Assessment Points

System	Effect	Assessment by Hx	PE	Test
CV	Early: Hyperdynamic state, high cardiac output assoc with low SVR Late: Septic shock, low output assoc with high SVR, LV dysfunction		Tachycardia Bounding pulses Warm, ruborous skin Tachycardia Diminished pulses Cool integument Peripheral cyanosis	ECG CVP *Or* PA cath ECHO
RESP	Atelectasis, elevated diaphragm, pleural effusion, abdominal distention, pain, or ARDS Decreased diaphragm excursion	Dyspnea Ipsilateral shoulder pain	Tachypnea Cyanosis Decreased or abnormal breath sounds, dullness to percussion	CXR, fluoroscopy ABG CT scan
HEME	Anemia due to suppressed marrow Coagulopathy associated with sepsis	Fatigue	Pallor Oozing around old incisions or IV sites Petechiae Ecchymoses	Hgb, Hct Plt count PT/APTT Fibrinogen, FSPs, D-dimer Thromboelastogram
GU	Decreased perfusion due to hypovolemia or sepsis	Decreased UO		BUN, Cr Lytes Acid-base balance
CNS	Mental status changes associated with sepsis		Range from mild confusion to coma	Must exclude other possible causes (e.g., CVA, CNS infection)

Key References: Singer M, Deutschman CS, Seymour CW, et al.: The third international consensus definitions for sepsis and septic shock (Sepsis-3), *JAMA* 315(8):801–810, 2016; Royal College of Anaesthetists: The first patient report of the national emergency laparotomy audit. Available at <www.nela.org.uk/reports>; 2015 (Accessed 11.07.16).

Perioperative Implications

Preoperative Preparation

- Appropriate broad-spectrum antibiotics.
- Restore intravascular volume.
- Optimize respiratory function: PEEP, bronchodilators, rarely thoracentesis.
- NG tube for ileus and/or obstruction.
- Tenuous CV status may require central venous access for monitoring/access or vasopressor and/or inotrope infusion.
- Assess coagulation status.

Monitoring

- Tailor to severity of illness.

Airway

- Rapid-sequence induction or awake fiberoptic intubation (aspiration risk)

Preinduction/Induction

- Titrate agents to severity of disease

Extubation

- Tenuous pulm status and/or septic deterioration may require prolonged mechanical ventilation.

Postoperative Period

- NPO until intestinal function returns.
- Analgesia important for adequate respiratory function.
- Monitor for postinterventional complications (transient sepsis, organ injury, hemorrhage, pneumothorax, peritonitis, wound dehiscence).

Anticipated Problems/Concerns

- Drainage will need to be prolonged (often greater than 10 d).
- Recurrent abscess formation or sepsis (57% in high-risk pts).
- At risk for MODS (respiratory/ARDS, renal, hepatic, GI bleed).
- High mortality rate (23–50%) in the presence of multiple organ dysfunction.
- Periop pneumonia/empyema/pleural effusion.
- Fistula formation.

Substance Abuse Disorder (Perioperative)

Lewis Fry | Robert A. Fry

Risk

- Incidence in USA (2013 estimation): 24.6 million (9.4% population)
- Marijuana 7.5%, heroin 0.27%, cocaine 0.6%, prescription drugs 2.5%, alcohol (heavy drinkers) 6.5%, tobacco products 25.2%
- Associations: Males, trauma, gunshot wounds, MVAs, falls, mental illness

Perioperative Risks

- Difficult airway and IV access
- Hemodynamic instability, autonomic dysfunction
- Opioid tolerance, achieving adequate analgesia, hyperalgesia/pain intolerance
- Systemic/blood borne infections (HIV, hepatitis B and C, TB, septic arthritis)
- Malnutrition, coagulopathy

Worry About

- Withdrawal (prevention and treatment)
- Pain management
- Acute psychosis (hallucinations, aggression, anxiety)
- Multiagent abuse, drug interactions, smoking, and drug-related lung disease
- Obstetrics: Lack of prenatal care, IUGR, 4× increased incidence of abdominal delivery, abruptio placenta, fetal abnormalities, drug effects that may mimic preeclampsia

Overview

- Chronic condition characterized by (1) impaired control of use, (2) social impairment, (3) risky use of substance, and (4) pharmacologic effects (tolerance, withdrawal)
- Physiologic and pathologic changes specific to drug class

Etiology

- Biopsychosocial disease: Possible genetic predisposition, susceptible premorbid personality types

Usual Treatment

- Team-oriented multimodal approach: Detoxification, psychiatric assessment, pharmacotherapy. Drug-specific pharmacotherapy may include naltrexone, slow-release morphine, buprenorphine, methadone, suboxone, disulfiram, acamprosate.
- Support group or special treatment facility; compliance 30–60%.

Assessment Points

System	Effect	Assessment by Hx	PE	Tests
GENERAL	Poor general health (malnutrition, poor dentition) hypothermia/hyperthermia withdrawal	Drugs and alcohol	Temperature, trauma, tracking Diaphoresis, tremors, N/V	Blood, urine toxicology screens
HEENT	Miosis (opioids), mydriasis (stimulants)		Pupils	
CV	Sympathetic stimulation, arrhythmias, ischemia/MI (cocaine, amphetamines), cardiomyopathy (opioids, ETOH, cocaine), aortic dissection (cocaine, amphetamines), endocarditis (IVDU)	Palpitations, SOB on exertion, chest pain	BP/HR, murmur, SVR, long QT	ECG ECHO Troponins
RESP	Bronchoconstriction, pulmonary Htn, interstitial fibrosis, pneumonia, pulmonary hemorrhage (cocaine), resp depression (heroin, opiates, PCP)/stimulation (amphetamines, LSD), emphysema (tobacco/marijuana)	SOB on exertion, hemoptysis	RR, O_2 sats, air entry, wheeze	CXR if indicated
GI	Cirrhosis (ETOH), salivation (PCP)	Anorexia, N/V, bleeding	Hepatomegaly, ascites	LFTs
RENAL	Retention (marijuana), ARF, ESRF (cocaine, amphetamines), hyponatremia (MDMA)		Oliguria Anuria (rhabdomyolysis)	Urea and lytes, CK and Cr Urine myoglobin
ENDO/METAB	Serotonin syndrome (cocaine, amphetamines, buprenorphine, LSD)		BP, temp, tremors, diaphoresis, confusion, seizures	
CNS	Altered mental state SAH, CVA (cocaine)	Anxiety, hyperactivity, euphoria. Aggression, hallucinations	Neuro exam, MSE	CT, MRI
PNS	Peripheral neuropathy (ETOH)	Altered sensation	Neuro exam	
OB	IUGR, preterm labor, placental abruption	Exposure, abdominal pain, bleeding	Vaginal bleeding	US

Key References: Lüscher C: Drugs of abuse. In: Katzung BG, Trevor AJ, editors, *Basic and clinical pharmacology,* ed 13, New York, 2015, McGraw-Hill; Bryson EO, Frost EAM, editors: *Perioperative addiction: clinical management of the addicted patient,* New York, 2012, Springer.

Perioperative Implications

Preoperative Preparation

- D&A Hx: CAGE-AID questionnaire, drugs abused, duration, frequency, route of administration
- Consideration of drug and toxicology screening (has limitations)
- Addiction specialist consultation recommended
- Acutely intoxicated: Delay of treatment wherever possible due to hemodynamic instability
- Chronic use: Management of pharmacotherapy, including opiate-replacement therapy as appropriate and prevention of withdrawal

Monitoring

- Standard ASA monitors; consider invasive monitoring for cardiovascular instability or end-organ dysfunction.

Airway

- Consider rapid-sequence induction in intoxication.
- Nasal septal/soft palate necrosis; drug-associated pulmonary disease (see Assessment Points table).

Preinduction/Induction

- Consider premedication: benzodiazepines, dexmedetomidine, or beta-blockers.
- Propofol (no specific contraindications); relative contraindications: Cocaine: etomidate, succinylcholine, ketamine. PCP & LSD: Ketamine. Marijuana: Barbiturates

Maintenance

- Autonomic dysfunction common; anticipate hemodynamic instability, myocardial ischemia, arrhythmias, myocardial depression, diminished or exaggerated responses to vasopressors.
- Consider decreased MAC (chronic opioid, cocaine, amphetamine use) and increased MAC (stimulant intoxication).

Postoperative Period

- Depressed airway reflexes and respiratory depression; postop apnea monitoring (recommended).
- Anticipate agitation, confusion, hallucinations, withdrawal, seizures, delayed return of motor function, fever, and hemodynamic instability.
- Withdrawal management (e.g., lorazepam, haloperidol, clonidine).
- Pain management: Consideration of alternative multimodal analgesia, including alternative routes, local anesthetics, regional blocks, nonsteroidals, ketamine, alpha blockers, and gabapentin; may require opiate doses 2-3× more than in opiate-naïve pts.
- In pts drinking >4 drinks/d, 2–3× increased risk for postop complications.

Supratentorial Brain Tumors

Tod B. Sloan | Antoun Koht

Risk

- Highest incidence age is 3–12 y and 55–65 y.
- Account for 80% of adult CNS tumors; incidence of primary tumor is ~15–20:100,000 per y.
- Account for one-third of childhood CNS tumors.

Perioperative Risks

- Increased ICP: Headache, seizures, neurologic deficit/dementia, visual and hearing changes, focal neurologic changes (hemiparesis, numbness, ataxia), and/or visual deficits if pituitary tumor present
- Endocrinopathy, fluid, and electrolyte imbalance

Worry About

- AEDs: Dilantin, keppra, tegretol. Adequate levels needed to avoid postop seizures.
- Raised ICP and brain edema: May lead to herniation (transtentorial [dilate ipsilateral] pupil), subfalcine (leg weakness), tonsillar (neck stiffness, spasticity, extensor-plantar response), and upward transtentorial (small pupils, extensor rigidity).
- Dexamethasone Rx may lead to hyperglycemia.
- Hyperglycemia may cause more retractor-induced ischemic injury to adjacent brain tissues.
- Endocrinopathy, particularly diabetes insipidus, if near pituitary.

Overview

- Portion of brain superior to tentorium cerebella.
- 13,000 deaths per y; third leading cause of death in pts 15–34 y of age.
- Brain edema surrounding malignant tumors causes initial Sx; often improve initially after corticosteroids.
- Seizures due to local neuronal irritation; 30–70% incidence related to tumor type.
- Obstructive hydrocephalus if the tumor is near third ventricle or foramen of Monro.

Etiology

- In adults, 85% of primary tumors occur in anterior two-thirds of cortex (most benign): glioma (45–50%), medulloblastoma, ependymoma, low-grade lymphoma (children: astrocytoma, medulloblastoma). 15% are meningiomas. Common presentation age is 55–65 y (1% of all cancers).
- Many supratentorial tumors are metastases (20–30%): Melanoma, breast cancer, small-cell lung, non-Hodgkin's lymphoma, colon, renal, nasal/throat. 50% have multiple metastases (25% of all pts with cancer have brain metastases), usually located at white-gray border.