Assessment Points

System	Effect	Assessment by Hx	PE	Test
CNS	Altered mental status	Anxiety, restlessness Confusion, seizures		
CV	Sympathetic stimulation Htn Arrhythmia Bradycardia (late sign)	Htn	Tachycardia BP	ECG TEE
RESP	Cyanosis Atelectasis, evidence of aspiration, pneumonia		Tachypnea	SpO_2 ABG, low PaO_2 CXR

Key References: Blum JM, Fetterman DM, Park PK, et al.: A description of intraoperative ventilator management and ventilation strategies in hypoxic patients, *Anesth Analg* 110(6):1616–1622, 2010; Sanford TJ: Hypoxemia. In Fleisher LA, Roizen MF, editors: *Essence of anesthesia practice,* ed 3, Philadelphia, PA, 2011, Elsevier, p 210.

Perioperative Implications

Monitoring

- Routine: Pulse oximetry is mandatory; ABG if concerns.
- Capnography and hemodynamic monitoring may help with differential Dx.

Airway

- Must ensure patency and intact circuit at all times.

Maintenance

- Adequate FIO_2 and alveolar ventilation
- Adequate O_2 delivery to tissues (CO, Hb)

Anticipate Problems/Concerns

- Must have a high index of suspicion whenever SpO_2 decreases or any of the clinical subjective or objective signs and symptoms are present. Always assume the decreased SpO_2 does not reflect a problem with the pulse oximeter but signifies a real problem. Stable vital signs may not fully eliminate significant arterial hypoxemia.

IgA Deficiency

Jahan Porhomayon | Paul R. Knight III

Risk

- Most common immunodeficiency disorder.
- Incidence estimated to be 1:100 to 1:1000.
- More prevalent among European descendants.
- Most pts are clinically normal.
- Increased risk of allergies and anaphylaxis.
- Increased risk of malignancies.

Perioperative Risks

- Increased incidence of pulm complications, atopic disorders, and postop infections

Worry About

- Recurrent sinopulmonary infections leading to decreased pulm reserve
- Associated autoimmune disorders (e.g., lupus, DiGeorge syndrome)
- Associated GI disorders leading to volume depletion
- Anaphylactic reactions from transfusion of blood products containing IgA

Overview

- An immunodeficiency syndrome with increased susceptibility to nosocomial infection.
- Cell-mediated immunity is usually normal.
- Coexisting diseases may include atopy, recurrent sinopulmonary infection, GI disease, and autoimmune disease.
- Decreased synthesis or secretion of IgA.

Etiology

- Absence of IgA on mucosal surface.
- Decreased IgA blocking antibodies against environmental antigens.
- Associated with histocompatibility groups HLA-A1, HLA-B8, and HLA-Dw3.
- There have been several reported cases of acquired IgA deficiency.
- Usually decreased rather than absent lymphocyte IgA secretion.
- Overt clinical disease presentation may relate to changes in IgG subclass and/or compensatory IgM secretion.

Usual Treatment

- Do not treat with gamma globulin.
- Increased suspicion of infections and aggressive antibiotic therapy.
- Therapy directed toward specific coexisting disease(s).

Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Decreased reserve, hypovolemia	Dyspnea or exertion	Tachycardia, orthostatic hypotension	ECG, ECHO
RESP	Recurrent sinopulmonary infection, hemosiderosis, asthma	Decreased exercise tolerance	Wheezing, rales	CXR, PFTs, sinus x-rays
GI	Chronic gastroenteritis, malnutrition, malabsorption	Chronic diarrhea	Cachexia	Lytes, BUN, serum albumin
HEME	Nonspecific	Depends on the extent of coexisting diseases		Serum IgA, anti-IgA antibody, Coombs test
RENAL	Nonspecific	Varies in severity depending on the extent of coexisting diseases		BUN, Cr
CNS	Degenerative, demyelinating	Mental retardation associated with ataxia-telangiectasia		MRI

Key References: Tait AR, Knight PR: Anesthetic considerations for the immune compromised patient. In Lema MJ, editor: *Problems in anesthesia: anesthesia and cancer.* Philadelphia, PA, 1993, JB Lippincott, pp 375-391; Out TA, van Munster PJ, De Graeff PA, et al.: Immunological investigations in individuals with selective IgA deficiency, *Clin Exp Immunol* 64(3):510–517, 1986; Yel L: Selective IgA deficiency, *J Clin Immunol* 30(1): 10–16, 2010.

Perioperative Implications

Preoperative Preparation
- Consider antibiotic therapy.
- Work up any indication of infection.
- Optimize any underlying organ dysfunction and volume status.

Monitoring
- Consider invasive hemodynamic monitoring in debilitated pts.

Airway
- Strict aseptic technique
- Universal precautions
- May encounter difficult intubation in pts with associated rheumatoid arthritis

Induction
- Hypotension secondary to hypovolemia and/or decreased cardiac reserve
- Wheezing allergies relatively resistant to conventional therapy

Maintenance
- May require high inspired O_2.
- Regional anesthesia and careful titration of anesthetic agents due to potential underlying CV and pulm diseases.
- Use only thoroughly washed RBC transfusions.

Extubation
- Careful assessment of neuromuscular function due to potential drug-drug interaction

Adjuvants
- Depend on organ dysfunction

Postoperative Period
- May require intensive pulmonary therapy.
- Maintain strict antiseptic precaution.
- Increased suspicion of bacterial infection.

Anticipated Problems or Concerns
- Anaphylactic reaction from transfusions of blood or blood products containing IgA to individual with IgA antibodies.
- Asthmatic pt with IgA deficiency is relatively resistant to treatment.
- Increased risk of nosocomial infection.

Immune Suppression

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Risk
- The incidence of HIV infection has been stable in USA, at approximately 20–30 newly diagnosed infections per 100,000 population per y.
- 20–25% of HIV infected pts will require surgery.
- Major risk factors: Neutropenia, yeast overgrowth, and/or nosocomial colonization of skin and mucosa.

Perioperative Risks
- In one study of AIDS pts undergoing intraabdominal surgery, 22.2% 30-d mortality was reported.
- Mortality is greatest at the extremes of age.
- Greatest source of morbidity and mortality is secondary to infection.
- Pneumonia accounts for approximately 40% of all deaths.
- Increased incidence of postop pneumonia, wound infection, postop sepsis, respiratory insufficiency, SIRS, and hypotension due to cardiovascular instability.
- Increased healing time.

Worry About
- Nosocomial transmission of infection
- Interactions with other drugs (IV recreational drugs, antiviral agents)
- Transmission of pathogenic drug-resistant strains of microbial agents to medical personnel (e.g., new strains of tuberculosis)
- Decreased pulm reserve due to repeated infections
- Decreased myocardial reserve secondary to underlying disease and generalized poor health
- Translocation of intestinal bacteria due to severe mucositis

Overview
- Immune suppression can arise from multiple causes, both primary and acquired.
- In the intraop period, surgical trauma, anesthetic agents, blood transfusion with or without severe hemorrhage decreases the immune response.

Etiology
- Primary immune deficiency (most are familial).
- The very young have immature immune systems.
- Aging alters some cellular immune responses.
- Acquired:
  - Malnutrition, drugs (glucocorticoids, chemotherapy, antiviral), massive burns, or trauma
  - Cancers (leukemia, lymphoma, and multiple myeloma)
  - Infections (HIV stages 2–4, influenza, sepsis)
  - Smoking decreases respiratory defense mechanisms

Usual Treatment
- Selective use of antibiotic prophylaxis, antivirals (e.g., acyclovir), antifungal agents (e.g., fluconazole), or immune enhancement (e.g., immune globulin)
- Strict sterile procedures and universal precautions
- Fastidious personal hygiene

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEME	Anemia, neutropenia, lymphopenia, recurrent bacteremia, coagulation abnormality, and thrombocytopenia	Easily fatigued, recurrent fever, sweats and chills	Pale Presence of petechiae or purpura	Hct/ Hgb, WBC, plts, plasma proteins, coagulation studies, special lymphocyte counts (e.g., $CD4^+$ cells)
CV	Subacute bacterial endocarditis, decreased reserve, hypovolemia, drug-induced injury (e.g., arabinomycin), mycotic aneurysms, pericardial effusion, vasculitis, pulm Htn	Decreased exercise tolerance, dyspnea on exertion	Murmurs, orthostatic hypotension, abnormal heart rate	ECG, transthoracic ECHO
RESP	Recurrent acute pulm infections, pulm fibrosis, obstruction, chronic tuberculosis and/or fungal infections	Decreased exercise tolerance, dyspnea on exertion	Airway lesions, pneumonia	CXR and spirometry
GI	Chronic gastroenteritis, chronic malnutrition, severe mucositis, parasitic infections	Severe "cramping," dysphagia, odynophagia diarrhea	Cachexia, leukoplakia	Lytes, albumin, blood cultures
RENAL	Chronic pyelonephritis, bladder infections, chronic cystitis, drug-induced nephropathy (e.g., cyclosporine), end-stage renal pathology	Recurrent UTIs, frequency	Hematuria, pyuria	BUN, Cr, pyelogram, spiral CT imaging
CNS	Mycotic infarcts, AIDS, dementia, encephalopathy	Minor strokes	Focal deficits, decreased mental function	CT imaging of the head
MS	Osteomyelitis	Deep pain located over involved area	Point tenderness	X-ray imaging

Key References: Tait AR, Knight PR: Anesthetic considerations for the immune compromised patient. In Lema MJ (editor): *Problems in anesthesia: anesthesia and cancer.* Philadelphia, PA, 1993, JB Lippincott Company, pp 375-391. Fishman JA: Opportunistic infections—coming to the limits of immunosuppression? *Cold Spring Harb Perspect Med* 3(10):a015669, 2013.

Perioperative Implications

Preoperative Preparation
- Continue or initiate antibiotic therapy and immune therapy.
- Assess and optimize underlying organ system dysfunction (HIV-associated cardiomyopathy).
- Assess volume status and lytes due to chronic diarrhea.
- Involved assessment may be required (pulm function tests, transthoracic echocardiography).
- Identify timing of administration of immune suppressive drug(s).

Monitoring
- Consider arterial line, pulm arterial line, or other invasive hemodynamic monitors in severely debilitated pts.

Airway
- Strict aseptic technique and universal precautions when handling the airway