

# Preoperative Work Up: Are the Requirements Different in A Developing Country?

Pages with reference to book, From 339 To 341

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## Abstract

In developing countries there is a tendency to advocate routine testing in asymptomatic healthy patients to identify undocumented significant medical conditions. A retrospective review of pre-operative laboratory investigations undertaken in patients attending the General Surgical department was performed. Three hundred and twenty patients case notes were reviewed, patients were selected on the basis of common general surgical procedures. Two hundred and sixteen patients (67.5%) did not have any associated medical illness on history and physical examination. Analysis of laboratory results showed that 42/216 (19.4%) had low hemoglobin. An abnormal chest X-ray was the next common abnormality 11/103 (10.6%). Mild hypokalemia ( $>3$  mEq/L) was seen in 6/123 (4.8%) and a raised blood sugar level was seen in 1/113 (0.88%) patients. Only one patient with hemoglobin of 4.8 gm/dL needed preoperative intervention, the rest of the abnormalities did not effect the treatment plan or outcome. The results were in general agreement with other studies except for the high proportion of low hemoglobin seen in the female population. It is suggested that a thorough history and physical examination is a reliable and inexpensive preoperative screening tool. Guidelines for pre-operative investigations in American Society of Anesthesiologists Grade I (ASA I) patients are suggested (JPMA 48:339, 1998).

## Introduction

Advances in medical science have made modern general anaesthesia extremely safe and uneventful. A recognized shortcoming of technological advancement in medical care has been the tendency to downgrade the importance of traditional clinical skills of history taking and physical examination. An increasing amount of significance is attached to the diagnostic abilities of complex machines. This is not to belittle the tremendous therapeutic advantage that can be derived from appropriate use of investigative methodologies. There can be no question about compromising patient care. Improvements in safety of treatment and better predictability of outcome are a laudable goal. There is however a flip side to this; the ever escalating cost of medical treatment. Driven by economic necessity, a number of routine clinical practices have been questioned and subjected to cost benefit analysis. Routine laboratory testing as a prerequisite for fitness for general anaesthesia is one such area. In populations with a well developed national health policy and adequate primary health care, it has been repeatedly shown that routine preoperative testing in asymptomatic individuals is not a cost effective way of practicing medicine<sup>1-6</sup>. To test whether a similar situation applies to a developing country with minimal primary health care facilities and poor health care awareness, a retrospective study was undertaken at Aga Khan University Hospital (AKUH), Karachi.

## Material and Methods

Case records of patients attending the general surgical department at AKUH over a 13 month period, from 1st December 1994 to 31st December 1995 were reviewed. The hospital computerized data base was utilized to identify patients having undergone the common general surgical procedures listed in

Table I. Emergency and elective admissions were included. Case files of all patients were reviewed. Demographic data plus associated disease conditions were recorded. Preoperative laboratory test results as entered on the preoperative anaesthesia form were used. Where these were not available, results nearest to the operation date were utilized. Hospital laboratory values for different tests were used to define normalcy. Information on the following tests was recorded. Hemoglobin (Hi), random blood sugar (RBS), serum creatinine (Cr), blood urea nitrogen (BUN), serum sodium (Na), potassium (K), chloride (Cl) and bicarbonate (HCO<sub>3</sub>). Chest X-ray reports were reviewed, these were scored as normal if no pathological condition was commented on. The report was coded as abnormal if any abnormality was suggested. Actions taken as a consequence of abnormal results were specifically looked for. The data was analyzed using standard commercially available computer software (Microsoft Excel spreadsheet and Microsoft Access relational database).

## Results

A total of 320 admissions over this period were reviewed. The breakdown according to disease category has been shown in Table I.

**Table I. Surgical conditions and treatment undertaken (n=320).**

Primary disease condition	Surgical procedure	Number
Acute appendicitis	Appendectomy	34
Perianal conditions	Hemorrhoidectomy/Laying open of low fistula/lateral sphincterotomy	46
Abdominal wall hernia's	Hernia repair	37
Benign gall bladder disease	Laparoscopic/Open cholecystectomy	143
Malignant breast disease	Lumpectomy/Wide excision /modified radical mastectomy	34
Perianal/breast abscesses	Incision and drainage	26

Seventy-two admissions (21.6%) were through the emergency room, the rest were elective admissions. There were 200 females and 120 males (F:M ratio 1.67:1). The mean age was 43 years (range 13-80 years). A total of 104 (32.5%) patients had an associated disease condition as obtained from history or physical examination. The disease conditions are listed in Table II.

**Table II. Associated medical diagnosis as obtained from history and physical examination (n=320).**

Associated diagnosis	Number of patients	%
Hypertension (HTN)	70	21.8
Ischemic heart disease (IHD)	60	18.75
Diabetes mellitus (DM)	30	9.5
Asthma	10	3
Chronic liver disease (CLD)	5	1.5
Chronic obstructive airway disease (COPD)	2	0.61
Heart block	1	0.30
Mitral valve disease	1	0.30
Glucose 6 Phosphate Dehydrogenase deficiency (G6PD)	1	0.30
Ventricular septal defect (VSD)	1	0.30
Chronic renal failure	1	0.30

Three hundred and twenty patients had haemoglobin (Hb) tested (Normal range. Male patients 13.7-16.3 gm/dl. Females: 11.5-13.5 gm/cl!). Forty-nine (24.5%) females had a low haemoglobin (<11.5 gm/dL) and 11(9.2%) males had a low haemoglobin (<13.7 gni/dL). In other wise healthy individuals 39/142 (27.5%) females had a low Hb (<11.5 gm/dl), of these 8(5.6%) had Hb below 10 gm/dL. In the healthy male population 3/74 (4%) patients had a Hb below normal (<13.7 gm/dL), 1 of these was below 10 gm/dL. This patient had long standing bleeding haemorrhoids.

Two hundred and three patients had random blood sugar checked (Normal range 80-160 mg/dl). Twenty-six (12.8%) diabetics. Two hundred and twelve patients had serum sodium estimation performed (Normal range 136-148 mmol/L). Two abnormalities (0.94%) were noted, one result was abnormal, of whom 25 patients were known in a diabetic and the other in a hypertensive patients. Serum potassium was tested in 216 patients (normal range 3.3-5.0 mmol/L). Eighteen abnormalities were seen (8.3%). One result was 5.7 mmol/L. Seventeen patients had levels below 3.3 mmol/L. All were above 3 mmol/L. Of these 17 patients, 10 (58.8%) did not have any associated illness. None of the abnormalities affected the planned surgical procedure or outcome of surgery.

Two hundred and twenty patients had serum creatinine tested (Normal 0.85-1.35 mg/dl). Seven patients (3.2%) had raised creatinine levels (range 1.4-3.7 mg/dl). All had significant associated disease conditions such as ischemic heart disease (IHD), hypertension (HTN), diabetes mellitus (DM) and chronic renal failure (CRF). One hundred and thirty-three patients had blood urea nitrogen tested (Normal 6-16 mg/dl). Four (3%) had raised levels and all had significant associated illnesses. Three also had an associated raised serum creatinine level.

Sixty-two patients had serum chloride levels checked (Normal 104- 114 mmol/L). Seven (11.3%) abnormalities were seen. One patient had chronic renal failure. None of the abnormalities led to intervention or change in treatment. Sixty-four patients had serum bicarbonate checked (Normal 17,5-

27.5 mmol/L). Three (4.7%) abnormal results were noted. No action was taken and planned procedure was not effected. One hundred and ninety two patients had preoperative chest X-rays performed. Twenty-two (11.5%) were reported as abnormal. Only one patient with an incidental finding, leading to diagnosis of Ca lung, needed change in planned therapy. Other abnormalities noted were changes suggestive of old tuberculosis, Chronic obstructive airway disease (COPD), Bronchiectasis etc. None of these findings led to a change in treatment or planned anaesthesia. After removal of 104 patients with known associated disease conditions the results of the above mentioned tests are shown in Table III.

**Table III. Laboratory tests undertaken and results in asymptomatic patients (n=216).**

Test performed	Total	Within normal	Abnormal	Action taken
Haemoglobin (Hb)	216	174	Female 39 (27.5%) Male 3 (4%)	1 patient transfused
Random blood sugar	113	112	1 (0.88%)	Nil
Creatinine (Cr)	131	All	Nil	
Serum sodium	121	All	Nil	
Serum Potassium	123	117	6 (4.8%)	Nil
Blood urea nitrogen	73	All	Nil	
Serum chloride	26	All	Nil	
Serum Bicarbonate	29	All	Nil	
Chest X-ray	103	91	11 (10.6%)	Nil

Apart from the low Hb, no other test led to any preoperative therapeutic intervention from the physicians. The primary disease condition was treated as planned.

### Discussion

The rationale behind preoperative testing can be categorized into: a) Screening of patients to detect asymptomatic medical conditions; b) Evaluation of existing medical conditions; c) Baseline measurements and d) Identification of patients at increased risk of adverse perioperative outcome. The first of these issues has been the topic of a number of studies. The emerging consensus at this point is that multi-test screening in other wise asymptomatic and healthy individuals does not lead to a balanced cost-benefit equation. The decision regarding the fitness of a patient forelective surgeiy can be accurately predicted in 96% of cases on the basis of a complete history and physical examination alone<sup>7</sup>.

The normal range of values for many diagnostic tests is based on a bell-shaped curve of distribution, with values outside the 95% confidence interval (more than 2 standard deviations away) being reported as abnormal. Subsequently 5% of normal values are classified as "abnormal". This is of great significance when multiple tests are ordered. A patient having 10 tests performed has a 40% chance that at least one will be "abnormal" when it truly is not<sup>5</sup>.

An area of concern for physicians has been the medico-legal implications of not performing screening investigations preoperatively. At present at least in Western medical literature there is enough evidence to safely discontinue the use of routine preoperative testing in healthy individuals, though there are no well defined guidelines which are universally accepted. A contrary point of view is the medico-legal implication of ignoring, what is thought to be clinically significant abnormal results. These far outnumber the truly significant abnormal results in other wise normal individuals.

Our study seems to be in general agreement with findings noted in Western medical literature. One area of difference is the, high proportion of low haemoglobin results seen in our female population (27.5% of otherwise healthy female patients). This is a well-recognized problem in our country and has multiple causes almost all, cultural and socio-economic. The routine use of tests like random blood sugar, serum creatinine, urea and electrolytes in other wise healthy adults does not provide additional useful information. The abnormalities noted are usually a minor deviation from the normal range. Almost all are noted in the case notes and ignored. Asymptomatic hypokalemia in healthy individuals with serum levels above 3.0 mmol/L has not been shown to be associated with increased risk of cardiac arrhythmia<sup>8,9</sup>. All patients with low serum potassium fell in this category.

Similarly routine chest X-rays seem to be an over-rated investigation, 11.5% of our patients undergoing this investigation were noted to have an abnormality. In only one patient, a chronic smoker, did this reveal an abnormality, which led to a change in management (this patient had lung cancer).

Though it is not possible to lay specific guidelines on the basis of this study, a common sense approach to preoperative testing can be suggested for other wise asymptomatic healthy individuals, American Society of Anesthesiologists Grade I (ASA I). In our population haemoglobin should be routinely checked in all patients. Creatinine alone should be checked to assess renal function. A normal serum creatinine result should be accepted to represent normal electrolytes. Urea or blood urea nitrogen should not be checked routinely. Tests such as serum Chloride and bicarbonate should only be done to identify specific abnormalities suspected clinically. Routine chest X-rays should be done only in patients above 55 years of age as they yield below this age in healthy individuals is very poor (Unpublished data, Department of Anaesthesia, AKUH).

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