

At 12:00 Am.

جيبك شي تاكله وتعال تسلى عالمايكرو



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Bacterial infections of the Respiratory Tract 2

Streptococcus Pneumoniae

General Information :

- ✓ gram-positive (have peptidoglycans) , lancet-shaped (oval) , diplococci
- ✓ a-hemolysis (have Pneumolysin [hemolysin] which is a pore-forming toxin that causes hemolysis) → shared feature with viridans streptococci. وعرفنا كيف نميز فيهم مكتوب بالملخص الي قبل ومهم تميزوا بينهم
- ✓ Capsules are important because they determine the Antigenicity & virulence of S. Pneumoniae + vaccination.
- ✓ The lower respiratory tract is completely sterile
- ✓ S. Pneumoniae and H. Influenza are part of the normal flora of the upper respiratory tract.

Factors that Predispose People to Pneumococcal Infections:

- ✓ factors either reduce mucus clearing or decrease immune reaction
 1. things that can depress the cough reflex: alcohol → increase aspiration
 2. Abnormality of the respiratory tract → prevent clearing of the mucus
 3. Abnormal circulatory dynamics → increase pulmonary secretions
 4. Splenectomy → sickle cell anemia and nephrosis
 5. Trauma to the head → leakage of spinal fluid through the nose

Pathogenesis	Virulence Factors:	Transmission	Diagnosis	Treatment	Prevention
bacteria moving to the lower respiratory tract by aspiration.	<p>-Capsular Polysaccharide most important, Vaccines are easily made for them. [antiphagocytic]</p> <p>-Lipoteichoic acid: complement activator</p> <p>-Pneumolysin: مكتوب فوق شرح عنها</p> <p>-IgA Protease: the organism's ability to colonize the mucosa of the upper respiratory tract</p>	<p>-Humans are the natural hosts for pneumococci; there is no animal reservoir.</p> <p>-endogenous origin يعني من النورمال فلورا عند الشخص نفسه ينتقل خلال ال aspiration</p>	<p>-gram-positive diplococci in Gramstained smears.(isolation)</p> <p>-If we only want to detect the presence of S. Pneumonia, we use the omnivalent serum . [Quellung reaction: antibody against the capsule].</p> <p>-On blood agar نفس قصة لما ميزنا بينه viridans + urine test : rapid antigen diagnostic test ومش دقيق ممكن يطلع false negative</p>	<p>-Penicillins طيب والي عنده حساسية بنسلين شو بنعطيه قولتكم ؟</p> <p>-Erythromycin</p> <p>-severe pneumococcal infections → penicillin G</p> <p>-mild pneumococcal infections → oral penicillin V</p> <p>-compination btw fluoroquinolone & levofloxacin</p>	<p>- Immuno-compromised: are given the 13-valent conjugate pneumococcal vaccine: booster doses every 5 years. [for age under 5 & immune compromised patient]</p> <p>- age 50 years or older: unconjugated 23-valent pneumococcal vaccine: booster doses at 65</p>

- ➔ Note : omnivalent serum contains antibodies targeting capsular serotypes .
- ➔ Vancomycin is the drug of choice for the penicillin- resistant pneumococci
- ➔ Ceftriaxone or levofloxacin can be used for less severely ill patients.
- ➔ conjugate → children unconjugated → adult

Diseases Caused by S. Pneumonia (pneumococcus)

1. Pneumonia
2. Bacteremia
3. Meningitis
4. URTIs
5. Conjunctivitis : common on children

Pneumonia (lower RT)

- ✓ 3 types of pneumonia:
 - a) community acquired → infectious cause from your community& the most common cause is S.Pneumonia)
 - b) health care associated → pneumonia acquired from hospitals caused by Pseudomonas aeruginosa, Klebsiella ,staph
 - c) ventilator associated → the top cause is Pseudomonas aeruginosa
- ✓ The most frequent cause of bacterial pneumonia
- ✓ | Most common lobes affected by S.Pneumonia are the middle right and lower left lobes.
- ✓ the most common cause of pneumonia is viral [Infiltration of both lungs]. The most common bacterial cause is S. Pneumonia [involves only one lobe or a segment of a lobe.]

Pathogenesis	Complications	Clinical Findings
-happens when a person aspires S. Pneumonia from their URT to the bronchial mucosa - The inflammatory reaction is focused primarily within the alveolus of a single lobule or lobe - consolidation: (lysed bacteria +their extracts+ RBCs+ WBCs +polymorphic nucleated cell	-Opacification - productive cough (cough with sputum) - empyema - Pericarditis is an uncommon	- pleuritic pain - feeling better after taking penicillin - the leading cause of sepsis in patients without a functional spleen

Otitis media & Sinusitis (Upper RT) :

- ✓ Middle ear infections (otitis media) → affect children between the ages of 6 months and 3 years.
- ✓ Acute otitis media is also called hot ear disease.

Meningitis (outside the scope of RS):

- ✓ leading causes of bacterial meningitis→ Str. Pneumoniae , H. influenzae , Neisseria
- ✓ The incidence is bimodal
- ✓ Main symptoms : Vomiting,fever& neck stiffness

Additional note :

- Strep. in general cause pyoderma & empyma .
- second & third common cause of meningitis alternate btw HI and Neisseria .

Hemophilus Influenza

- ✓ gram negative rods , **coccobacillary** ,encapsulated **with a polysaccharide capsule**
- ✓ six serotypes(A-F) →serotype B is responsible for more serious illnesses [composed of polyribitol phosphate(PRP), promotes antiphagocytosis and invasiveness]
- ✓ Unencapsulated Strains→ **less invasive**, limited to the upper RT[sinusitis and otitis media]
- ✓ Heme (factor X) and NAD (factor V): for adequate energy production.
- ✓ **Typeable H.I.:{A-F}& B is significant / Non-typeable H.I.: colonizers of normal person+ COPD**

Note : Meningiococcus G-ve coccus: capsulated which can colonize the respiratory epithelium

Pathogenesis	Clinical Findings	Diagnosis	Treatment	Prevention
<p>-Reservoir: only humans with no animal reservoir</p> <p>-Transmission: inhalation of airborne droplets[asymptomatic colonization or infection]</p> <p>- Virulence Factors: produces an IgA protease , the capsules the main virulence factor+ immunogenic</p> <p>-Pyogenic with no exotoxin production</p>	<p>- Meningitis : stiff neck, (neurological symptoms; drowsiness), is typical</p> <p>- Upper RTI redness with bulging of the tympanic membrane + H. influenzae is second only to the pneumococcus</p> <p>- Epiglottitis: Rare , obstruct the airway , drooling, stridor (high pitched breathing noise) , thumb sign , cherry red</p>	<p>- chocolate agar +factor x and factor V</p> <p>- Quellung reaction</p>	<p>- meningitis and serious systemic infections → ceftriaxone</p> <p>- H. influenzae upper RTI → amoxicillin-clavulanate or trimethoprim-sulfamethoxazole</p>	<p>- Vaccine: contains the capsular type B conjugated to diphtheria toxoid. given some time between the ages of 2 and 15 months.</p> <p>[This vaccine is much more effective in young children than the unconjugated vaccine]</p> <p>- Meningitis in close contacts of the patient can be prevented by rifampin (reducing transmission)</p>

اللَّهُمَّ اتَّقِنَا بِمَا عَلَّمْتَنَا، وَعَلِّمْنَا مَا يَنْفَعُنَا، وَزِدْنَا عِلْمًا وَيُبْرِكْ لَنَا فِيهِ.