

UPPER RESPIRATORY TRACT INFECTIONS

- DEFINITION .
- THE COMMON COLDS,THE
PARANASAL SINUSES,
PHARYNX,TONSILS AND ADENOIDS.
- CROUP,EPIGLOTTITIS



UPPER RESPIRATORY TRACT INFECTIONS

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THE COMMON COLD

- DEFINITION :
viral illness in which the symptoms of rhinorrhea and nasal obstruction are prominent and systemic symptoms and signs such as myalgia and fever are absent or mild .
- Rhinitis, rhinosinusitis.
- ETIOLOGY : most common is are rhinoviruses .table

Pathogens Associated with Common Cold

Agents primarily associated with colds	Rhinoviruses	Frequent
	Coronaviruses	Occasional
Agents primarily associated with other clinical syndromes that also cause common cold symptoms	Respiratory syncytial virus	Occasional
	Influenza viruses	Uncommon
	Parainfluenza viruses	Uncommon
	Adenoviruses	Uncommon
	Enteroviruses	Uncommon

- **EPIDEMIOLOGY:**

- Year round , However :

RV → peaks early fall(august- october) and late spring (April-May).

- Parainfluenza viruses peaks late fall
- RSV and Influenza (December –April)
- Children have average of 6 to 7 colds/year, 10 to 15% have at least 12/year.
- Decrease with age ,2 to 3/year in adults
- More with children in out-of-home daycare centers by 50% during first three years of life.

PATHOGENESIS

Spread :

Viruses spread by **small-particle aerosols, large-particle aerosols and direct contact.**

- RV and RSV direct contact is more efficient .
- Influenza more spread with the small particle aerosols.

Pathogenesis

- **Influenza /Adenovirus** infection -> destruction of nasal epith lining
- **Rhinovirus ,Coronaviruses and RSV** -> no apperant histologic damage as in nasal epithelium .

Re-Infection ?

- **Rhinoviruses and adenoviruses :**
Trigger serotype-specific protective immunity but have large no. of serotypes of each virus.
- **Parainfluenza viruses and RSV** have small no. of distinct serotypes . Host immunity that develops is not protective but moderates severity of subsequent illness

.

Pathogenesis

- Influenza viruses

- able to change the antigens presented on the virus and behave as if there were multiple virus serotypes

CLINICAL MANIFESTATIONS

- Onset usually after 1-3 days of acute infection.
- Sore or scratchy throat ,then nasal obstruction and rhinorrhea.
- **Cough in 30%** of colds, usually after the onste of nasal symptoms.
- **Fever** and other **constitutional** symptoms more in influenza ,adeno- and RSV than in rhinoviruses and coronaviruses.

Physical findings

Limited to the URS:

- increased nasal secretion (change in its color or consistency doesn't indicate sinusitis or bacterial superinfection)
- nasal cavity;swollen erythematous turbinates (nonspecific,limited use)

DIAGNOSIS:

Exclude other causes that are more serious or treatable.

- DDx :non-infectious disorders ,other URTI's ,table .

Conditions that may mimic the Common Colds

Condition	Differentiating Features
Allergic Rhinitis	Prominent itching and sneezing, nasal eosinophilia
Foreign Body	unilateral, foul-smelling discharge, bloody nasal secretions
Sinusitis	Headache, facial pain, periorbital edema, persistence of rhinorrhea or cough > 10-14 days
Streptococcal nasopharyngitis	Nasal discharge that excoritates the nares
Pertussis	Onset of persistent or paroxysmal cough
Congenital Syphilis	Persistent rhinorrhea with onset in 1 st 3 mo. Of life

LABARATORY FINDINGS

- Routine labs are not helpful for Dx and Mx of common colds
- Nasal smear for eosinophils usefull for allergic rhinitis ,if PMN cells predominates in uncomplicated cold doesn't indicate bact. Superinfection.
- Viral detection ;culture ,serology for antigen detection ,not indicated ,only when antiviral therapy is planned to be used.
- Bacterial cultures or antigen detections usefull only when group A strept. Or bordetella pertussis or nasal diphtheria is suspected.

TREATMENT

- Symptomatic Treatment .
- Antiviral therapy

SYMPTOMATIC TREATMENT

- No study to prove benefit in children.
- Balance against side effects of the drugs.
- **FEVER**; infrequently associated with uncomplicated CC, antipyretics generally not indicated.
- **NASAL OBSTRUCTION**; topical/systemic
- Topical; oxymetazoline or phenylephrine as intranasal drops or nasal spray, not approved <2 yrs.

Symptomatic treatment

- Side effects:
 - Topical : Imidazolines rarely bradycardi,hypotension and coma.
RHINITIS MEDICAMENTOSA ,apparent rebound effect with prolonged use of topical adrenergics.
 - oral ;CNS stimulation,HTN and palpitations.

- **RHINORRHEA** :
- 1st generation anti hist. Reduce by 25-30%, non-sedating aren't effective for cc syp.
- Topical ipratropium bromide-no sedation(se;nasal irritation,bleeding)
- **SORE THROAT**: analgesia,usu. Mild .acetaminophin .Aspirin **NOT** used (Reye syndrome in children with influenza).
- **COUGH** : cough suppression not necessary, usu. Due to PND ,antihistamine is beneficial

Symptomatic Treatment :cough

- Cough ,can be due to reactive airway disease(viral induced),may persist days to weeks aftr acute infectin ,benefit bronchodilators.
- Codeine ,dextromethorphan -no benefit
- Expectorants –not effective.
- Ineffective treatment ;Vit.C ,guaifenesin,huidified warm air,zink

COMPLICATIONS

- **OTITIS MEDIA** ;most common,5-30%
- **SINUSITIS** ; 5-13% in children ,0.5-25 %in adults as bacterial sinusitis,(other than self limited sinus involvement in the pathophysiology of viral illness)
- **EXACERBATION of ASTHMA** ;relatively uncommon.
- **Antibiotic resistance** of pathogenic respiratory pathogens.

PREVENTION

- CHEMOPROPHYLAXIS
;immunoprophylaxis generally not available for common colds.
- Influenza vaccine may be usefull ,but infl. Reonsible for small % of CC.
- Interruption of direct contact ;handwashing,face sheilds .

SINUSITIS

- Common illness of childhood and adolescence, potential for serious complication, significant morbidity .
- Viral / Bacterial ; 0,5-2% of viral URTI complicated by acute bacterial sinusitis.
- Development ; ethmoid and maxillary present at birth, but only ethmoidal is pneumatized. maxillary pneumatized at 4yrs. Sphenoids by 5 years. frontal sinuses 7-8 yrs. they are normally sterile

- ETIOLOGY:
- *Streptococcus pneumoniae* 30% (25% Beta Lactamase positive).
- *Nontypable haemophilus influenzae* 20% (50% B-lactamase positive)
- *Moraxella catarrhalis* 20% (100% B-lactamase positive).
- Others ; *Staphylococcus aureus* , other streptococci and anaerobes , uncommon.
- Chronic infx; *H. influenzae*, coagulase neg. Staph
M. cat. *S. pneum.* , alpha-hemolytic strept.

EPIDEMIOLOGY

- Occur at any age.
- Predisposing conditions: URTI(with out-of-home day-care,school aged sibling) ,allergic rhinitis ,cigarette smoke exposure .chronic disease develop in children with immune deficiencies ,cystic fibrosis ,ciliary dysfunction, phagocytic disorders ,GERD,anatomic defects(cleft palate} nasal foreign bodies .

PATHOGENESIS

- **TYPICALLY OCCURS AFTER VIRAL ILLNESS**;viral rhinosinusitis-fluid in the sinuses,nose blowing forces nasal secretions into sinus cavity and introduce bacteria to the nasopharynx ,impaired immunity(inflammation and edema during viral illness block sinus drainage and impair mucociliary fxn).

CLINICAL MANIFESTATION

- **NONSPECIFIC**, nasal congestion ,discharge ,fever,cough.
- Less common ;bad breath ,decreased smell ,priorbital edema.
- Headache and facial pain ,rare in children.
- P/E mild erythema –swelling of nasal mucosa-discharge ,sinus tenderness(adolescents and adults).

DIAGNOSIS

- Based solely on history; persistent hx of RTI including cough, nasal discharge for >10-15 days without improvement OR severe symptoms; temp. >39 °C and purulent nasal discharge for 3-4 days.
- Bacteria isolated from maxillary s. in 70% with severe symptoms
- Chronic sinusitis; persistent cough-discharge >90 days.

Diagnosis

- Sinus aspirate cx is the only accurate method,not practical.
- Transillumination of sinus cavity,difficult in children,unreliable.
- Radiography; plain film :thickening,air-fluid level
- DDx ; viralURTI,ALLERGIC RHINITIS,NASAL FB.



TREATMENT

- Debate about benefit of AB therapy for clinically Dx sinusitis 50-60% self limited
- Promote resolution of sym. And prevent suppurative complications.
- Initial amoxicillin(45mg/kg/day)
- Ulternative ;cfuroxime
axetil,cefpodxime,clarithromycin or azithromycin
- Failure of therapy-ent evaluation for sinus aspiration-Cx.
- Duration;individualized ,7 days after resolutionof symptoms.

- Frontal sinus ;ceftriaxone initially till clinical improvement.
- Decogestants,mucolytics intranasal GCS ,not studied ,not recommended in acute bacterial sinusitis.

COMPLICATIONS

- **ORBITAL COMPLICATIONS**, periorbital cellulitis and orbital cellulitis-acute bacterial ethmoiditis.(CT of orbits and sinuses ,ophthalmometry Cx)
- **INTRACRANIAL COMPLICATIONS**, meningitis,cavernous sinus thrombosis ,subdural empyema ,epidural abscess and brain abscess.(s,s:altered mentality,signs of incr. ICP require immediate scanning of brain/orbit and sinus.
- TX ; Broad spectrum antibiotics(cefotaxime/ceftriaxone with

- Brain abscesses may require surgical drainage.
- **BONE COMPLICATIONS** ;osteomyelitis of frontal bone(Pott Puffy Tumor)and mucoceles-surgical drainage.
- **PREVANTION OF SINUSITIS:**
- Frequent hand washing ,avoid patients with colds,influenza vaccine(small proportion)

ACUTE PHARYNGITIS

- SORE THROAT is the primary symptom. 1/3 of URTI.
- ETIOLOGY :
 - viruses
 - Group A B-hemolytic strep (GABHS).
 - OTHERS; group C strept. , Arcanobacterium hemolyticum, Francisella tularensis, Mycoplasma pneumoniae , Neisseria gonorrhoeae, Corynebacterium diphtheriae .

EPIDEMIOLOGY

- Viral URTI mostly in winter and spring, spread by close contact.
- **Streptococcal pharyngitis** uncommon <2-3 yrs.
- Incidence increases among children then declines late adolescents and adults.
- Throughout the year ,often spring/winter
- Pharyngitis with group C strep., A.hemolyticum most frequently in adults and adolescents.

PATHOGENESIS

- Colonization with GABHS may result in acute infx or carrier state.
- M Protein is major virulence, resist phagocytosis by PMN cells
- Type specific immunity against particular M protein.
- **Scarlet fever** ,GABHS produce SPE-A,B and C,induce fine rash

CLINICAL MANIFESTATION

- Onset often rapid; sore throat , fever.
- Headache , GI symptoms ; frequent.
- P/E : **red pharynx** , tonsils enlarge with yellow blood tinged **exudate**, possible to have **petechiae** ‘doughnut’ lesions on soft palate and post. Pharynx . Uvula-red swollen.
- Ant. Cervical L.N enlarged, tender.
- **Scarlet fever**; circumoral pallor, strawberry tongue , fine red papular rash ‘sand paper’

Viral pharyngitis:

- More gradual, more with **rhinorrhea**, **cough**, **diarrhea**.
- **Adenovirus** may have concurrent conjunctivitis, fever
- **Coxsackievirus** ‘herpangina’; small grayish vesicles, punched-out ulcers on post. Pharynx, or acute lymphonodular pharyngitis.
- **EBV**; prominent tonsillar enlargement, cervical lymphadenitis, HSM, fatigue –IM.
- **PRIMARY HERPES SIMPLEX**, young children, high fever, gingivostomatitis.

Herpangina



IM



Primary herpetic gingivostomatitis



DIAGNOSIS

- **IDENTIFY GABHS**; throat culture (imperfect), false pos./neg., rapid antigen detecting tests ;specificity is high,less sensitive .
- Special media of cx for some organisms ,prolonged incubation (A.hemolyticum).
- Viral cx;unreliable,expensive
- CBC ,many lymphocytes-positive slide aggltn.(SPOT) –EBV infectious mononucleosis.



TREATMENT

- Mostly self limited(streptococcal infx)
- Early AB therapy –quick recovery by 12 –24 hours.
- Primary AIM TO PREVENT ACUTE RHEUMATIC FEVER ,if Tx within 9 days of illness.
- AB without waiting culture in(symptomatic with pos. rapid AG detecting test,scarlet fever,household contact of documented strept.infx,recent hx of acute rheumatic fever in family member)

- GABHS ;
- Penicillin V ,cheap,bid or tid ,250mg/dose,oral amoxicillin 250mg tid (tastes better ,tabs available) ,single IM Penicillin G,benzathine, Erythromycin (40 mg/kg/day),first generation CPS,azithromycin .clindamycin(irradication carrier state).
- Nonspecific tx;antipyretics; acetamenophin ,ibuprofen,gargling warm salt water/phenol-mentol sprays .

RECURRENT PHARYNGITIS

- EITHER relapse with identical strain (IM penicillin advised if compliance poor)
- OR resistance ,non-penicillin AB considered.
- OR different strain from new exposure.
- TONSILLECTOMY ;lower % OF PHARYNGITIS FOR 1-2 YRS.:(those with culture positive ,severe, frequent : > 7 episodes in the previous year ,or >5 in each of the preceding two years.

COMPLICATIONS- PROGNOSIS

- Viral URTI predispose to Bacterial Middle Ear Infections.
- Streptococcal infx complications;
- suppurative local complications(parapharyngeal abscesses)
- later ,nonsuppurative ones (ARF ,acute post infectious glomerulonephritis)

PRAVENTION

- ANTIMICROBIAL PROPHYLAXIS ,oral penicillin only in preventing recurrence of ARF.
- Multivalent streptococcal vaccine;under development.

Retropharyngeal and Lateral pharyngeal abscess

- Retropharyngeal abscess; usu. Less than 3-4 yrs of age. boys > girls (retroph. Lymph nodes involute >5yrs.)
- Clinical; nonspecific : fever , irritability. dec. oral intake, drooling. neck stiffness , torticollis , refusal to move neck.. sore throat neck pain . others ; muffled voice , stridor , respiratory distress.
- P/E : bulging of post. pharyng. Wall (<50%) , cervical LAP ,

- **LATERAL PHARYNGIAL ABSCESS** ; fever ,dysphagia ,prominent bulge on lateral wall of pharynx ,sometimes medially displaced tonsil.
- **DDX** ; acute epiglottitis ,FB aspiration ...others;lymphoma,hematoma and vertebral osteomyelitis.
- **DIAGNOSIS** ; incision FOR drainage and culture of abscess or node....**CT SCAN(with contrast)** also useful ,plain soft tissue neckfilms inspiratory

- **ETIOLOGY** ;both are caused by **polymicrobial** infx(GABHS ,anaerobes,staphylococcus aureus) ,others;klebsiella ,H.influenza)
- **TREATMENT** : IV antibiotics with/without surgical drainage.
- Third generation CPS plus ampicillin-sulbactam or clindamycin(anaerobes)
- Surgical drainage necessary in pts with respiratory distress ,failure to improve with iv AB treatment

complications

- Significant upper airway obstruction
- Rupture leads to Aspiration Pneumonia
- Extension to mediastinum
- Thrombophlebitis of the int. jugular vein
- Erosion of carotid artery sheath
- **Lemierre disease** ,uncommon infx oropharynx—
septic metastatic abscesses in lungs ,spetic infx of
int. JUGULAR VEIN(ANAEROBE)

PERITONSILLAR CELLULITIS/ABSCESS

- RELATIVELY COMMON DEEP INFX OF NECK.
- Direct invasion of bacteria through capsule of tonsils to surrounding tissues.
- Usually adolescent recent hx of acute pharyngotonsillitis.
- Sore throat, fever, trismus dysphagia.

PERITONSILLAR CELLULITIS/ABSCESS

- P/E asymmetrical bulge of the tonsil with displacement of uvula .
- CT scan
- GABHS and Anaerobes
- Antibiotic therapy and surgical needle aspiration(90%)
- 5% INCISION DRAINAGE.
- TONSILLECTOMY ; Failure of combined AB – needle aspiration ,recurrent peritonsillar (10%)abscesses,complications

TONSILS AND ADENOIDS

Definition ; Waldeyer ring; palatine tonsils , pharyngeal tonsils or adenoids , lymphoid tissue around eustachian tube orifice, lingual tonsil , scattered lymphoid tissue /pharynx.....

- Mostly immunologically active 4-10yrs (produce secretory immunity)...
- Acute Infection; most are viral, bacterial : GABHS (most common), group C, staph. Aureus , G-ve organisms, mycoplasma pneumoniae, rare " nisseria gonorrhoeae , C. diphtheria , oral candidiasis (immune compromised).
- Clinical ; dry throat, fever, malaise, odynophagia, dysphagia, referred otalgia, headache, ms. Acches, LAP

- Chronic Infection polymicrobial, may include high incidence of B lactamase producing organisms (aerobic : strptococci ,H.influenza.anaerobic :peptostreptococcus ,prevotella ,fusobacterium.the tonsillar crypts will accumulate squamated epith. Cells,lymphocytes ,bacteria and debris, causing crypt tonsillitis

- CLINICAL ;halitosis ,chronic sore throats ,foregn body sensation,foul-taste sensation.P/E: tonsils any size,contain copious debres within crypts.throat cx. Usually –ve (not GABHS).
- Tx.clinamycin/amoxicillin with clavulanate,penicillin v plus rifambin, Tonsillectomy curative.

- Airway obstruction ;tonsils-adenoid major cause,clinical:chronic mouth breathers,hyposomnia,nasal obstruction,hyponasal speech,decreased appetite,poor school performance..rare right sided heart failure. night ;loud snoring ,choking ,frank apneas ,restless sleep,gasping,night terrors,enuresisdiaphoresis.
- p/e ;large tonsils ‘no correlation with severity’ ,lateral neck radiograph.
- Tx. Adenotonsillectomy.
- Indications for adenoidectomy ;chronic nasal infections,recurrent otitis media ,chronic sinus infection not responding to medical tx.,airway obstruction.

INFECTIOUS UPPER AIRWAY OBSTRUCTION

- CROUP (laryngotracheobronchitis): most common cause .viral infx of glottic and subglottic region
- Etiology ;most are viral :
 - Parainfluenza(I,2,3)-75%
 - Others ,Influenza A and B(A severe infx) ,adenovirus,RSV ,measles .
 - Mycoplasma pneumoniae (rare).
- Age ; between 5months and 5 years, peak in 2nd year of life.
- Males > females. More in winter ,recurrence frequent 3-6 years then declines...15% strong family Hx of croup.

CLINICAL ; •

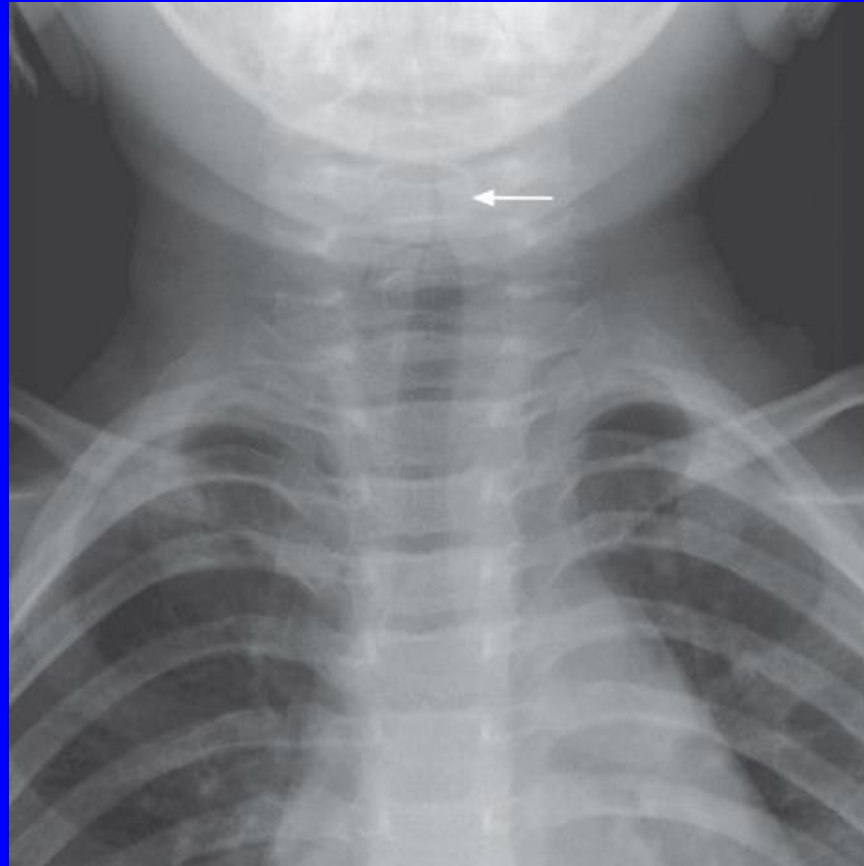
URTI some rinorrhea ,pharyngitis ,mild •
cough,low grade fever for 1-3 days before s
ans s of upper airway obstructio become
apperant .then barking cough ,hoarseness
,Inspiratory stridor

- fever, usually low grade and may persist, may reach 39-40, some are afebrile.
- Worse symptoms at night often recur with decreasing intensity over days and resolve within a week. Agitation and crying greatly aggravate symptoms and signs, may prefer to sit up or held upright. The older the milder. Most are mild illness.

Diagnosis

- Radiography only considered After stabilization of Airways for those who have atypical presentation.
- Helpful to differentiate croup from epiglottitis .

steeple sign



ACUTE EPIGLOTTITIS

- DRAMATIC ,POTENTIALLY LETHAL.
- acute fulminating course of high grade fever ,dyspnea ,sore throat ,rapidly progressive respiratory obstruction,degree variable.
- Rapid course sore throat,fever in houers – toxic,difficult swallowing ,difficult breathing.Drooling ,neck hyper extended to maintain airways.Tripod position :sitting upright – leaning forward with chin up mouth open and bracing on the arms.

Epiglottitis

Air hunger and restlessness followed by •
rapidly increasing CYANOSIS AND
COMA . STRIDOR –LATE near complete
AO.

DEATH unless proper airway mx. •

etiology

- H.influenza type b ,most common before vaccine introduction.(reduced by 90%).
- Streptococcus pyogenes,S.pneumoniae ,staph. Aureus ,now larger proportion.
- Age was 2-4 (before vaccination) but as early as 1st year and late as 7 years have been seen.

DIAGNOSIS

- CLINICAL,HX
- Laryngoscopy ‘cherry-red’ swollen epiglottis,other surrounding tissue involved.performed in theatre or ICU.
- Lateral radiograph films show ‘thumb sign’
:Patient suspected to have EPI should always be accompanied by physician skilled in intubation,airway mx.

Epiglottitis



- Avoid anxiety provoking (opening mouth,forcing supne position ,phelebetomy,IV line placement..)
- ESTABLISH AIRWAY by nasotracheal intubation ,or less often trachiotomy ,REGARDLESS DEGREE OF RESPIRATORY DISTRESS ..WHY ?
- 6% of patients die without artificial airway while only 1% in those with.

- Pulmonary edema may occur with acute airway obstruction.
- Intubation usually lasts for 2-3 days
- Bacteremia ,mostly present,occasionally others; pneumonia ,meningitis ,arthritis,cervical LAP ,otitis media and other infx caused by H.influenza b.

treatment

- **CROUP**
- **Airway management.**
- **Cool mist (moistens secretions, clearance, comfort-reassurance, soothes mucosa).**
- **Nebulized epinephrine (constriction arterioles-decrease edema). racemic solution 1:1, or l-epinephrine (5cc of 1:1,000)**
- **Indications ; moderate to severe stridor at rest,**
 - **need for intubation**
 - **hypoxia**
 - **stridor not responding to mist**
- **Observe 2-3 hours (provided no stridor at rest)**
- **GCS, dexamethasone, single dose 0.6mg/kg IM (or oral)**
- **Admit : progressive stridor, severe stridor at rest, resp. distress, cyanosis, altered mental status, need for reliable observation**

- Epiglottitis ,medical emergency
- Admit to ICU ,artificial airway
- Oxygen mask
- Culture of blood,epiglottic surface (selected cases CSF).
- Ceftriaxone,cefotaxime or ampicillin sulbactam
. (therapy for 7-10 days)
- Chemoprophylaxis :given to contacts if there is a child <2 years or immune compromised(Rifambin)