Pneumocystis Pneumonia: Prevention & Treatment

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Last Updated: June 9, 2022
No conflicts of interest or relationships to disclose.
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Funding for this presentation was made possible by U1OHA29296 from the Human Resources and Services Administration HIV/AIDS Bureau. The views expressed do not necessarily reflect the official policies of the Department of Health and Human Services nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government. Any trade/brand names for products mentioned during this presentation are for training and identification purposes only.
Pneumocystis Pneumonia

- Prevention
  - Criteria for starting & stopping prophylaxis
  - Prophylaxis options & other considerations

- Treatment
  - Recommended agents for mild-moderate or severe PCP/PJP
  - Adjunctive therapy & managing non-response to treatment
What kind of organism is *Pneumocystis*?

A) Bacteria
B) Virus
C) Protozoa
D) Fungus
What is unique about *Pneumocystis* compared to other fungi?

A) Cell wall contains a polysaccharide component called galactomannan

B) Lacks common fungal cell wall components (e.g., ergosterol)

C) Grows as broad hyphae with right-angle branching visible on culture

D) Dimorphic (can exist as mold or yeast depending on temperature)
Pneumocystis: Prevention
Pneumocystis Prevention
Initiating Primary Prophylaxis for Adults & Adolescents, Including Pregnant Persons

- Indications:
  - CD4 count <200 cells/mm³ (Al)
  - CD4 percentage <14% (BII)
  - CD4 count 200-250 cells/mm³, not taking ART, and can’t monitor frequently (BII)
  - Oral thrush or AIDS-defining illness (speaker addition)
# Pneumocystis Prevention Options for Prophylaxis

## Trimethoprim-sulfamethoxazole
- DS tab daily preferred; also prevents toxoplasmosis (AI)
- SS tab daily effective & may be better tolerated (AI)
- DS tab 3 times per week also effective (BI)

## Dapsone
- Check G6PD level
- 100 mg daily (BI); does not prevent toxoplasmosis

## Atovaquone
- Liquid, expensive
- 1500 mg daily (BI); may prevent toxoplasmosis

## Inhaled pentamidine
- Several limitations
- 300 mg monthly (BI); does not prevent toxoplasmosis

Pneumocystis Prevention
Discontinuing Prophylaxis

• CD4 count >200 cells/mm³ for at least 3 months (AI)

• European COHERE database review (>23k PWH, >100k PYFU)
  - CD4 101-200 cells/mm³ and HIV RNA <400 copies/mL
    • No difference in PCP incidence if receiving primary prophylaxis or not
    • 0 cases of PCP in those who discontinued primary prophylaxis

• “One approach…” stop prophylaxis when CD4 count 100-200 cells/mm³ if HIV RNA below limits of detection for ≥3-6 months (BII)
• Preventing initial exposure difficult; largely ubiquitous organism

• Should hospitalized patients with PCP/PJP be separated from other immunosuppressed hospitalized patients? Yes
  - Organism can be detected/quantified in air near patients with infection
  - Outbreaks in renal transplant and other units documented

• CDC: “avoid placement in the same room as an immunocompromised patient”
Pneumocystis: Treatment
Pneumocystis Treatment
Recommended Options

- Outpatient
  - No significant hypoxia
  - Able to take PO
  - Adherent to meds

- Inpatient
  - Significant hypoxia
  - Unable to take PO
  - Comorbidities
  - *Remember illness may worsen initially!

**Mild disease**
- Oral TMP-SMX (AI)
  - TMP + Dapsone* (BI)
  - Clindamycin + Primaquine* (BI)
  - Atovaquone (BI)

**Severe disease**
- IV TMP-SMX (AI)
  - IV Pentamidine (AI)
  - Clindamycin + Primaquine* (AI)

**Other considerations**
- RCT’s all done prior to 1999
- TMP-SMX dose based on limited data
- Patient population, ART use, and critical care protocols different
- Retrospective data: lower TMP-SMX doses as effective, better tolerated
- OI guidelines: lower doses may be considered, but RCT data unavailable

-OI Guidelines (clinicalinfo.hiv.gov)

- TMP-SMX dosing study: RCT planned (NCT04851015) comparing 10 mg/kg/day TMP vs 15 mg/kg/day
- McDonald et al: consider lower dose if older, baseline CKD, hyperK, low suspicion for PCP/PJP

*Check G6PD
Pneumocystis Treatment
Key Clinical Reminders

- Empiric treatment ok? Yes
- Standard course: 21 days
- Corticosteroids if: **PaO2 <70 or A-a gradient >35** (ABG is key!)
  - Oral prednisone (start ASAP, ideally within 72 hours of initiating treatment)
    - Example: days 1–5: 40 mg BID, days 6–10: 40 mg QD, days 11–21: 20 mg QD
  - Or, IV methylprednisolone at 75% of prednisone doses
- Alter treatment based on prophylaxis? No
- Start ART within 2 weeks of PCP treatment? Yes

OI Guidelines (clinicalinfo.hiv.gov)
Pneumocystis Treatment
Considering Treatment Non-Response

- Illness often worsens during first **3 to 5 days**
  - Wait **4 to 8 days** before switching therapy for lack of clinical improvement

- What to do if suspect treatment failure? Unclear…
  - Rule out concomitant infection (e.g., obtain or repeat BAL)
  - Switch oral meds to IV? IV med to alternate agent?
  - Add additional agent? Add echinocandin?
  - Increase steroid dose? Prolong the steroid taper?
  - Extend treatment (and steroid) duration?
Acknowledgment

This Mountain West AIDS Education and Training (MWAETC) program is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling $3,098,654 with 0% financed with non-governmental sources.

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