General and specific Perioperative Care of the Surgical Patient

I. PREOPERATIVE EVALUATION AND MANAGEMENT

A. General Evaluation of the Surgical Patient. The goals of preoperative evaluation are to

(1) identify the patient's medical problems and functional status;

(2) determine if further information is needed to characterize the patient's medical status;

(3) estimate the patient's level of risk for the planned procedure;

(4) establish if the patient's condition is medically optimized.

Much of this can be accomplished with a thorough history and physical examination. For minor surgical procedures and procedures on young, healthy patients, routine diagnostic testing is often unnecessary. For patients with existing comorbidities, or in patients undergoing certain complex procedures, preoperative laboratory studies and imaging should be decided on an individual basis.

What is the ASA grading system?

The American Society of Anesthesiologists (ASA) grade is the most commonly used grading system, which accurately predicts morbidity and mortality associated with anaesthesia and surgery.

ASA Grade	Definition	Mortality (%)
I	Normal healthy individual	0.05
II	Mild systemic disease with no functional limitation	0.4
III	Severe systemic disease with functional limitation	4.5
IV	Severe systemic disease which is a constant threat to life	25
V	Moribund patient, not expected to survive 24 hours with or without surgery	50

What are the most common reasons for cancellation of an operation on the day of surgery?

_ Onset of new medical condition

_ Insufficient optimisation of co-existing conditions

_ Inadequate investigations of co-existing conditions

_ Lack of critical care beds (less common than above three factors)

B. Specific Considerations in Preoperative Management:

1. Cardiovascular disease is one of the leading causes of death after noncardiac surgery. Patients who experience a myocardial infarction (MI) after noncardiac surgery have a hospital mortality rate of 15% to 25% (CMAJ. 2005;173:627).

a. Risk factors.

- ✓ **Patient factors**: have been identified and are associated with perioperative cardiac morbidity and mortality. These include *age above 70 years*, *unstable angina*, *recent (prior 6 months) MI*, *untreated CHF*, *diabetes mellitus*, *valvular heart disease*, *cardiac arrhythmias*, *peripheral vascular disease*, and *functional impairment*.

- ✓ **Factors related to the surgical procedure:** Intrathoracic, intraperitoneal, major vascular, emergency surgery, uncontrolled intraoperative bleeding.

e. Preoperative management:

(1) Patients with pacemakers should have their pacemakers turned to the uninhibited mode before surgery. In addition, bipolar cautery should be used when possible in these patients. If unipolar cautery is necessary, the dispersive electrode should be placed away from the heart.

(2) Patients with internal defibrillators should have these devices turned off during surgery.

(3) Perioperative beta-blockade: recent studies, including the PeriOperative ISchemic Evaluation (POISE) trial, suggest that beta-blockers reduce perioperative ischemia and may reduce the risk of MI and cardiovascular death in high-risk patients (Lancet. 2008;371:1839-1847). Beta-blockers should ideally be started days to weeks before elective surgery. Preoperatively, each patient's dose should be titrated to achieve adequate heart rate control to benefit from betablockade while avoiding the risks of hypotension and bradycardia (Circulation. 2009;120:2123- 2151).

(4) Patients with recent angioplasty or stenting: Several studies have shown a high incidence of cardiovascular complications when noncardiac surgery is performed shortly after coronary angioplasty or stenting. Current guidelines are to delay noncardiac surgery at least 6 weeks after coronary angioplasty or placement of bare metal stents, which require 6 weeks of dual antiplatelet therapy with aspirin and clopidogrel. In contrast, dual antiplatelet therapy should be continued for at least 12 months following placement of a drug-eluting stent (DES), which can affect timing of elective operations.

2. Pulmonary disease. Preexisting lung disease confers a dramatically increased risk of perioperative pulmonary complications. Risk factors for pulmonary complications include chronic obstructive pulmonary disease, smoking, asthma, obstructive sleep apnea, advanced age, obesity, surgical site located near the diaphragm, and functional status.

a. Preoperative evaluation and screening

(1) Physical examination should be performed carefully, with attention paid to signs of lung disease (e.g., wheezing, prolonged expiratory/inspiratory ratio, clubbing, or use of accessory muscles of respiration).

(2) Diagnostic evaluation

(a) A **chest x-ray (CXR)** should only be performed for acute symptoms related to pulmonary disease, unless it is indicated for the specific procedure under consideration.

(b) An **arterial blood gas (ABG)** can be considered in patients with a history of lung disease or smoking to provide a baseline for comparison with postoperative studies, but is not reliable to accurately predict postoperative pulmonary complications.

(c) Preoperative pulmonary function testing is controversial and probably unnecessary in stable patients with previously characterized pulmonary disease undergoing nonthoracic procedures.

b. Preoperative prophylaxis and management

(1) Pulmonary toilet. Increasing lung volume by the use of preoperative incentive spirometry is potentially effective in reducing pulmonary complications.

(2) Antibiotics do not reduce pulmonary infectious complications in the absence of preoperative infection. Elective operations should be postponed in patients with respiratory infections. If emergent surgery is required, patients with acute pulmonary infections should receive intravenous (IV) antibiotic therapy.

(3) Cessation of smoking. All patients should be encouraged to and assisted in smoking cessation before surgery.

(4) Bronchodilators. In the patient with obstructive airway disease and evidence of a significant reactive component, bronchodilators may be required in the perioperative period. Elective operation should be postponed in the patient who is actively wheezing.

3. Renal disease

a. Preoperative evaluation of patients with existing renal insufficiency:

Risk factors: Patients without preexisting CRI ranges may be at risk of developing postoperative acute renal failure (ARF), elevated preoperative BUN or creatinine, CHF, advanced age, intraoperative hypotension, sepsis, aortic cross-clamping, intravascular volume contraction, and use of nephrotoxic and radionucleotide agents.

(1) Evaluation

(a) History. Patients with hypertension or diabetes and CRI are at a substantially increased risk of perioperative morbidity and mortality. The timing and quality of the patient's last dialysis session, the amount of fluid removed, and the preoperative weight provide important information about the patient's volume status. In nonanuric patients, the amount of urine made on a daily basis should also be documented.

(b) Physical examination should be performed to assess the volume status. Elevated jugular venous pulsations or crackles on lung examination can indicate intravascular volume overload.

(c) Diagnostic testing

(i) Laboratory data. Serum electrolyte and bicarbonate levels should be measured, as well as blood urea nitrogen (BUN) and creatinine. A complete blood cell count (CBC) should be obtained to evaluate for significant anemia or a low platelet level. Normal platelet numbers can mask platelet dysfunction in patients with chronic uremia.

(2) Management

(a) Timing of dialysis. Dialysis should be performed within 24 hours of the planned operative procedure.

(b) Intravascular volume status. Cardiac events are the most common cause of death in patients with CRI. Both hypovolemia and volume overload are poorly tolerated, and invasive monitoring in the intraoperative and postoperative periods may assist in optimizing fluid balance.

(3) Prevention

(a) Intravascular volume expansion. Adequate hydration is the most important preventive measure for reducing the incidence of ARF.

(b) Radiocontrast dye administration. Patients undergoing radiocontrast dye studies have an increased incidence of postoperative renal failure. Fluid administration (1 to 2 L of isotonic saline) alone appears to confer protection against ARF.

(c) Other nephrotoxinsÑincluding aminoglycoside antibiotics, nonsteroidal anti-inflammatory drugs (NSAIDs), and various anesthetic drugs can predispose to renal failure, as well, and should be avoided in patients at high risk for postoperative renal failure.

4. Infectious complications: Infectious complications are a major cause of morbidity and mortality following surgery. They may arise at the surgical site itself or in other organ systems.

a. Assessment of risk: Risk factors for infectious complications after surgery can be grouped into procedure-specific and patient-specific risk factors.

(1) Procedure-specific risk factors include the type of operation, the degree of wound contamination (whether the case is classified as clean, clean/contaminated, contaminated, or dirty), and the duration and urgency of the operation.

(2) Patient-specific risk factors include age, diabetes, obesity, immunosuppression, malnutrition, preexisting infection, and other chronic illness.

b. Prophylaxis:

(1) Surgical site infection:

Operation	Likely Pathogens	Recommended Antibiotics prophylaxis
Cardiac: Prosthetic valve and other procedures	Staphylococci, corynebacteria, enteric Gramnegative bacilli	Vancomycin and Cefazolin Vancomycin and Aztreonam
Thoracic	Staphylococci	Cefazolin Vancomycin
Vascular: Peripheral bypass or aortic surgery with prosthetic graft	Staphylococci,streptococci, Enteric Gram-negative bacilli, clostridia	Cefazolin Vancomycin and Aztreonama
Orthopedic: Total joint replacement or internal fixation of fractures	Staphylococci	Cefazolin Vancomycin
Upper GI and	Enteric Gramnegative bacilli,	Cefazolin Cefotetan

hepatobiliary	enterococci, clostridia	Cefoxitin
Colorectal	Enteric Gramnegative bacilli, anaerobes, enterococci	Cefoxitin Cefotetan Ertapenem Cefazolin and Metronidazole
Appendectomy (no perforation)	Enteric Gramnegative bacilli, anaerobes, enterococci	Cefoxitin Cefotetan
Obstetrics/gynecology	Enteric Gramnegative bacilli, anaerobes, group B streptococci, enterococci	Cefotetan Cefoxitin Cefazolin Clindamycin and Gentamicin

(2) Respiratory infections. Risk factors and measures for preventing pulmonary complications are discussed above.

(3) Genitourinary infections may be caused by instrumentation of the urinary tract or placement of an indwelling urinary catheter. Preventive measures include avoiding catheterization for short operations, sterile insertion of the catheter, and removal of the catheter on postoperative day 1. Some operations that include a low pelvic dissection, will require longer catheterization because of local trauma.