

Routine Preoperative Laboratory and Diagnostic Screening

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The only policy that has been revised as often as the *nil per os* orders (see pages 40–45) for our institution is the guidelines for ordering routine preoperative laboratory and diagnostic screening. Once upon a time there were standard batteries of preoperative tests to provide baselines, comfort or knowledge. The cost of such testing and questions about immediate utility have, over the years, resulted in the current recommendation: only those tests that are clinically indicated should be ordered. Sounds simple enough; however, if it were that simple this article would not be of interest!

In 2003 the American Society of Anesthesiologists (ASA) House of Delegates approved the Statement on Routine Preoperative Laboratory and Diagnostic Screening, which originated from the Standards and Practice Parameters Committee. This statement reads:

Preoperative tests, as a component of the preanesthesia evaluation, may be indicated for various purposes, including but not limited to: 1) discovery or identification of a disease or disorder which may affect perioperative anesthetic care, 2) verification or assessment of an already known disease, disorder, medical or alternative therapy which may affect perioperative anesthetic care, and 3) formulation of specific plans and alternatives for perioperative anesthetic care. No routine* laboratory or diagnostic screening† test is necessary for the preanesthetic evaluation of patients. Appropriate indications for ordering tests include the identification of specific clinical indicators or risk factors (e.g., age, pre-existing disease, magnitude of the surgical procedure). This statement will be integrated into an update of the ASA Practice Advisory for Preanesthesia Evaluation¹ at a future date. It will not appear independently after that time.

Anesthesiologists, anesthesiology departments or health care facilities should develop appropriate guidelines for preanesthetic screening tests in selected populations after considering the probable contribution of each test to patient outcome. Individual anesthesiologists should order test(s) when, in their judgment, the results may influence decisions regarding risks and management of the anesthesia and surgery. Legal requirements for laboratory testing where they exist should be observed. The results of tests relevant to anesthetic management should be reviewed prior to initiation of the anesthetic. Relevant abnormalities should be noted and action taken, if appropriate.

* "Routine" refers to a policy of performing a test or tests without regard to clinical indications in an individual patient.

† "Screening" means efforts to detect disease in unselected populations of asymptomatic patients.

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What is most important in the ASA's statement is that any tests should be ordered only if they are likely to discover something that may affect perioperative anesthetic care and that may lead to formulation of specific and alternative plans for management of the anesthesia and surgery. Under this rubric, no routine tests (tests without regard to clinical indications) are necessary. As an obvious corollary, if a test were to be ordered, then the results relevant to anesthetic management should be reviewed and appropriate action should be taken prior to anesthesia; otherwise the test does not meet the guideline criterion of affecting anesthetic care. This seems simple, yet the fact is that time and money are wasted on "routine testing" that fails to make a meaningful contribution to the perioperative assessment.

Both anesthesiologists and surgeons are equally guilty when it comes to the ordering of "routine testing." With regard to reviewing test results, anesthesiologists often, but not inevitably, will check the results of the tests that they order; however it is the experience of many that surgeons rarely check the results or respond to abnormal results of the tests that they order. Surgeons will state that they order the tests because "anesthesia" wants them to do so, and some anesthesiologists say that they order tests to protect themselves legally. Neither explanation is scientifically rigorous, nor do they demonstrably improve care. Preoperative testing should be individualized for each patient. The preoperative history and physical examination should be the determinants of any testing applicable to each particular patient. Indeed, the ordering of non-demonstrably-necessary tests as a routine is *not* appropriate.

Using this framework, in the ambulatory surgery center it would be very rare to "need" a test. Preoperative guidelines consistent with the ASA statement would be:

TEST	TO ORDER OR NOT
Routine hemoglobin/hematocrit or complete blood count	NO — unless history or signs of anemia
Routine pregnancy	NO — unless patient requests test or states she may be pregnant and the patient's management would be altered. Patient's permission/request for pregnancy testing should be documented. Pregnancy test results should be meticulously confidential and only revealed to the patient herself.
Routine potassium	YES — if end-state renal disease
Glucose	YES — if diabetic
Electrocardiogram	YES — if active abnormal cardiac condition determined by history and/or physical (decompensated congestive heart failure, chest pain, arrhythmia, murmur)
Other tests	Based on history and physical

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In-hospital preoperative testing guidelines are similar; however, due to the higher-risk kinds of surgeries performed in the hospital compared to the ambulatory surgery center, more indications for testing may exist. Some examples include:

1. Creatinine level if intravenous contrast dye will be injected
2. Hemoglobin/hematocrit if there is potential for significant blood loss
3. Type and screen if transfusion requirement likely
4. Pregnancy test if possibility of pregnancy. Patient's permission/request for pregnancy testing should be documented. Pregnancy test results should be meticulously confidential and only revealed to the patient herself.
5. Potassium if end-stage renal disease
6. INR if on Coumadin
7. Blood glucose and HgA1c if diabetic
8. Chest X ray in the morbidly obese patient (BMI > 40) with at least one risk factor for coronary heart disease, poor exercise tolerance or both to look for undiagnosed heart failure, cardiac chamber enlargement or abnormal pulmonary vascularity
9. Chest X ray for thoracic surgery
10. Coagulation and liver function tests if hepatic disease
11. Electrocardiogram based on American College of Cardiology (ACC)/American Heart Association (AHA) standards

A short summary of the ACC/AHA standards for preoperative 12-lead electrocardiogram includes:

1. Vascular surgery patients with at least one clinical risk factor (coronary artery disease, congestive heart failure, diabetes, unstable coronary syndromes such as unstable angina or recent myocardial infarction, murmur, creatinine > 2) should have electrocardiogram.
2. Patients with known coronary, peripheral or cerebrovascular disease undergoing intermediate-risk surgery (orthopedic, head and neck, prostate surgery) should have an electrocardiogram.
3. Morbidly obese (BMI >40) with at least one risk factor for coronary heart disease (same as in #1) or with poor exercise tolerance should have an electrocardiogram.
4. Vascular or thoracic surgery patients or any other patients with clinical indications (as long as the results of the preoperative electrocardiogram will affect clinical management) should have an electrocardiogram.

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5. Patients scheduled for intermediate-risk surgery with at least one of the above clinical risk factors (same as in #1) may have an electrocardiogram.
6. Patients with low functional capacity undergoing intermediate-risk procedure should have an electrocardiogram.
7. An electrocardiogram is *not* indicated for asymptomatic persons for low-risk surgeries. Low-risk surgeries include superficial or endoscopic surgery, cataract surgery, breast surgery and ambulatory surgery.
8. Electrocardiograms should not be ordered because the patient is above a certain age; rather the basis for ordering them should be history and physical and ACC/AHA standards.

Summary

Regarding the ordering of routine preoperative laboratory and diagnostic screening:

1. Order only tests that in the judgment of the provider will influence decisions regarding risks and management of the surgery and anesthesia.
2. Results of tests should be reviewed prior to coming to the operating room.
3. Action should be taken if results are abnormal.
4. The benefit must outweigh the risk; *prima facie*, there will be no benefits if the ordering provider does not care about the results. If there are results, the most significant indication that the test was appropriate is action on the results *before* the patient comes to surgery.
5. If caring for a vulnerable population of people that never sees a physician unless desperately ill, preoperative screening tests may be indicated. The results of these tests may influence decisions regarding the management of the surgery and anesthesia and thus fit the criteria and should be ordered.
6. In any individualized case, deviation from the recommendations in this article may be reasonable if likely to benefit the patient. The goal is to deliver quality care following a cost-conscious, evidence-based approach.

Reference

1. ASA Practice Advisory for Preanesthesia Evaluation: *Anesthesiology* 2002; 96:485-496. Amended in 2003 but not republished.