* Respiratory Infections in Immuno-compromised Hosts
* Assist Prof Microbiology
* Dr. Syed Yousaf Kazmi
* LEARNING OBJECTIVES
* Describe pathogenesis, clinical findings and lab diagnosis of rhino-cerebral mucormycosis
* Describe pathogenesis, clinical findings & laboratory diagnosis of *pneumocystis jiroveci* pneumonia
* RHINO-CEREBRAL MUCORMYCOSIS

Introduction

* Opportunistic mycosis(Fungus)
* *Rhizopus oryzae* 60% cases
* Others-*Rhizomucor, Absidia, Mucor* etc.
* Very lethal infections
* Usually not diagnosed until death
* Recent increase incidence due to ?
* PATHOGENESIS
* Saprophytic mould-decaying organic matter
* Widely present in environment
* Spores in air-Inhaled
* Reach para-nasal sinuses
* Acidosis esp Diabetic ketoacidosis-very strong link
* Other conditions-leukemia, steroid therapy, burns, immunodeficiency, dialysis with iron chelator
* PATHOGENESIS
* Spores in sinuses germinate
* Hyphae invade the blood vessels
* Thrombosis and infarction
* Ischemic necrosis of part distal to necrosis
* Plane for invasion of fungus
* Sinuses, bones, cartilage, eye, brain tissue invaded
* No body planes hinder its spread
* Clinical features
* Rapid and fulminant course
* Oedema face, eye
* Bloody nasal discharge
* Fever, general illness
* Confusion, delirium
* Death in serious cases
* Laboratory diagnosis

CLINICAL SUSPICION IS UTMOST IN EARLY DIAGNOSIS & TREATMENT

* Blood Glucose- High in DKA
* Urine ketone bodies-+ve in DKA
* Blood pH-usually low
* Blood CP- usually high TLC, Low Hb
* Laboratory diagnosis
* Nasal swab/ fluid for microscopy
* Usually negative by Gram stain
* Special fungal stains required
* Nasal swab/ fluid for fungal culture
* Special fungal culture medium e.g. Sabauraud Agar
* Rapid growth
* Identification by microscopy
* Tissue for H/P
* Stain for fungal hypha
* Non septate hyphae
* *Pneumocystis jiroveci* pneumonia
* *P. jiroveci* –fungus
* Present in environment
* Many healthy people harbour this fungus
* Opportunistic mycosis
* Most common cause of non-bacterial pneumonia in AIDS patients
* Cell mediated immunity-limits infection by this fungus
* *Pneumocystis jiroveci* pneumonia

Transmission

* Person to person transmission
* Environment to person
* Own flora of throat?

Predisposing conditions

* HIV infection
* Malnourished
* Steroid therapy
* Antineoplastic treatment
* Organ transplant recipient
* *p. JIROVECI* PNEUMONIAPATHOGENESIS
* Cell mediated immunity is central in combating the *Pneumocystis jiroveci*  pneumonia
* *Pneumocystis jiroveci*  pneumonia is strongly related to AIDS
* The infection usually occurs when CD4 count drops below 400/uL
* *p. JIROVECI* PNEUMONIAPATHOGENESIS
* Cysts of *Pneumocystis jiroveci* are inhaled from environment which enter alveoli
* Inflammatory response to cyst
* Frothy exudate accumulates in alveoli that block gaseous exchange
* Pneumonia develops due to fluid in lung-hinder gaseous exchange across alveolar membrane
* *p. Jiroveci* pneumonia-  
  clinical features
* Progressive exertional dyspnoea (95%)
* Fever (>80%)
* Non-productive cough (95%)
* Chest discomfort
* Weight loss
* Chills
* Haemoptysis (rare)
* Laboratory diagnosis
* Serum LDH(NV<95 IU/L)
* Usually elevated in PNP(> 200 IU/L)
* High sensitivity but low specificity
* Bronchoalveolar lavage / lung biopsy for cyst stain.
* Methenamine silver, Giemsa, Calcofluor white
* Gram stain not effective
* Immuno-fluorescent staining
* On broncho-alveolar lavage, lung biopsy specimen
* Sensitive test
* Laboratory diagnosis
* PCR
* Rapid and sensitive test
* Serology
* Not useful in acute infection
* Used in establishing the prevalence of *P. jiroveci*  infection