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The EM Educator Series

The EM Educator Series: HIV/AIDS + fever

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Case 1:
A 41-year-old male with history of HIV and poor compliance with medical therapy presents with cough and progressive shortness of breath over several weeks. He noted fever the last several days. His vital signs include HR 114, RR 23, BP 100/56, T 38.1 C, and saturation 88% on room air. He appears toxic.

Case 2:
A 55-year-old female is brought in for altered mental status. She has a history of AIDS. According to her husband, she has not been eating or drinking at home and has demonstrated increasing confusion at home. She was diagnosed with and treated for PJP one year ago. On exam, her GCS is 8, and she is febrile.

Questions for Learners:

1. How do HIV and AIDS differ?
2. What opportunistic infections are associated with specific CD4 counts?
3. How can you estimate the CD4 count if this is not available in patient history or records?
4. What sources should you consider in the patient with HIV/AIDS and fever?
5. How does PJP present, how should suspected PJP be evaluated and managed, and how do these patients decompensate?
6. How do cryptococcus and toxoplasmosis differ in patients with HIV/AIDS?
7. What abdominal complications can arise in HIV/AIDS patients?

Suggested Resources:

- Articles:
  - MDCalc Absolute Lymphocyte Count
  - emDocs febrile HIV patient
  - LIFTL HIV Extravaganza
  - LIFTL HIV and AIDS
  - NUEM PJP
  - LIFTL PJP
  - WikEM
- PMID:
  - Emergency Medicine Clinics of NA Management of HIV in the ED
  - Emergency Medicine Clinics of NA Respiratory Emergencies in HIV

Answers for Learners:

1. How do HIV and AIDS differ?

HIV = retrovirus infection → infection of T-helper lymphocytes (CD4+) and progressively destroys them - → immunosuppression

AIDS = HIV with an AIDS defining illness. Presence of conditions suggestive of AIDS/immune suppression in the right clinical setting such as oral candidiasis, oral hairy leukoplakia, Kaposi Sarcoma, persistent HSV infection, lymphoma, PCP pneumonia, encephalopathy, etc.

2. What opportunistic infections are associated with specific CD4 counts?

In general, CD4 values **< 500 cells/uL, < 200 cells/uL and < 50 cells/uL** correspond with mild, moderate and severe immune impairment respectively. While these classifications are important for risk stratification, they are less important in the ED setting where real-time CD4 counts are almost never available.

CD4 Count	Stage	Diseases
>500	Early disease	Similar to non-immunocompromised patients (Consider HAART medication side-effects)
200-500	Intermediate disease	Kaposi's sarcoma, Candida, bacterial respiratory infections
<200	Late disease	PCP, central line infection, MAC, TB, CMV, drug fever, sinusitis, endocarditis, lymphoma, histoplasmosis, cryptococcus, PML
<100	Very late disease	Cryptococcus, Cryptosporidium, Toxoplasmosis
<50	Final Stage	CMV retinitis, MAC

3. How can you estimate the CD4 count if this is not available in patient history or records?

In HIV+ patient presenting to ED, absolute lymphocyte count (ALC) can be used as surrogate for CD4 count

- A CD4 count of <200 is very likely if the ED ALC is <950 and less likely if the ALC is >1700
- ALC is useful to confirm, but not exclude a low CD4
- **Absolute lymphocyte count < 1,200 is *suggestive* of CD4 < 200 cells/uL**; although this is flawed as certain infections can cause a transient decrease in lymphocyte count.

4. What sources should you consider in the patient with HIV/AIDS and fever?

Pulmonary disease is the leading cause of morbidity and mortality amongst the HIV population. Common things being common, the **most common infections are the same ones that people with normal immune systems get** such as pneumonia, bronchitis, URI, etc. Once the CD4 count drops **below 500, patients are at higher risk for common infections as well as OI**. Of these, the most common is **PCP** (pneumocystis jiroveci pneumonia).

Other sources including CNS, CNS (crypto and toxo)

5. How does PJP present, how should suspected PJP be evaluated and managed, and how do these patients decompensate?

PCP is characterized by an **indolent course over days to weeks of fevers, dry cough, and increasing dyspnea on exertion** in a patient who has known or suspected HIV infection. Factors supportive of this diagnosis include a serum **LDH 2-3x** upper limit of lab reference normal values, CXR with **bilateral symmetric interstitial infiltrates**, or ground glass appearance especially on CT chest. Treatment is with **TMP-SMX** (trimethoprim- sulfamethoxazole) oral vs. intravenous depending on severity of disease. A **prolonged steroid taper over three weeks should be considered** in patients who are hypoxic (O2 sats < 90% or PaO2 < 70mmHg on ABG).

6. How do cryptococcus and toxoplasmosis differ in patients with HIV/AIDS?

The most common CNS infection in HIV is ***Cryptococcus neoformans***. It presents as **insidious onset over weeks of recurrent headache and fevers**, in the **later stages can cause increased ICP leading to seizures and AMS**. The diagnosis is made by CNS cryptococcal antigen testing which will require a lumbar puncture to obtain CSF. Treatment is as inpatient with **IV amphotericin B and flucytosine, followed by prolonged oral therapy with fluconazole**.

Complicating matters are the other typical CNS processes in HIV – **toxoplasmosis, EBV-related lymphoma, tuberculosis, and progressive multifocal leukoencephalopathy caused by the JC virus**. The former two disorders will cause ring enhancing/mass lesions best visualized by CT with contrast. These lesions and masses can cause CSF flow obstruction, hydrocephalus, etc and so the **CT should be obtained prior to LP in all HIV patients with suspected CNS infection.**

As an aside, CNS infections typically present in the later stages of AIDS with a **CD4 count < 100**. With proper follow-up, these patients should already be on **TMP-SMX prophylaxis for PCP which also covers for toxoplasmosis, so this diagnosis would be much less likely in someone who is compliant.**

7. What abdominal complications can arise in HIV/AIDS patients?

Multiple causes including the typical bacterial salmonella, shigella, campylobacter, Yersinia and Clostridium difficile remain the most common causes of febrile diarrheal illness in HIV. Due to immune suppression, the body is also susceptible to more exotic organisms such as **Cryptosporidium and Isospora**. **Fluid losses from Cryptosporidium-induced diarrhea can cause fulminant dehydration and even death.** In the severely immune compromised (CD4 < 50), **CMV** can cause severe enteritis. Mycobacterium tuberculosis can also cause severe diarrhea especially in high-risk individuals and those from developing countries.

Diagnosis relies on stool studies for ova and parasites, specific toxin assays, culture, AFB staining. Treatment is generally supportive.

Remember that oral thrush and esophagitis can be the presenting symptoms of HIV infection as well, this is most commonly caused by **candidiasis** but can be related to viral etiology such as **HSV, EBV, or CMV**.