Tuberculosis

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Risk

- Incidence in USA in 2014 was 2.96 cases per 100,000 persons; worldwide, incidence is over 9 million cases per year. There were 1.5 million TB-related deaths worldwide in 2014.
- Incidence in USA has been decreasing every year since 1992.
- Risk is higher among homeless, elderly, Asian, and Latin American immigrants, minorities, and prisoners. Also, immunosuppression (e.g., HIV infection, transplant recipients, chronic renal insufficiency) increases TB risk.
- TB is still a leading cause of death among HIV-infected pts.

Perioperative Risks

- Risk to the pt and to medical personnel.
- Pt risk depends on extent of pulm disease, organ system involvement, and overall health status.
- Elective surgery is best delayed until pt is either noninfectious or free of TB.

Worry About

- Overall health status of the pt, infectiousness of the pt, cross-contamination through anesthesia machine and other nondisposable equipment
- Effects of anti-TB drugs on organ systems (e.g., liver damage, hearing loss, neuritis, nephrotoxicity)

Overview

- TB is caused by *Mycobacterium tuberculosis*.
- Pulmonary TB is the most common form of infection in humans; intestine, spine and bones, kidneys, and meninges can also be affected.
- TB left untreated can be fatal.

Etiology

- TB is transmitted by droplet nuclei produced by coughing, sneezing, or talking (causative bacilli can remain airborne for hours).
- TB does not spread by casual contact (e.g., shaking hands, sharing food or drink, or disposing of bed linens).
- Primary infection can be the reason for up to one-third of newly diagnosed TB cases.

Usual Treatment

- Initial phase (2 mo) of treatment comprises a four-drug regimen taken orally (i.e., isoniazid, rifampin, pyrazinamide, and ethambutol), followed by continuation phase (4 mo) with a two-drug regimen taken orally (i.e., isoniazid and rifampin).
- Four-drug regimen is recommended for 6 mo in drug-resistant cases.
- HIV/AIDS pts may need a longer duration of therapy (9–12 mo).

Assessment Points

System	Effect	Assessment by Hx	PE	Test
GENERAL		Night sweats, weight loss	Fever	Tuberculin skin test and in vitro T-cell release of IFN-gamma assay
RESP	Hilar or mediastinal lymphadenopathy, apical infiltrate or necrosis.	Cough and hemoptysis	None or inspiratory rales in affected area	CXR, sputum culture
CV	Pericardial effusion, constrictive pericarditis	SOB	Signs of tamponade, muffled heart sounds	ECG, ECHO
CNS	TB meningitis	Listlessness, headache, seizures, coma	Altered mental status, cranial nerve abnormality	LP, CSF analysis
GI	Peritonitis, enteritis	Abdominal pain, obstruction	Palpable mass, ascites	Endoscopy and biopsy, ascitic fluid analysis/culture
GU	Chronic cystitis, epididymitis, hydronephrosis, female genital tract disease	Late appearance of pyuria, hematuria	May have thickened epididymis	Cystoscopy
MS	Weight-bearing joints (e.g., spine, hip, knee)	Pain, kyphosis	Spinal tenderness	X-ray, CT, bone biopsy

Key References: Centers for Disease Control and Prevention (CDC): Tuberculosis. <www.cdc.gov/tb>. (Accessed 13.06.16); Shaikh SI, Sudhindra GB: Tuberculosis and anaesthesia, *Indian J Appl Res* (4)2:15–17, 2014.

Perioperative Implications

Preoperative Preparation

- Evaluate for toxicity due to anti-TB therapy: CBC, ALT, AST, serum bilirubin levels, visual symptoms, and peripheral neuropathy. For extensive pulmonary TB, consider PFTs.
- Care team must wear properly fitted N95 masks.
- Schedule TB/suspected TB cases at the end of d to maximize time for clearing and minimize spread. A comprehensive discussion and planning among the team members (surgery team, anesthesia team, and support staff) is necessary.
- Use an OR that has an anteroom; otherwise keep the doors closed, minimize traffic, and use additional air cleaning.
- Use disposable equipment and add a bacterial filter (0.3 µm) to the expiratory limb or at the Y-connection of the anesthesia circuit.
- After use, stop all gas flow through the anesthesia machine for at least 1 h to avoid cross- contamination. If machine contamination is suspected, formaldehyde gas can be used to sterilize it.

Monitoring

- Standard ASA monitors
- Depending on comorbidities and type of surgery, invasive monitoring should be considered case by case.

Postoperative Period

- Postop recovery in an AII room (AII room—an isolation room with single occupancy, negative pressure in the room, airflow at 6–12 ACH or equivalent; remember that mycobacterial bacilli can remain airborne for hours).
- If AII room is not available, air-cleaning technologies (e.g., HEPA filtration, UVGI) can be used.

Ulcerative Colitis, Chronic

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Risk

- Incidence in USA and Northern countries of 35-100:100,000; incidence of 11:100,000/y with 2- to 4-fold increased frequency in Jewish populations.
- Mortality highest in early years of disease, or with prolonged disease due to risk of colon cancer; two peaks for age of onset: 15–30 y and 60–80 y.
- Male:female ratio is 1:1; smokers:nonsmokers, 0.4:1; former smokers:nonsmokers, 1.7:1. Up to 20% of pts have a positive family Hx.

Perioperative Risks

- Inflammatory mediators activate the coagulation cascade in local blood vessels.
- Increased interleukin-17 level is being investigated as having a cause or effect connection between IBD and inhalational anesthetics.
- Chronic steroid use can cause adrenal insufficiency and delayed wound healing.

Worry About

- Diarrhea causing metabolic acidosis, hypokalemia, lyte abnormalities, intravascular volume depletion
- Defects in bleeding or clotting due to activation of coagulation cascade
- Bowel distention precluding use of nitrous oxide and increasing risk of perforation.
- Extracolonic manifestations: Primary sclerosing cholangitis and/or cirrhosis of the liver: choose appropriate anesthetics, analgesics, and NMBs. Ankylosing spondylitis: Limited cervical ROM, restrictive pulm mechanics.

Overview

- Indications for surgery include toxic megacolon, colonic perforation, massive hemorrhage, obstruction, and cancer prevention or resection. If pt is presenting for surgery, disease is in progressive stage and operation can be urgent/emergent in nature.
- Pts may have steroid dependence, hypovolemia, electrolyte imbalance, malnutrition, hypoalbuminemia, anemia, bleeding.
- Sulfasalazine is the mainstay of treatment for all stages of disease. Side effects include blood