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# SURGICAL DECISION MAKING

Robert C. McIntyre, Jr.  
Richard D. Schulick

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# Surgical Decision Making

*Sixth Edition*

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# Preface

Ben Eiseman and colleagues first conceived of best-practice decision trees applied to prevalent surgical diagnoses and treatments in the late 1970s.<sup>i</sup> At that time, care pathways, bundled care episodes, cost-effectiveness analysis for individual patients or patient cohorts, and the transition from analog to digital information flow were irrelevant. Or perhaps these ideas were aspirations for a few forward-thinking clinicians, for a few researchers interested in health policy and payment reform, and for elite informaticians dealing largely with complicated datasets not in the health-care universe.

Six editions later, *Surgical Decision Making* algorithms could be viewed as having led the way, as a “forcing function” in coalescing default best practice in an ever-more-complex population of data. *Surgical Decision Making* has been and still is a practical attempt to optimize the everyday management of common surgical diseases.

Many of the dilemmas apparent at the inception of the series are still present:

- How to come to a consensus on best practice in diagnostic and therapeutic approaches
- How to continuously update clinical expertise with an ever-expanding and dynamic basic and clinical research database
- How to define and update intermediate- and long-term quality metrics
- And most importantly, how to balance the art and the science of care without creating one of the popular false polarities in health care—cookbook medicine (one care template that fits all patients) versus “seat of the pants” individual

variation (“I do it my way because of what I was taught 35 years ago”)

This sixth edition presupposes that surgeons will be the key managers of many prevalent medical problems. The present editors have added experts and expertise consistent with the immense new knowledge that contributes to better (i.e., more valuable) care for all of our patients. But these *Surgical Decision Making* algorithms do not substitute for judgment. The humility of Eiseman et al.’s preface to the third edition still stands:

Clinicians understandably resist the idea of reducing multifactorial decisions, which are subject to variations of the patient and the provider, to simple line drawings. A cookbook approach to problem solving cannot possibly reflect the circumstances under which the surgeon exercises judgment. This book is not intended to prescribe behavior in every instance. It offers the reader an opportunity to follow the logic of an expert in selecting the best among many competing options of diagnosis and treatment.

And I would argue that as the data and the complexities in diagnostics and therapeutics have expanded, the need for simplicity and default best-practice algorithms becomes even more critical as a starting point for determining a continued optimization of surgical care.

As one of my former colleagues at Geisinger stated, “This is the stuff every surgical trainee should know if he or she is to pass the specialty board exams.”<sup>iii</sup>

<sup>i</sup>Norton, L., Steele, G., Eiseman, B. 1978. *Surgical Decision Making*. W.B. Saunders Company, Philadelphia.

<sup>ii</sup>Eiseman, B., Robinson, W., Steele, G. 1982. *Follow-Up of the Cancer Patient*. Thieme-Stratton, New York.

<sup>iii</sup>Casale, A., Paulus, R., Selna, M., Doll, M., Bothe, A., McKinley, K., Berry, S., Davis, D., Gilfillan, R., Hamory, B., Steele, G. 2007. “Proven-CareSM”: a provider-driven pay-for-performance program for acute episodic cardiac surgical care. *Annals of Surgery* 246 (4), 613–621.

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# PREOPERATIVE LABORATORY EVALUATION

Stephanie Davis, MD, and  
Christopher D. Raeburn, MD

**A** The estimated cost of preoperative testing in the United States is between \$3 billion and \$18 billion each year. The majority of these tests are unnecessary and do not change perioperative morbidity or mortality or necessitate a change in management. Additional testing to evaluate borderline or falsely abnormal results further increases cost and, more important, can lead to iatrogenic injury. Thus *routine* preoperative testing should be avoided; instead, specific preoperative laboratory evaluation should be performed to confirm or rule out medical conditions that are likely to affect a patient's perioperative course. Laboratory testing within 6 months of the operative date is acceptable if a patient's medical history has not changed. A thorough history and physical alone are 96% accurate in predicting a patient's fitness for surgery.

**B** The magnitude and risk of the operative procedure should be considered when determining the extent of preoperative evaluation. Intracranial, thoracic, intraabdominal, and suprainguinal vascular operations are higher risk procedures. Multiple studies, including two large randomized controlled trials, have shown no difference in outcome between patients who underwent routine versus no preoperative testing before low-risk ambulatory surgery.

**C** Asymptomatic patients without any comorbid disease who can perform 4 metabolic equivalents (METs; e.g., walking, golf, yard work) and are undergoing elective procedures need no preoperative laboratory evaluation regardless of age. Abnormal preoperative laboratory values in healthy, asymptomatic patients do not predict postoperative adverse outcomes.

**D** A basic metabolic panel (BMP) including electrolytes, glucose, blood urea nitrogen, and creatinine is useful in patients with seizure disorders because electrolyte abnormalities may lower the seizure threshold during the perioperative period and complicate antiseizure therapy. A history of stroke may indicate a cardiac condition such as atrial fibrillation or simply be a marker of systemic atherosclerotic disease; thus a complete blood count (CBC), BMP, and electrocardiogram (ECG) should be considered in those undergoing a high-risk procedure.

**E** Patients with a known history of coronary artery disease (CAD), and those with signs/symptoms or risk factors indicative of CAD, may require further preoperative cardiac evaluation (see Chapter 2, Preoperative Cardiac Evaluation). Patients with evidence of peripheral vascular disease should be

assumed to have CAD until proven otherwise. Routine preoperative laboratory testing is not indicated unless the patient's cardiovascular comorbidities and/or the invasiveness of the operation indicate it.

**F** In patients with pulmonary disease and a recent change in symptoms, preoperative chest x-ray is indicated to assess for the presence of acute or progressive disease. Patients with stable disease need not undergo chest x-ray. Pulmonary function tests (PFTs) and arterial blood gases (ABGs) may be warranted in patients with significant obstructive/reactive airway disease undergoing thoracic or upper abdominal surgery but should not be done in all patients. Spirometry may be helpful in a patient with chronic obstructive pulmonary disease or asthma if, after clinical assessment, it is uncertain whether the degree of airflow obstruction has been optimally reduced. A partial pressure of arterial carbon dioxide (PaCO<sub>2</sub>) greater than 45 mm Hg is a risk factor for pulmonary complications. Risk reduction can include cessation of smoking for 8 weeks before operation, airflow reduction with bronchodilators or steroids, elimination of infection, and instruction on lung-expansion maneuvers.

**G** CBC, liver function tests (LFTs), prothrombin time (PT), international normalized ratio (INR), and partial thromboplastin time (PTT) are indicated in patients with a history of advanced liver disease because these patients are at increased risk for perioperative infections, hemorrhage, and wound complications. It remains controversial whether diabetes mellitus is an independent risk factor for perioperative complications, unless it is poorly controlled. Thus checking the HgbA1c is reasonable if the planned surgery would be delayed to optimize glycemic control. Although mild to moderate malnutrition does not affect perioperative complications, patients with severe malnutrition may have significant anemia, electrolyte disturbances, and coagulation defects. Severely malnourished patients undergoing elective surgery may benefit from preoperative nutritional support. Serum albumin level is a very reliable indicator of increased operative risk.

**H** Renal dysfunction predisposes to electrolyte disturbances, which increase the risk for anesthetic complications and perioperative arrhythmias. Thus assessment and normalization of preoperative electrolyte abnormalities and anemia are indicated.

**I** A history of hematologic disorders such as anemia, thrombocytopenia, or bleeding tendency should be investigated. Malignancy affects perioperative morbidity and warrants a search for anemia, thrombocytopenia, and coagulation abnormalities if this has not previously been completed.

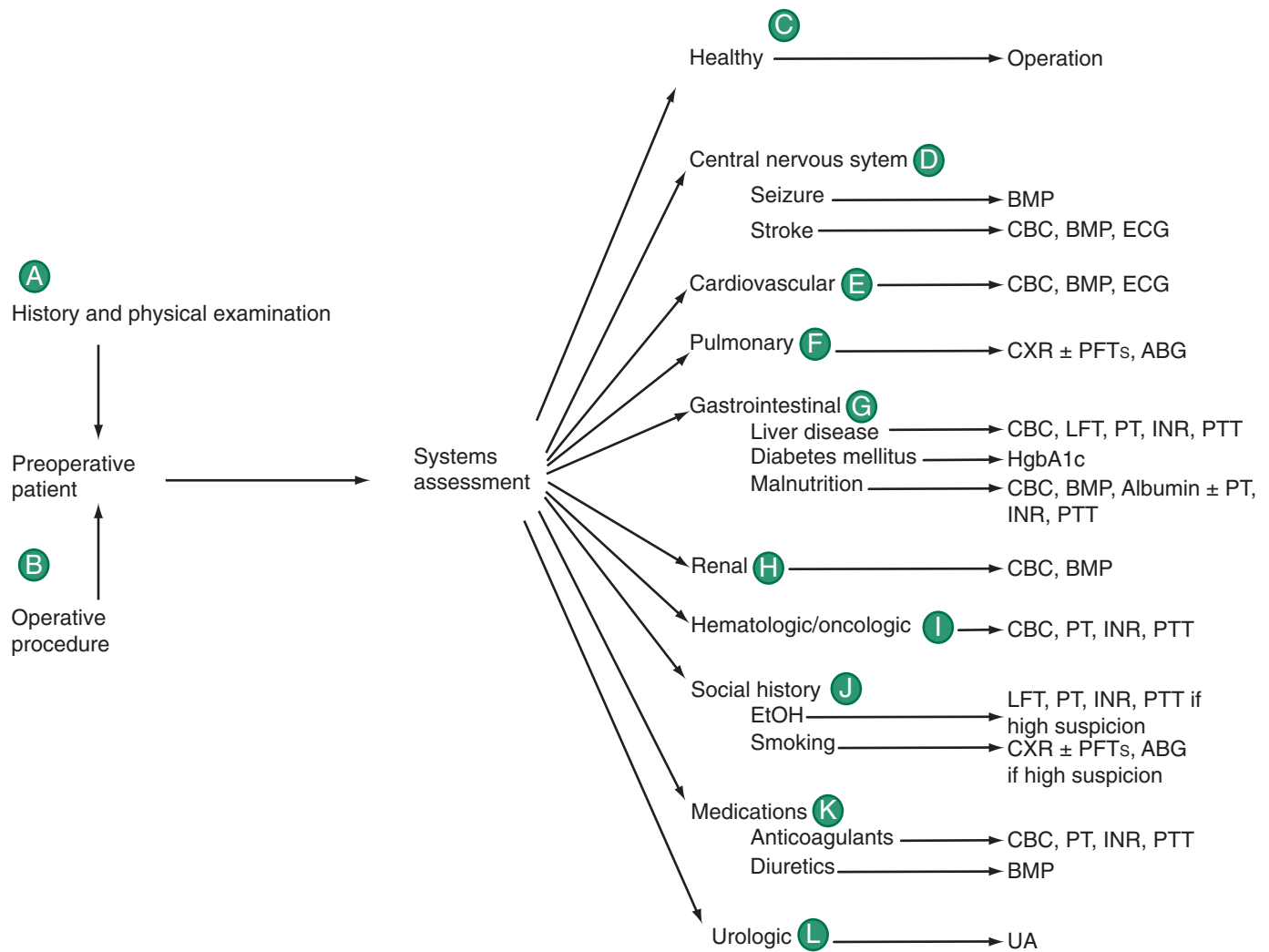
**J** A social history is important in identifying patients with a significant history of alcohol or tobacco abuse. Identification of liver disease in patients with a significant history of alcohol abuse may permit medical optimization before elective surgery. Cessation of smoking 4 weeks before surgery significantly reduces perioperative pulmonary complications. Concern that stopping smoking only a few weeks before surgery might worsen clinical outcomes has not been found in recent studies, which show no increase in complications. Routine preoperative laboratory testing in patients with a history of alcohol or smoking use is not recommended unless there is high suspicion of disease.

**Abstract**

A thorough history and physical alone are very accurate in predicting a patient's fitness for surgery. The majority of preoperative tests are unnecessary and do not change perioperative morbidity or mortality or necessitate a change in management. Routine preoperative testing should be avoided; instead, specific preoperative laboratory evaluation should be performed to confirm or rule out medical conditions that are likely to affect a patient's perioperative course.

**Keywords**

preoperative risk  
laboratory  
surgery



**K** A careful review of medications is important because certain medications, such as anticoagulants and diuretics, may increase the risk for perioperative morbidity. There are increasing numbers of new oral anticoagulant (NOAC) medications available, most of which do not have an accurate laboratory test to assess the degree of anticoagulation effect. Thus it is important to understand the indications for and half-life of these medications to determine whether they should be held for surgery and if so, for how long. Testing of renal function is important in determining how long NOAC medication should be stopped before surgery.

**L** For specific urologic procedures, a preoperative urinalysis may be indicated. Alternatively, if a patient is complaining of signs/symptoms that may indicate a urinary tract infection (UTI), a urinalysis should be obtained.

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