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An Evaluation of the POSSUM Score's Efficacy in Predicting the Outcome of Patients Undergoing a Laparotomy - A Study Protocol

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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Study Protocol

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ABSTRACT

Background: POSSUM Score is used to assess the outcome of complication, surgical intervention and the proportion between predicted and observed morbidity and mortality.Such scoring systems have been especially designed to compare patient's severity of illness, predict mortality, morbidity and to plan an effective treatment protocol.

Objectives:

a. To assess applicability of POSSUM score (morbidity and mortality) in surgical practice in a tertiary care centre in a rural area.

b. To assess utility of POSSUM score in clinical management.

Methodology: The complications included in the study will be assessed in patients undergoing laparotomy during the hospital stay irrespective of the period of stay. The severity of these complications will be predicted using POSSUM score. The cases developing complications will be randomly selected to make a total participant size of 100.

Results: At the end of the study, we expect easy applicability of POSSUM score in assessment of morbidity and mortality in patients undergoing laparotomy.

Conclusion: We hope that POSSUM score is an easy tool which can be applied to assess the morbidity and mortality in patients undergoing laparotomy.

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Keywords: POSSUM score; morbidity; mortality; laparotomy.

1. INTRODUCTION

Background/rationale-At a time, when resources are constrained, and expectations from medical personnel are insurmountable [1], it is important to quantify the risk of peri-operative morbidity and mortality [2]. The prime concern of any surgical procedure is the curtailment of morbidity and mortality rates [3] thus assisting in the faster adaptation of more effective treatment regimens [4].

Therefore, attention has been focused on the development of scoring systems that standardize patient data thus allowing meaningful comparisons [5].The formation of such scoring systems has been designed specifically to compare populations and severity of illness, thus predicting mortality, morbidity and helping to form an individualised treatment strategy for early intervention and better outcome [6].

One of the scoring systems so developed is-POSSUM SCORE(Physiological and Operative Severity Scoring system for the enUmeration of Morbidity) which assesses the outcomes of surgical procedures, their complications and the proportion of predicted and observed morbidity and mortality in a range of the population that receives medical care. [7,8,9,10].

Possum score was found in early nineties by Copeland and his colleagues at Department of General Surgery at Warrington Hospital, UK.

It includes a 2-part scoring system:

Physiological score which consists of 12 parameters scored during pre-operative period.
Operative score which includes 6 parameters scored during the operative period.

Numerous researches have been carried in Western countries, but there are fewer published studies in Low and Middle Income Countries (LMIC). This prospective study was conducted in a district hospital (AVBRH-Acharya Vinoba Bhave Rural Hospital) that predominantly serves the rural population (Sawangi, Meghe, Wardha, Maharashtra) in an attempt to bridge the gap [11].

1.1 Objectives

1. To assess applicability of POSSUM score (morbidity and mortality) in surgical practice in a tertiary care centre in a rural area.
2. To assess utility of POSSUM score in clinical management.

2. METHODS

2.1 Study Design

2.1.1 Prospective Observational Study.

Setting: Present study will be conducted in Acharya Vinoba Bhave Rural Hospital(AVBRH), a tertiary care teaching hospital situated in rural area of Wardha district, in central India attached to Jawaharlal Nehru Medical College, Sawangi Meghe Wardha. The study will take place over the course of two years, with 100 people undergoing laparotomy as an emergency or elective procedure. The complications included in the study will be assessed in patient undergoing laparotomy with a follow-up period of 30 days.

2.1.2 Variables

The physiological score includes patient vitals like systolic blood pressure, pulse rate, Glasgow Coma Scale (GCS). The blood parameters included for the study are haemoglobin, White Cell Count, Urea, sodium and potassium levels. Other investigations includes chest radiograph and Electocardiogram (ECG).

While operative score includes the type of procedure performed, number of procedures, blood loss during the operative intervention and the mode of the surgery.

2.1.3 Data sources/ measurement

Data will be gathered from patient records as well as laboratory reports. Data analysis was carried out both manually and with the aid of a computer. The calculated data was organised in a systematic manner, presented in various tables and figures, and statistical analysis was performed using the Statistical Package for Social Science (SPSS) with a p value of 0.05 as the level of confidence to evaluate the study's objectives. To analyse the projected data by POSSUM score with the observed data, the correlation will be obtained using the chi square test.

3. EXPECTED OUTCOMES/RESULTS

In this study we expect to see a strong co-relation between morbidity [12] and mortality calculated through POSSUM score [13] giving an idea about the prospectus of a patient undergoing laparotomy in a rural setting with limited resources. We also expect to see POSSUM score to be standardised for any patient undergoing surgery to predict an outcome after any surgery.

4. DISCUSSION

In an era of resource limitations and low economic status [14], POSSUM score with its parameters can become an easy and effective tool to predict the outcome of patients undergoing laparotomy preoperatively. POSSUM score can give an idea of possible complications, thus helping the heathcare provider to take appropriate measures to decrease the postoperative morbidity and mortality.

5. CONCLUSION

Various scoring systems for early diagnosis and prompt intervention for better patient care have been discovered during the times of evidence-based medicine for patient care and management. The study confirms the use of the POSSUM scoring system, which can subsequently be utilised widely in low and middle income countries (LMIC) for individualised patient care.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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ANNEXURES

Table 1. Physiological Severity Score

	1	2	4	8
Age	<60	61-70	>71	
Cardiac signs Chest radiograph	No failure	Diuretic,digoxin,antianginal or antihypertensive therapy	Peripheral edema,warfarin therapy Borderline cardiomegaly	Raised jugular venous pressure Cardiomegaly
Respiratory history Chest radiograph	No dyspnoea	Dyspnoea on exertion	Limiting dyspnoea(one flight of stairs) Mild COAD	Dyspnoea at rest (rate>30/min) Fibrosis or consolidation
Systolic Blood pressure (mmHg)	110-130	131-170 100-109	>171 90-99	<89
Pulse (beats/min)	50-80	81-100 40-49	101-120	>121 <39
GCS	15	12-14	9-11	<8
Hemoglobin (g/dl)	13.0-16.0	11.5-12.9 16.1-17.0	10.0-11.4 17.1-18.0	<9.9 >18.1
WBC ($X10^{12}$/L)	4.0-10.0	10.1-20.0 3.1-4.0	>20.1 <3.1	
Urea (mmol/L)	<7.5	7.6-10.0	10.1-15.0	>15.1
Sodium (mmol/L)	>136	131-135	126-130	<125
Potassium (mmol/L)	3.5-5.0	3.2-3.4 5.2-5.3	2.9-3.1 5.4-5.9	<2.8 >6.1
Electrocardiogram	Normal		Atrial fibrillation(rate 60-90)	Any other abnormal rhythm or >5 ectopics/min, Q waves or ST/T wave changes

Table 2. Operative Severity Score

	1	2	4	8
Operative severity	Minor	Moderate	Major	Major+
Multiple procedures	1		2	>2
Total blood loss(ml)	<100	100-500	501-999	>1000
Presence of malignancy	None	Primary only	Nodal metastasis	Distant metastasis
Mode of surgery	Elective		Emergency resuscitation of >2 hrs possible Operation <24 hrs after admission	Emergency (immediate surgery <2 hrs needed)

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