

ROUTINE PREOPERATIVE LABORATORY SCREENING

Timothy E. Pitts, D.P.M.

For more than a decade, the usefulness of routine preoperative screening has been questioned. With the increase in same-day surgery and the emphasis on cost containment in medicine, the traditional preoperative laboratory testing is under close scrutiny.

Most studies indicate that 50-60% of tests routinely ordered could be eliminated without adversely affecting the patient's welfare, and that less than 2% of the unnecessary tests are significantly abnormal.^{1,2,3} Furthermore, studies by Johnson et al., indicated that, "even when abnormalities are found, they do not influence the outcome of the surgery in the majority of the patients."²

Current data suggests strong evidence against indiscriminate preoperative testing. A number of studies indicate that the history and physical examination offers the physician more valuable information than a battery of laboratory tests, and in fact, excessive screening may in some cases actually pose extra risks to the patient. Additionally, authorities note that these extra tests do not offer medical legal protection, but are merely costly. In a test to assess the value of preoperative investigations in an otherwise healthy surgical population, Turnbull, et al., reviewed the charts of 2,570 patients undergoing cholecystectomies. 5,003 preoperative screening tests were performed and abnormal results were obtained in 225. However, the findings in most of these cases were of little importance and action resulted in only 17 of these cases. Turnbull concludes: "When compared to the results of the history and physical examination, routine preoperative investigations provided little information that altered management in otherwise healthy surgical patients undergoing elective surgery."¹

Even stronger statements have been made against preoperative screening investigation in the general surgical population. For example, Wilson, et al., demonstrated that the decision regarding fitness for elective surgery can be made on the basis of the history and physical exam alone in 96% of the cases,¹ and studies by Johnson, et al., showed that fully half of all the abnormalities found in their routine clinical laboratory testing could have been anticipated from the history and physical exams. Johnson, et al., go on to suggest that, "Since none of the abnormalities influenced recommendations by internists, cancellation, complication, or

admission, the true value of these routine tests is in doubt."²

Roizen takes this philosophy of routine preoperative testing a step further and concludes that the extra testing actually poses increased risk for the patient. To prove his point, Roizen cites the Kaiser organization's multiphasic screening tests of the 1960's. The organization originally implemented 16 tests, but the findings of these tests inevitably led to increased numbers of tests so that the patient's welfare was in jeopardy. Roizen concludes, "Extra tests have simply posed extra risk to the patient because of the iatrogenic disease caused by the pursuit and treatment of borderline abnormal and false positive results."⁶ Roizen goes on to suggest that this unwarranted risk to the patient is the reason that the Kaiser organization eventually dropped the majority of its battery of screening tests.

A third point in the case against indiscriminate preoperative testing lies in the fact that it does not offer increased medical legal protection. In this age of rampant litigation, the physician-patient relationship is feeling the strain of the sometimes overzealous legal community. Therefore, the physician has been forced to assume the role of an adversary, ordering increasing numbers of tests so that he cannot be held accountable should litigation ensue. However, Roizen states that, "An abnormality not appropriately pursued is a greater liability risk than is an abnormality that is not detected preoperatively."⁶ He states that if a physician does not pursue a test that is not indicated by history, he is less negligent than if he ordered a battery of unindicated tests and ignored their results.

Not surprisingly, several studies have documented a low physician-response rate to abnormal results of routine preoperative tests. Laurence, et al., found that when the standard urinalysis was ordered on 200 clean-wound, orthopedic, non-prosthetic knee procedures, there was a high prevalence of abnormal results (15%), but a low physician response rate (29%).¹¹ Further, Turnbull's study of 803 patients revealed 172 abnormalities, none of which altered patient management.¹ Roizen considers the number of physicians who dismissed the findings of their routine tests to present more of a potential for litigation in patients with undesirable postoperative results than their discriminate counterparts who simply do not order these unnecessary tests.

A final consideration concerning unindicated preoperative testing is that of cost. Blue Cross/Blue Shield estimates that more than \$30 billion is spent in North America on preoperative testing and the subsequent evaluations because of these tests, and they have estimated that \$8 billion dollars could be saved by only ordering tests indicated by the findings of the history and physical exam.⁶

When faced with this considerable evidence against the use of unwarranted preoperative screenings, today's physician must make several informed choices. Romsh suggests the following guidelines for a diagnostic routine study to be appropriate preoperatively. The diagnostic study should be reflective of a condition that:

- 1) "Poses a significant risk of preoperative morbidity that can be lessened by preoperative treatment,
- 2) Is undetectable through history and physical examination, and
- 3) Is sufficiently prevalent in the population to justify the cost of seeking it."⁴

ROUTINE PREOPERATIVE TESTS

The following discussion includes an evaluation of seven routinely ordered preoperative tests with suggestions by authorities in the field. Since the majority of elective podiatric surgical patients are normal healthy individuals or individuals with mild systemic disease (Bripps Classification of Physical Status I and II), the discussion will be limited to these individuals.

Complete Blood Count

The most common abnormal result is a low hemoglobin. Most authorities consider a hemoglobin below 10.0 g/dl as being significant. Of the studies reviewed, approximately 0.3-0.9% of the CBCs were found to be abnormal and almost all of the abnormalities were of minor significance. In a study by Kaplin, et al., a differential cell count was included with 390 CBC tests and only one of them was abnormal.³ WBCs are rarely elevated in an asymptomatic patient, and an elevated WBC alone does not affect preoperative morbidity. Uncontrolled polycythemia is the one abnormality detected by a CBC which has a high preoperative complication rate.⁴ Roizen's recommendation for healthy patients under age 40 is a hemoglobin test for females and no testing for males.¹³ McKee, et al., however, suggest that even a simple hemoglobin test is unnecessary in patients under age 40 and recommend a CBC on all patients over 40, even for minor surgery since asymptomatic anemia can be identified in older patients.¹⁰

Blood Chemistry Analysis

The most important biochemical investigation is the level of potassium, since hyperkalemia predisposes one to cardiac arrest and hypokalemia predisposes one to cardiac arrhythmias. Bleary, et al., Kaplin, et al., McKee, et al., and Turnbull, et al., all showed that unsuspected abnormalities were found in less than 1% of the cases reviewed and no change in patient management was required. Renal and hepatic disease, diabetes mellitus, and hypertension are some of the more common disorders that are of particular concern in anesthesia and surgery and should be fully investigated preoperatively. Bleary, et al., recommended that electrolytes, BUN, and creatinine be routinely ordered for patients over 70 years of age.⁴ Griner and Glaser found that in healthy patients taking no medications, the ratio of false positives to true positives may be as high as 20:1.⁴ McKee, et al., suggested routine investigation of urea and electrolytes in all patients over 60 years of age having major surgery.¹⁰ Roizen recommended a preoperative blood glucose and BUN for patients over 40 to screen for unsuspected liver and kidney disease.⁴ Bleary, et al., and Brown have shown that patients with asymptomatic liver disease can undergo anesthesia and surgery without significant complications. In a study by Turnbull in 1987, less than 2% of the 396 patients demonstrated a random serum glucose which was abnormal. No action was taken in any of the cases, and the postoperative period was complicated in only one of the cases.¹

Urinalysis

Routine urinalyses are frequently ordered preoperatively in relatively healthy patients for one of two reasons. The first is to detect urinary tract infections, and the second is to screen for underlying kidney disease. Lawrence, et al., in previous literature did not support either rationale. In Lawrence's study of 200 nonprosthetic knee procedures, he found that only 10% of routinely ordered urinalyses were indicated. Although 15% of the urinalyses showed abnormal results, these abnormalities were acted on in only 29% of the cases, and no cancellation or postponement of any of the procedures occurred. Although it is possible for a remote infection such as a urinary tract infection to precipitate a surgical wound infection, Lawrence found no difference in rates of wound infections between patients with normal and abnormal urinalysis results.¹¹ Since the usual rate of postoperative infection for elective podiatric surgery is approximately less than 1%, the possibility of a remote infection causing a wound infection is extremely rare. Urinalysis will seldom reveal a disorder that is not clinically suspected on a history and physical examination. Furthermore, a repeat urinalysis which is often indicated following initial abnormal findings in asymptomatic patients, will further increase medical expenses.

Coagulation Studies

Romfh reported that every study of coagulation tests including bleeding time, clotting time, platelet count, partial thromboplastin time (PTT), and prothrombin time (PT) through 1986 documented that these tests have no ability to predict the occurrence or absence of hemorrhage or unsuspected bleeding disorders preoperatively. Furthermore, routine preoperative coagulation studies are associated with a high number of false positive results.⁴

Chest X-rays

Routine preoperative chest x-ray on asymptomatic patients is yet another investigation that is overutilized. Roizen states that routine preoperative chest x-rays are not cost effective below age 60 in asymptomatic or healthy patients. McKee, et al., suggested preoperative x-rays on all patients over age 60 undergoing major surgery. McKee feels that preoperative films are justified with this age group because of the associated high incidence of preoperative abnormalities and high risk of repeat x-rays postoperatively.¹⁰ Cain found evidence that significant surgical abnormalities elicited on chest x-rays (ie., chronic obstructive pulmonary disease, pulmonary edema, atelectasis, pneumonia, pulmonary nodules, dextrocardia, vascular aneurysm, cardiomegaly, or recent fracture) are revealed in approximately 1.5% of patients less than 40 years of age, in 5% of the 40 to 60 year old patients, and in approximately 30% of the patients older than 60.

ECG

McKee's study, along with other previous works suggested that a routine preoperative ECG is of value in patients over 50 years of age unless clinically indicated. Roizen, on the other hand, believed that routine preoperative ECGs are indicated for all patients over 40 years of age. Some of the more common ECG abnormalities include nonspecific ST and T-wave abnormalities, arrhythmias, conduction disturbances, and old myocardial infarctions. In a study by Johnson, et al., approximately 44% of the patients over 40 years old who related no pre-existing history of active medical problems showed ECG abnormalities.²

Pregnancy Test

Most doctors recommend a preoperative UCG or HCG test on all females of childbearing age without history of tubal ligation or hysterectomy.

CONCLUSION

As compelling evidence suggests, many of today's routinely ordered preoperative tests are unnecessary, costly, offer little or no medicolegal protection, and, in some cases may even put the patient's welfare at risk. Leading authorities find that it is up to the physician to order only those tests he feels are indicated in each of his patients.

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