Pneumocystis Jiroveci (Carinii) Infection

Shelli Farhadian, MD PhD
Lydia Barakat, MD

Objectives:
1. Identify pulmonary opportunistic infections in HIVinfected patients
2. Recognize the clinical presentation of PJP
3. Learn about treatment modalities for PJP

Case:

Ms PJ is a 45 year old woman who presents to the ED with four weeks of cough. She had previously been followed at the local HIV clinic, where she originally presented ten years ago, with candida esophagitis and a CD4 count of 49. She was started on anti-retroviral therapy, as well as TMP/SMX and azithromycin for primary opportunistic infection prophylaxis. Ms PJ had done well over the years, with a rise in her CD4 count above 200 and reduction in viral load to undetectable, and prophylactic antibiotics were stopped. Three years ago, she was briefly incarcerated, and was subsequently lost to follow-up. She has not seen any providers since her incarceration.

On admission, she tells you that she has had four weeks of a dry cough and shortness of breath that is worse with exertion. She has had intermittent fevers at home and 10 pound weight loss over the last three months. She is a non-smoker and denies injection drug use. Ms PJ lives in New Haven and has not recently travelled outside of the area.

On initial exam, she is in mild respiratory distress. She in thin, weighing 50 kg. She has fever to 101.1, heart rate of 90, blood pressure 110/75, respiratory rate 30, and SpO2 90%, which decreases to 81% with ambulation. She has oral thrush. No rash or skin lesions. She has no palpable lymphadenopathy. She has fine inspiratory crackles throughout both lungs. She had RRR with no S3. No lower extremities edema.

The rest of the exam is unremarkable. Initial laboratory testing reveals a CD4 count of 177 per mm^3 and WBC count 10,000. Chest X-ray shows diffuse, bilateral interstitial infiltrates.

Question 1:
Which of the following are the most likely possible diagnoses for this patient? What aspects of the history and exam support the most likely diagnosis?
a. Pneumocystis jirovecii pneumonia, bacterial pneumonia, cryptococcus pneumonia
b. Pneumocystis jirovecii pneumonia, bacterial pneumonia, pulmonary TB
c. Pulmonary embolism, pulmonary TB, Histoplasma pneumonia
d. Bronchogenic carcinoma, pulmonary aspergilloma, pulmonary TB

Question 2
What further studies would you obtain at this point?
a. induced sputum culture, chest CT-scan, ABG
b. bronchoscopy with broncheoalveolar lavage, LDH, ABG
c. open lung biopsy, chest CT-scan, LDH

Case continued: Initial laboratory results show PaO2 70mmHg, A-a gradient 43, LDH 400. Methenamine silver stain of induced sputum shows a cluster of cystic inclusions consistent with Pneumocystis jirovecii infection

Question 3
What is the best treatment approach to this patient?
a. TMP-SMX: 15-20mg/kg/day TMP component by IV, then 2 DS tabs PO every 8 hours
b. TMP-SMX: 1 DS tab per day
c. TMP-SMX: 15-20mg/kg/day TMP component by IV, then 2 DS tabs PO every 8 hours, PLUS prednisone
d. TMP-SMX: 1 DS tab per day PLUS predniso**ne**

Question 4
When would you start anti-retroviral treatment (ART)?
a. immediately
b. within 2 weeks
c. in 3 months
d. after PCP resolves

Case continued: Your patient is started on 40mg prednisone twice a day as well as TMP-SMX. She initially feels worse, but by day 7 she is improving, with better oxygenation and she is transitioned to oral TMP-SMX. On day 10 you initiate ART. The patient does well and is discharged to home. Three weeks later, she develops recurrent fever and worsened dyspnea.

Question 5
What are possible complications of PCP and its treatment? How can you tell if this person has Immune Reconstitution Inflammatory Syndrome (IRIS)?

References:

*Thomas, Charles and Limper, Andrew. “Pneumocystis Pneumonia” N. Engl. J. Med. 2004;350:2487

*Centers for Disease Control and Prevention. Guidelines for Prevention and Treatment of Opportunistic Infections in HIV-Infected Adults and Adolescents. MMWR 2009;58 (No. RR-4) April 10, 2009:[pages 6-10].

Additional References:

Ball, Susan C. "Pneumocystis pneumonia in a person with a low CD4 count after stopping antiretroviral therapy." The AIDS reader 17.12 (2007):583-6, 593.

Briel M, Bucher HC, Boscacci R, Furrer H. Adjunctive corticosteroids for Pneumocystis jiroveci pneumonia in patients with HIV-infection.
Cochrane Database Syst Rev. 2006

Croda J, and al. Benefit of antiretroviral therapy on survival of human immunodeficiency virus-infected admitted to the intensive care unit. Crit.Care Med. 2009;37(5):1605

Dworkin M, Hanson, D and al. Survival of Patients with AIDS, after diagnosis of Pneumocystis carinii Pneumonia, in the United States. JID 2001;183:183:1409

Huang L. Pulmonary Manifestations of HIV. HIV InSite Knowledge Base Chapter. January 2009. http://hivinsite.ucsf.edu/InSite?page=kb-04-01-05

Kovacs JA, Gill VJ. And al. New insights into transmission, diagnosis, and drug treatment of Pneumocystis carinii pneumonia. JAMA 2001;286(19):2450

Safrin S, Finkelstein DM, Feinberg J, Frame P, Simpson G, Wu A, Cheung T, Soeiro R, Hojczyk P, Black JR Comparison of three regimens for treatment of mild to moderate Pneumocystis carinii pneumonia in patients with AIDS. A double-blind, randomized, trial of oral trimethoprim-sulfamethoxazole, dapsone-trimethoprim, and clindamycin-primaquine. ACTG 108 Study Group. Ann Intern Med. 1996;124(9):792.

Smego RA, NagarS, and al. A meta-analysis of salvage therapy for Pneumocystis carinii pneumonia . Arch. Intern. Med 2001;161(12):1529

Thompson MA, Aberg JA, Cahn P, Montaner JS, Rizzardini G, Telenti A, Gatell JM, Günthard HF, Hammer SM, Hirsch MS, Jacobsen DM, Reiss P, Richman DD, Volberding PA, Yeni P, Schooley RT, International AIDS Society-USA. Antiretroviral treatment of adult HIV infection: 2010 recommendations of the International AIDS Society-USA panel. JAMA. 2010;304(3):321.

Wilkin, A, and JFeinberg. "Pneumocystis carinii pneumonia: a clinical review." Am Fam Physician 60.6 (1999):1699-708, 1713.

Zaman MK, White DA. Serum lactate dehydrogenase levels and Pneumocystis carinii pneumonia. Diagnostic and prognostic significance. Am Rev Respir Dis. 1988 Apr;137(4):796-800

Zolopa, A, Andersen, J, Powderly, W, et al. Early antiretroviral therapy reduces AIDS progression/death in individuals with acute opportunistic infections: a multicenter randomized strategy trial. PLoS ONE 2009; 4:e5575. Epub 2009 May 18.