

Preoperative Physician Fitness

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ABSTRACT

A preoperative checkup is necessary for the patients who are preparing for surgery. The opinion of the internist is vital to decide the suitability of major and minor surgeries by assessing the health status of patients. There are different key parameters to be monitored and recorded, which includes a proper history, thorough clinical examination and an appropriate laboratory checkup. By assessing pre and perioperative risks, the role of physician is to optimize patient's medical conditions to reduce morbidity and mortality. This article discusses these topics at length and provides some recommendations for fellow practitioners.

Keywords: General physicians, Laboratory checkup, Mortality, Preoperative.

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INTRODUCTION

Adequate preoperative preparation and optimized treatment of preexisting diseases are very essential for a patient undergoing surgery to avoid peri and postoperative morbidity and or mortality and the person to take an active role to assess the possible complications during operation is a primary-care physician. So a systematic high-quality and cost-effective approach is needed for a safe surgery.^{1,2}

These are the primary goals of a physician for a preoperative assessment:³

- To assess the overall health status of the patients.
- To detect undiagnosed clinical conditions.
- To detect a preoperative risk.
- To optimize patient's medical condition and to reduce hospital staying.

GENERAL HEALTH ASSESSMENT

History

It is the most important component of preoperative evaluation. It includes thorough present, past, family, personal histories, drug history, including allergy to a drug (if any) to be taken.¹⁻³

Physical Examination

It includes assessment of the airway, lungs, heart, and vital signs. Investigations are to be done for any significant finding in a physical examination.^{1,4}

Drug History

A thorough drug history should be taken. Some drugs such as aspirin (at least 3 days before surgery), clopidogrel (7 days before surgery), and oral contraceptives (6 weeks before surgery) are to be stopped before surgery and some modification of dosage may be required such as antidiabetics and antihypertensive.¹

Laboratory Workup

Usually routine laboratory tests are not recommended for healthy individuals as a preoperative assessment. Depending upon the findings in clinical examination and history, laboratory tests are advised (Table 1).

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Table 1: Indications of laboratory tests^{1,5}

Complete blood count
Major surgery
Chronic cardiovascular, pulmonary, renal, hepatic disease, and malignancy
Suspected anemia, bleeding prosthesis or myelosuppression, less than one year of age
Coagulation profile (platelet count, INR, APTT)
Anticoagulant therapy
Bleeding prosthesis
Liver disease
Electrolyte and creatinine
Hypertension
Renal disease
Diabetes
Pituitary or adrenal disease
Digoxin or diuretic therapy
Fasting glucose
Diabetes
Electrocardiogram
Heart disease, hypertension, diabetes, sub-arachnoid, or intracranial bleeding, cerebrovascular accident, head trauma
Chest radiograph
Cardiac or pulmonary disease

Source: Zambouri A. Preoperative evaluation and preparation for anesthesia and surgery. *Hippokratia* 2007;11(1):13–21

Complete Blood Count

Usually hemoglobin and hematocrit measurement are required before surgery, especially in a case of anemia or prolonged surgery with anticipated significant blood loss. It is also indicated in some preexisting chronic diseases such as chronic kidney disease, chronic liver disease, or any chronic inflammatory condition.^{6,7}

Coagulation Testing

Coagulation tests such as platelet count, PT, and APTT are usually done before any major surgery and also in patients with impaired hemostasis or patients taking anticoagulants or in patients with a spontaneous bleeding history or a known family history of coagulopathy.⁶⁻⁸

Electrolyte and Creatinine Testing

Indicated usually in patients of hypertension, heart failure, chronic kidney disease, chronic liver disease, or in patients taking drugs such as diuretics, angiotensin-converting enzyme inhibitors, angiotensin receptor blockers, nonsteroidal anti-inflammatory drugs, and digoxin.

According to few guidelines, serum electrolyte assessment is indicated in patients aged more than 40 years but usually not followed if history and physical examinations are normal.^{6,7}

Glucose and HbA1C Testing

In known diabetics or patients on medication such as corticosteroid or in patients with a history suggestive of undiagnosed diabetes, glucose and A1C measurement are indicated.⁶⁻⁸

Electrocardiography

Patients should have preoperative ECG before a high-risk or intermediate-risk surgical procedure. ECG is usually not indicated in patients undergoing low-risk procedures. Cardiac risk factors for noncardiac surgery are assessed⁶⁻⁸ (Table 2).

Chest Radiography⁶⁻⁹

Usually not indicated routinely in healthy patients but recommended as a preoperative assessment in known pulmonary or cardiac disease. Abnormal chronic findings in chest X-ray do not alter the outcome of surgery; so previous chest X-ray reports should also be assessed.

These are the risk factors of perioperative pulmonary complications:

- Chronic obstructive pulmonary disease,
- Age older than 60 years,
- Functional dependence,

Table 2: Surgery related risk of perioperative cardiac complications

<i>Risk of procedure</i>	<i>Examples</i>
High (>5%)	Aortic and major vascular surgery, peripheral vascular surgery
Intermediate (1–5%)	Intraperitoneal or intrathoracic surgery, carotid endarterectomy, head and neck surgery, orthopedic surgery, prostate surgery
Low (<1%)	Ambulatory surgery, breast surgery, endoscopic procedures, superficial procedures, and cataract surgery

Source: Zambouri A. Preoperative evaluation and preparation for anesthesia and surgery. Hippokratia 2007;11(1):13–21

- Congestive heart failure,
- Emergency procedure,
- Prolonged procedures.

Urinalysis

Though routinely not recommended, it is suggested in patients undergoing surgical implantation of foreign material (like prosthetic joint, heart valve) or invasive urologic procedures.^{6,8}

PERIOPERATIVE RISK ASSESSMENT^{1,10}

Depending upon the risk associated with a surgery, there are some grading system. Among them one is ASA (American Society of Anesthesiologists) grading system, which is very simple and correlates the risk of anesthesia and surgery with patient's general health and other comorbid conditions.

It is very useful and applied to almost all patients before surgery. Increased grading score is associated with increased pre- and perioperative complications, especially in ASA class 4 and 5 (Table 3).

ASSESSMENT OF CARDIOVASCULAR RISK^{1,11}

To assess the risk factors for noncardiac surgery, the American College of Cardiology (ACC) and the American Heart Association

Table 3: American Society of Anesthesiologists' classification of physical status

ASA class 1	No organic, physiological, biochemical or psychiatric disturbances
ASA class 2	Mild-to-moderate systemic disturbance that may or may not be related to the reason of surgery (e.g. heart disease that only slightly limits physical activity, essential hypertension, diabetes mellitus, anemia, extremes of age, morbid obesity, and chronic bronchitis)
ASA class 3	Severe systemic disturbance that may or may not be related to the reason for surgery (does limit surgery), e.g. heart disease that limits activity, poorly controlled essential hypertension, diabetes mellitus with vascular complications, chronic pulmonary disease that limits activity, angina pectoris, and a history of prior myocardial infarction
ASA class 4	Severe systemic disturbance that is life-threatening with or without surgery—e.g. congestive heart failure, persistent angina pectoris, advanced pulmonary, renal, or hepatic dysfunction
ASA class 5	A moribund patient who has a little chance of survival but is submitted to surgery as a last resort (resuscitative effort)—e.g. uncontrolled hemorrhage as from a ruptured abdominal aneurysm, cerebral trauma, pulmonary embolus
ASA class 6	A declared brain-dead patient whose organs are being removed for donor purposes
E	An E is added to the status number to designate an emergency operation

Source: Zambouri A. Preoperative evaluation and preparation for anesthesia and surgery. Hippokratia 2007;11(1):13–21

(AHA) have published guidelines for perioperative cardiovascular evaluation for noncardiac surgery.

These are:

- Major clinical predictors (markers of unstable coronary artery disease):
 - Myocardial infarction less than 6 weeks
 - Unstable or severe angina (class 3–4)
 - Decompensated congestive heart failure Significant arrhythmias (causing hemodynamic instability). Severe valvular disease (aortic/mitral stenosis with valve area less than 1 cm²). CABG /PTCA less than 6 weeks
- Intermediate clinical predictors (markers of unstable coronary artery disease):
 - Previous myocardial infarction more than 6 weeks and less than 3 months based on a history or the presence of pathological q waves
 - Mild angina (class 1–2)
 - Silent ischemia, compensated congestive heart failure, ejection fraction less than 35%, post CABG/PTCA more than 6 weeks and less than 3 months, or more than 6 years with antianginal therapy
 - Diabetes mellitus
 - Renal insufficiency
- Minor clinical predictors (increased probability of coronary artery disease):
 - Family history of coronary artery disease
 - Age more than 70 years
 - ECG abnormalities (arrhythmias, LVH, LBBB)
 - Low functional capacity
 - A history of stroke
 - Uncontrolled systemic hypertension
 - Hypercholesterolemia, smoking
 - Post infarction (more than 3 months), asymptomatic without treatment
 - Post CABG/PTCA more than 3 months and less than 6 years and no symptoms of angina nor anti-anginal therapy

ASSESSMENT OF PULMONARY RISK

Postoperative pulmonary complications are pneumonia, atelectasis, bronchitis, bronchospasm, and respiratory failure.

Risk factors are:^{1,12}

- Depending upon the surgery:
 - Risk is greater in upper abdominal and thoracic surgery, prolonged surgery more than 3 hours, surgery under general anesthesia, and in emergency surgery.
- Known obstructive airway disease (asthma, COPD) patients:
 - All COPD or asthma patients with a history of hospitalization within last 6 months are at high risk before surgery.
- In other chronic lung diseases such as interstitial lung diseases.
- In known smoker patients.
- Elderly patients especially in age >60 years.
- Obese patients.
- Presence of obstructive sleep apnea.
- Poor general health status.

PREVENTIVE STEPS TO AVOID THESE COMPLICATIONS

COPD/Asthma

For obstructive airway disease patients, the underlying conditions should be under controlled before surgery. There should be no wheezing and peak flow should be greater than 80% of predicted. If necessary, a short course of steroid (1 mg per kg body weight of prednisolone or other in equivalent doses) should be given. Patients with a recent history of hospitalization should be assessed more carefully as airway reactivity may persist for several weeks. COPD patients should be examined and investigated for cor pulmonale. Impaired nutrition status and electrolyte imbalance should be corrected as they cause respiratory muscle weakness.

Diabetes Mellitus^{1,13}

Diabetic patients are at greater risk than a nondiabetic as long-term complications of diabetic are more. There are some recommendations before surgery to prevent perioperative complications:

- Blood glucose should be maintained below 180 mg/dL until oral feeding is started as blood glucose more than 180 g/dL (10 mmol/L) causes osmotic diuresis, dehydrations, and other complications.
- OHA should be withheld on the day of surgery and may be stopped up to 48 hours after operation. To minimize the metabolic consequences of surgical stress, a combination of glucose and insulin should be given as per glycemic status. Usually in a 70 kg patient, 1 unit/hour regular insulin causes a decrease in blood glucose by approximately 25 to 30 mg/dL. In minor surgery, usually glucose insulin combination is not required.

PATIENTS ON ANTICOAGULATION^{1,14}

It is very difficult to adjust the dosage of anticoagulation for a person undergoing surgery as a major concern is the increased risk of hemorrhage or thromboembolism after discontinuation of oral anticoagulation therapy. So there are some recommendations to avoid this complication:

- INR should be kept around 1.5.
- Oral anticoagulant to be stopped at least 4 days before surgery to reach the INR around 1.5 (if previous INR was 2–3), and after surgery it will take at least 3 days to reach INR around 2.
- INR measurement to be repeated one day prior to surgery and if it is more than 1.7, 1 mg vitamin K injection SC/IV to be given and if INR is more than 1.5 on the day of surgery, one or two units of FFP transfusion to be given before any major surgery.

PATIENTS RECEIVING ANTIPLATELET DRUGS¹

According to The American Society of Regional Anesthesia (ASRA) and European Societies, there are some recommendations for these patients to avoid major life-threatening bleeding complications during surgery and these are:

- There should at least be 3 days aspirin-free interval before surgery.
- Ticlopidine should be stopped at least 14 days before surgery.
- Clopidogrel should be stopped 7 days prior to surgery.
- Abciximab should be discontinued 48 hours before surgery.
- Eptifibatid and tirofiban should be stopped 8 hours before surgery.

CONCLUSION

Assessment of a patient undergoing surgery is very important to avoid perioperative complications and the role of a physician is very crucial here. These are some recommendations of preoperative assessment and should be followed to decrease the morbidity and mortality of patients in significant amounts.

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