

# HIV/AIDS

HIV is retroviral mediated destruction of the immune system. Multisystem dysfunction results from both the disease process and the drug therapy.

## ANESTHETIC CONSIDERATIONS:

- Possible Difficult Airway
  - Case reports of obstruction/difficulty from Kaposi's sarcoma
- Pulmonary Involvement
  - Pulmonary infections (Haemophilus, Streptococcus, Mycobacterium, PJP)
  - Pulmonary hypertension
- Cardiac Involvement
  - Dilated cardiomyopathy
  - Pericardial effusion
  - Infective/thrombotic endocarditis
- Drug Therapy
  - Continue drug therapy perioperatively
  - Mitochondrial dysfunction (lactic acidosis, hepatic toxicity, pancreatitis, neuropathy)
  - Metabolic changes (lipodystrophy, dyslipidemia, hyperglycemia)
  - Bone marrow suppression
  - Allergic responses
  - Protease inhibitors prolong action of fentanyl
- Other
  - HIV-associated neurocognitive impairment
  - CNS infection/tumor
  - Renal failure

## ANESTHETIC GOALS:

- Diverse clinical manifestations require individualized preoperative evaluation and identification of systemic effects.

## HISTORY AND PHYSICAL

- Constitutional Symptoms
- Cutaneous
  - Kaposi's sarcoma (violaceous nonblanching nodules)
  - Reactivation of herpes, warts, psoriasis, seborrheic dermatitis
- Ophthalmologic
  - CMV retinitis
- Oral
  - Candida, oral hairy leukoplakia, oral lymphoma, Kaposi's
- Cardiac
  - Dilated cardiomyopathy, effusion, stigmata of endocarditis
- Pulmonary
  - Dry cough, dyspnea interstitial infiltrate on CXR (PJP, pneumonia, TB etc)
- Neurologic
  - Neurocognitive impairment
  - Focal defects (T gondii encephalitis, lymphoma) and increased ICP symptoms
  - Meningitis

## INVESTIGATIONS

- CBC, lytes, BUN, Creat
- ECG
- CXR
- PFTs if indicated on history (PJP – ILD/pulmonary fibrosis from PJP infection)
- ABG if indicated on history
- TTE if indicated on history

## TREATMENT

Disease treatment: (HAART—highly active anti-retroviral therapy)

- Reverse transcriptase inhibitors (Lamivudine, Zidovudine)
- Nonnucleoside reverse transcriptase inhibitors (Delavirdine, Nevirapine)
- Protease inhibitors (Ritonavir, Lopinavir)
- Integrase inhibitors (Raltegravir)
- Entry inhibitors
  - Fusion inhibitors (Enfuvirtide)
  - CCR 5 antagonists (Maraviroc)

Side effects:

- Mitochondrial dysfunction: lactic acidosis, hepatic toxicity, pancreatitis, neuropathy
- Metabolic abnormalities: lipodystrophy, dyslipidemia, hyperglycemia
- Bone Marrow suppression: anemia, neutropenia, thrombocytopenia
- Allergic reactions

#### Prophylaxis:

- PJP; septr 1 SS tab daily; CD4 <200 or oral candidiasis
- Pneumonia; pneumococcal vaccine q5years; any CD4
- Toxoplasmic encephalitis; septr 1SS tab daily; CD4<100
- MAC; Azithromycin or Clarithromycin; CD4<50

#### CONSULTS

- Possible ID

#### OPTIMIZATION

- Opportunistic infections should be treated before any elective/semi-urgent surgery

#### ANESTHETIC OPTIONS

- GA
- Regional
  - Case series suggest that neuraxial techniques in neurologically normal patients are safe
  - Epidural blood patch safety has been questioned (introduction of virus into CNS) – little experience reported in literature though case reports of safety have been published; consensus is to trial other analgesic therapies first, before proceeding with blood patch
  - Elective C-Section reduces the rate of vertical transmission
  - Concern always exists about CNS infection or CNS neoplasm in poorly controlled/advanced patients
  - Careful! Might have thrombocytopenia
- Local

#### ANESTHETIC SETUP

- **Drugs**
  - Standard
- **Equipment**
  - Standard CAS
  - PNS (TOF)
  - UNIVERSAL PRECAUTIONS

#### MANAGEMENT OF ANESTHESIA

- **Induction**
  - Nothing special
  - Strict aseptic technique - immunocompromised
- **Maintenance**
  - As per comorbid states
- **Emergence**

#### DISPOSITION & MONITORING

- As per preop assessment, comorbid and systemic manifestations

#### COMPLICATIONS

- Prolonged duration of opioids in patients on protease inhibitors
- Anesthesia is immunomodulatory and can increase immunosuppression in the postoperative period

#### PATHOPHYSIOLOGY

- Acquired Immunodeficiency Syndrome was first characterized in 1981
- Single stranded RNA virus (retroviridae) with 2 copies in each viron
- Two subtypes HIV-1 and HIV-2
- Replicates in T4 lymphocytes by binding to GP160 of CD4
- Initial burst of viremia followed by a quiescent phase of several weeks to months
- Seroconversion is delayed taking up to 6 months
- Following quiescence viral replication increases leading to a quantitative defect in CD4 cells
- This results in progressive impairment of host immune function
- Becomes clinically evident at first opportunistic infection (AIDS defining illness)
- Disease progression is monitored by measuring CD4 cell count levels and HIV RNA levels
  - CD4<sup>+</sup> lymphocyte cell count and viral load (which reflects the patient's immunologic status during the previous 3 months) can have prognostic value.
    - A 13% mortality rate within 6 months of surgery has been reported when the CD4<sup>+</sup> count is less than 50/mm<sup>3</sup>
    - 0.8% mortality rate with CD4<sup>+</sup> counts greater than 200/mm<sup>3</sup>.<sup>(109)</sup>
    - Antiretroviral therapy is continued perioperatively.
- Vertical transmission is 25% for untreated, 3% for treated (mom and baby)
- **HIV** can affect all organs and cause multiple complications.
  - **CVS:** Myocarditis, dilated cardiomyopathy, valvular disease, pulmonary hypertension, pericardial effusions, and tamponade are possible. Antiretroviral-induced lipodystrophy causes CAD.
  - **RESP:** Pulmonary infections with *Pneumocystis jiroveci*, *Mycobacterium avium* or *tuberculosis*, cytomegalovirus, and *Cryptococcus* are common and often drug resistant.
  - **CNS:** Central nervous system tumors, infections, aseptic meningitis, and acquired immunodeficiency syndrome (AIDS)-related dementia occur
  - **ID/HEME:** as well as lymphomas, Kaposi's sarcoma, cervical cancer, and lymphoid interstitial pneumonitis.
  - **AIRWAY:** Supraglottic or intraoral Kaposi's sarcoma may interfere with ventilation and intubation; non-Hodgkin's lymphoma can cause mediastinal masses.
  - **GI:** Dysphagia, diarrhea, esophagitis

- **RENAL:** renal dysfunction can lead to malnutrition, dehydration, and electrolyte imbalance (hyponatremia and hyperkalemia are the two major electrolyte disorders). Acute tubular necrosis, glomerulonephritis, renovascular disease, and **HIV**-associated nephropathy with nephritic syndrome can be present.
- **DRUG EFFECTS:** The nucleoside reverse transcriptase inhibitors (i.e., zidovudine, didanosine, stavudine, lamivudine, abacavir, emtricitabine) may cause lactic acidosis, electrolyte abnormalities, neuropathy, autonomic dysfunction, gastrointestinal upset, renal or hepatic dysfunction, and pancreatitis. Zidovudine can cause pancytopenia.

#### **REFERENCES**

- Anesthesia and Co-existing disease 5<sup>th</sup> ed
- Barash 5<sup>th</sup>
- Leelanukrom Current Opinion in Anaesthesiology 2009 22:412-18