



Case 70: Fever

- **Chief complaint**
 - 40-year-old male presents with fever
- **Vital signs**
 - **HR: 108 BP: 101/58 RR: 25 Sat: 87% on RA T: 38.8°C Wt: 50 kg**
- **Patient appearance**
 - Patient appears thin, alert, warm to touch
- **Primary survey**
 - Airway: speaking normally
 - Breathing: mild respiratory distress, no cyanosis
 - Circulation: warm skin, 2+ distal pulses
- **Action**
 - Place patient on the monitor
 - Oxygen by NC
 - Two large bore peripheral IV lines (draw rainbow top)
 - 1 L IVF bolus
 - POC glucose (120, if ordered)
- **History**
 - Source: Patient
 - HPI: a 40-year-old male presents with a cough for three weeks, initially non productive and now with some green sputum. Over the last 3 days, he developed a fever and shortness of breath, initially with exertion and now even at rest. He also reports some chest pain with deep inspiration and diarrhea, non-bloody. If asked, he will endorse weight loss, night sweats and general malaise for over a month. He denies any headache, neck pain, hemoptysis, vomiting, abdominal pain. No recent travel, antibiotics or sick contacts. Did receive his COVID vaccine.
 - PMHx: none, but hasn't seen a doctor in years
 - PSHx: none
 - Allergies: none
 - Meds: none
 - Social: former IV drug use, daily smoker, social alcohol; not sexually active
 - FHx: non-contributory
 - Code Status: full code

- **Physical Exam**

- **General:** awake and alert, thin, mild respiratory distress
- **HEENT:** thick white coating on tongue and mouth (scrapes off, if asked)
- Neck: normal, supple, no stiffness
- Chest: nontender
- **Heart:** tachycardic
- **Lungs:** decreased breath sounds bilaterally with crackles at bases
- Abdomen: normal
- Extremities: normal
- Back: normal
- Neuro: normal
- Skin: normal

- **Instructor Prompt:** learners should discuss differential diagnosis (with history of not seeing a doctor and IVDU, concern should be had for undiagnosed HIV/AIDS)

- **Action**

- Order Labs
 - CBC, BMP, LFT, PT/INR, PTT, troponin, blood cultures x2, lactate, ABG, urinalysis, urine culture, HIV, lymphocyte panel, LDH
 - Consider hepatitis panel, 1-3-beta-d-glucan, RPR
- Order Imaging
 - Stat portable CXR
 - ECG
- Order Meds
 - 30 cc/kg IVF bolus for sepsis (1.5 L)
 - Ibuprofen or acetaminophen
 - Empiric antibiotics: Ceftriaxone 1g IV, Azithromycin 500 mg IV, trimethoprim-sulfamethoxazole 5 mg/kg IV
- Move patient to negative pressure isolation room (airborne precautions due to risk of TB)

- **Response/Results**

- Patient reevaluation and repeat vitals:
 - Vitals after fluids, antipyretic and O2: **HR: 100**, BP: 110/60, **RR 22**, Sat: 95% on 4L, T: 37.5°C
 - Vitals if no fluids given: **HR: 115 BP: 98/50** (Prompt: give intervention)
- [Case 70 Lab Results](#) (sig for WBC 1.1, lymphocytes 0.8, HCO3 18. Cr 1.7, ABG pH 7.3/PaCO2 33/PaO2 60/ HCO3 18)
- Additional Lab Results: **lactate 3.8, LDH 350, HIV positive**, other lab results are still pending
- ECG (verbal report- sinus tachycardia otherwise normal)

- CXR ([Figure 70.1](#): interstitial infiltrates in a “bat-wing” distribution)
- **Instructor Prompt:** discuss significance of low lymphocyte count and ABG results
- **Action**
 - Discuss case with Infectious Disease consultant
 - Consultant recommendations include adding IV trimethoprim-sulfamethoxazole 5 mg/kg if not already ordered, fluconazole 100 mg for thrush and steroids (40 mg prednisone PO)
 - Update patient regarding likely HIV diagnosis and plan
 - Admit patient to medicine (consider step down), isolation (airborne precautions)
- **Diagnosis**
 - Primary Diagnosis: Pneumonia, likely PCP
 - Secondary Diagnoses: Oral thrush, HIV/AIDS
- **Critical actions**
 - Identification of sepsis including giving fluids
 - Oxygen therapy
 - Workup for infectious source, with HIV on differential
 - Antibiotic therapy including bactrim
 - Steroids for PaO₂ < 70 mmHg
 - Appropriate isolation for risk of TB
- **Instructor Guide**
 - This is a case of fever and respiratory symptoms in a patient without medical history but significant social risk factors. The patient initially presents tachycardic, tachypneic and hypoxic. Important early actions include recognizing sepsis, starting fluids and placing on oxygen. Important historical clues include history of IV drug use and his history of weight loss, night sweats, general malaise. His absolute lymphocyte count is < 1000, also clueing in for an immunocompromised state. The patient should be given IV antibiotics including trimethoprim-sulfamethoxazole as PCP is suspected and steroids for a PaO₂ < 70. Given his immunocompromised state, he is at risk for TB and should be placed in airborne precautions when admitted.
- **Case Teaching Points**
 - The differential for fever and respiratory symptoms should include sepsis possibly due to pneumonia, tuberculosis, myocarditis (less likely without any chest pain and normal cardiac markers), pulmonary embolism (less likely given the night sweats, and weight loss), septic emboli, and COVID-19.
- **What are risk factors associated with acquiring HIV infection?**

- Some risk factors include sexual transmission with the majority of HIV cases in the US occurring through men who have sex with men, IVDU, blood transfusion prior to 1985 and maternal HIV infection.
- New HIV infection rates continue to rise among disadvantaged minority populations.
- **What are the clinical stages of HIV?**
 - Stage 1 (acute retroviral syndrome)
 - Occurs 2 to 4 weeks after infection
 - Nonspecific presentation, flu-like illness; diagnosis is missed in 75% of cases
 - Symptoms occur within a month of being infected and include:
 - Fever, fatigue, pharyngitis, rash, headache, lymphadenopathy, weight loss, headache and diarrhea
 - Stage 2 (clinical latency)
 - Patients have no complaints
 - If not taking meds, median time is 10 years before development of AIDS
 - Stage 3 (AIDS)
 - CD4 count < 200 or occurrence of AIDS defining illness
- **What is the most common type of pneumonia in a patient with HIV and what opportunistic infections should be considered?**
 - HIV patients are more likely to get typical community acquired infections. *Streptococcus pneumoniae* is the most common, followed by PCP and tuberculosis.
 - As the CD4 count drops, consider these infections
 - <500: TB, HSV, zoster, Kaposi's
 - <200: PCP (*Pneumocystis jirovecii*), candidiasis
 - <100: toxoplasmosis, histoplasmosis, cryptococcus, MAC (*Mycobacterium avium* Complex)
 - <50: PML (Progressive Multifocal Leukoencephalopathy), CMV (GI, Pulm, retinitis), CNS lymphoma
- **What are the typical symptoms, work-up, and treatment for PCP pneumonia?**
 - Typical symptoms
 - Fever, cough (usually nonproductive) and shortness of breath, progressing from only with exertion to at rest
 - Specific workup
 - CBC with diff - a total lymphocyte count <1700 correlates well with a CD4 count < 200
 - Order a CXR - often shows diffuse interstitial infiltrates or granular pattern ("bat-wing appearance")
 - Consider LDH - may be elevated in patients with PCP but has low sensitivity and specificity
 - ABG - usually demonstrates hypoxemia and an increase in the A-a gradient
 - Treatment

- First line is trimethoprim-sulfamethoxazole 15-20 mg/kg per day -> two double strength tablets TID x 21 days or 5 mg/kg IV 3-4x/day
- Can also use pentamidine IV (caution due to side effects of hypoglycemia, hypotension), trimethoprim-dapsone or atovaquone
- Steroids (prednisone at 40 mg BID, tapering over 21 days) in patients with PaO₂ <70 mm Hg or A-a gradient >35 mm Hg
- Start or continue anti-retroviral therapy

- **Why obtain 1-3-beta-D-glucan in labs?**

- Component found in the cell wall of *P. jirovecii*
- Elevated plasma levels have been found in patients w/ HIV and PCP
- PCP pneumonia is suspected in patients with levels greater than 80 pg/mL
- Has a sensitivity and specificity of 92% and 65% respectively
- Elevated levels can be observed in other fungal infections, including histoplasmosis

- **Attributions**

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- **References:**
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 - Image Reference
 - CXR from Radswiki, Radiopaedia.org, rID: 11789

Case 70 Lab Results

Basic Metabolic Panel:

Na	135 mEq/L
K	4.2 mEq/L
Cl	100 mEq/L
CO ₂	18 mEq/L
BUN	15 mg/dL
Cr	1.7 mg/dL
Gluc	120 mg/dL

Liver Function Panel:

AST	32 U/L
ALT	14 U/L
Alk Phos	90 U/L
T bili	1.1 mg/dL
D bili	0.3 mg/dL
Lipase	40 U/L
Albumin	4.0 g/dL

Complete Blood Count:

WBC	$1.1 \times 10^3/\mu\text{L}$
Hb	13.1 g/dL
Hct	42.5%
Plt	$285 \times 10^3/\mu\text{L}$

Urinalysis:

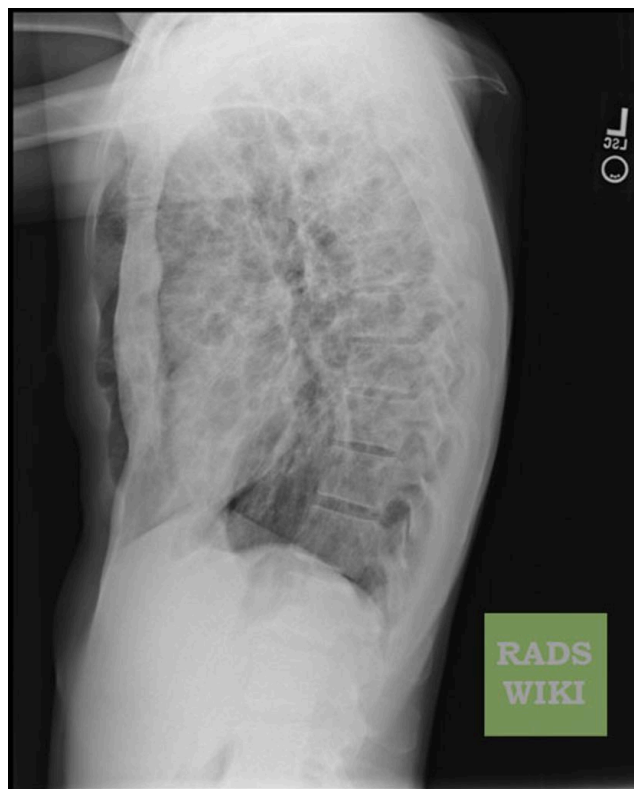
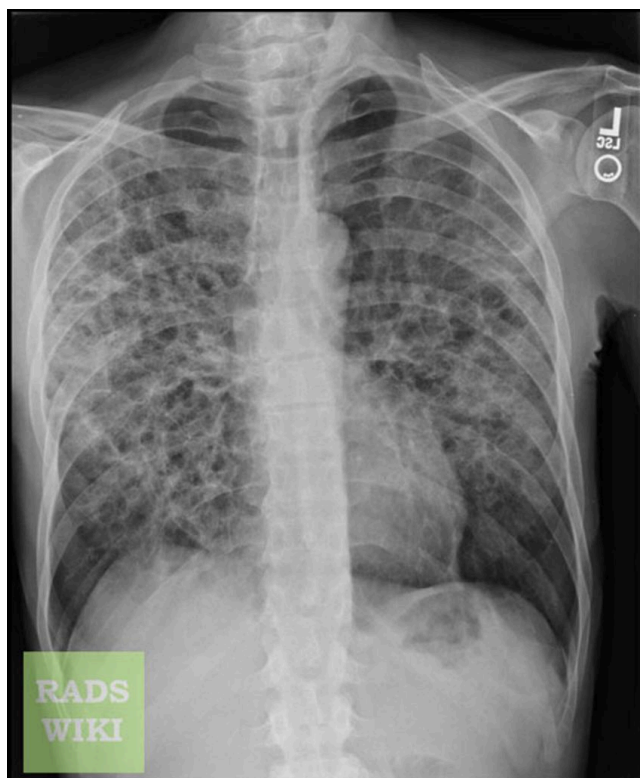
SG	1.018
pH	6.8
Prot	Neg
Gluc	Neg
Ketones	Neg
Bili	Neg
Blood	Neg
LE	Neg
Nitrite	Neg
Color	Yellow

Coagulation Panel:

PT	13.1 sec
INR	1.0
PTT	28 sec

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Figure 70.1- CXR



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