

Preoperative Medical Evaluation in Elective Surgery versus Standard Criteria

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Received: 18 March 2010

Revised: 10 Apr 2010

Accepted: 30 May 2010

Abstract

Background: The routine use of preoperative appropriate paraclinic testing is useful in patients scheduled to undergo elective surgery. The purpose of this study was to assess the prevalence of unnecessary preoperative evaluation performed for patients undergoing elective surgeries.

Methods: This descriptive analytic study was performed to assess the patterns of preoperative evaluation tests on 498 patients undergoing elective surgery at Shahid Beheshti and Yahyanejhad Hospitals, Babol; from January 2008 to January 2009. The patients' data such as age, gender, preoperative medical histories, drug used, American Society of Anesthesiologists status (ASA), preoperative diagnosis, hospitals name, admission ward and type of surgery were collected. Then we compared these data to the national standards of preoperative evaluation tests presented with international guidelines as well as by the Health Ministry of Iran.

Results: Four hundred ninety-eight patients [209 males (41.9%) and 289 female (58%)] with the mean age of 39.2 years were studied. Most of the patients (62%) were below 40 yea .Based on and in matching with A.S.A and Health Ministry standards for preoperative assessment, the most common unnecessary orders tested were ECG that was unnecessary in 77.3%. The frequencies of unnecessary tests for WBC, FBS, AST, ALT and chest X ray were 63.7, 40.4, 40, 33.3, and 32.8%, respectively.

Conclusion: The results show that the unnecessary preoperative orders evaluation tests had no indication in 32-77% of subjects.

Key words: Preoperative evaluation, Elective surgery, Laboratory testing.

Casp J Intern Med 2010; 1(2): 53-57.

The ultimate goals of preoperative medical assessment are to reduce the morbidity associated with surgery, to increase the quality and decrease the cost of preoperative care, and to restore the patient quickly to the desired level of functioning (1). Routine preoperative medical testing is commonly performed in patients scheduled to undergo elective surgery, although the value of such testing is uncertain (2). Despite the low risk of preoperative complications, the use of laboratory tests before surgery became ingrained. At that time, clinicians thought it to be logical to order tests to detect abnormalities that might lead to an increased morbidity or mortality in the preoperative period. Despite its widespread use, however, systematic evaluations of the clinical effectiveness and cost-effectiveness of routine laboratory testing were often lacking (3). Furthermore, 5% of healthy people have abnormal test results. Hence, the predictive value of the test is low, especially if the prevalence of the disease is also low (4). Past decade has seen a reorientation to focus on developing systems, both guidelines and preoperative evaluation clinics, which can reduce the number of unindicated testing and more appropriately directing the preoperative evaluation as a means of reducing costs (5).

A history and physical examination, focusing on risk factors for cardiac, pulmonary and infectious complications, and a determination of a patient's functional capacity, are essential to any preoperative evaluation. In addition, the type of surgery influences the overall preoperative risk and the need for further cardiac evaluation. Routine laboratory studies are rarely helpful except to monitor known disease states (6). To effectively provide this consultative service, the physician should understand the risk associated with the particular type of surgery planned and relate this risk to the patient's underlying acute and chronic medical problems (7). Table 1 summarizes the findings on the history and physical examination that suggest the need for further evaluation. The goal of this study was to assess the prevalence of unnecessary preoperative evaluation performed for patients undergoing elective surgeries.

Methods

This descriptive analytic study was conducted to review the patterns of preoperative evaluation by surgeons during one year. The study was done on 498 patients undergoing elective general surgery at Shahid Beheshti and Yahyanejiad Hospitals, Babol; from January 2008 to January 2009. The randomly selected samples of patients were studied. The patient's data such as age, gender, preoperative medical histories, drug in used, American Society of Anesthesiologists status (ASA), preoperative diagnosis, hospital's name, admission ward and type of surgery were collected in the data sheet. We recorded all tests and procedures ordered preoperatively which was determined by the review of medical records and after collection they were compared to standards of American Society of Anesthesiologists status (ASA), American Surgeons Association and the national standards of preoperative evaluation presented by the Health Ministry of Iran. Due to this comparison, the prevalence of the unnecessary evaluation calculated and analyzed.

Results

Among 498 patients [(209 males (41.9%) and 289 female (58%)] with mean age of 39.2 years (range, 15-82 years) were evaluated. Most of the patients (62%) were below 40 years. Complete blood count (CBC) was done in 496 cases, FBS in 473, BUN in 467, NA and K in 421 and CXR were done in 421 patients. Other ordered tests were

shown in table 1. Based on and in matching with A.S.A and Health Ministry standards for preoperative assessment, the most common unnecessary ordered test was ECG that was unnecessary in 77.3%. This percent was 65.3% for FBS test and 63.7% for CBC test. The other obtained data were shown in table 1.

Table1: Ordered tests, number, percent of wrong or right ordered tests in comparison with standards

Lab test	Total Number	Wrong	Right
CXR	274	32.8%	67.2%
ABG	4	0.0%	100.0%
CBC	493	63.7%	36.3%
ESR	60	3.3%	96.7%
Na & K	421	21.9%	78.1%
Phosphorus	20	40.0%	60.0%
Calcium	13	7.7%	92.3%
Chloride	4	0.0%	100.0%
Bun & Cr	467	29.6%	70.4%
FBS	245	40.4%	59.6%
U.A	308	29%	71%
U.C	18	0.0%	100.0%
Bill	31	32.3%	67.7%
ECG	330	77.3%	22.7%
Echo	21	9.5%	90.5%
ALP	45	33.3%	66.7%
AST & ALT	53	35.8%	64.2%
HDL	25	0.0%	100.0%
LDL	25	0.0%	100.0%
Triglyceride	34	0.0%	100.0%
Cholesterol	35	0.0%	100.0%
PTT	128	4.7%	95.3%
PT	130	4.6%	95.4%
CT	41	2.4%	97.6%
BT	42	2.4%	97.6%
Blood typing	221	48%	52.0%
Blood reservation	198	15.2%	84.8%

CXR chest x-rat, ABG arterial blood gas, CBC complete blood count, ESR erythrocyte sedimentation rate, NA&K sodium and potassium, BUN & Cr blood urea nitrogen and creatinine, FBS fasting blood sugar, UA urine analysis, UC urine culture, Bill bilirubin, ECG electrocardiogram, Echo echocardiography, ALP alkaline phosphatase, AST & ALT serum aspartate and alanine aminotransferases, HDL high density lipoprotein, LDL low density lipoprotein, PT prothrombine time, PTT Partial thromboplastin time, CT clotting time, BT bleeding time.

Discussion

Our study showed that for some of preoperative evaluation tests such as CBC, ECG, CXR, FBS, BUN, serum creatinine, SGPT and SGOT, there were no indications for their performance in 30-77% of cases. The value and utility of preoperative diagnostic studies have become a central issue in evaluating cost-effective health care in the surgical patient (8,9).

Schein et al. performed a study of almost 20,000 patients undergoing cataract surgery who were randomized to either routine laboratory testing or no-routine testing. They reported no difference in preoperative morbidity and

mortality between those who received routine testing against those who did not (10). Based on the world standards, the American Society of Anesthesiologists (ASA) and the American College of Surgeons recommendation for preoperative evaluation in healthy patients, the preoperative evaluation of healthy patients should include the following:

1. A screening questionnaire for all patients.
2. A history of exercise tolerance for all patients.
3. Blood pressure and pulse for all patients.
4. Pregnancy test for women who may be pregnant.

All other tests of the clinical evaluation suggest a likelihood of disease (Table 2).

Table 2: Summary of Recommended Preoperative Laboratory Tests Depending on the History and Physical Findings

Condition	Indicated testing and other measures*
Healthy patient	
≤ 40 years	Hemoglobin, urine screening for pregnancy in women of childbearing potential
> 40 years	Add ECG and blood glucose (age ≥45 years)
Cardiovascular disease	ECG, chest radiographs, hemoglobin, electrolytes, BUN, creatinine, glucose (age ≥45 years or history of diabetes)
Recent MI (≤6 weeks), unstable angina, decompensated CHF, significant arrhythmias, severe valvular disease	Cardiology consultation
Previous MI (>6 weeks ago), mild stable angina, compensated CHF, diabetes mellitus	Stress test if high-risk procedure or patient has low functional capacity; consider assessment of left ventricular function (i.e., echocardiography)
Rhythm other than normal sinus rhythm, abnormal ECG, history of stroke, advanced age, low functional capacity	Stress test if high-risk procedure and patient has low functional capacity
Pulmonary disease	Chest radiographs, hemoglobin, glucose (age ≥45 years), ECG (age >40 years); provide patient with instructions for incentive spirometry or deep-breathing exercises
Asthma	Pulmonary function testing or peak flow rate to assess disease status
COPD	Consider pulmonary function testing and arterial blood gas analysis for assessment of disease severity
Cough	Evaluate for etiology
Dyspnea	Evaluate for etiology
Smoking	Counsel patient to stop smoking 4 to 8 weeks before surgery
Obesity	Provide patient with instructions for incentive spirometry or deep-breathing exercises
Abdominal or thoracic surgery	Provide patient with instructions for incentive spirometry or deep-breathing exercises
Malnutrition	Laboratory tests based on primary disease, plus albumin and lymphocyte count; if malnutrition is severe, consider postponing surgery and providing preoperative supplementation

ECG = electrocardiogram; BUN = blood urea nitrogen; MI = myocardial infarction; CHF = congestive heart failure; COPD = chronic obstructive pulmonary disease.

*--Other testing may be warranted based on the patient's surgical condition or other concomitant diseases.

Kaplan et al. evaluated the usefulness of routine laboratory screening of preoperative patients by the assessment of 2,000 patients undergoing elective surgery over a four-month period and only 0.22% of these revealed abnormalities that might have influenced preoperative management (11). Based on a 10 year experience (1984-1993) Piranese et al. designed a study that included 6968 children who underwent elective surgery. Laboratory tests or specialist consultation performed only if the child history and/or clinical assessment show abnormalities that might influence management. Among the 8968 children, only 125 (1.8%) underwent tests and/or specialist consultation. No surgery has been delayed, nor has the anesthetic technique been changed because of an abnormal test (12). Narr et al. reviewed the charts of 1044 healthy patients who did not undergo any preoperative laboratory testing before their elective surgeries. These patients did not experience any significant preoperative morbidity or mortality (13). In a pilot study performed by Chung et al. 1061 eligible patients were randomized either to have indicated preoperative testing or no preoperative testing. There were no significant differences in the rates of preoperative adverse events and the rates of adverse events within 30 days after surgery between two groups (14).

In another study, Turnbull et al. reviewed the charts of 2570 patients undergoing elective surgery, finding that only 104 out of 5003 laboratory tests were abnormal and significant, and that only 4 patients would have benefited from "routine" laboratory testing (15). All above researches showed routine preoperative medical testing and is commonly performed in patients scheduled to undergo elective surgery which - in absence of specific clinical indications - contributed little to patient care and could be eliminated.

In Rozein's article he mentioned that a proposed preoperative assessment clinic facilitates those most sought-after goals increased quality and reduced costs. As part of this process, ordering only laboratory tests warranted by a patient's symptoms and medical history is important to avoid risks of unnecessary testing and follow-up of false-positive results (17). Despite all the data gathered over a period of more than two decades, 60 to 70 percent of laboratory tests ordered preoperatively were not required according to the history or the results of the physical examination², that were in accordance to our findings. In summary, unnecessary preoperative orders tests with no indication were done on up to 77% of subjects.

Acknowledgment

We thank the operating room staff and surgical ward nurses in our hospital.

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