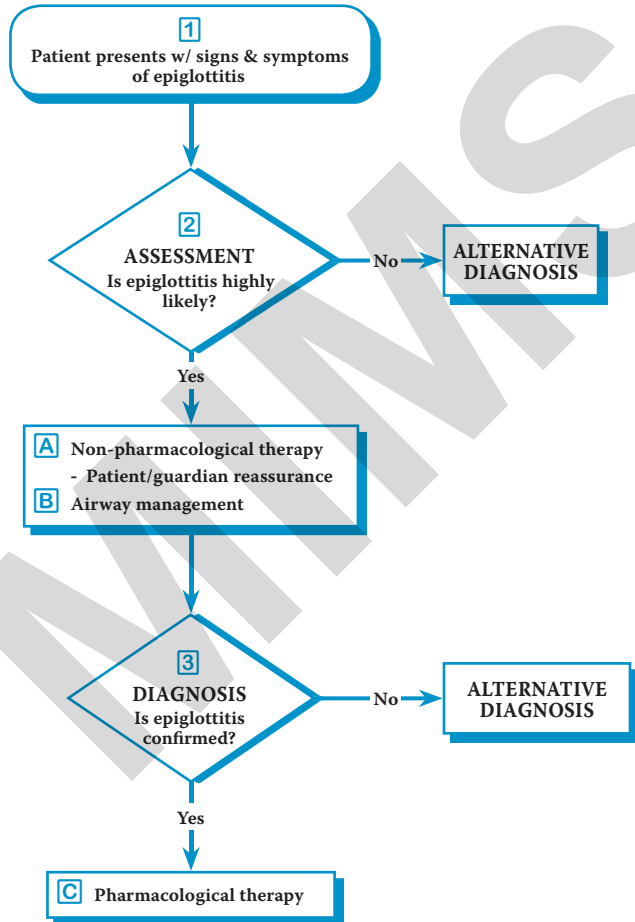


Epiglottitis (1 of 7)



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1 EPIGLOTTITIS

- Also known as supraglottitis or cherry-red epiglottitis
- Inflammation of the epiglottis & supraglottic tissues (aryepiglottic folds, arytenoid, uvula)
- Characterized by an acute, rapidly progressing resp disease
- **A medical emergency requiring immediate treatment & typically artificial airway placement**
- *H influenzae* type b (HIB) is the most common etiologic agent in children
 - The incidence of epiglottitis has decreased because of widespread vaccination against HIB
 - Second most common cause is group A beta hemolytic Strep
 - Other causative organisms now include *Streptococcus pyogenes*, *S pneumoniae* & *Staphylococcus aureus*

Signs & Symptoms**Children**

- High fever & severe sore throat which is often of sudden onset
 - Barking cough is uncommon
- Dyspnea, w/ possible rapid progression to airway obstruction
- Difficulty in swallowing
- Drooling due to inability to handle secretions, w/ hyperextension of the neck
 - Drooling w/o coughing increases the probability of epiglottitis compared to croup
- Patient may prefer to sit upright while leaning forward w/ chin up & mouth open while bracing on the arms
- Inspiratory stridor may be severe & may herald complete airway obstruction

2 ASSESSMENT

- Evaluate for presence & severity of airway obstruction based on history & physical examination
 - Patients on “tripod” position are most likely suffering from severe epiglottitis & needs immediate treatment
- Direct examination of the pharynx in patients whose signs & symptoms are highly suggestive of epiglottitis should be deferred
- Stabilize airway prior to performing diagnostics

Epidemiology

- Usually affects children between 1-5 yr old who have not been immunized or are under-immunized for *Haemophilus influenzae*
- May occur in an adult w/ a sore throat in areas where *H influenzae* infections have largely been prevented by immunization
- Epiglottitis patients often have an underlying disease, usually viral
- Usually, there are no other family members suffering from acute resp symptoms

3 DIAGNOSIS**Laryngoscopy**

- Visualization of the posterior pharynx is the best way to confirm the diagnosis
- The procedure should be performed speedily in a controlled environment, eg an operating room or an intensive care unit (ICU) where intubation may be promptly performed, in the event of airway obstruction
- Administration of an inhaled anesthetic may allow an expeditious exam of the airway but an expert in intubation should be on stand by
- A large, cherry-red epiglottis is usually seen
 - Aryepiglottic folds & base of the tongue may also be inflamed
- An older cooperative child may voluntarily open the mouth wide enough to permit the direct view of the inflamed epiglottis

Radiography

- If epiglottitis is considered possible, but not probable, the patient may first undergo x-rays of the upper airway
- The “thumb sign” which results from edema & enlargement of the epiglottis may be seen
 - Absence of the “thumb sign” does not rule out epiglottitis, but it tells the clinician that examination of the pharynx may be done w/o great danger of airway obstruction
- Other findings indicative of epiglottitis include absence of vallecular air space, thickened aryepiglottic folds, distended hypopharynx & straightening of cervical lordosis

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3 DIAGNOSIS (CONT'D)**Ultrasonography**

- Ultrasound evaluation in older patients usually shows an “alphabet P sign” due to severely inflamed epiglottitis & the hyoid bone

Culture

- Culture should be performed by obtaining a swab of the epiglottis during the airway stabilization
 - 60-98% reveals *H. influenzae* type b infection
- Blood cultures should also be obtained once airway has been established

Other Tests

- Complete blood count may reveal leukocytosis

ALTERNATIVE DIAGNOSIS**Croup**

- Characterized by barking cough, hoarse voice, dyspnea & inspiratory stridor
- Prominent/audible stridor w/ marked retractions may be indicative of impending respiratory obstruction

Diphtheria

- Characterized by malaise, sore throat, anorexia, & low-grade fever
- Pharyngeal exam shows a typical gray-white membrane adherent to the tissue that bleeds when attempted to be removed, w/c establishes the diagnosis of diphtheria vs epiglottitis
- W/ insidious course but sudden respiratory obstruction may occur

Tracheitis

- Patient appears febrile & symptoms mimics epiglottitis esp in patients previously on antibiotic therapy

Other Bacterial Infections

- Retropharyngeal abscess, uvulitis, peritonsillar abscess
- Usually ruled-out by radiographic findings & direct examination

Other Noninfectious Alternative Diagnoses

- Foreign body aspiration
- Hereditary angioedema

A NON-PHARMACOLOGICAL THERAPY**Patient/Guardian Reassurance**

- Actions that minimize anxiety & pain are appropriate until the airway is secure
- Child should be held & comforted
- Avoid anxiety-provoking maneuvers (eg blood extraction, IV line placement, placing the child in a supine position or direct inspection of the oral cavity) until the airway is secure

Oxygen Therapy

- Provide supplemental O₂ if necessary

B AIRWAY MANAGEMENT

- A physician well-versed in airway management & use of intubation apparatus should accompany patients w/ suspected epiglottitis at all times
- In patients w/ epiglottitis, an airway should be established to prevent airway obstruction, regardless of the degree of resp distress, by either nasotracheal intubation or tracheostomy
 - If possible, the procedure should be done in either an operating room or ICU
 - Using a nasotracheal tube that is 0.5-1 mm smaller than that estimated by age is recommended for easier intubation & lesser long-term sequelae
- Bag-valve-mask ventilation may be done if there is an delay in intubation
- If intubation & ventilation both can not be performed, cricothyroidotomy may be considered if airway obstruction is imminent
- The duration of intubation depends on the patient's clinical progress & duration of epiglottic swelling
 - Reduction in swelling can be determined by direct laryngoscopy or flexible fiber optic laryngoscopy
 - Patient should improve sufficiently & should be able to handle secretions adequately
- The tube should be removed as soon as possible, which is usually w/in a few days
 - Intubation is required for <24 hr in most cases

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C PHARMACOLOGICAL THERAPY

- Empiric treatment w/ antibiotics effective against *H influenzae* should be started pending results of culture & sensitivity studies
 - The prevalence of beta-lactamase producing organisms, together w/ local antimicrobial resistance patterns, should be taken into consideration when choosing an antibiotic

Penicillins

- Eg Ampicillin/Sulbactam, Piperacillin/Tazobactam, Amoxicillin/Clavulanic Acid
- Ampicillin alone is not recommended in settings w/ a high prevalence of beta-lactamase producing organisms
- Piperacillin/Tazobactam combination is recommended for immunocompromised patients due to its wide coverage

3rd Generation Cephalosporins (Parenteral)

- Eg Cefotaxime, Ceftriaxone
- Employed empirically because of the increasing frequency of beta-lactamase producing organisms

Co-trimoxazole

- May be used as an alternative in patients w/ type 1 allergy to Penicillin

Fluoroquinolone

- Eg Levofloxacin, Moxifloxacin
- Treatment option for patients allergic to beta-lactamase inhibitors
- Not recommended for children <16 yr of age

Antibacterial Combinations

- Eg Trimethoprim/Sulfamethoxazole
- Treatment option for patients allergic to beta-lactamase inhibitors

Other Antibiotics

- Eg Vancomycin, Clindamycin
- Vancomycin is recommended for patients at high risk for penicillin-resistant diseases
- Clindamycin combined w/ a fluoroquinolone is another treatment option for patients allergic to beta-lactamase inhibitors

Duration of Therapy

- Antibiotics should be given for 7-10 days

Other Pharmacologic Agents

- Racemic Epinephrine & corticosteroids are not effective

PREVENTION

Haemophilus influenzae type B (Hib) vaccine

- Studies have shown a decrease in the incidence of epiglottitis because of increased H influenzae type b vaccination

Please refer to Pneumonia - Community-acquired Disease Management chart for details on vaccination against S pneumonia

Further Evaluation

- Antibiotic prophylaxis w/ Rifampicin should be given to the following household members:
 - Children ≤4 yr of age w/o or w/ incomplete vaccination against *H influenzae* type b
 - There is 1 or more contact <48 mth of age in the household who is incompletely immunized
 - W/in the household is an immunocompromised child
- Chemoprophylaxis w/ Rifampin, Ceftriaxone, or Ciprofloxacin is recommended for older children & adults who came in contact w/ patients infected w/ *H influenzae* type b or meningococcal epiglottitis

Dosage Guidelines

ANTIBACTERIAL COMBINATION		
Drug	Dosage	Remarks
Co-trimoxazole (Sulfamethoxazole (SMZ) & Trimethoprim (TMZ))	>2 mth: 8-12 mg/kg/day IV/PO divided 12 hrly (based on TM)	<p>Adverse Reactions</p> <ul style="list-style-type: none"> GI effects (N/V, anorexia, diarrhea, rarely antibiotic-associated diarrhea/colitis, glossitis); dermatologic effects (rash, pruritus, photosensitivity); hypersensitivity reactions can range from mild (eg rash) to severe/life-threatening (eg Stevens- Johnson syndrome); urogenital effect (crystallization in the urine) Rarely hematologic effects which may be more common if given for long periods or w/ high doses; Rarely hepatic & renal effects; Aseptic meningitis has occurred <p>Special Instructions</p> <ul style="list-style-type: none"> Maintain adequate fluid intake Contraindicated in patients allergic to sulfonamides Use w/ extreme caution or not at all in patients w/ hematological disorders esp megaloblastic anemia due to folic acid deficiency Use w/ caution in patients w/ renal impairment or severe hepatic dysfunction & in patients w/ folate deficiency (may consider administration of folic acid) Use w/ caution in patients w/ G6PD deficiency Use w/ caution in patients w/ pre-existing liver dysfunction, monitor liver function during therapy in these patients

ANTI-TB AGENTS		
Drug	Dosage	Remarks
Other Antibiotics - Rifampicin		
Rifampicin	20 mg/kg IV/PO q24 x 4 days Max dose: 600 mg/day	<p>Adverse Reactions</p> <ul style="list-style-type: none"> Generally well tolerated; GI effects (N/V, anorexia, diarrhea, GI distress, antibiotic-associated diarrhea/colitis); Discoloration of urine & body fluids Rarely hepatic effects (transient abnormalities in liver function, hepatitis); Hematologic effects have occurred; Renal effects have been reported w/ intermittent therapy; CNS effects can occur (headache, drowsiness, ataxia) <p>Special Instructions</p> <ul style="list-style-type: none"> Rifampicin accelerates the metabolism of drugs metabolized by CYP-450 Use w/ caution in patients w/ pre-existing liver dysfunction, monitor liver function during therapy in these patients

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Dosage Guidelines

CEPHALOSPORINS		
Drug	Dosage	Remarks
Cephalosporins (3rd Generation)		
Cefotaxime	1 mth-12 yr: 150-200 mg/kg/day IM/IV divided 6-12 hrly (in combination w/ Clindamycin) Max dose: 200 mg/ kg/day	Adverse Reactions <ul style="list-style-type: none"> Hypersensitivity reactions (urticaria, pruritus, rash, severe reactions such as anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (candidal infections) High doses may be associated w/ CNS effects (encephalopathy, convulsions); Rarely hematologic effects; Hepatic & renal effects have occurred Prolonged prothrombin time (PT), prolonged activated partial thromboplastin time (APTT), &/or hypoprothrombinemia (w/ or w/o bleeding) have been reported & occurs most frequently w/ N-methylthiotetrazole (NMTT) side chain containing cephalosporins Special Instructions <ul style="list-style-type: none"> May be taken w/ food to decrease gastric distress Use w/ caution in patients allergic to Penicillin, there may be 10% chance of cross sensitivity Use w/ caution in patients w/ renal impairment
Ceftriaxone	50-100 mg/kg/day IV/IM 24 hrly	

OTHER ANTIBIOTICS		
Drug	Dosage	Remarks
Glycopeptide Antibacterial		
Vancomycin	Childn: 10 mg/kg IV 6 hrly or 20 mg/kg IV 12 hrly over 60 min (based on TM) Infants & Neonates: Initial dose: 15 mg/kg IV Maintenance dose: 10 mg/kg IV 12 hrly x 1 wk, then 8 hrly x 1 mth	Adverse Reactions <ul style="list-style-type: none"> Hematologic effects (eosinophilia, neutropenia); Inj site reactions (thrombophlebitis, hypersensitivity reactions, erythema); Other effects (flushing, hypotension, "red-man" syndrome, ototoxicity, nephrotoxicity) Potentially fatal: Stevens-Johnson syndrome, toxic epidermal necrolysis, blood dyscrasias Special Instructions <ul style="list-style-type: none"> Contraindicated in patients w/ history of impaired hearing Use w/ caution in patients w/ renal impairment, auditory dysfunction
Lincosamide		
Clindamycin	Childn >1 mth: 8-25 mg/kg/day PO divided 6-8 hrly <10 kg: 37.5 mg PO 8 hrly or 20-40 mg/kg/day IV/IM divided 6-8 hrly Neonates <1 mth: 15-20 mg/kg/day IV/IM divided 6-8 hrly Treatment to be given for 10 days for confirmed β -hemolytic <i>Strep</i> infection	Adverse Reactions <ul style="list-style-type: none"> Hematologic effects (eosinophilia, neutropenia); Inj site reactions (thrombophlebitis, hypersensitivity reactions, erythema); GI effects (pseudomembranous colitis, N/V, diarrhea, esophagitis, esophageal ulcer, jaundice, dysgeusia); Other effects (urticaria, maculopapular rash) Special Instructions <ul style="list-style-type: none"> Contraindicated in patients w/ history of impaired hearing Use w/ caution in patients w/ GI disease, colitis, diarrheal states, renal/hepatic impairment

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Dosage Guidelines

PENICILLINS		
Drug	Dosage	Remarks
Aminopenicillins w/ Beta-lactamase Inhibitors		
Amoxicillin/clavulanic acid (Co-amoxiclav, Amoxicillin/clavulanate)	>3 mth: 30 mg/kg IV 6-8 hourly (based on Amoxicillin)	Adverse Reactions <ul style="list-style-type: none"> Hypersensitivity reactions (rash, urticaria, pruritus, severe reactions eg anaphylaxis); GI effects (diarrhea, N/V, rarely antibiotic-associated diarrhea/colitis); Other effect (candidal infections) Rarely hematologic effects; Renal & hepatic effects have occurred; High doses may be associated w/ CNS effects (encephalopathy, convulsions) Special Instructions <ul style="list-style-type: none"> Avoid in patients w/ Penicillin allergy Use w/ caution in patients w/ renal/hepatic impairment
Ampicillin/Sulbactam (Sultamicillin: Pro-drug of Ampicillin/Sulbactam)	>30 kg: 350-750 mg PO 12 hrly <30 kg: 25-50 mg/kg/day PO divided 12 hrly	
Piperacillin/Tazobactam	≥12 yr (>50 kg): 4.5 g IV 8 hrly	

VACCINES		
Drug	Dosage	Remarks
Influenza, inactivated, whole virus ¹ (Inactivated influenza vaccine) (Influenza virus strains type A & B determined annually by WHO according to surveillance data)	6-35 mth, Not previously vaccinated w/ influenza vaccine: 0.25 mL IM/deep IV x 1-2 doses at least 1 mth apart 6-35 mth, Previously vaccinated w/ influenza vaccine: 0.25 mL IM/deep IV x 1 dose 3-8 yr, Not previously vaccinated w/ influenza vaccine: 0.5 mL IM/deep IV x 2 doses ≥1 mth apart 3-8 yr, Previously vaccinated w/ influenza vaccine: 0.5 mL IM/deep IV x 1 dose ≥9 yr: 0.5 mL IM/deep IV x 1 dose <i>Followed by annual revaccination</i>	Adverse Reactions² <ul style="list-style-type: none"> Typically mild local reactions that last <2 days Systemic reactions (fever, malaise, myalgia) occur more commonly in patients w/o prior exposure to the virus antigens in the vaccine; Hypersensitivity reactions Special Instructions <ul style="list-style-type: none"> Contraindicated in individuals w/ anaphylactic reaction to egg proteins or to any hypersensitivity to any component of the vaccine Use w/ caution in patients w/ a history of Guillain-Barré syndrome
Influenza, live attenuated virus vaccine	Intranasal administration Administer as 0.1 mL per nostril 2-8 yr, Not previously vaccinated w/ influenza vaccine: 0.2 mL/dose X 2 doses at least 1 mth apart 2-8 yr, Previously vaccinated w/ influenza vaccine: 0.2 mL/dose X 1 dose ≥9 yr: 0.2 mL/dose X 1 dose Followed by annual revaccination	Adverse Reactions <ul style="list-style-type: none"> Resp effects (colds, nasal congestion, fever); Hypersensitivity reactions Special Instructions <ul style="list-style-type: none"> Contraindicated in individuals w/ anaphylactic reaction to egg proteins or to any hypersensitivity to any component of the vaccine, in patients w/ asthma, hematologic disorders, hemoglobinopathies, HIV, neurologic or neuromuscular disorders Use w/ caution in patients w/ a history of Guillain-Barré syndrome, nasal congestion

¹Various preparations of inactivated influenza vaccines (eg: Inactivated split virion, inactivated surface antigen & virosomal adjuvanted) are available.

²Adverse reactions may differ depending on the non-viral components of the specific influenza vaccine preparation.

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