Assessment Points

System	Effect	Assessment by Hx	PE	Test
NEURO	Altered mental status and seizures	Level of consciousness, delirium, somnolence nausea/vomiting, seizures, toxic ingestion	Obtunded, confused, somnolent	Toxicology screen, osmol gap, serum lytes
CV	Arteriolar vasodilation, hypotension, decreased response to vasopressors and inotropes, arrhythmias, hypocontractility	Signs of end-organ hypoperfusion	Tachycardia, hypotension, poor peripheral pulses, cold extremities, poor capillary refill	Invasive hemodynamic monitoring, ECHO, ECG
PULM	Hypoxemia, hyperventilation, respiratory failure	Tachypnea, dyspnea	Rapid and shallow breathing, accessory muscle use, hypoxia, and hypercarbia	CXR, ABG, pulse oximetry
RENAL	Oliguria, acute kidney injury, ATN	Urine output, chronic renal disease	Signs of hypo- or hypervolemia	UO, Cr, BUN, urine lytes, UA, serum lytes
GI		Nausea, vomiting, diarrhea, melena, abdominal pain	Abdominal pain to palpation	Serum lactate, radiographic imaging, upper/lower endoscopy
ID		Fever, rigors	Hyperthermia or hypothermia, signs of focal infection	WBC with differential, cultures, radiographic imaging
ENDO	Hyperglycemia, insulin resistance	DM, polyuria, polydipsia, hyperphagia	Signs of dehydration	Blood glucose, serum ketones

Key References: Morris CG, Low J: Metabolic acidosis in the critically ill: Part 1. Classification and pathophysiology and Part 2. Causes and treatment. *Anaesthesia* 63:294–301, 396–411, 2008; Laing CM, Unwin RJ: Renal tubular acidosis. *J Nephrol* 19(Suppl 9):S46–S52, 2006.

Perioperative Implications

Preoperative Preparation

- Carefully assess for electrolyte abnormalities, pH balance, volume, and kidney function via CMP, phosphorus, and calcium levels.
- Consider elective versus emergent surgery. If elective and found to have multiple metabolic derangements, consider postponement for appropriate medical management and if surgery is urgent or emergent, consider ways to optimize the pt preop.
- Remember that some forms of RTA can be associated with genetic or autoimmune syndromes such as Fanconi or Sjögren. Incorporate other syndrome specific clinical considerations for each case.

Monitoring

- Arterial line and/or central venous pressure can assist in assessment of volume status periop.

Intraoperative Preparation

- Pts with advanced renal pathogenesis should have anesthetic medications that avoid the kidney, including cis-atracurium with neuromuscular blockade requirement, and avoidance of morphine, which is conjugated to morphine 6-glucoronide and an active metabolite, and is eliminated through the kidney.
- Pts may be hemodynamically unstable, demonstrating decreased responsiveness to inotropes and vasopressors.
- Many pts with advanced renal pathogenesis have increased potassium levels, and, therefore, succinylcholine should be avoided as it can further increase potassium levels, leading to adverse effects such as cardiac arrest.

Postoperative Period

- Pt may require postop ICU care and prolonged mechanical ventilation.

Anticipated Problems/Concerns

- Hemodynamic instability with decreased responsiveness to inotropes and to vasopressors
- Compensation for profound metabolic acidosis, which may lead to acute respiratory failure
- Treatment with bicarbonate, which may paradoxically increase $PaCO_2$ and worsen intracellular acidosis and respiratory status

Acquired Immunodeficiency Syndrome

Jordan B. Johnson | Jeffrey R. Kirsch

Risk

- USA incidence of HIV: 50,000 per year
- USA prevalence of HIV: 1.2 million
  - Sub-Saharan Africa prevalence: 25.8 million in 2014
- USA prevalence of AIDS (HIV stages 3 and 4): 26,688
  - All but 8 were age 13 or older

Perioperative Risk

- Susceptibility to infection
- Drug interactions
- Occupational exposure/viral transmission

Overview

- AIDS is the clinical syndrome representing the late and more severe stages of infection with HIV.
- Once inside the host, HIV attaches and is internalized to CD4+ T4 helper lymphocytes. Viral RNA is transcribed into the cell's DNA allowing formation of viral progeny within the host. Host's CD4+ T4 helper lymphocytes become defective and unable to help fight opportunistic infections and neoplasms causing progressive immunocompromisation.
- In 2007 WHO published a clinical classification system for HIV/AIDS; stages 1 to 4 are based on clinical symptoms and presence of associated illnesses, and AIDS is defined by the presents of features of stages 3 and 4.

Etiology

- Transmission can occur when there is contact between HIV-infected blood or contaminated body fluids and open wounds, broken skin, or mucus membranes.
- During sexual encounters, delivery of a fetus, breastfeeding, inoculation by contaminated needles, and occupational exposure.

Usual Treatment

- Regimen of HAART.
  - Target different stages in HIV replication cycle.
- Pts may be taking additional drugs, both for treatment and for prophylaxis targeting associated illnesses, such as other antivirals, antifungals, antibiotics, and/or chemotherapy drugs.

Assessment Points

System	Effect	Possible Pathogenesis
RESP	Bronchitis, sinusitis, pneumonia, pneumonitis, airway obstruction	Direct effect of HIV Opportunistic infections Neoplasm (e.g., Kaposi sarcoma)
CV	Cardiomyopathy, coronary artery disease, pericardial effusion, endocarditis, pulm hypertension, vacuities	Direct effect of HIV Medication side effect, namely antiretroviral drugs (reverse transcriptase inhibitors) Autoimmune disease Neoplasm
HEME	Anemia, neutropenia, thrombocytopenia, lymphadenopathy, coagulopathy, hematologic malignancy	Direct effect of HIV Medication side effect
NEURO	Meningitis, encephalitis, encephalopathy, cognitive impairment, HNCI, AIDS dementia, autonomic and peripheral neuropathies, seizures	Direct effect of HIV Opportunistic infections Neoplasm
RENAL	Acute and chronic renal failure, nephropathy	Direct effect of HIV Medication side effect, namely antiretrovirals
GI	Oral lesions, dysphagia, odynophagia, diarrhea, HIV/AIDS enteropathy, pancreatitis, hepatobiliary involvement	Direct effect of HIV Opportunistic infections Medication side effect Neoplasm
ENDO	Lipodystrophy, metabolic syndrome, hypercortisolism, adrenal insufficiency, SIADH, hyperthyroidism, hypothyroidism, lactic acidosis	Direct effect of HIV Opportunistic infections Medication side effect

Key References: Bajwa SJ, Kulshrestha A: The potential anesthetic threats, challenges and intensive care considerations in patients with HIV infection, *J Pharm Bioallied Sci* 5(1):10–16, 2013; Panlilio AL, Cardo DM, Grohskopf LA, et al.: Updated U.S. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis, *MMWR Recomm Rep* 54:1–17, 2005.

Perioperative Management

Preoperative Preparation

- Meticulous medication review, specifically for HAART drugs.
- Careful physical exam for signs of illnesses associated with an immunocompromised state (e.g., lymphadenopathy, Kaposi sarcoma lesions).
- Should continue antiretroviral medications throughout the periop period.
- Preop lab work (CBC, coagulation panel, renal and liver enzyme panels).
- Additional tests (ECG and CXR).
- CD4+ cell count to evaluate the severity of individual's disease and the likelihood of opportunistic infections and neoplasm.
  - A positive correlation between viral load and rate of transmission has been observed in certain populations.

Monitors

- Standard ASA monitors
- Additional monitors as indicated

Airway Management

- Should have awareness of active resp pathology such as infection, inflammatory processes, or airway obstruction as a consequence of immunocompromised state or neoplasm.
- Concern for hypotension if active systemic infectious process or cardiac dysfunction.
- Careful dosing of medications to minimize drug interactions.

Choice of Anesthetic

- Based on type of procedure and pt's comorbidities.
- Pts with AIDS, given they are significantly immunocompromised and may have CV or infectious AIDS-defining illness, may not tolerate general anesthesia.
- Regional and neuraxial anesthesia have been used successfully in these pts and should be considered, but coagulopathy should be ruled out.
- HIV-infected pts may be given the option of cesarean section to decrease the risk of mother-baby transmission, though certain cesarean-associated complication rates have been found to be higher in HIV-infected pts.
- Drugs metabolized by CYP450 system should be dose adjusted if pt is on HAART regimen, specifically protease inhibitors and non-nucleotide reverse transcriptase inhibitors.

Extubation

- Standard extubation criteria apply.

Postoperative Period

- Susceptibility to infections.
- Significant cardiac events.
  - The antiretroviral drug abacavir has recently been shown to independently increase the risk of CV disease in HIV-infected pts.

Occupational Exposure

- Periop team members at higher risk of occupational transmission.
- Vigilance and meticulous handling of sharps and contaminated materials to decrease work-related exposure.
- Risk of exposure correlated with depth of skin inoculated, hollow-bore needle usage, and volume of HIV-infected body fluid involved.
- Know your hospital's policy regarding occupational exposures.
- Begin postexposure prophylaxis with a combination of antiretroviral medications as soon as possible but certainly within 72 hr of exposure.

Acromegaly

Russell T. Wall III

Risk

- People within USA:
  - Prevalence is 40 cases/million; incidence is 3 to 8 new cases/million/y.
  - Occurs with equal frequency in men and women and most frequently diagnosed in third to fifth decades of life (5 to 20 y lag between onset of symptoms and diagnosis).

Perioperative Risks

- Common conditions increasing periop risk include airway abnormalities, CV dysfunction (Htn), resp impairment (obstructive sleep apnea), endo abnormalities (hyperglycemia).

Worry About

- Difficulty or inability to ventilate and/or intubate
- Extent of CV disease
- Postop airway obstruction

Overview

- Acromegaly is a slowly progressive, debilitating endocrinopathy resulting from excess secretion of growth hormone, usually from a benign macroadenoma of the anterior pituitary gland, and characterized by overgrowth of soft tissues and bone and cartilage of skeleton (nose, jaw, hands, fingers, feet, toes). Excess growth hormone before puberty (epiphyseal closure) leads to gigantism (<5% of acromegalics).

Etiology

- Greater than 99% of cases result from primary pituitary adenoma.

Usual Treatment

- Surgery—primary therapy:
  - Transsphenoidal pituitary microsurgery versus transcranial; transsphenoidal more common