

- RESPIRATORY INFECTIONS
IN IMMUNO-COMPROMISED
HOSTS

- ASSIST PROF
MICROBIOLOGY

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- 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.

Sabouraud 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* PNEUMONIA

PATHOGENESIS

- 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*

PNEUMONIA

PATHOGENESIS

- ❑ 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