



Respiratory module

Part 2

MICROBIOLOGY

7- *Corynebacterium diphtheriae*

Cause Diphtheria : الخناق

Acute Communicable diseases that Occurs in Children and Become less Common due to Immunization

1-Structure : Gram +ve Bacilli " Non Spore Forming "

" Coryne : Club shape " شبة المضرب

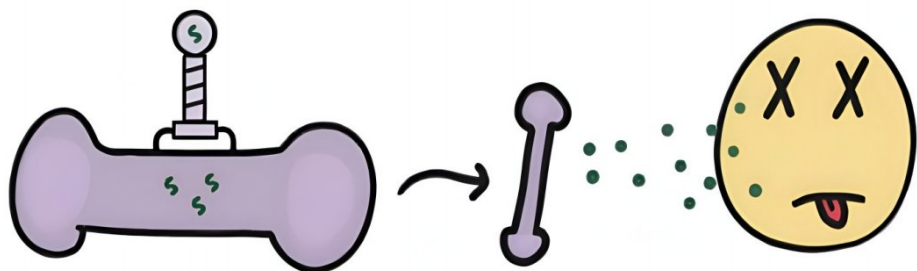


2-MOT : Respiratory Droplet from Carrier & Case

3-Pathogenesis : Virulence Factors : Diphtheria Exotoxin

ability of *C.diphtheriae* to produce Toxin is due to prescence of Prophage " gene of Virus " for Toxin production is Carried on this Prophage the Acquisition of Phage leads to Toxicity : Lysogenic Conversion

Inhibit Elongation Factor 2 : EF2 Resulting in Inhibition of the Protein synthesis and Tissue Necrosis



Bacteriophage Insert Toxin gene Into the Bacteria

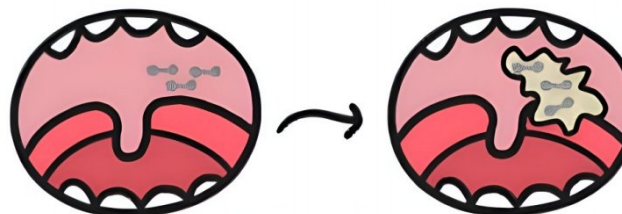
Bacteria Now is Able to Secret Toxin and Kills Cells

4- C/P : IP : 2-5 days

- *C.diphtheriae* Implants on the Mucosa in URT

FAHM + Sore throat " Pharyngitis "

By the Effect of The Toxin causes Necrosis of the Mucosal epithelium leading to Formation of Dirty grey Pseudomembrane with abundant Fibrinolytic Exudate



The Organism doesn't Penetrate Deeply into mucosal Tissue " NOOOOOO bacteremia " just Toxemia

5- Complications :

1-Laryngeal Obstruction due to Edema of the Larynx and Perioheral Neuritis

2-Suffocation due to Sloughing and Aspiration of This Pseudomembrane Leading of Obstruction of airways

3-Absorption of Exotoxins Producing Myocarditis , peripheral Neuropathy



6- Lab Diagnosis :

Based on Clinical Manifestation + History of Contact
lack Immunization + travelling to endemic area



to Differentiated between *C. diphtheria* and Other Types

Specimen : swab from Throat , nose , any other Lesions



1- Direct Smear : G +
Club shaped : bacilli
" Chinese letter "



2- Cultivation :
Loeffler's serum
medium



3- K Tellurite
media

4- Toxicity test : " in reference lab " Elek's test or ELISA

5- PCR : TOX Gene on Clinical Specimen

6- TTT :

Antitoxin " Life saving " should never be delayed once diagnose Diphtheria

7-Prevention :

A- Vaccine Called " DPT " at age of 2,4,6 month route is
IM Diphtheria Toxoid + Pertussis Vaccine + Tetanus Toxoid

B- Booster dose Contain Diphtheria & Tetanus Toxoid " DT " only are given at 1.5 years at School age and every 10 years



8-Borrelia Vincenti

Cause Vincent's angina

Commensal Flora in the Mouth

1- Structure :

G-ve Helical , irregular , Loosely , Coiled
Bacteria " Spirochetes " + anaerobic



2- Pathogenesis & C/P :

in Case of Injury of Mucous Membrane ,
Immunodeficiency , Malnutrition , Herpes Infection

Borrelia Vincentii with anaerobic Fusiform Bacilli
" Fusobacteria " Flourish and Increase in Number

Vincent's angina

Ulcers on the Tonsils and the Gums with
Pseudomembrane containing Pus , Necrotic
Tissue that Result

Ulcerative Gingivostomatitis : Trench mouth



3-Lab Diagnosis : Swab from Pseudomembrane

Gram stain & Giemsa : *Borrelia Vincenti* and *Fusobacteria*
& large number of Pus cells

Culture : deep column of Broth enriched with ascitic
fluid and Incubated anaerobically

9- Haemophilus Influenzae

Cause Life Threatening Condition " Epiglottitis "

1- Structure : Small G-ve rod : Coccobacilli

the Most of Virulent Strains of H.influenza have a polysacchride Capsule
the Others are non Capsulated

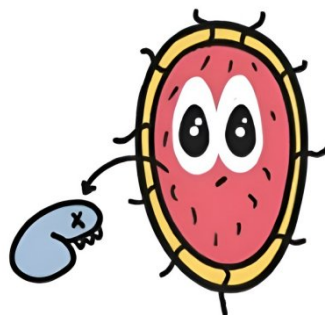
Capsulated Strains are 6 types " a-f ". type b is the Most virulent

Virulence factors :

A- Polysaccharide Capsule formed of polyribitol phosphate " PRP component " Most Important "

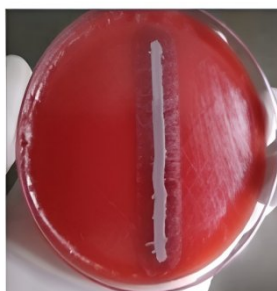
B- Ordinary Pili for adhesion

C- IgA protease



Growth requirement it doesnt grow in ordinary media

it needs Growth factor like Hemin and NAD . it Grow in Chocholate agar which contain these Growth factors at 37 c and 5-10 % CO2 " Capnophilic "



Satalism

H. Influenza Grows well around S aureus agar due to S aureus form Complete hemolysis and Release GF for H.influenza " Satalism "

2- MOT : 1- Close Contact with Infected Individual

2- Respiratory Droplet

3- Pathogenesis :



Normal

Swell , Block the flow of air into Lungs



Airway obstruction
Severe & High Mortality

4- C/P :

Common Symptoms		
1- FAHM	2- Pharyngitis	3- Irritability
Specific to Children		Specific to Adult
1- Dyspnea 2- Muffled " HoarseVoice " 3- High pitched abnormal Breathing Sound : Stridor		1- Dysphagia 2- Drooling
Potential Lifethreatening Condition :		

5- lab diagnosis : 1- Made Clinically 2- Isolating Bacteria from Blood

6-Prevention : Immunization against H.influnza type B and S.pneumoniae

10-Mucor , Rhizopus & Absidia Cause Fungal Sinusitis

present abundantly in soil and any infection caused by these fungi is named as **mucomycosis** " العفن الاسود "

1- Structure :

Broad non sepatate hyphae " Filamentous " and Broad Branching

2- MOT : Inhalation of Spores

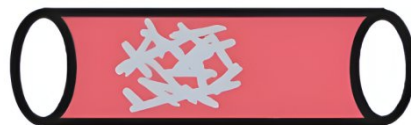
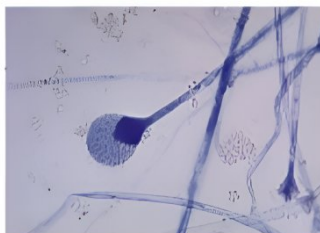
Risk factors : Immunodeficiency

- | | |
|--------------------------|---------------------|
| 1- Diabetic Ketoacidosis | 4- Severe Burn |
| 2- Leukemia " Lymphoma " | 5- High serum Iron |
| 3- Overdose Steroid | " Hemachromatosis " |

3- Pathogenesis & C/P :

Germination in a nasal passage and Invasion of Hyphae into Blood Vessel causing **Thrombosis**

Ischemic Necrosis Cause Mass Destruction

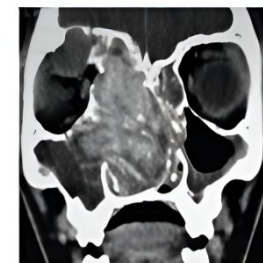


The Affected Skin is normal in Early Stage and Become Red , Edematous then Black due to Tissue Death nad Bloody nasal Exudate



4- Complication :

the Disease may progress with invasion of Sinus , Obitr Causing Orbital Cellulitis , eye , Crainial Bone and Brain



5- Lab diagnosis :

- A- CT Coronal View : Mucomycosis
- B- Specimen from Nasal Discharge & Bisopsy
- C- Direct microscopic Examination or Culture & Sensitivity

6- TTT :

- A- Correct predisposing factor
- B- Surgical Debridement
- C- Systemic antifungal : **Amphotericin B**

11- Human-Para-influenza-Virus : HPIV

1- Structure : belong to paramyxovirus

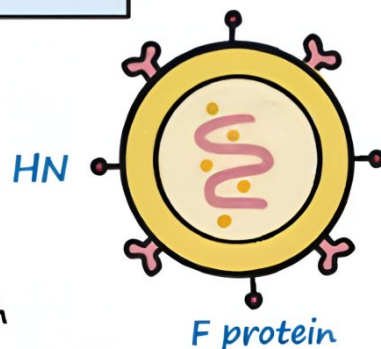
A- Genome : -ve sense ss RNA

B- Caspid : nucleocapsid

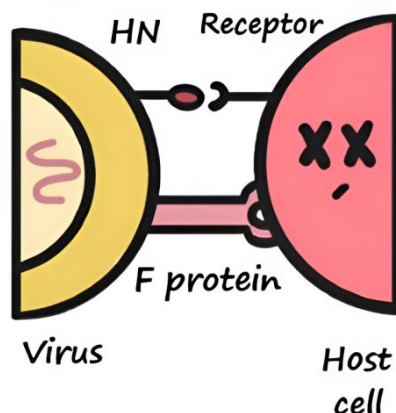
C- Enveloped

Envelope : Lipid enveloped is associated with 2 viral Specific glycoprotein

Classified into 4 Serotypes : HPIV 1 , HPIV 2 , HPIV 3 , HPIV 4



A- Hemagglutinin Neuraminidase : HN protein	B- Fusion : F protein
1- promote the Fusion between the Host Cells leading to Syncytium Fotation	promote the Fusion between Host and Viral Cell membrane
2- Viral attached to RBCs to make Hemadsorption & hemagglutination	

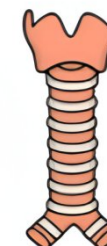


2- Pathogenesis :

The Virus attach to Host Cells and Envelope fuse with Host Cell Membrane

The Virus Replicate throughout the Laryngeotracheobronchial Tree Including Mucous Production

the Vocal cord of Larynx Become Grossly Swollen causing Obstruction of Inflow of air : Inspiratory Stridor



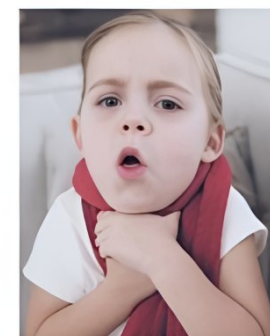
3- C/P : According to age

A- Adult

Limited to URT " Common Cold "

B- Infant and Young Children

Bronchi & Bronchioles & Lung envolved due to : Small Size & relative Immaturity



Diseases Caused by HPIV

HPIV 1 , 2	Croup " Laryngeotracheobronchitis "
HPIV 3	mild to Sever Respiratory illness
HPIV 4	Bronchiolitis , Bronchitis , Pneumonia

4- Lab Diagnosis : Mainly Clinically

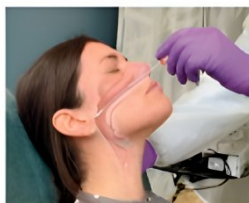
Specimen by :



Nasal wash



Bronchoalveolar Lavage



Nasopharyngeal aspirate

1- Direct virus Demonstration : DIF for viral ag

2- Viral Isolation and Identification :
CPE for Syncytia Formation

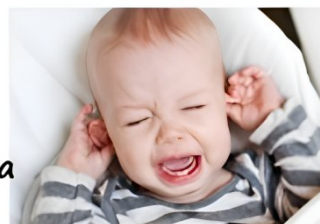
3- Viral growth is Detected by Hemadsorption by DIF

4- Serotypes is Identified with Specific Antiserum

Seriology : Nt , HI , ELISA test for
Detection IgM or IgG : rising titer

Acute Otitis media

Acute infection
of Middle ear



M/C organism : Strepto Pneumoniae , Moraxella
Catalralis , Hemophilus Influenza **الثلاثي المرح**

Lab diagnosis :

- 1- Mainly clinical
- 2- C/S
- 3- Needle Aspiration of middle ear fluid

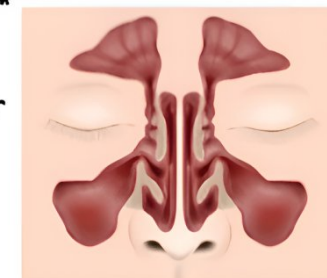
Acute Sinsuitis

it's acute Inflammation of Paranasal Sinus

M/C oragnism : Viral + Bacterial **الثلاثي المرح**

1- Pathogenesis :

if Symptoms worsen after 3-5 days or
Persist for longer than 10 years and
More severe than normal Experienced
with Viral infection a 2nd bacterial
infection is Diagnosed



if acute Sinusitis doesnt Resolve , Chronic Sinsusitis can
develop from Mucous , Retention , hypoxia blockage of Ostia

2- C/P :

- | | |
|-----------------------|-------------------------|
| 1- Purulent Discharge | 3- Facial or Sinus Pain |
| 2- Nasal Congestion | 4- Headache |

3- Lab diagnosis : Mainly Clinical and by Radiography