

## REVIEW PAPER

# Revisiting Pre Anaesthetics Evaluation: A Review

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## ABSTRACT

*All patients undergoing surgical procedures under general anaesthesia have to undergo pre-anesthetic evaluation, so as to reduce the patient's surgical and anesthetic perioperative morbidity or mortality and also aid in early and eventless recovery. The main aim of pre operative assessment is to identify the medical, social and personnel issue which may have a bearing on the outcome of the anesthetic procedure. There have been numerous studies conducted on what is needed and what is not needed in preoperative assessment. The present paper reviews the need for preoperative assessment and its indications.*

**Keywords:** *General anaesthesia, perioperative, oral surgery*

## INTRODUCTION

All patients scheduled to undergo surgery should be assessed in advance with a view of optimal preparation and perioperative management. Failure to undertake this activity places the patient at increased risk of perioperative morbidity or mortality. Surgical procedures and administration of general anaesthesia is associated with significant stress which is in proportion to the magnitude of injury, total operating time, amount of intraoperative blood loss and degree of postoperative pain.<sup>1</sup> Decreasing the stress response to surgery and trauma is one of the key factors in improving outcome and lowering the length of stay in the hospital as well as lowering the cost. The primary goals of pre anaesthetic evaluation are:<sup>1, 2, 3</sup>

1. Documentation of the condition for which the surgery is required
2. Assessment of the patient's overall health
3. Uncovering the underlying medical condition that might affect the surgical and anesthetic outcome
4. Perioperative risk determination
5. Optimization of the patient's medical condition in order to reduce the patient's surgical and anesthetic perioperative morbidity or mortality
6. Development of appropriate perioperative care plan
7. Education of the patient about surgery, anesthesia, intraoperative care and postoperative pain treatments in the hope of reducing anxiety and facilitating recovery
8. Reduction of costs, shortening of hospital stay, reduction of cancellations and increase of patient satisfaction.

In 2003, National Institute of Clinical Excellence (NICE)<sup>4</sup>, published recommendation for routine preoperative testing followed by the German Societies of Anaesthesiology

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and Intensive Care Medicine, Internal Medicine, and Surgery in 2010, published joint recommendations on the preoperative evaluation of adult patients for elective, non-cardiac surgery.<sup>5</sup>

In this review, we revisit the guidelines for the pre-anesthetic evaluation so as to update the knowledge of preoperative testing and thus avoid over testing and improve patient outcome and satisfaction.

### PRE ANAESTHETIC EVALUATION<sup>6</sup>

**Screening:** This stage aims at filtering the appropriately to determine who requires pre-operative testing via questionnaire and medical examination (past and present medical history). The patients screened who *do not need* to attend the preoperative assessment clinic to see an anaesthetist:

1. Have no coexisting medical problems
2. Require no or only baseline investigations, the results of which are within normal limits
3. Have no potential for, or history of, anaesthetic difficulties
4. Require peripheral surgery for which complications are minimal.

The type of patients who fit into this class are those scheduled for day care surgeries (Ambulatory). These patients will be seen by the anaesthetist at the time of the admission, who will:

1. Confirm the findings of the screening;
2. Check the results of any baseline investigations;
3. Explain the type of anaesthetic appropriate for the procedure;
4. Have the ultimate responsibility for deciding it is safe to proceed.

### HISTORY AND PHYSICAL EXAMINATION

To decrease the risk associated with general anaesthesia and surgical procedures, the pre anesthetic evaluation should be done within 6 weeks of the scheduled date of the surgery.<sup>5</sup>

In order to detect underlying medical condition or inadequately treated condition that may affect the outcome of the surgery, one must take a precise medical history (**Table 1**). History should be carried out in an organized manner covering all important and positive findings. The history should include past and present medical history, previous anesthetics and operations, family history, drug history, allergies and social history. The American Society

of Anesthesiologists classification (ASA) is also a useful indicator of the fitness of the patient undergoing general anaesthesia (**Table 1**).

**Table 1** ASA Classification

ASA I:	A normal healthy patient
ASA II:	A patient with mild systemic disease
ASA III:	A patient with severe systemic disease
ASA IV:	A patient with severe systemic disease that is a constant threat to life
ASA V:	A moribund patient who is not expected to survive without the operation
ASAVI:	A declared brain-dead patient whose organs are being removed for donor purposes

**Cardiovascular System:** Symptoms of the following problems must be sought in all patients: (i) Ischaemic heart disease, (ii) Heart failure, (iii) Hypertension, (iii) Conduction defects, arrhythmias and (iii) Peripheral vascular disease.

Patients with a proven history of myocardial infarction (MI) are at a greater risk of perioperative reinfarction, the incidence of which is related to the time interval between infarct and surgery. This time is variable. In a patient with an uncomplicated MI and a normal exercise test elective surgery may only need to be delayed by 6–8 weeks. Heart failure is one of the most significant indicators of perioperative complications, associated with increased risk of perioperative cardiac morbidity and mortality. Its severity is best described using a recognized scale, for example the New York Heart Association classification (**Table 2**). Untreated or poorly controlled hypertension may lead to exaggerated cardiovascular response during anaesthesia. Both hypertension and hypotension can be precipitated, which increase the risk of myocardial and cerebral ischaemia (**Table 3**).

**Table 2** New York Heart Association (NYHA) functional classification

Class I:	Cardiac disease without limitation of physical activity, No fatigue, palpitation, dyspnoea or angina
Class II:	Cardiac disease resulting in slight limitation of physical activity. Asymptomatic at rest, ordinary physical activity causes fatigue, palpitation, dyspnoea or angina
Class III:	Cardiac disease causing marked limitation of physical activity. Asymptomatic at rest, less than physical activity causes fatigue, palpitation, dyspnoea or angina
Class IV:	Cardiac disease limiting any physical activity. Symptoms of heart failure or angina at rest, increased with any physical activity

**Table 3** NYHA classification for hypertension

<b>Mild (SBP 140–159 mmHg, DBP 90–99 mmHg):</b> No evidence that delaying surgery for treatment affects outcome.
<b>Moderate (SBP 160–179 mmHg, DBP 100–109 mmHg):</b> Consider review of treatment. If unchanged, requires close monitoring to avoid swings during anaesthesia and surgery.
<b>Severe (SBP &gt; 180 mmHg, DBP &gt; 109 mmHg):</b> At this level, elective surgery should be postponed due to the significant risk of myocardial ischaemia, arrhythmias and intra-cerebral haemorrhage. In an emergency, will require acute control with invasive monitoring.

**Table 4** History and physical examination

General information	Age, Height, Weight
Current medications	e.g., anticoagulants, anti-angina drugs, analgesics
Past surgical and anesthetic history and any associated problems or complications	e.g., bleeding tendency, protracted awakening from anaesthesia, allergic reactions, transfusion reactions
Cardiopulmonary reserve	e.g., physiologic reserve, MET ( <b>Table 5</b> ), exercise
Allergies and intolerances	e.g., local anesthetics, non-steroidal anti-inflammatory drugs, antibiotics
<b>Organic disease / potential evidence of organic disease</b>	
Heart/circulatory system	e.g., arterial hypertension, arrhythmia, congenital heart defect, angina pectoris, coronary heart disease, dyspnea
Lungs/respiratory system	e.g., chronic obstructive pulmonary disease (COPD), asthma, pneumonia
Vascular system	e.g., varicose veins, arterial occlusive disease, thrombosis, embolism
Liver and biliary pathways	e.g., hepatitis, jaundice, cirrhosis, gallstones
Kidneys	e.g., renal failure, dialysis, kidney stones
Esophagus/stomach/intestines	e.g., reflux, gastritis, ulcer, strictures, digestive disturbances
Metabolism	e.g., diabetes mellitus, gout

Thyroid gland	e.g., hyperthyroidism
Skeletal system	e.g., scoliosis, arthritis, restricted range of motion
Musculature	e.g., myasthenia, familial muscle disease, malignant hyperthermia
Nervous system, mental function	e.g., epilepsy, depression
Eyes	e.g., cataract, glaucoma
Ears	e.g., hearing impairment, hearing aid
Oral and maxillofacial area	e.g., loose teeth, dentures, bridges, crowns
Female reproductive system	e.g., known or possible pregnancy
Substance consumption	e.g., tobacco, alcohol, illicit substances

**Bleeding History**

- 1) Have you ever been diagnosed as having a clotting disorder?
- 2) Have you ever had bleeding of any of the following types:
  - a) nosebleed for no apparent reason?
  - b) bruises or very small hematomas under the skin for no apparent reason?
  - c) bleeding into the joints, soft tissues, or muscles?
  - d) prolonged bleeding after a cut or scrape?
- 3) Have you ever had prolonged or unusually intense bleeding after a tooth extraction?
- 4) Have you ever had unusually intense bleeding during or after an operation?
- 5) Are you known to have a problem with wound healing?
- 6) Does anyone in your family have an increased bleeding tendency?
- 7) Have you taken any medications that can affect the blood clotting system in the past two weeks?
- 8) Are you now taking any painkillers or anti-rheumatic drugs?
- 9) For women: Do you have unusually intense or prolonged menstruation (>7 days)?

**Physical Examination**

Respiratory pathway	e.g., size of oral opening, visibility of uvula and palate, mobility of cervical spine, condition of teeth, thyromental distance, upper-lip-biting test, neck circumference
Heart	e.g., heart sounds, heart murmurs, skipped beats, heart rate and rhythm, blood pressure
Lungs	e.g., respiratory sounds, dullness to percussion, cyanosis
Cardiopulmonary reserve	e.g., if the history is unclear: stress test—doctor and patient climb stairs together
Potential signs of heart failure	e.g., physiologic reserve (by history and/or stress test), dyspnea, edema, signs of venous congestion

**RESPIRATORY SYSTEM**

Enquire specifically about symptoms of: chronic obstructive lung disease, emphysema, asthma, infection, restrictive lung disease. patients with pre-existing lung disease are more prone to postoperative chest infections, particularly if they are also obese, or undergoing upper abdominal or thoracic surgery. If an acute upper respiratory tract infection is present, anaesthesia and surgery should be postponed unless it is for life-threatening condition.

An indication of cardiac and respiratory reserves can be obtained by asking the patient about their ability to perform everyday physical activities before having to stop because of symptoms of chest pain, shortness of breath, etc. For example:

1. How far can you walk on the flat?
2. How far can you walk uphill?
3. How many stairs can you climb before stopping?
4. Could you run for a bus?
5. Are you able to do the shopping?
6. Are you able to do housework?
7. Are you able to care for yourself?

The problem with such questions is that they are very subjective and patients often tend to overestimate their abilities. to make this more objective, The New York Heart Association (NYHA) Classification of function is one system, but even this uses some subjective terms such as ‘ordinary’ and ‘slight’. The Specific Activity Scale grades common physical activities in terms of their metabolic equivalents of activity or ‘mets’, and classifies patients on how many mets they can achieve (**Table 5**).

**Table 5** New York Heart association classification of cardiac function compared to Specific Activity Scale

NYHA	Functional Classification	Specific Activity Scale Classification
Class I	Cardiac disease without limitation physical activity	No fatigue, palpitation, dyspnoea or angina Can perform activities requiring > 7mets, jog/walk at 5 mph, ski, play squash or basketball, shovel soil
Class II	Cardiac disease resulting in slight limitation of physical activity Asymptomatic at rest, ordinary physical activity causes fatigue, palpitations, dyspnoea or angina	Can perform activities requiring > 5 but < 7 mets. Walk at 4 mph on level ground, garden, rake weed, have sexual intercourse without stopping

NYHA	Functional Classification	Specific Activity Scale Classification
Class III	Cardiac disease resulting in marked limitation of physical activity Asymptomatic at rest, less than ordinary physical activity causes fatigue, palpitations, dyspnoea or angina	Can perform activities requiring > 2 but < 5 mets. Perform most household chores, play golf, push the lawnmower, shower
Class IV	Cardiac disease limiting any physical activity. Symptoms of heart failure or angina at rest, increased with any physical activity	Patients cannot perform activities requiring > 2 mets. Cannot dress without stopping because of symptoms, cannot perform any class III activities

Not all patients can be assessed in this way; for example those with severe musculoskeletal dysfunction may not be able to exercise to the limit of their cardio-respiratory reserve. In such circumstances other methods of assessment are required. The most readily available method of non-invasive assessment of cardiac function in patients is some type of echocardiography.

**LABORATORY INVESTIGATION**

There is little evidence to support the performance of ‘routine’ investigations, and these should only be ordered if the result would affect the patient’s management. In patients with no evidence of concurrent disease (ASA 1), preoperative investigations will depend on the extent of surgery and the age of the patient (**Table 6**). Even patient’s age is not a fixed criteria for conducting such tests. One of the main reasons cited is high prevalence of abnormal laboratory values with no relevance to perioperative risk and the (unnecessary) expense of such testing.<sup>8</sup> Although laboratory findings tend to deviate from the norm more frequently with increasing age, there is still no correlation between the number of abnormal laboratory findings and the outcome of surgical treatment, even in elderly patients.<sup>9,10</sup> Conventional clotting tests, such as the activated partial thromboplastin time (aPTT), the international normalized ratio (INR), and the platelet count, are inadequate for the detection of the more common coagulopathies, they are, therefore, less useful than a standardized bleeding history.<sup>5</sup>

**Table 6** Baseline investigation in patients with no evidence of concurrent disease (ASA1)

Age of patient	Minor Surgery	Intermediate Surgery	Major Surgery	Major plus surgery
16-39 Consider	Nil Nil	Nil Nil	FBC RFT, BS	FBC, RFT Clotting, BS
40-59 Consider	Nil ECG	Nil ECG, FBC, BS	FBC ECG, BS, RFT	FBC, RFT ECG, BS, Clotting
60-79 Consider	Nil ECG	FBC ECG, BS, RFT	FBC, ECG, RFT BS, CXR	FBC, RFT, ECGBS, Clotting, CXR
>80 Consider	ECG FBC, RFT	FBC, ECG RFT, BS	FBC, ECG, RFTBS, CXR, Clotting	FBC, RFT, ECGBS, Clotting, CXR

According to current evidence, and recommendation by NICE guidelines and American college of cardiology and American heart association guidelines for preoperative cardiac evaluation for noncardiac surgeries. The laboratory and clinical tests should be performed according to the patient's age co-related with ASA classification and presence or absence of underlying systemic co morbid condition. Thus patient falling under ASA grade I would not require fewer laboratory tests as compared to those falling under ASA grade II and higher.

## DISCUSSION

Pre anesthetic evaluation is an important part of pre operative preparation of a patient undergoing surgery under general anesthesia.

The aim of pre anesthetic evaluation is to reduce the perioperative and post operative complication, reduce the hospital stay of the concerned patient and to increase patient satisfaction. However, most medical centre are either unaware of the guideline for conducting the laboratory tests or due to medico-legal concerns, leads to over testing of the patient.

Two recent studies in 2012 and 2011 found that over half (52% - 54%) of low-risk patients received unnecessary preoperative laboratory testing.<sup>11,12</sup> The reason cited for over testing were, unclear responsibility, belief that others want it to be done, lack of knowledge of guidelines and medico-legal concerns.<sup>13,14,15</sup> This lead to a concern for a developing nation like India, where the majority of patient are not insured or are financially handicapped, thus leading to over burdening. Recent studies have concluded that the strongest predictors of preoperative complications are the patient's pre existing illnesses, as revealed by a thorough history, and the nature of the surgical procedure. Many authors have also concluded that routine laboratory testing alone does not increase the safety of the patient preoperatively or post operatively.

## CONCLUSION

Unless the medical history or clinical examination indicate otherwise, routine testing may not be required. Therefore, it is imperative for the surgeon and the physician to be completely aware of the guidelines of preoperative testing, and to test only what is required for the given surgical procedure as indicated by history and the nature of the surgical procedure.

## REFERENCES

- Zambouri A. Preoperative evaluation and preparation for anesthesia and surgery. *Hippokratia* 2007;11(1):13-21.
- Roizen MF, Foss JF, Fischer SP. Preoperative evaluation. In *Anesthesia*. 5<sup>th</sup> Edn. Miller RD (ed) Philadelphia, Churchill-Livingstone, 2000, p. 824-883.
- Kitts JB. The preoperative assessment; who is responsible? *Can J Anesth* 1997;44:1232-1236.
- National Institute for Clinical Excellence-Pre-operative tests, the use of pre-operative test for elective surgeries. [cited 2015 July 25]; Available from: URL:<http://guidance.nice.org.uk/cg3>
- Andreas B. Böhmer, Frank Wappler, Bernd Zwissler. Preoperative Risk Assessment-From Routine Tests to Individualized Investigation: *Dtsch Arztebl Intl* 2014;111:437-46.
- Textbook of Anesthesia – Alan R Atkinhead, David J Rowbothman, Graham Smith.
- American college of cardiology and American heart association guidelines for pre – operative cardiac evaluation for non – cardiac surgeries.
- Chung F, Yuan H, Yin L, Vairavanathan S, Wong DT. Elimination of preoperative testing in ambulatory surgery. *Anesth Analg* 2009;108:467-75.
- Wolf-Klein GP, Holt T, Silverstone FA, Foley CJ, Spatz M. Efficacy of routine annual studies in the care of elderly patients. *J Am Geriatr Soc* 1985;33:325-9.
- Levinstein MR, Ouslander JG, Rubenstein LZ, Forsythe SB. Yield of routine annual laboratory tests in a skilled nursing home population. *JAMA* 1987;258:1909-15.
- Benarroch-Gampel J et al. Preoperative Laboratory Testing in Patients Undergoing Elective, Low Risk Ambulatory Surgery. *Ann Surg* 2012;256:518.
- Katz RI et al. Survey Study of Anaesthesiologists and Surgeons Ordering of Unnecessary Preoperative.
- Katz RI et al. Survey Study of Anesthesiologists' and Surgeons' Ordering of Unnecessary Preoperative Laboratory Tests. *Anesth Analg* 2011;112:207.
- Patey AM et al. Anesthesiologists' and surgeons' perceptions about routine pre-operative testing in low-risk patients: application of the Theoretical Domains Framework (TDF) to identify factors that influence physicians' decisions to order pre-operative tests. *Implementation Science* 2012;7:52.
- Brown SR and Brown J. Why Do Physicians Order Unnecessary Preoperative Tests? A Qualitative Study. *Fam Med* 2011;43(5):338.