampicillin - 25 to 50mg/kg/dose by slow i.v push or i. m.

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 28	12
	> 28	8
30-36	0 to 14	12
	> 14	8
37 to 44	0 to 7	12
	> 7	8
≥ 45	All	6

2. Gentamicin - I.V infusion over 30 min

PMA (Weeks)	Post Natal (days)	Interval (hours)	Dose (mg/kg)
≤ 29	0 to 7	48	5
	8 to 28	36	4
	≥ 29	24	4
30 to 34	0 to 7	36	4.5
	≥ 8	24	4

3. Cefotaxime - 50 mg/kg/dose I.V infusion by over 30 min or 1 m gonococcal – 25 mg/kg/dose over 30 min I.V or 1 m

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 28	12
	> 28	8
30 to 36	0 to 14	12
	> 14	8
37 – 44	0 to 7	12
	> 7	8
≥ 45	All	6

4. Amikacin – I.V infusion over 30 min

PMA (Weeks)	Post Natal (days)	Dose (mg/kg)	Interval (hours)
≤ 29	0 to 7	18	48
	8 to 28	15	36
	≥ 29	15	24

30 to 34	0 to 7	18	36
	≥ 8	15	24
≥ 35	All	15	24

5. Piperacillin + Tazobactam – 50 to 100 mg/kg/dose (as Piperacillin component) I.V infusion over 30 min.

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 28	12
	> 28	8
30 to 36	0 to 14	12
	> 14	8
37 to 44	0 to 7	12
	> 7	8
≥ 45	All	8

6. Netilmicin – I.V infusion over 30 min

PMA (Weeks)	Post Natal (days)	Dose (mg/kg)	Interval (hours)
≤ 29	0 to 7	5	48
	8 to 28	4	36
	≥ 29	4	24
30 to 34	0 to 7	4.5	36
	≥ 8	4	24
≥ 35	All	4	24

7. Meropenem
a) Sepsis - 20 mg/kg/dose every 12 hrs IV infusion over 30 min.
b) Meningitis and infectious caused by pseudomonas species – 40 mg/kg/dose every 8 hrs I.V infusion over 30 min.

8. Vancomycin
* Meningitis – 15 mg/kg/dose
* Bacteremia – 10 mg/kg/dose

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 14	18
	> 14	12
30 to 36	0 to 14	12
	> 14	8
37 to 44	0 to 7	12
	> 7	8
≥ 45	All	6

9. Fluconazole
12 mg/kg loading dose, than 6 mg/kg/dose I.V infusion over 30 min or PO.

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 14	72
	> 14	48
30 to 36	0 to 14	48
	> 14	24
37 to 44	0 to 7	48
	> 7	24
≥ 45	All	24

10. Amphotericin – B (Liposomal)
5-7 mg/kg/dose every 24 hrs I.V infusion over 2 hrs.

		Total Duration
Clinical Sepsis	-	5 – 7 days
Screen positive	-	7 – 10 days
Culture Positive		14 – 21 days
Meningitis	-	14 – 21 days
Veutriculitis	-	6 – 8 weeks
Urosepsis	-	10 – 14 days
Fungal sepsis	-	21 days

11. Colistin methsulfate – 75000 I.U X I.V X 8 hrly

12. Oxacillin
Usual dose – 25 mg/kg/dose I.V over at least 10 min.
Meningitis – 50 mg/kg/dose

PMA (Weeks)	Post Natal (days)	Interval (hours)
≤ 29	0 to 28	12
	> 28	8
30 to 36	0 to 14	12
	> 14	8
37 to 44	0 to 7	12
	> 7	8
≥ 45	All	6

Neonatal Intensive care unit (NICU)

Investigative pathways may be followed as described earlier.

Use patient category-Type1, 2 or 3 as described earlier. Initiate empirical therapy for the types as 1st , 2nd or 3rd line for type 1, 2, and 3 patients respectively.

1st Line	2nd Line	3rd Line
IV Ampicillin & IV Gentamicin	IV Cefotaxime/Amikacin If suspected Nosocomial IV Piperacillin Tazobactam + Amikacin or Cloxacillin+ Netilmicin	Meropenem/Colistin depending on the sensitivity pattern *Vancomycin-if suspected staph sepsis Antifungal { IV Fluconazle / IV Amphotericin B (liposomal) }

Condition	Examples of clinical conditions	Clinical Picture	Sepsis Screen	Culture	Choice of antibiotic	Duration
1. Baby being ventilated, no risk factors for sepsis	TTNB Asphyxia HMD without PROM surgical condition	Not Suggestive of sepsis	Negative	Negative	Ampicillin + Gentamicin	Till the time of ventilation
2. Risk factors for sepsis		Not consistent with sepsis	Positive	Negative	Cefotaxime + Amikacin	7 days
3. Clinical sepsis with moderate sickness	Lethargy Resp. distress Apnea, feed intolerance	Consistent with sepsis	+	Negative	Cefotaxime + Amikacin	10 to 14 days
			-	Positive	(Piperacillin -Tazobactam) + Amikacin	14 days
		Meningitis	+ -		-do-	21 days
4. Clinical sepsis with severe sickness	Shock DIC	+	+ -	+ -	Ceftazidime + Vancomycin + Amikacin or Vancomycin +Meropenem	14-21 days

Drug doses (NICU)

Ampicillin:

<7 days:	<2 kgs:	50-100 mg/kg/24 hrs IM/IV; 12 hrly
	>2 kgs:	75-150 mg/kg/24 hrs IM/IV; 8 hrly
>7 days:	<1.2 kgs:	50-100 mg/kg/24 hrs IM/IV; 12 hrly
	1.2-2 kgs:	75-150 mg/kg/24 hrs IM/IV; 8 hrly
	> 2 kgs:	100-200 mg/kg/24 hrs IM/IV; 6 hrly

Cefotaxime:

≤7 days:	< 2 kgs:	100 mg/kg/24 hrs IM/IV; 12 hrly
	≥ 2 kgs:	100-150 mg/kg/24 hrs IM/IV; 8-12 hrly
>7 days:	<1.2 kgs:	100 mg/kg/24 hrs IM/IV; 12 hrly
	1.2-2 kgs:	150 mg/kg/24 hrs IM/IV; 8 hrly
	≥ 2 kgs:	150-200mg/kg/24 hrs IM/IV; 6-8 hrly

Meropenem:
Neonates: 20mg/kg/dose

< 7 days:		12 hrly
≥7 days:	≤ 1.2-2 kgs:	12 hrly
	> 2 kgs:	8 hrly

Piperacillin -Tazobactam:
300 to 400 mg/kg /day 4 to 6 hourly IV

Gentamicin:

< 29 wks:	0-7 days:	5 mg/kg/dose IM/IV; 48 hrly
	8-28 days:	4 mg/kg/dose IM/IV; 36 hrly
	>28 days:	4 mg/kg/dose IM/IV; 24 hrly
30-33 wks:	0-7 days:	4.5 mg/kg/dose IM/IV; 36 hrly
	>7 days:	4 mg/kg/dose IM/IV; 24 hrly
≥34 wks:	0-7 days:	4 mg/kg/dose IM/IV; 24 hrly
	>7 days:	4 mg/kg/dose IM/IV; 12-18 hrly

Chloramphenicol:
Loading dose: 20mg/kg
Maintenance dose (first dose should be given 12 hrs after loading dose)

≤7 days:		25 mg/kg/24 hrs IV; QD
>7 days:	≤ 2 kgs:	25 mg/kg/24 hrs IV; QD
	> 2 kgs:	50 mg/kg/24 hrs IV; 12 hrly

Colistin

1 mg colistin BASE activity (CBA) = 2.4 mg colistimethate sodium

1 mg colistin BASE activity (CBA) = 2.4 mg colistimethate sodium
1 mg colistin BASE activity (CBA) = 30,000 IU
1 mg colistimethate sodium (CMS) = 12,500 IU

Renal function	Loading dose	Maintainance dose
CrCl > 50 mL/min	CBA 5mg/kg/dose X 1 dose	CBA 2.5mg/kg/dose-IV Q12H
CrCl 20-40 ml/min	CBA 5mg/kg/dose X 1 dose	CBA 2.5 mg/kg/dose-IV Q24H
CrCl <20ml/min	CBA 5mg/kg/dose X 1 dose	CBA 2.5 mg/kg/dose- IV Q48H

Colistin methsulfate – 75000 I.UX I.V X 8 hrly

Metronidazole:

<7 days:	<1.2 kgs:	7.5 mg/kg/dose IV; Q48 hr
	1.2-2 kgs:	7.5 mg/kg/dose IV; Q24 hr
	≥ 2 kgs:	15 mg/kg/24 hrs IV; 12 hrly
>7 days:	<1.2 kgs:	7.5 mg/kg IV; Q24 hr
	1.2-2 kgs:	15 mg/kg/24 hrs IV; 12 hrly
	≥ 2 kgs:	30 mg/kg/24 hrs IV; 12 hr

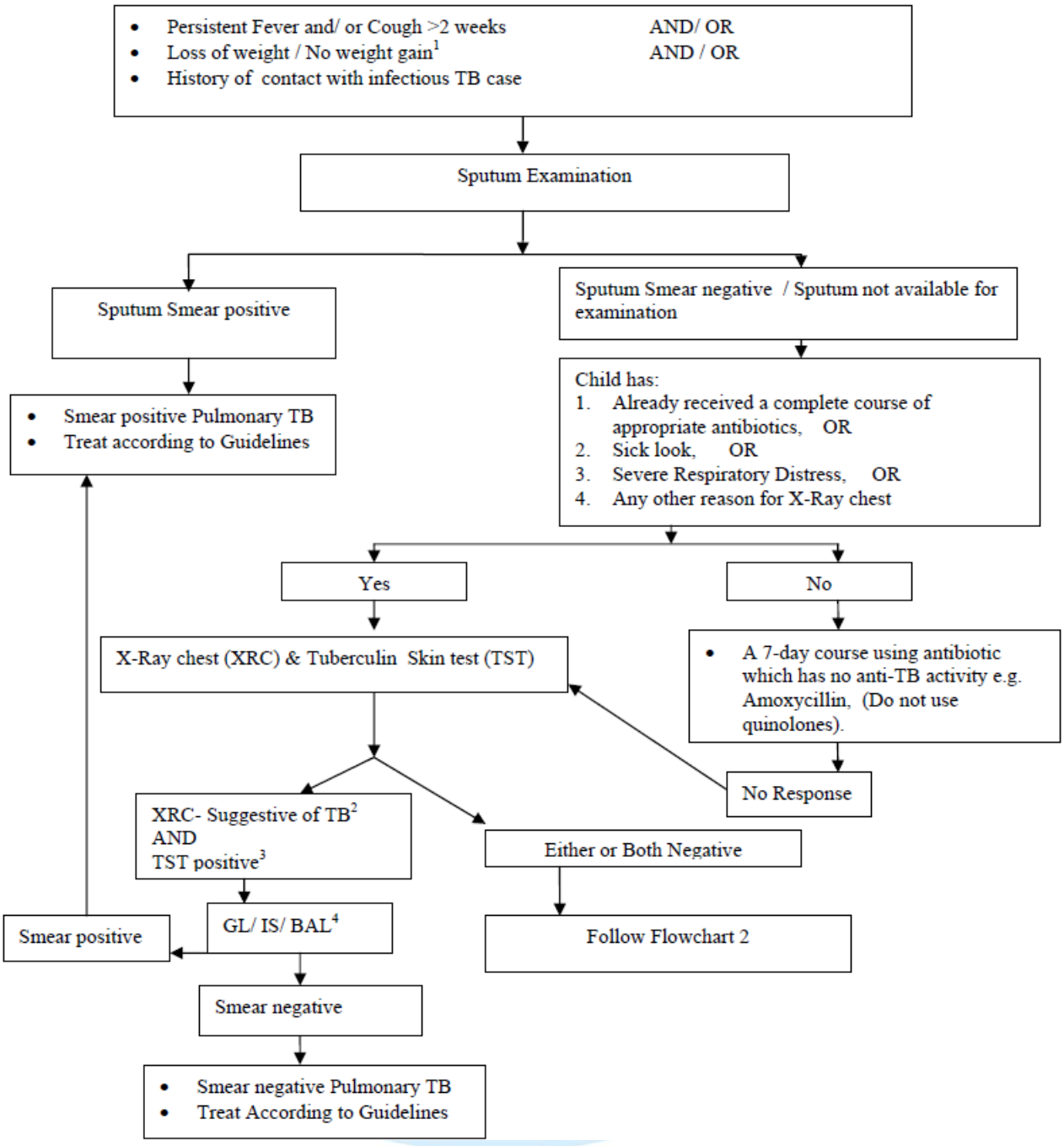
Pediatric Medicine - Out Patient Department

Pneumonia	See under Inpatient setting (Community acquired pneumonia)
Diarrhoea	Routine cases of watery diarrhea shall not require antibiotic therapy. Indications for prescribing antibiotics in diarrhea patients. Diarrhoea with blood in stool and fever or as per clinical condition as warranted by clinicians Cotrimoxazole (5-8 mg/kg/day of trimethoprim in 2 divided doses for 5 days) OR Ciprofloxacin (10-20 mg/kg/day in 2 div doses for 5 days) OR Cefixime (8-10 mg/kg/day in 2 div doses) (<6 mo and also beyond as needed and in cases of dysentery)
Urinary Tract Infections	Amoxicillin OR Amoxycillin+clavulanate (30-50 mg/kg/day in 2-3 divided doses) for 7-10 days OR Cefixime (8-10 mg/kg/day in 2 div doses) for 7-10 days
Enteric fever	Cefixime (20 mg/kg/day in 2 div doses for 14 days or till 5 days after defervescence) 2nd line: Azithromycin (10-20 mg/kg/day in a single dose for 7-10 days)
Pyoderma	Cloxacillin (50-100 mg/kg/day in 4 div doses for7-10 days) OR Cephalexin (40-60 mg/kg/day in 4 div doses for 7-10 days). *(for more details see under dermatology department)*
Amebiasis	Metronidazole (30 mg kg/d in 3 div doses) for 7 days OR Tinidazole (50 mg/kg/day as single dose) for 3-5 days OR Nitazoxamide; 12-48 mo: 100 mg (5 ml) twice daily for 3 d 4-12 yrs : 200 mg twice daily for 3 days >12 yrs : 500 mg twice daily for 3 days
Helminthiasis	Albendazole (400 mg PO as a single dose for all ages) OR Mebendazole (100 mg BID PO for 3 days for all ages) OR Pyrantel pamoate (11 mg/kg PO once) OR Piperazine Citrare (150 mg/kg PO initially, followed by 6 doses of 65 mg/kg at 12 hour intervals PO) is the treatment of choice for intestinal or biliary obstruction caused by round worm infestations and is administered as syrup through nasogatric tube

TUBERCULOSIS

Diagnostic algorithm for diagnosis of pediatric tuberculosis

(Flow Chart 1)



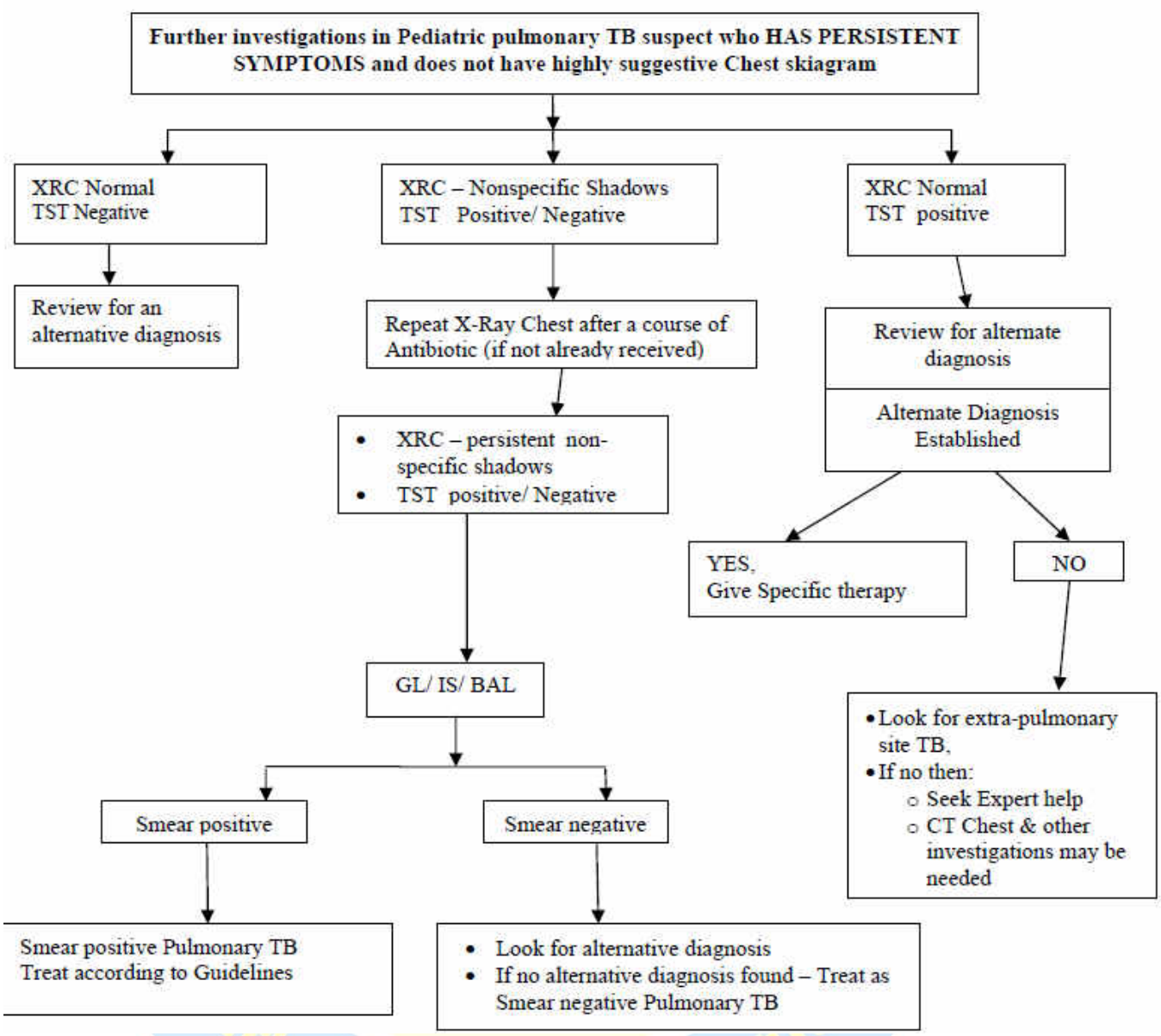
[1] History of unexplained weight loss or no weight gain in past 3 months; Loss of weight defined as loss of more than 5% body weight as compared to highest weight recorded in last 3 months.

[2] Radiological changes highly suggestive of TB are Hilar/paratracheal lymphadenitis with or without parenchymal lesion, Miliary TB, fibrocavitary pneumonia.

[3] If the radiological picture is highly suggestive of TB, then proceed to do further investigations irrespective of the TST result as the sensitivity of the test is not 100%.

[4] All efforts including Gastric Lavage (GL)/ Induced sputum (IS) or Bronchoalveolar lavage (BAL) should be made to look for Acid fast bacilli (AFB). Thus all GL/IS/BAL specimens will be subjected to ZN staining and MGIT culture for mycobacteria.

Diagnostic algorithm for diagnosis of pediatric tuberculosis
(Flow Chart 2)



Category of treatment	Type of patients	TB Treatment Regimens	
		Intensive phase	Continuation Phase
New Cases	• New smear – positive pulmonary tuberculosis (PTB) • New smear-negative PTB • New extra – pulmonary TB	$2H_3R_3Z_3E_3$	$4\ H_3R_3$
Previously treated cases	• Relapse, failure to respond or treatment after default • Re-treatment others	$2S_3\ H_3R_3Z_3E_3$+ $1H_3R_3Z_3E_3$	$5\ H_3R_3E_3$

H=Isoniazid, R= Rifampicin, Z= Pyrazinamide, E= Ethambutol, S= Streptomycin

*The number before the letters refers to the number of months of treatment. The subscript after the letters refers to the number of doses per week.

- **Pulmonary TB** refers to disease involving lung parenchyma. Extra Pulmonary TB refers to disease involving sites other than lung parenchyma. If both pulmonary and extra pulmonary sites are affected, it will be considered as Pulmonary for registration purposes.
- **Extra Pulmonary TB** involving several sites should be defined by most severe site.
- **Smear positive**: Any sample (sputum, induced sputum, gastric lavage, broncho-alveolar lavage) positive for acid fast bacilli.
- **New Case:** A patient who has had no previous ATT or for less than 4 weeks.
- **Relapse**: Patient declared cured/completed therapy in past and has evidence of recurrence.
- **Treatment after Default:** A patient who has taken treatment for at least 4 weeks and comes after interruption of treatment for 2 months and has active disease.
- **Failure to respond:** A case of pediatric TB who fails to have bacteriological conversion to negative status or fails to respond clinically / or deteriorates after 12 weeks of compliant intensive phase shall be deemed to have failed response provided alternative diagnoses/ reasons for non-response have been ruled out.
- **Others:** Cases who are smear negative or extra pulmonary but considered to have relapse, failure to respond or treatment after default or any other case which do not fit the above definitions.

- In patients with TB meningitis on Category I treatment, the four drugs used during the intensive phase can either be HRZE or HRZS.
- The present evidence suggests that Ethambutol can be used in children.
- Children who show poor or no response at 8 weeks of intensive phase may be given benefit of extension of IP for one more month.
- In patients with TB Meningitis, spinal TB, miliary/disseminated TB and osteo-articular TB, the continuation phase shall be extended by 3 months making the total duration of treatment to a total of 9 months. A further extension may be done for 3 more months in continuation phase (making the total duration of treatment to 12 months) on a case to case basis in case of delayed response and as per the discretion of the treating physician.

Under Revised National Tuberculosis Program (RNTCP, all patients shall be covered under directly observed intermittent (thrice weekly) therapy. The supervised therapy is considered as the most optimal treatment and is followed under RNTCP. It is important to ensure completion of treatment in every case put on treatment to prevent emergence of resistance, particularly to Rifampicin. In the rare circumstances where a patient is given daily therapy, observation and completion of therapy remains as important. It is the duty of the prescriber to ensure appropriate and complete treatment in all cases.

Doses of antitubercular drugs:

Isoniazid: ***Daily therapy*** - 10-15mg/kg (upto 300 mg/day) PO QD or ***Twice weekly therapy*** -20-40 mg/kg (upto 900mg) per dose PO
Rifampicin: ***Daily therapy*** - 10-12 mg/kg/24hr (upto 600mg/day) Q12-24hrs IV/PO or ***Twice weekly therapy*** – 10-20 mg/kg/ 24hr PO, max dose: 600mg/day
Pyrazinamide: ***Daily therapy*** – 30-35 mg/kg/2hr (upto 2000mg/day) PO BID or ***Twice weekly therapy*** – 50-70 gm/kg/dose PO , max dose: 4g/dose
Ethambutol: ***Daily therapy*** – 20-25 mg/kg/dose (upto 1500mg/day) PO QD or ***Twice weekly therapy*** – 50- mg/kg/dose PO twice weekly, max dose 2.5g/24hr
Streptomycin: ***Daily therapy*** – 15-40mg/kg/24hr (upto 1000mg/day) IM QD or ***Twice weekly therapy*** – 20-40mg/kg/dose IM twice weekly, max dose 1.5gm/24hr

TB preventive therapy

The dose of INH for chemoprophylaxis is 10 mg/kg (instead of currently recommended dosage of 5 mg/kg) administered daily for 6 months. TB preventive therapy should be provided to:

a. All asymptomatic contacts (under 6 years of age) of a smear positive case, after ruling out active disease and irrespective of their BCG or nutritional status.
b. Chemoprophylaxis is also recommended for all HIV infected children who either had a known exposure to an infectious TB case or are Tuberculin skin test (TST) positive (>=5mm induration) but have no active TB disease.
c. All TST positive children who are receiving immunosuppressive therapy (e.g. Children with nephrotic syndrome, acute leukemia, etc.).
d. A child born to mother who was diagnosed to have TB in pregnancy should receive prophylaxis for 6 months, provided congenital TB has been ruled out.

BCG vaccination can be given at birth even if INH chemoprophylaxis is planned.

For more details please refer to National Guideline on Diagnosis & treatment of Pediatrics tuberculosis Jan 2012

DEPARTMENT OF PEDIATRIC SURGERY

Surgical Wound Classification

Class I: An uninfected operative wound in which no inflammation is encountered and are closed primarily and if necessary, drained with closed drainage. Operative incisional wound following nonpenetrating blunt trauma should be included in this category.

Class II: An operative wound in which the respiratory, alimentary, genital or urinary tracts are entered under controlled conditions and without unusual spillage .Specifically ,operation involving the biliary tract, appendix vagina ,and oropharynx are included in this category, provided no evidence of infection or major break in technique is encountered.

Class III: Open, fresh, traumatic wounds. .In addition, operation with major breaks in sterile technique or gross spillage from the gastrointestinal tract and incisions in which acute, nonpurulent inflammation is encountered are included in this category.

Class IV: Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection or perforated viscera. This category includes operations where acute bacterial inflammation is encountered or clean tissue must be transgressed for surgical access to a collection of pus.

Antibiotic uses

1. To be given 30 minutes prior to surgery
2. Second dose to be given if operation lasts longer then 3hrs,or massive hemorrhage has occurred
3. No prophylaxis for class I patient, except
    a. Abdominal cases
    b. Surgery exceeding 2hrs
    c. Having three concomitant diagnosis
4. No Prophylaxis for urological procedures with sterile urine
5. Prophylaxis for 24hrs to be given in all class II cases
6. Bowel preparations in colorectal surgeries
7. Therapeutic antibiotics to be given for all class III and class IV wounds

Key Priorities – Before Surgery

1. Preoperative showering
    a. Advise patients to shower or have a bath (or help patients to shower, bath or bed bath) using soap, either the day before, or on the day of, surgery.
2. Hair removal
    a. Do not use hair removal routinely to reduce the risk of surgical site infection.
    b. If hair has to be removed, use electric clippers with a single-use head on the day of surgery. Do not use razors for hair removal, because they increase the risk of surgical site infection.
3. Patient theatre wear
    a. Give patients specific theatre wear that is appropriate for the procedure and clinical setting, and that provides easy access to the operative site and areas for placing devices, such as intravenous cannulae. Consider also the patient's comfort and dignity.
4. Staff theatre wear
    a. All staff should wear specific non-sterile theatre wear in all areas where operations are undertaken.
5. Staff leaving the operating area
    a. Staff wearing non-sterile theatre wear should keep their movements in and out of the operating area to a minimum.
6. Nasal decontamination
    a. Do not use nasal decontamination with topical antimicrobial agents aimed at eliminating *Staphylococcus aureus* routinely to reduce the risk of surgical site infection.
7. Mechanical bowel preparation
    a. Do not use mechanical bowel preparation routinely to reduce the risk of surgical site infection.

8. Hand jewelry, artificial nails and nail polish
    a. The operating team should remove hand jewelry before operations.
    b. The operating team should remove artificial nails and nail polish before operations.

Antibiotic prophylaxis – General principles

1. Do not use antibiotic prophylaxis routinely for clean non-prosthetic uncomplicated surgery.
2. Give antibiotic treatment (in addition to prophylaxis) to patients having surgery on a dirty or infected wound.
3. Give antibiotic prophylaxis to patients before:
    - Clean surgery involving the placement of a prosthesis or implant
    - Clean-contaminated surgery
    - Contaminated surgery
4. Consider giving a single dose of antibiotic prophylaxis intravenously on starting anaesthesia. However, give prophylaxis earlier for operations in which a tourniquet is used.
5. Before giving antibiotic prophylaxis, consider the timing and pharmacokinetics (for example, the serum half-life) and necessary infusion time of the antibiotic. Give a repeat dose of antibiotic prophylaxis when the operation is longer than the half-life of the antibiotic given. Administer prophylaxis within 1 hour before incision to maximize tissue concentration.
    - Two hours are allowed for the administration of vancomycin and fluoroquinolones.
    - Select appropriate agents on the basis of the surgical procedure, the most common pathogens causing SSI for a specific procedure, and published recommendations.
    - Discontinue prophylaxis within 24 hours after surgery for most procedures
6. Inform patients before the operation, whenever possible, if they will need antibiotic prophylaxis, and afterwards if they have been given antibiotics during their operation.
7. Studies with results showing a beneficial effect of supplemental oxygen included patients who underwent colorectal surgery. It has been observed that 30%-35% supplemental FiO_2 levels are useful in minimising SSI. Higher /lower concentrations are less helpful.
8. Maintaining normothermia (temperature higher than36^0C) immediately after colorectal surgery is helpful in reducing the incidence of SSI.

Categories of Surgeries

Clean Surgeries:

a) Uninfected, no inflammation
b) Respiratory, Gastrointestinal and Genitourinary tracts not entered
c) Closed primarily

Examples: Exploratory laparotomy, mastectomy, neck dissection, thyroid, vascular, hernia, splenectomy

Clean-contaminated Surgeries:

a) Respiratory, Gastrointestinal and Genitourinary tracts entered, controlled, no spillage
b) No unusual contamination

Examples: Cholecystectomy, small bowel resection - anastomosis, Whipple's procedure, liver transplantation, gastric surgery, bronchoscopy, colon surgery

Contaminated Surgeries:

a) Open, fresh, accidental wounds
b) Major break in sterile technique
c) Gross Spillage from GI tract
d) Acute non-purulent inflammation

Examples: Inflamed appendectomy, bile spillage in cholecystectomy, diverticulitis, Rectal surgery, penetrating wounds

Dirty Surgeries:

a) Old traumatic wounds, devitalized tissue
b) Existing infection or perforation
c) Organisms present BEFORE procedure

Examples: Abscess I&D, perforated bowel, peritonitis, wound debridement, positive cultures pre-operatively

CATEGORICAL LISTS OF SURGERIES

Clean	Clean contaminated		Contaminated	Dirty
Open herniotomy	Cholecystectomy	Nephrectomy	Ileostomy	Appendicectomy (with burst appendix)
Lipoma excision	Choledochal cyst excision	Oesophageal atresia repair	Fistulectomy	Exploratory laprotomy
Lap. Orchidopexy	Circumcision	Open appendicectomy	Exploration of foreign body	Decortication
Lap. Pyloromyotomy	Cleft lip repair	Palate repair	Colostomy closure	
Lap. Herniotomy	Cysto lithotomy	Pyelolithotomy	Anoplasty	
Subcutaneous cyst excision	Cystoscopy	Pyeloplasty	ASARP	
Orchidopexy	D.J. stent insertion	Sacrococcygeal teratoma excision	PSARP	
Prepucial dilatation	D.J. stent removal	Splenectomy	Rectal biopsy	
Penoscrotal transposition correction	Duhamel's pull through	Suprapubic cystotomy		
Thoracotomy	Fistula closure (U.C. fistula)	Ureteric re -implantation		
Pyloromyotomy	Fundoplication (hiatus hernia)	Ureterolithotomy		
Umblical hernia umblical polyp mini .lap	Genitoscopy	Ureterostomy		
CDH repair	Kasai's procedure	Urethral cyst excision		
Umblical polyp excision	Lap. Appendicetomy	Urethroplasty		
	Lap. Cholecystectomy			
	Lap. Nephrectomy			
	Meatotomy			

Preoperative antimicrobial prophylaxis and post operative antimicrobial therapy

S. No.	Surgery Name	Categories	Pre op prophylaxis (Dose of each antimicrobial must be received within half an hour before surgery)	Post op therapy
1.	Abdominal Pull Through	Contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg /day +Amikacin 15mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV 24-48hrs PO switch – Amoxicillin 30-50 mg/kg/day + Metronidazole 20-30 mg/kg/day 3-5 days
2.	Anal Fistulectomy	Contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV 24-48hrs PO switch – Amoxicillin 30-50 mg/kg/day +Metronidazole 20-30 mg/kg/day 3-5 days
3.	Anal Tag Removal	Contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	No Antibiotic
4.	Angular Dermoid Cyst Excision	Clean	No antibiotic	No antibiotic
5.	Anoplasty	Contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day /Gentamicin 5-7.5 mg/kg/day IV dose before 30mts of surgery	Therapy - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 5-7.5 mg/kg/day IV dose 3-5days in No sepsis cases
6.	Appendicectomy	Clean contaminated / Dirty	Acute – Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 5-7.5 mg/kg/day IV dose before 30mts of surgery Interval – Ceftriaxone 30-50 mg/kg/day Burst – Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15 mg/kg/day /Gentamicin 5-7.5mg/kg/day IV dose before 30mts of surgery	Acute – Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15 mg/kg/day /Gentamicin 5-7.5 mg/kg/day IV Interval – Ceftriaxone 30-50 mg/kg/day Burst – Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15 mg/kg/day /Gentamicin 5-7.5mg/kg/day IV dose 3-5days in No sepsis cases
7.	APSARVUP,	Contaminated	Ceftriaxone 50-75 mg/kg/day	Ceftriaxone 50-75

	ASARP, PSARP		+ Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV dose before 30mts of surgery	mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV dose for 5 days
8.	Bladder Neck Reconstruction	Clean contaminated	Ceftriaxone 50-75 mg/kg/day +Amikacin 15mg/kg/day and Gentamicin 5-7.5mg/kg/day IV dose before 30mts of surgery	Therapy - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV dose 3-5days in No sepsis cases
9.	Bladder Repair (Exstrophy Bladder)	Contaminated	Ceftriaxone 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 5-7.5mg/kg/day IV dose before 30mts of surgery(Add Metronidazole 20-30mg/kg/day if cloacal exstrophy)	Therapy - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day +Amikacin 15mg/kg/day IV dose 3-5days in No sepsis cases (Add Metronidazole 20-30 mg/kg/day if cloacal exstrophy)
10.	Brachial Cyst Excision	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV Do not continue beyond 48 hrs of surgery
11.	Branchial Fistula Excision	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	No antibiotic
12.	Cardiomyotomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV Do not continue beyond 48 hrs of surgery
13.	CDH Repair	Clean contaminated	Ceftriaxone 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery	Ceftriaxone+ Amikacin for 48hrs extend to 7-10days if element of pneumonia
14.	Cervical Lymph Node Biopsy	Clean	No antibiotic	No antibiotic
15.	Cholecystectomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	No Antibiotic
16.	Choledochal Cyst Excision	Clean contaminated	Uncomplicated - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day IV dose before 30mts of surgery Complicated add Amikacin 15 mg/kg/day	Uncomplicated - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg/kg/day IV dose Complicated: add Amikacin 15 mg/kg/day for 5 days
17.	Chordee Correction	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV 48hrs + Cephalexin 30-50 mg/kg/day for 5days
18.	Circumcision	Clean contaminated	No antibiotic	No antibiotic

19.	Cleft Palate Repair	Clean contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose + Metronidazole 20-30mg dose IV Do not continue beyond 48 hrs of surgery
20.	CLW Chin Suturing	Contaminated	No antibiotic	Oral Amoxicillin 30-50 mg/kg/day 3 days in deep wound cases
21.	Colostomy	Contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery	Therapy - Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15mg/kg/day IV dose 3-5days in No sepsis cases
22.	Colostomy Closure	Contaminated	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 4mg/kg/day IV for 3-5days
23.	Colostomy Revision	Contaminated	Same as colostomy closure	Same as colostomy closure
24.	Colostomy(Divided)	Contaminated	Same as colostomy	Same as colostomy
25.	Cystolithotomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
26.	Cystoscopic DJ Stent Insertion	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
27.	Cystoscopic DJ Stent Removal	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	No Antibiotic
28.	Cystoscopic Urethral Dilatation	Clean contaminated	No Antibiotic	No Antibiotic If intra op trauma Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
29.	Cystoureteroscopy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
30.	Dermoid/Subcutaneous Swelling Cyst Excision	Clean	No antibiotic	No antibiotic
31.	Duhamel's Pull Through	Contaminated	Same as PSARP	Same as PSARP
32.	Endo Cystectomy /Partial Pericystectomy For Hydatid Cyst	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Donot continue beyond 48 hrs of surgery

33.	Epispadias Repair	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day for 48hrs followed by Oral Cephalexin 30-50 mg/kg/day for 5days
34.	Excision Ranula	Clean contaminated	Ceftriaxone50-75 mg/kg/day IV dose before 30mts of surgery	No Antibiotic
35.	Foreign Body Removal	Contaminated	Ceftriaxone50-75 mg/kg/day IV dose before 30mts of surgery	No antibiotic
36.	Gastrostomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery & Cefotaxime 50-75 mg/kg/day in place of Ceftriaxone in neonates before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose + Metronidazole 20-30 mg/kg/day dose IV Do not continue beyond 48 hrs of surgery
37.	Glansplasty	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day for 48hrs followed by Oral Cephalexin 30-50 mg/kg/day for 5days
38.	Hepatectomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
39.	Herniotomy & Lap Herniotomy	Clean	No antibiotic	No antibiotic
40.	Hydrocele Repair = Herniotomy	Clean	No antibiotic	No antibiotic
41.	Hypospadias	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day for 48hrs followed by Oral Cephalexin 30-50 mg/kg/day for 5days
42.	Incision and drainage (I&D)	Dirty	Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery	Necrotising Fasciitis – Ceftriaxone 50-75 mg/kg/day + Metronidazole 20-30mg +Amikacin 15mg/kg/day IV for 5-7 days S/C abscess – Cloxacillin for 5 days
43.	Ileostomy	Contaminated	Same as colostomy	Same as colostomy
44.	Ileostomy Closure	Contaminated	Same as colostomy closure	Same as colostomy closure
45.	Incisional Hernia Repair	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery
46.	Kasai's Procedure	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV + Amikacin 15 mg/kg/day /day + Metronidazole 20-30mg/kg/day IV 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose + Amikacin 15 mg/kg/day + Metronidazole 20-30mg/kg/day IV Duration 7days + Oral

				Cefixime 8mg/kg/day 2weeks
47.	Laparoscopic Orchidopexy	Clean	Ceftriaxone 50-75 mg/kg/day / IV single dose before 30mts of surgery	No antibiotic
48.	Laparoacopic Herniotomy	Clean	No antibiotic Except complicated hernia, neonates - Ceftriaxone 50-75 mg/kg/day IV 30 minutes before surgery	No antibiotic In complicated hernia, neonates - Ceftriaxone 50-75 mg/kg/day IV for 48hrs
49.	Laparoscopic Pyloromyotomy	Clean	No antibiotic	No antibiotic except when duodenal perforation Ceftriaxone 50-75 mg/kg/day IV for 5 days
50.	Nephrectomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	No antibiotic for dysplastic/ hydronephrotic/ Non-malignant cases If operated for Wilm's tumor Ceftriaxone 50-75 mg/kg/day IV for 48hrs
51.	Penoscrotal Transposition Correction	Clean Contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day for 48hrs followed by Oral Cephalexin 30-50 mg/kg/day for 5days
52.	Prepucial Dilatation	Clean	No antibiotic	No antibiotic
53.	PUV –Cystoscopy + Valve Fulgration	Clean contaminated	Neonates – Cefotaxime 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery Older Children – Ceftriaxone 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose before 30mts of surgery	Neonates – Cefotaxime 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose Older Children – Ceftriaxone 50-75 mg/kg/day +Amikacin 15mg/kg/day / Gentamicin 2.5mg/kg/day IV dose PO Switch Amoxicillin 30-50 mg/kg/day / Cephalexin 30-50 mg/kg/day / Trimethoprim 5mg/kg/day
54.	Pyelo Lithotomy/ Pyeloplasty	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV q8h dose Do not continue beyond 48 hrs of surgery In case pus is visible add amikacin 48hrs + oral Cephalexin for 3-5days
55.	Rectal Biopsy	Contaminated	Ceftriaxone	PO – Amoxicillin + Metronidazole 3days
56.	Sacrococygeal Teratoma Excision	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of	Ceftriaxone 50-75 mg/kg/day + Amikacin 5-

			surgery	7.5 mg/kg/day + Metronidazole 20-30 mg/kg/day 2-5days based on size
57.	Splenectomy	Clean Contaminated	Ceftriaxone 50-75 mg/kg/day IV dose 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose for 48 hours+
58.	TEF Repair	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Donot continue beyond 48 hrs of surgery
59.	UC Fistula	Clean contaminated	Ceftriaxone50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day 48hrs + Cephalexin 5days
60.	Ureterolithotomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery In case pus is visible add Amikacin 15 mg/kg/day for 48hrs + oral Cephalexin for 3-5days
61.	Ureterostomy	Clean contaminated	Ceftriaxone 50-75 mg/kg/day IV dose before 30mts of surgery	Ceftriaxone 50-75 mg/kg/day IV dose Do not continue beyond 48 hrs of surgery (Therapy – as per UTI)
62.	Urethroplasty	Clean contaminated	Same as hypospadias + Stricture Urethroplasty	Same as hypospadias + Stricture Urethroplasty

Antimicrobial Prophylaxis for surgeries not specified in above table following guidance may be used:

Clean Surgery	Clean contaminated Surgery	Contaminated/dirty Surgery
No Pre operative prophylaxis in Uncomplicated Hernia Surgeries For all other surgeries under this group: Inj Ceftriaxone 50 – 75 mg/kg/day I.V or I/M single dose half an hour before surgery	For GI surgeries Inj Ceftriaxone 50 – 75 mg/kg/day I.V or I/M followed by 8hrly doses AND Metronidazole 20 – 30 mg/kg/day I/V every 8 hrly Do not continue beyond 48hrs of surgery Urinary tract surgeries Inj Ceftriaxone 50 – 75 mg/kg/day I.V or I/M followed by 8hrly doses Donot continue beyond 48hrs of surgery	All surgeries under this group Inj Ceftriaxone 50 – 75 mg/kg/day I.V or I/M followed by 8hrly doses AND Metronidazole 20 – 30 mg/kg/day I/V every 8 hrly AND **Gentamicin** 4mg/kg/dose 12hrly IV or IM Consider Vancomycin 40 mg/kg/day I/V every 6-8 hrly (as an infusion over 30-60 min) in place of gentamicin for suspected case of Enterococcal infection/contamination Therapy should not be continued beyond one week.

Premptive Therapy in surgical patients

For patients who are managed without surgery or are being stabilized before surgery recommended antimicrobial therapy is as follows:

	Diagnosis/ patient condition	Type 1 Patient	Type 2 Patient	Type 3 Patient
1.	Appendicular abscess	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
2.	Cellulitis	Suspected Staphylococcal cellulitis Cloxacillin Gram Negative cellulitis: Ceftriaxone AND Amikacin	Suspected Staphylococcal Cellulitis Vancomycin *Gram Negative cellulitis:* Piperacillin-Tazobactam AND Amikacin	Meropenem/Imipenem AND Vancomycin
3.	Urinary Tract Infections (UTI)	Amoxicillin OR Amoxycillin+clavulanate (30-50 mg/kg/day in 2-3 divided doses) for 7-10 days OR Cefixime (8-10 mg/kg/day in 2 div doses) for 7-10 days	Refer to page 8	Refer to page 8
4.	Subacute Intestinal Obstruction	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
5.	Esophageal Stricture	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
6.	Omphalocele	Ceftriaxone AND Amikacin	Piperacillin-Tazobactam AND Amikacin	Meropenem/Imipenem AND Vancomycin
7.	Pancreatitis	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
8.	Necrotizing enterocolitis (NEC)	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
9.	Enterocolitis	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
10.	Patients for investigation	Ceftriaxone AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
11.	Lymphangioma for Sclerotherapy	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin	Meropenem/Imipenem AND Vancomycin
12.	Febrile neutropenia	Ceftazidime AND Vancomycin	Meropenem/Imipenem AND	Meropenem/Imipenem AND

			Vancomycin	Vancomycin
13.	Chemotherapy	Ceftriaxone AND Amikacin	Meropenem/Imipenem AND Vancomycin	Meropenem/Imipenem AND Vancomycin
14.	PUV acute / chronic retention	Ceftriaxone	Piperacillin-Tazobactam AND Amikacin	Meropenem/Imipenem AND Vancomycin
15.	Acute cholecystitis	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
16.	EHBA	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
17.	Cholangitis	Ceftriaxone AND Amikacin AND Metronidazole	Piperacillin-Tazobactam AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin
18.	Liver abscess	See Page 7	See Page 7	See Page 7
19.	Renal abscess	Ceftriaxone AND Amikacin	Meropenem/Imipenem AND Vancomycin	Meropenem/Imipenem AND Vancomycin
20.	Blunt trauma abdomen	Ceftriaxone AND Amikacin AND Metronidazole	Meropenem/Imipenem AND Vancomycin	Meropenem/Imipenem AND Vancomycin
21.	Empyema	See Page 7	See Page 7	See Page 7
22.	Subcutaneous abscess/ Thrombophebitis	Suspected Staphylococcal cellulitis Cloxacillin *Gram Negative cellulitis:* Ceftriaxone AND Amikacin	Suspected Staphylococcal Cellulitis Vancomycin *Gram Negative cellulitis:* Piperacillin+Tazobactam AND Amikacin	Meropenem/Imipenem AND Vancomycin

Drug doses (IV antibiotics)

1. Amikacin:
    a. Children: 15 mg/kg/day 12h in two doses
    b. Neonates: 10mg/kg/dose
2. Ceftriaxone

Children & Neonates: 50-75mg/kg/day in two divided doses

3. Cefuroxime

Children & Neonates – 50 mg/kg body weight in divided doses

4. Chloramphenicol may be used in place of Piperacillin +Tazobactam in most of the cases above

Children & Neonates: loading dose - 20 mg /Kg : Maintenance 15mg/.kg/day in two divided doses. After 12 hours of loading dose

5. Cefotaxime

Children & neonates- 10-200mg/kg/day in three/four divided doses

6. Gentamicin

Children & neonates: 2.5mg/Kg/dose IV 8h

7. Metronidazole

Children & Neonates 15mg/kg/day 8h IV

* For penicillin allergic patients use clarithromycin + Gentamicin

DEPARTMENT OF DERMATOLOGY

S.No	Medical Condition	Common Pathogen	Antibiotic Dosage and Route of Administration			Comments
			First Line	Second Line	Others	
	BACTERIAL INFECTIONS					
1.	Bullous Impetigo	Staphylococcus aureus MSSA	Oral Cloxacillin 50-100 mg/kg in 4 div. doses or Oral Cephalexin 25-50 mg/kg in 4 divided doses	Oral Amoxycillin+Clavulanic acid 20-40mg/kg (based on amox base) in 2-3 divided doses or Oral Erythromycin 30-50 mg/kg/d in 4 divided dose	Oral TMP-SMX-DS (5-8mg/ kg of TMP+25-50mg/kg of SMX) per day in 2 divided doses or Oral Doxycycline 5mg/kg in 2 divided doses (Not in children <8 yrs) Or Oral Minocycline 2mg/kg/d in in 2 divided doses (Not in children <8 yrs)	
		MRSA	Inj Vancomycin 40-60mg/kg in 4 divided doses or Oral Linezolid 10mg/kg/dose 12 hourly	Oral minocycline (2mg/kg/d) in 2 divided doses	Oral TMP-SMX-DS (5-8mg/ kg of TMP+25-50mg/kg of SMX) per day in 2 divided doses + Oral Rifampicin 10-20mg/kg/day in 2 divided doses(up to a maximum of 600mg/day)	
2.	Non Bullous Impetigo	Staphylococcus aureus	Do	Do	Do	

		group A β hemolytic streptococci				
3.	Ecthyma	Staphylococcus aureus	Do	Do	Do	
4.	Superficial Folliculitis	Staphylococcus aureus	Do	Do	Do	
5.	Deep Folliculitis (sycosis barbae, sycosis nuchae, folliculitis decalvans)	Staphylococcus aureus	Do	Do	Do	
6.	Furunculosis	Staphylococcus aureus	Do	Do	Do	
7.	Carbuncle	Staphylococcus aureus	Do	Do	Do	
8.	Hidradenitis Suppurativa	Staphylococcus aureus Anaerobic Streptococci Bacteroides Spp.	Oral Erythromycin 30-50 mg / kg/d in 4 div doses Or Oral TMP-SMX-DS (5-8mg/ kg of TMP+25-50mg/kg of SMX) per day in 2 divided doses	Oral Minocycline(2mg/kg/d in in 2 divided doses) or Oral Doxycycline 5mg/kg/d in 2 divided doses (not in children < 8yrs)	Oral Clindamycin 300mg TDS	
9	Erysipelas	Streptococcus pyogenes Rarely Staphylococcus aureus	Oral Cloxacillin (50-100mg/kg/d in 4 div doses or Oral Cephalexin 25-50mg/kg/ d in 4 div doses	Oral Erythromycin 30-50 mg / kg/d in 4 div dose or Oral Co-amoxyclav (20-40 mg/kg/d in 2 divided doses doses	Oral Azithromycin 5-10 mg/kg/d as single daily dose	
10.	Acute Lymphangitis	Streptococcus pyogenes	Do	Do	Do	
11.	Cellulitis	Streptococcus pyogenes Rarely Staphylococcus aureus	Do -As for staph-	Do -As for staph-	Do -As for staph-	

		Gram negative rods				
12.	Intertrigo	Bacterial -Streptococcus pyogenes -Staphylococcus aureus Fungal Candida albicans Coryneforms	- As for strept- -As for staph- 1% clotrimazole cream LA twice daily	- As for strept- -As for staph- 1 % oxiconazole cream LA twice daily	-As for strept- -As for staph-	Mild topical steroid may be combined in severe cases.
13.	Necrotizing Fascitis	Streptococcus pyogenes Staphylococcus aureus(MSSA) -Anaerobic Strep. -Gram negative bacilli	Inj. Meropenem 500 mg IVq 8hr × 2 week Or Inj. Piperacillin + Tazobactam 4.5 gm IV q 8 hrs × 2 week	Inj. Clindamycin 600 mg IV 8 hrly + Inj. Ciprofloxacin 400 mg IV 12hrly × 2 weeks + Inj. Metronidazole 10mg/kg/d 8 hrly	IV to PO Clindamycin 300 mg (PO) 8 hrly × 2 week + Inj Ciprofloxacin 500 mg IV q 12hrly × 2 weeks + Metronidazole 10mg/kg/d 8 hrly	Extensive debridement needed

14.	Staphylococcal scalded skin syndrome	*Staphylococcus aureus* gp II phage type + 1 (epidermolytic toxin / epidermolysin/ exfoliative toxin	Inj. Cloxacillin 2gm IV (children 50-100 mg / kg / d) in 4 divided doses × 5-7 days	Inj. Vancomycin 1 gm iv q 12 hrs (children 40-60 mg/kg/d in 4 div doses) × 5-7 days		Emollients to be applied topically Topical antibiotic not mandatory
15.	Toxic Shock syndrome	Staphylococcus aureus	Same as for Staphylococcus aureus	Same as for Staphylococcus aureus	Management of shock	
16.	Erythrasma	Corynebacterium minutissimum	Topical 1% Clotrimazole or Topical 1% Clindamycin Or Topical 1% fusidic acid	Oral Erythromycin 30-50mg/kg in 4 divided doses x 14 days or Oral Tetracyline 250mg 1 qid x 14 days		
17	Pitted Keratolysis	Micrococcus sedentarius	Topical 1% fusidic acid	Oral Erythromycin		

			or Topical 1% clotrimazole or Topical 1% Clindamycin or Topical erythromycin + Aluminium chloride/ formaldehyde soaks (if associated hyperhidrosis)	30-50mg/kg in 4 divided doses x 14 days or Oral Tetracyline 250mg 1 qid x 14 days (if extensive lesions)		

	FUNGAL INFECTIONS					
1.	Tinea Capitis -Grey Patch -Black Dot -Inflammatory	*T. rubrum* *Microsporum canis* *T. mentagrophytes*	Oral Griseofulvin (20-25mg/kg/day in 2 div doses with fatty food x 6-12 weeks or longer until fungal cultures are negative	Oral Fluconazole 6 mg/kg/d X 20 days, or 8mg/kg/week x 8-16 weeks or OralTerbinafine 3-6mg/kg/d for 2- 4 weeks <20kg – 62.5mg 20-40kg- 125 mg >40kg – 250 mg	Oral Itraconazole 3-5 mg/kg/day x 4-6 weeks	Add oral antibiotic if required, to cover bacterial pathogen Duration of therapy are for trichophyton sp. Treat for approx twice as long for microsporum canis
2.	Tinea corporis / cruris / pedis / mannum	Same as above	1% clotrimazole cream LA twice daily × 2-4 weeks	Terbinafine cream LA twice daily × 2 weeks	Oral fluconazole 3-6mg/kg (max150mg) once a week × 4-6 weeks Or Oral Terbinafine 3-6mg/kg/day × 2 weeks Or Oral Griseofulvin 10mg/kg/day x 2-4 weeks	

3.	Tinea unguium/ onychomycosis	*E. floccossum* *T. rubrum* *T. mentagrophytes*	Oral Griseofulvin (15-20mg/kg/day in 2 div doses with fatty food x 6 months (finger nails) & 1 year (toe nails) or Oral fluconazole 150mg once a week × 6months to 1 year	Oral terbinafine 3-6 mg/kg once daily × 6-12 weeks 6 weeks in case of finger nails 12 weeks in case of toe nails	Oral itraconazole 3-5mg/kg/day for 6-12 weeks.	
4.	Tinea versicolor	*Malassezia furfur* (*Pityrosporum orbiculare*)	1% clotrimazole cream LA twice daily × 1-2 weeks	Oral fluconazole 400mg single dose orally	Oral ketoconazole 200mg OD × 7 days	
5.	Candidal paronychia	*Candida albicans*	Oral fluconazole 3-6 mg/kg once a week × 6 months(if associated candidal onychomycosis)	Oral itraconazole 3-5 mg /kg for 6-12 weeks	Oral ketoconazole 200 mg 1od × 3 month	
6.	Cutaneous Candidiasis	*Candida albicans*	Interdigital/local 1% clotrimazole cream LA twice daily × 2-4 weeks Mucocutaneous/oral Oral fluconazole 10 mg/kg (max 400mg) day 1 then 5mg/kg(max 200 mg) per day × 2 weeks Or 100-200mg /day X 7-14 days	Oral itraconazole 200 mg q 24 hrs × 2 weeks		
7.	Vaginal Candidiasis	*Candida albicans*	Oral fluconazole 150mg single dose	Oral itraconazole 200 mg 12 hourly for 1-3 days		

	VIRAL INFECTIONS					
1.	Herpes simplex virus rash (cold sores/fever blister)	Herpes simplex virus -1 and 2	1st Episode. Oral Acyclovir 15 mg/kg/ dose upto a maximum of 100 mg/dose in children < 2 years 200mg/dose in children >2 years To be given 5times a day × 7days	Oral Famciclovir 250mg TDS × 10 days	Herpes Labialis - Oral Valacyclovir 2gm two doses 12 hours apart. Genital HSV-Oral Valacyclovir 1gm 12 hourly × 10 days	Topical antibiotic cream Topical calamine lotion
			Recurrent Oral Acyclovir 400mg TDS × 5 days	Herpes labial-Oral Famciclovir 1500mg single dose For Genital HSV-500mg 12 hourly for 3days	Herpes Labial-Oral Valacyclovir 2gm two doses 12 hours apart For Genital HSV- Oral Valacyclovir 500mg 12 hourly for 3days	
			Suppressive Oral Acyclovir 400mg BD× one year then reevaluate	Oral Famciclovir 250mg 12 hourly for 1 year	Oral Valacyclovir 500mg-1gm once daily × 1 year	
2.	Chicken Pox (Varicella)	Varicella Zoster Virus	Oral Acyclovir 20mg/kg/dose QID X 7days (max of 800mg/dose) Or if associated complications or immunocompromised patient then Acyclovir	Oral Famciclovir 500mg TDS × 7 days	Oral Valacyclovir 20 mg/kg 8hourly for seven days	Start preferably within 24-48 hours of onset.

			10mg/kg/dose 8 hourly IV for 7days			
3.	Herpes Zoster (Shingles)	Varicella Zoster Virus	Oral Acyclovir 20mg/kg/dose (max of 800 mg per dose) 5 times a day × 7-10 day	Oral Famciclovir 500mg TDS × 7-10 days	Oral Valacyclovir 1gm TDS × 7-10 days	-No role of topical antiviral drugs -Start preferably within 48-72 hours of onset
	PARASITIC INFESTATIONS					
1	Scabies	*Sarcoptes scabeii*	Permethrin 5% Cream single overnight application over the whole body below the neck in patients > 1 year of age. Scalp, face and neck also to be treated in infants <1 year	Oral Ivermectin in a dose of 200 mcg / kg single dose given empty stomach Repeat after 2 weeks (not in children < 5yrs or < 15 kg)	Crotamiton cream	▪ Family members also to be treated ▪ gamma benzene hexachloride or Benzyl benzoate emulsion can also be used ▪ Mild topical steroid if eczematization ▪ Oral antibiotic if lesions are infected
2	Pediculous capitis	*Pediculous humanus var. Capitis*	Permethrin 1% cream rinse to be applied for 10-15 minutes over the over scalp after hair wash. Repeat application required after 1 week	Gamma benzene hexachloride for weekly application over scalp	Cotrimoxazole (TMP-SMX)-DS (5-8 mg / kg of TMP + 25-50 mg/kg of SMX) per day in B.Ddoses	▪ Treatment of family member especially siblings ▪ Treatment of any associated skin lesions

DEPARTMENT OF DENTISTRY

S. No.	Condition	Common pathogen	Antibiotic Dosage & Route		
			1st line	2nd line	Others
1.	Acute periapical abscess	Aerobic, anaerobic Streptococci	Cap. Amoxycillin 125/250 mg TIDx3-5 days	Wait for 2 days No relief Inj. Gentamicin. i.m. 5 mg/Kg body wt	Cap amoxycillin 250 mg + Clavulanic Acid 125 mg BD x 5 days
2.	Cellulitis space Infections	S. pyogenes anaerobic bacteria	Cap Amoxycillin 125/250 1TIDx 7days + Gentamicin i.m. 5mg/kg x5-7 days	Ceftriaxone 50-75 mg / kg IV	Give Metronidazole 200mg TID + Amoxycillin 250mg OR Tab Ciprofloxacin 250 mg BD x 5d + Tab Metronidazole 200mg TID x 3 days
3.	Candidiasis	Candida albicans	Nystatin OR Amphotericin lozenges		
4.	Primary herpetic stomatitis	HSV-1	Acyclovir 200 mg-400 mg/day for 7 days – oral		
5.	Herpes labialis	HSV-1	Acyclovir ointment , Local application.		

DEPARTMENT OF OPHTHALMOLOGY

For OPD Cases:

Disease	First Line	Second Line
Conjunctivitis	E/d Tobramycin	E/d Ciprofloxacin
Cellulitis	Amoxycillin / Cephalexin	Parental Ceftriaxone, Ceftazidime

For **Preoperative routine cases**:

Systemic antibiotics like Amoxycillin and Cephalosporins orally and topical tobramycin / Ciprofloxacin eyedrops two days prior to surgery.

For **Postoperative routine intraocular / extraocular cases**:

Systemic antibiotics like Amoxycillin and Cephalosporins orally (if required parenteral) and followed after 5 days with topical tobramycin- dexamethasone combination in intraocular surgery.

DEPARTMENT OF ORTHOPEDIC SURGERY

Condition	Antibiotic Dosages and Route		Comments
	1st line	2nd line	
Clean and non-infected soft tissue surgery with no implants	Inj **Cloxacillin** + Inj **Gentamicin** (two dosages, one at induction and one dosage after surgery) followed by oral **Cloxacillin** for 5 days	Inj **Ceftriaxone** and Inj **Amikacin** (two dosages, one at induction and one dosage after surgery) followed by oral **Cephalexin** for 5 days	In case of infection following surgery, the antibiotic will be decided accordingly to the culture and sensitivity report
Clean non- infected cases with implants *(prolonged Surgery duration >2 hours)*	Inj **Ceftriaxone** and inj **Amikacin** (five dosages with one given at induction) followed by oral Cloxacillin or Cephalexin for a total of 12 days		
Septic arthritis and acute osteomyelitis	Treatment initiated withInj **Ceftriaxone** and Inj **Amikacin** further antibiotic decided by culture report and sensitivity		Injectable antibiotics usually for a week and oral antibiotics for 4-6 weeks depending upon severity
Open injury of bone and soft tissues	Inj Ceftriaxone & Inj **Amikacin** +/- Inj **Metronidazole**; duration according to the severity of injury		Metronidazole to be given only in case with suspected anaerobic infections.

DEPARTMENT OF ENT

Out Patient Department

S. No	Medical Condition	Common Pathogen	Antibiotic 1st Line	Antibiotic 2nd Line	Antibiotic 3rd Line
1	Acute Otitis Media Acute Pharyngitis Acute Tonsillitis Acute Laryngitis	S.pneumoniae H.influenzae M.catarrhalis	Amoxycillin (oral) (50mg / kg/ day) X 1 week	Erthromycin or Azithromycin (oral) (50mg / kg/ day) X 1 week	Amoxycillin+Clavulanate (40-50mg/kg/day) x 7 days
2	Otitis External Acute Nasal Vestibulitis	S. aureus S. pyogenes	Cloxacillin (oral -50mg / kg/ day) x 5-7 days	Erythromycin or Azithromycin (oral) (50mg / kg/ day) X 1 week	Amoxycillin + Clavulanate (40-50mg/kg/day) X 7 days
3	Acute Rhino Sinusitis	Usually mixed infection	Amoxycillin (oral) (50mg / kg/ day) X 10days	Cephalexin or Azithromycin (oral) (50mg / kg/ day) X 1 week	Amoxycillin + Clavulanate (40-50mg/kg/day) X 10 days
4	Acute Cervical Lymphadenitis	S. aureus S. pyogenes	Amoxycillin (50mg / kg/ day) OR Cloxacillin oral -50mg / kg/ day x 5-7 days	Erythromycin OR Azithromycin (oral) (50mg / kg/ day) X 5-7 days	Amoxycillin + Clavulanate (40-50mg/kg/day) X 5-7 days
5	C.S.O.M	Usually mixed infection with Gram +ve and -ve	Ciprofloxacin ear drop x 15 days	Gentamicin ear drop x 15 days	
6	Otomycosis	Candida, Aspergillus spp.	Clotrimazole ear drop X 15 days		

In-patient Units

S.No	Medical Condition	Common Pathogen	Antibiotic 1st Line	Antibiotic 2nd Line	Antibiotic 3rd Line
1	Routine Post Operative Prophylaxis	S. aureus Pseudomonas spp.	**Amoxycillin** OR Cephalexin (Oral) 50 mg / kg/ day x 5-7 days	Erythromycin 50mg or Ciprofloxacin 50mg/day Oral X 5 days	Amoxycillin + Clavulanate (40-50mg/kg/day) 5-7 days
2	Parapharyngeal Abscess Peritonsillar abscess Intracranial Complication Ludwig's Angina Deep Neck Infections Retro Pharyngeal Abscess	Mixed Infections with Gram +ve / -ve anaerobe	Combination of **Crystalline Penicillin** (2-3 lac U/kg/ day) + Gentamicin + Metronidazole 30mg/kg/ day X 7 days	Combination of Ceftriaxone + Cloxacillin -50mg / kg/ day x 5-7 days + Metronidazole 30mg/kg/ day X 7 days	

Antimicrobial Stewardship Program

Definition

Antimicrobial stewardship refers to coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen including dosing, duration of therapy, and route of administration.

Antibiotic policy

Antibiotic policy has been prepared by the antimicrobial stewardship team in consultation with microbiology departments and physicians and surgeons from various departments. The policy is reviewed and updated annually. Institutional guidelines for the management of common infections are thus available. Processes to measure and monitor antimicrobial use at the institutional level is available in CNBC. Periodic distribution of a facility-specific antibiogram indicating the rates of relevant antibiotic susceptibilities to key pathogens is published.

Antimicrobial Stewardship Program included monitoring of following activities at CNBC:

1. Rational use of antibiotic are been monitored – On daily basis for seven indicator antibiotics ***(Vancomycin, Meropenam, Ofloxacin, Ciprofloxacin, Cefoperazone + Sulbactam , Colistin and Levofloxacin***) by ICNs on daily rounds and details recorded on preformatted template. Other antibiotics are also checked for rational combinations and doses. Treating doctors are asked to explain the reasons for initiating these antibiotics in writing. These patients are the discussed for rationality with Clinical Microbiologists. Irrational antibiotic therapy, if identified is communicated to treating physician or surgeon for immediate discontinuation/modification. Irrational combination of antibiotics or doses is also monitored.
2. Pre – surgical prophylaxis and post operative antibiotic therapy are also monitored on daily basis. In case of irrationality it is been informed to the concerned department and necessary actions are taken.
3. Defined Daily Dose (DDD) for antibiotics are monitoring for the usage pattern.DDD is calculated monthly from the data collected from the inpatient department trough daily appraisal form.

$$\text{DDD} = \frac{\text{Antibiotic used (gms)}}{\text{Defined Drug Dose (gms)}}$$

4. No. of doses administered are also monitored per thousand patient days.
5. The data analysis is done and discussed during periodic HICC meetings.
6. Adherence to antibiotic policy is also discussed in the HICC meeting.