Currently more than two-thirds of surgeries in the United States are done on an ambulatory or office basis. Apfelbaum predicts that ambulatory surgeries will be close to 80 percent of all surgeries in the United States within the next couple years. Add to this the non-surgical same-day procedures performed with anesthesia (endoscopy), etc., and the number of patients needing assessment is significant.

Preoperative evaluation in the ambulatory and office-based setting is exactly that – evaluation, not testing. Successful outcomes depend on the appropriate selection of patients and accurate assessment of their health status and medical comorbidities. This evaluation has multiple components, and laboratory testing is only one part. Most agree on the elements of evaluation; lab testing and need for consults are where inconsistencies still definitely exist. In the recently published study by Katz et al., not one of the possible tests was unanimously agreed upon by directors of preoperative clinics as indicated for a given patient scenario. Fifty percent of test choices, however, were unanimously agreed upon as not indicated.

Elements of Preoperative Evaluation:
1) A focused, quality history and physical (H&P) is most important. It is an ASA standard and a regulatory requirement from The Joint Commission. In the Australian Incident Monitoring Study, inadequate preoperative evaluation and communication problems were shown to be sentinel contributing factors to preventable major adverse events. Laboratory testing or lack thereof was not implicated in these complications. Self-reported exercise tolerance is a useful predictor, as shown by Reilly. Postoperative complications were inversely related to exercise ability. Although the study group consisted of major surgeries, this can likely be extrapolated to ambulatory surgery.

2) Laboratory testing should be minimal in the ambulatory setting and follows long-established guidelines for any patient having surgery. Testing is done to confirm clinical findings, and each test ordered should achieve one or more of these three goals: 1) predict risk, 2) alter management and 3) improve outcomes.

No amount of testing substitutes for a good history and physical examination. The ASA guidelines for pre-anesthesia care state that no routine testing is indicated. The Joint Commission concurs, and the Centers for Medicare & Medicaid Services (CMS) does not pay for “routine” preoperative testing. Preoperative testing costs the United States an estimated $20 billion annually. Many studies published since the late 1970s support selective testing. When selective testing is done, truly abnormal results are more frequent. These abnormal results are not unexpected and were more likely to change management.
Despite the urgings of ASA and the Society for Perioperative Assessment and Quality Improvement (SPAQI) and numerous publications for minimal testing (and the limited payment by CMS for such testing), there unfortunately remains confusion as to what is appropriate testing for any given patient. This fact diminishes the potential for cost savings and reduces adherence to evidence-backed guidelines. The Katz study also provides information as to which surgical specialties order more tests and potentially why.

**What Is the Evidence?**

The goal of assessment is to detect any previously unrecognized disease that may increase perioperative risk above baseline. Few abnormalities detected by nonspecific testing result in changes in management, even in the elderly, and rarely have such changes benefited patients or lack of testing affected safe anesthesia. Some abnormal results have even led to harm. Schein and others have demonstrated that eliminating testing does not increase risk. Although Schein’s work is procedure-specific (cataract), these findings probably apply to other low-risk surgeries performed as day surgery.

A Canadian pilot study advocated no preoperative testing in ambulatory patients. In this study, Chung and colleagues showed no difference between the “routine” testing and no-testing groups in ambulatory surgery patients with regard to adverse events at seven and at 30 days. There were a number of limitations to the study, including significant exclusion criteria and sample size in relation to the fact that poor outcomes are rare, and therefore further studies need to be done before no-testing becomes the new routine. The importance of this study is that it confirms the lack of benefit conferred by testing, and in the current health economic climate this fact cannot be ignored. The majority of ambulatory patients are ASA Physical Status 1 and 2 where mortality is low (quoted mortality 0.06-0.08 percent and 0.27-0.4 percent respectively in all, including major surgeries.). Warner et al. found a 1-30 day incidence of a major postoperative morbidity or mortality in a group of 38,598 ambulatory surgery patients of 0.08 percent (n=33). Four patients died – two of myocardial infarcts, two of unrelated motor vehicle accidents.

Do we need to treat ambulatory ASA Physical Status 3 patients differently? Natof, in a study of over 13,000 ambulatory patients, found that well-controlled ASA Physical Satus 3 patients were at no higher risk of postoperative complications than those in ASA class 1 or 2.

Tests should only be ordered if the result will change the anesthetic or surgical plan or decrease the risk of the procedure. If the medical condition is stable, then laboratory tests performed in the preceding four months to one year can be used. The following is a list of tests to be considered:

**A. Type and Screen (T&S)**

- Anticipated blood loss >500 ml.
- Rhesus antibody result needed for possible Rhogam® therapy.

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B. Pregnancy

Beta human chorionic gonadotrophin (bHCG) assay is recommended but not mandated by ASA, and policy is institution-specific. Mandated testing is costly. Kahn and colleagues quantified this cost as $3,273/true positive pregnancy test. Consider testing in all women of reproductive age. bHCG can be done on the day of surgery but is recommended earlier if patient history suggests pregnancy is possible, as day-of-surgery cancellation has a bigger economic impact.

C. Hemoglobin (Hb)

- Signs and symptoms of anemia/history of bleeding.
- Chemotherapy/radiotherapy.
- Chronic renal failure.
- Baseline in surgery where significant blood loss (>500cc) is expected.

D. Platelet Count

- Personal or family history of bleeding or bruising

E. Coagulation Studies

Abnormal results by routine screening have not shown positive predictive value for operative bleeding. Therefore, testing is guided by H&P findings:

- Personal or family history of bleeding or bruising.
- Liver disease or metastases.
- Severe malnutrition/vitamin K deficiency.
- Patients on anticoagulant therapy.

F. Electrocardiogram (ECG)

Twenty million preoperative ECGs are performed each year. Recent publications have questioned the value of the routine preoperative ECG. It is also unclear when an abnormal ECG should alter management. A meta-analysis found the resting ECG to be a poor screening tool for coronary artery disease. The American Heart Association (AHA) does not recommend a preoperative ECG for asymptomatic patients for low-risk surgery (class 3 recommendation).

G. Chemistry

- Concern about uncontrolled diabetes.
- Electrolyte abnormalities.
- Creatinine before contrast use or other nephrotoxic intervention.

Screening and selection of the patient are critical, and methods to achieve this are varied, with some exciting new electronic modalities available. Each ambulatory center needs to tailor the criteria for patient selection according to the type of facility and available equipment. Freestanding centers that close at night need to identify patients who may need admission. Higher risk for admission include extremes of age, especially infants less than 55-60 weeks post-conceptual age, and elderly patients over the age of 85 years. Obstructive sleep apnea patients warrant longer postoperative monitoring. Many centers are not equipped with the instruments or the staff to manage difficult intubations, nor do they want the efficiency impact of doing a slower fiberoptic intubation, so potential difficult intubations need to be identified ahead of time.

What methods of screening are there?

1. Surgeon or primary care assessment and then morning of surgery – these have the highest risk of cancellation.
2. Chart review and selective patient visits.
3. The gold standard is the preoperative evaluation clinic (>70 percent of hospitals have them). The advantages of these:
   a. Consistency, including meeting all regulatory requirements.
   b. Decreased lab ordering.
   c. Decreased ordering of unnecessary consults.
   d. Minimizing delays and cancellations on the day of surgery.
   e. Preoperative evaluation clinics are expensive, but this cost is offset by the savings from the listed advantages.
4. Telephone screening has been shown to lower day-surgery cancellations and is acceptable to many patients.
5. Internet-based screening questionnaires, filled out at home or in kiosks in the surgeon’s office, are potentially exciting and promising new modalities. A number of commercially available programs have become available and are easy to implement. Patient satisfaction is high, the information is stored electronically, and the information collected is in agreement when compared with traditional paper questionnaires.
6. The virtual interview – “e-medicine” video-conferencing – has taken off in more rural areas, and this too is exciting with the advantage of being able to “examine” the patient, even if it is hands off.
These newer methods have many advantages: consistency, patient satisfaction and cost containment, to name but a few; but their use has been limited by overprotective health information management departments who cite concerns about HIPPA violations.

Standardization in preoperative evaluation remains a challenge. Available evidence suggests we should emphasize the H&P, and very limited, if any, testing is indicated. Modern electronic record keeping and databases allow for bigger and better outcome studies, which would reinforce the evidence for selective testing and further optimize efficiency and cost containment while maintaining patient safety.

References: