

# How Relevant are Surgical Profile Tests Done Pre-operatively in Minor and Medium Surgical Procedures? - An Analytical Clinical Study

C G Jayachandran<sup>1</sup>, S Harikrishnan<sup>2</sup>, Linette J Morris<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Anaesthesiology, Government Medical College, Thiruvananthapuram, Kerala, India, <sup>2</sup>Associate Professor, Department of Anaesthesiology, Government Medical College, Thiruvananthapuram, Kerala, India, <sup>3</sup>Professor and Head, Department of Anaesthesiology, Government Medical College, Thiruvananthapuram, Kerala, India

## Abstract

**Background:** All the patients undergoing surgery are ordered to undergo a battery of tests collectively named as surgical profile. The advantage of surgical profile is to reduce morbidity and mortality during and immediately after surgery. It also tends to reduce the cost of perioperative care and pre-operative anxiety. Surgical profile also includes few additional tests undertaken following clinical examination to reduce the surgical-anaesthetic risk.

**Aim:** The advantage of ordering pre-operative surgical profile in evaluating the surgical risk in patients undergoing minor and medium surgical procedures.

**Materials and Methods:** The present study is a prospective and descriptive cross-sectional study of 1150 patients evaluated pre-operatively during the pre-anesthetic checkups in the Department of Anaesthesiology, Government Medical College Hospital, Thiruvananthapuram, Kerala. Patients undergoing minor and medium surgeries belonging to American Society of Anesthesiologists Grade-I; aged 3 to 50 years were included in the study. The surgical profile ordered in them were hemoglobin, total blood count, erythrocyte sedimentation rate, coagulation profile, electrocardiogram, X-ray chest, fasting blood sugar, serum creatinine, blood urea, sodium and potassium levels, viral screening and Hbs Ag. Few additional tests were ordered to confirm the clinical diagnosis of the condition of the patients wherever necessary to help reduce intraoperative time.

**Results:** Totally, 10,395 investigations were carried out pre-operatively for the 1150 patients. Among the total tests, 175 were observed as abnormal (15.21%). Among the patients with abnormal laboratory tests a change in approach for further management was undertaken in 62/175 (35.42%) but overall incidence of change in the treatment course was (62/1150), 05.39%.

**Conclusion:** Pre-operative surgical profiles should not be undertaken as a tradition, but should be based on thorough clinical examination, nature of surgical procedure, anesthetic technique, and clinical status of the patient.

**Key words:** Anaesthesia, Minor surgical procedures, Medium Surgical Procedures, Surgical profile tests and ASA task force

## INTRODUCTION

After thorough clinical examination, surgical patients require a series of tests to assess the functioning of different systems of their body. These may be to confirm the diseases as evidence-based medicine are in vogue and

those for helping surgeon and anesthesiologists to assess the general fitness of the patient for surgery. This workup is also called as surgical profile in a planned procedure. Anesthesiologist's role as part of the team to plan the modality of anaesthesia for a specific procedure with the help of relevant investigations is crucial. In recent times, such a practice has been subject of close scrutiny due to low significance and higher cost. Surgical profile in otherwise healthy patients is invariably of little value in detecting diseases and in changing the anaesthetic management or outcome.<sup>1</sup> Preoperative evaluation of surgical patients with the help of surgical profile should be aimed at reducing morbidity and preferably, should be ordered

Access this article online



www.ijss-sn.com

Month of Submission : 05-2017  
Month of Peer Review : 06-2017  
Month of Acceptance : 07-2017  
Month of Publishing : 07-2017

**Corresponding Author:** Dr. S Harikrishnan, Department of Anaesthesiology, Government Medical College, Thiruvananthapuram, Kerala, India. E-mail: harikrishnans248@gmail.com

by the anaesthesiologist.<sup>2</sup> When an anaesthesiologist orders the preoperative tests, apart from securing more appropriate clinical profile the consequent incidences of surgery cancellations are reduced.<sup>3,4</sup> A prospective cross-sectional study in healthy patients showed that nearly 72.5% of preoperative tests ordered by surgeons were considered not indicated by anaesthesiologists.<sup>5,6</sup> Delahunt and Turnbull analyzed the blood tests before surgery and correlated them with the difference they made to the management while there were abnormal results detected, it was found that the management was not altered in any case due to the blood testing.<sup>7</sup> Greer and Irwin suggested that routine pre-operative blood tests are not required for those patients who are clinically well and asymptomatic.<sup>8</sup> Rohrer *et al.* have shown that preoperative screening tests for clotting disorders that were not suspected on the basis of detailed history and examination are not necessary and not recommended to be carried out routinely.<sup>9</sup> Few authors defined routine tests as compulsory tests for all patients regardless of the findings obtained from clinical evaluation.<sup>10,11</sup> Among the list of tests, there are serum creatinine, blood urea, and urine biochemical changes, blood count and coagulation studies, X-ray and electrocardiogram examinations, among others.<sup>10</sup> However, literature data indicate that these tests are not cost-effective and neither related to any perioperative complications.<sup>4,10</sup> This should not lead to an incidence of under investigation however. Further, studies have shown that performing routine screening tests in patients who are otherwise healthy is invariably of little value in detecting diseases and in changing the anaesthetic management or outcome.<sup>10</sup> Thorough clinical assessment is a prime factor in patient's preoperative assessment and this should be followed by investigations in necessary patients; established from the study by Shah *et al.*<sup>12</sup> When the surgical profile was undertaken without basis of clinical history, may lead to increased risk for the patient, especially when false-positive results motivate further investigations. It may lead to unnecessary postponement of surgery, prolonging hospital stay and subjects the patient to the risk of hospital infections.<sup>13</sup> There was no significant correlation with perioperative complications and the pre-operative abnormal tests with a prevalence of 0.5-12% in a study population of 544 patients by American Society of Anesthesiologists (ASA).<sup>14</sup> In an observation conducted retrospectively to review medical records, it was estimated that hospital savings were approximately US\$80,000 annually just by eliminating preoperative testing not indicated for the 5100 patients they studied.<sup>3</sup> The present study was conducted to study the advantage of ordering pre-operative surgical profile in evaluating the surgical risk in patients undergoing minor and medium surgical procedures.

## MATERIALS AND METHODS

The present study was a prospective and descriptive cross-sectional study of 1150 patients evaluated pre-operatively during the pre-anesthetic checkups in the Anaesthesiology department, Government Medical College Hospital, Thiruvananthapuram, Kerala.

### Study Period

A study conducted between March 2014 and February 2016. Institutional Ethical clearance was obtained and approved consent letter was used.

### Inclusion criteria

1. Patients undergoing minor and medium surgeries were included.
2. Patients belonging to ASA Grade-I were included.
3. Patients aged 3-50 years were included.

### Exclusion criteria

1. Patients undergoing major surgeries were excluded.
2. Patients belonging to ASA Grade-II and III were excluded.
3. Patients aged below 3 years and above 50 years were excluded.
4. Patients with previous history of surgeries were excluded.
5. Patients with history of myocardial infarction, diabetes mellitus, uremia, and bleeding disorders were excluded.
6. Patients with psychiatric disorders were excluded.
7. Patients with inconclusive diagnosis were excluded from the study.

The surgical profile ordered in them were hemoglobin, total blood count, erythrocyte sedimentation rate, coagulation profile, electrocardiogram, X-ray chest, fasting blood sugar, serum creatinine, blood urea, sodium and potassium levels and viral screening and Hbs Ag. Few additional tests are ordered to confirm the clinical diagnosis of the condition of the patients wherever necessary to help reduce intra-operative time. A proforma was filled showing the laboratory data, their abnormalities in these tests, and if any change in approach was also noted. Change in approach included ordering new tests, referral to a super specialist or postponement and abandoning of surgeries. The surgical profile was ordered by the surgeon previously preoperatively and additional tests, according to his routine, without interference from the anaesthesiologist. All the data were analyzed using standard statistical methods. The results were assessed using descriptive statistics.

## OBSERVATIONS AND RESULTS

After applying the exclusion criteria among the 3437 patients who underwent anaesthetic checkups, 1150 patients were

included in the study (34.35%). Among them, 798 were males (69.39%) and the remaining 352 were females (30.60%). The age and sex distribution of the study group was tabulated in Table 1.

The natures of surgeries labeled under minor and medium type are shown in the Table 2.

Totally, 10,395 investigations were carried out pre-operatively for the 1150 patients. Among the total tests, 175 were observed as abnormal (15.21%). Among the patients with abnormal laboratory tests a change in approach for further management was undertaken in 62/175 (35.42%) but overall incidence of change in the treatment course was (62/1150), 05.39%. Hematological laboratory tests conducted in the present study were for hemoglobin in all patients; 1150 (100%), total blood count in 1150 (100%), and coagulation profile in 724/1150 (62.95%). The number of abnormal results in these tests were 26 (0.26%), 21 (01.82%), and 01.65%, respectively, and the overall change in approach for treatment was 4 (0.34%), 5 (0.43%), and 3 (0.26%), respectively (Table 3).

## DISCUSSION

As a tradition ordering surgical profiles as a pre-anaesthetic precursor was being considered as a valuable tool for evaluation of fitness in all the surgical

patients in the Government Medical College Hospital, Thiruvananthapuram. This has helped determine and decide the fitness for anaesthesia and surgery. However, in the recent times in India, this practice is subjected to close scrutiny by the patients and consumer act implementers.

In addition, these tests aggregate to high costs of total billing. In such a context, the present study was conducted to observe and analyze the laboratory results and the influence of abnormal tests in changing the course of further management during and after surgeries. According to the American College of physicians, laboratory tests performed should always have a clinical justification and to be undertaken with selective and restrictive criteria.<sup>11</sup> In the present study, total investigations done pre-operatively were 10,395 for the 1150 patients included in the study. Among the total tests, 175 tests showed abnormal parameters to the age of the patients (15.21%). Among the patients with abnormal laboratory tests a change in approach for further management was undertaken in 62/175 (35.42%) but overall incidence of change in the treatment course was (62/1150), 05.39%. Those patients who showed abnormal results were given further treatment and special laboratory investigations to rule out diseases in the specific systems were undertaken. However, all the 1150 patients underwent successful surgeries and remained clinically healthy post-operatively. In few similar studies, it was observed that detecting abnormalities in laboratory tests of clinically healthy patients does not influence change in treatment usually<sup>13,11,2</sup>. Review of literature shows little evidence that the patients with abnormal results are certain to develop increased post-operative mortality.<sup>14</sup> Moreover, studies conducted by many authors suggest that the pre-operative tests would be unnecessary if a careful clinical evaluation is performed.<sup>15</sup> A surgical profile on the other hand increases the expenditure by the Hospital as well as the risk to the Health personnel requesting for other special investigations entailing risks and complications for the patients.<sup>16</sup> In contrast, many a times if the abnormal laboratory results are not recognized by the treating physician, it becomes a legal issue and liability on the part of treating surgeon than not ordering the test itself. Insecurity during clinical examination leads to indiscriminate ordering of pre-operative laboratory tests in addition to the false belief that more number of tests would protect the treating surgeon legally.<sup>13</sup> If the tests are considered independent of each other and more the number of tests conducted, they would result in more chances of obtaining an abnormal report.<sup>17</sup> If a laboratory test shows normal report or an abnormal report without any clinical implication, no further treatment can be initiated and the test remains without utility; on the other hand currently available anaesthetic drugs and techniques are safe enough toward the kidney or heart and if the tests are performed with a purpose of finding out the contraindication to drugs, then

**Table 1: The age and sex distribution of the study group (n=1150)**

Age group	Male (%)	Female (%)
03-18	220 (19.13)	064 (05.56)
19-34	252 (21.91)	139 (12.08)
35-50	326 (28.34)	149 (12.95)

**Table 2: The type of surgeries labeled as minor and medium in the present study**

Type of surgery	Name of surgeries
Minor	Endoscopic procedures in ENT
	Cataract surgery
	Superficial skin surgeries
	Myringoplasty
	Biopsies
	Septoplasty
	FESS
	Fracture reduction
	Tibial nail removal
	Medium
ENT-laryngeal and head and neck	
Orthopedic	
Neurosurgical	
Uro- Gynaecological	

**Table 3: The number of tests performed, number of test positive, and change in the course of management in the study (n=1150)**

(Total tests- 10,395) type of tests performed	Number and % of tests	Number and % of abnormal tests - 175 (15.21)	Change in approach to the management - 62 (35.42)
Hemoglobin	1150 (100)	26 (0.26)	04-0.34
Total blood count	1150 (100)	21 (01.82)	05-0.43
Coagulation profile	724 (62.95)	12 (01.65)	03-0.26
Fasting blood sugar	838 (72.86)	21 (02.50)	04-0.34
Blood urea	1104 (96)	11 (0.99)	03-0.26
Serum creatinine	1104 (96)	09 (0.81)	03-0.26
Serum sodium and potassium	426 (37.04)	14 (03.28)	05-0.43
ECG	778 (67.65)	23 (02.95)	07-0.60
X-ray chest	821 (71.39)	18 (02.19)	08-0.69
HbsAg	1150 (100)	08 (0.69)	08-0.69
Viral screening	1150 (100)	12 (01.04)	12-01.04

ECG: Electrocardiogram

these tests remain futile.<sup>13</sup> In the present study, the number of abnormal results among hematological tests; hemoglobin 26 (0.26%), total blood counts 21 (01.82%), and coagulation tests 12 (01.65%) and the overall change in approach for treatment was 4 (0.34%), 5 (0.43%), and 3 (0.26%), respectively (Table 3). As per the practice advisory for pre-anesthesia evaluation - ASA task forces studies, routine hemoglobin abnormal findings represented 0.5-43.8% of cases and requirement for change in approach represented 0-28.6%. Their routine hematocrit was abnormal in 0.2-38.9% of cases and change in clinical approach in 0-100% of cases; routine coagulation tests showed abnormalities in BT, PT, aPTT, or platelet count represented 0.8-22% of cases and required change in approach in 1.1-4% of cases.<sup>14</sup> Review of literature shows that the incidences of finding abnormal hematocrit and hemoglobin values as well as serum urea and creatinine are very common but there is no proof that this would lead to increased morbidity or mortality during or after surgeries.<sup>2,11,13</sup> Electrocardiogram (ECG) was undertaken in 778/1150 patients (67.65%) in this study and abnormal finding was noted in (02.95%); 7 patients (0.60%) required a change in approach to further treatment in the present study (Table 3). The practice advisory for pre-anesthesia evaluation - ASA task force studies, routine ECG results were documented as abnormal in 7-42.7% of cases and required change in clinical approach in 9.1% of cases.<sup>14</sup> As per guidelines of American College of Cardiology/American Heart Association recently, ordering ECG as a routine in surgical profile for low risk patients undergoing surgery is not useful moreover may even be harmful.<sup>2,14,15</sup> Similar observation was made by Correll *et al.*<sup>19</sup> while investigating values of preoperative ECG; no benefit was found in anticipating cardiovascular complications when compared to medical history. 821 patients (71.39%) underwent X-ray chest as a surgical profile in the present study and abnormal findings were noted in 18 (02.91%) of them; change in approach to management was noted

in 8 (0.69%) patients (Table 3). In ASA-task force studies routine X-ray, results were abnormal in 2.5-60.1% of cases and change in clinical approach in 0-51%.<sup>14</sup> In their systematic review of surgical profiles Joo *et al.*<sup>20</sup> commented that the abnormalities noted on X-ray chests increases with increasing age and risk factors of patients but these changes do not in any way alter the perioperative or post-operative course of management. 838 patients (72.86%) underwent fasting blood sugar estimation as a surgical profile in the present study and abnormal findings were noted in 21 (02.50%) of them; change in approach to management was noted in 4 (0.34%) patients (Table 3). In the present study, serum sodium and potassium were conducted in 426/1150 patient (37.04%) and abnormal finding was noted in 14 (03.28%); change in approach to treatment was made in (0.43%) patients. ASA task force studies showed preoperative routine Potassium estimation showed 1.5-12.8% of abnormal results.<sup>14</sup> ASA task force agrees that preoperative tests should not be ordered routinely. In preoperative cases, it should be ordered in a selective manner with the purpose of guiding or optimizing perioperative management.<sup>14</sup> Reducing the number of laboratory tests results thereby decreasing operating costs, time, and medical stress associated with false positive results.<sup>18</sup>

## CONCLUSIONS

Preoperative surgical profiles should not be undertaken as a tradition, but should be based on thorough clinical examination, nature of surgical procedure, anesthetic technique and clinical status of the patient. They should be undertaken with the sole purpose to guide and optimize perioperative care of the patients. Selective ordering of these tests reduces stress, time consumed, and cost of surgeries; remains as a more rational conduct on the part of surgeon and the anesthesiologist.

## REFERENCES

1. Kumar A, Srivastava U. Role of routine laboratory investigations in preoperative evaluation. *J Anaesthesiol Clin Pharmacol* 2011;27:174-9.
2. Nascimento JP, Castiglia YM. The electrocardiogram as preoperative examination of the patient without cardiovascular disease. Is it really necessary? *Rev Bras Anesthesiol* 1998;48:352-61.
3. Fleisher LA. Avaliação pré-operatória. In: Barash PG, Cullen BF, Stoelting RK, editors. *Anestesia Clínica*. São Paulo: Ed Manole; 2004. p. 473-87.
4. Gusman PB, Nascimento JP, Castiglia YM. Preanesthetic evaluation Outpatient clinic *Rev Bras Anesthesiol* 1997; 47: 522-7.
5. Flamm M, Fritsch G, Hysek M, Klausner S, Entacher K, Panisch S, *et al.* Quality improvement in preoperative assessment by implementation of an electronic decision support tool. *J Am Med Inform Assoc* 2013;20:e91-6.
6. Dzankie S, Pastor D, Gonzalez C, Leung JM. The prevalence and predictive value of abnormal pre-operative laboratory tests in elderly surgical patients. *Anesth Analg* 2001;93:301-8.
7. Delahunt B, Turnbull PR. How cost effective are routine preoperative investigations? *N Z Med J* 1980;92:431-2.
8. Greer AE, Irwin MG. Implementation and evaluation of guidelines for preoperative testing in a tertiary hospital. *Anaesth Intensive Care* 2002;30:326-30.
9. Rohrer MJ, Michelotti MC, Nahrwold DL. A prospective evaluation of the efficacy of preoperative coagulation testing. *Ann Surg* 1988;208:554-7.
10. Birth JP, Kirsch LA, Samaha JT. Need assessment routine hematocrit, hemoglobin, urea and creatinine during the preanesthetic evaluation. *Rev Bras Anesthesiol* 1998;48:264-71.
11. Costa VV, Pereira ES, Saraiva RA. Laboratory tests in the pre-anesthetic evaluation for small surgeries. Study retrospective. *Rev Bras Anesthesiol* 1998;48:14-9.
12. Shah SA, Sajid T, Asif M, Khan F, Ghani R. Significance and cost effectiveness of pre-operative routine laboratory investigations in young healthy patients undergoing elective ear, nose and throat surgery. *J Ayub Med Coll Abbottabad* 2007;19:3-6.
13. Nascimento JP, Kirsch LA, Samaha JT. Need assessment routine hematocrit, hemoglobin, urea and creatinine during the preanesthetic evaluation. *Rev Bras Anesthesiol* 1998;48:264-71.
14. American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Practice advisory for preanesthesia evaluation: A report by the American society of anesthesiologists task force on preanesthesia evaluation. *Anesthesiology* 2002;96:485-96.
15. Yen C, Tsai M, Macario A. Preoperative evaluation clinics. *Curr Opin Anaesthesiol* 2010;23:167-72.
16. Garcia-Miguel FJ, Serrano-Aguilar PG, López-Bastida J. Preoperative assessment. *Lancet* 2003;362:1749-57.
17. Lira RP, Nascimento MA, Kara-José N, Arieta CE. Predictive value of preoperative tests in facelift. *Rev Saude Publica* 2003;37:197-202.
18. Ajimura FY, Maia AS, Hachlya A, Watanabe AS. Preoperative laboratory evaluation of patients aged over 40 years undergoing elective non cardiac surgery. *Sao Paulo Med J* 2005;123:50-3.
19. Correll DJ, Hepner DL, Chang C, Tsen L, Hevelone ND, Bader AM. Preoperative electrocardiograms: Patient factors predictive of abnormalities. *Anesthesiology* 2009;110:1217-22.
20. Joo HS, Wong J, Naik VN, Savoldelli GL. The value of screening preoperative chest x-rays: A systematic review. *Can J Anesth* 2005;52:568-74.

**How to cite this article:** Jayachandran CG, Harikrishnan S, Morris LJ. How Relevant are Surgical Profile Tests Done Pre-operatively in Minor and Medium Surgical Procedures? - An Analytical Clinical Study. *Int J Sci Stud* 2017;5(4):84-88.

**Source of Support:** Nil, **Conflict of Interest:** None declared.