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Original Research Article

To evaluate the efficacy of P-POSSUM in estimation of mortality and morbidity risk in patients undergoing laparotomy

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Abstract

Background & Methods: The aim of the study is to evaluate the efficacy of P-POSSUM in estimation of mortality and morbidity risk in patients undergoing laparotomy. A working proforma sheet, containing patient's demography, variables form history, clinical examination, investigations, operation undergone and outcome, was designed. Physiological data were collected at the time of induction of anaesthesia, and operative data were collected at the completion of operation.

Results: For all patients mean mortality risk as calculated by POSSUM was 18.75%. Expected and observed mortality was 20.06 and 09 patients respectively. 73 patients were having mortality risk in between 01 to 20%, with mean risk of 10.36% corresponding to expected mortality in 7.97 patients but no patient observed mortality. 06 patients were present in a mortality risk group of 41-60% and 61-80% corresponding to expected mortality in 3.12 and 4.24 patients. Total 4 patients died in each group. 15 patients were present in 21-40% risk group having mean risk of 26.22%. Expected and observed mortality in this group was 4.71 and 01 respectively.

Conclusion: Scoring systems can be used to assess the outcome of surgery and would help us in proper management of patients. It can help us in proper utilization of available resources, better patient counselling and improving surgical results. These scoring systems can be used in our set up for better patient's counselling, improving surgical outcome and better management of limited resources and man power.

Keywords: efficacy, P-POSSUM, mortality, morbidity & laparotomy.

Study Design: Observational Study.

1. Introduction

Clinicians have worked out many models, to predict morbidity and mortality risk associated with the surgery to be performed. Using the patient's age alone as a 'score' to determine whether or not they will be fit to survive surgery has been shown to be invalid. In multi-variate analyses, age on its own has been shown to be a poor predictor of mortality and

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morbidity[1]. In a study, conducted in England it was demonstrated that, although older patients do worse after emergency surgery, it is because, they have more co-morbidities than younger patients [2].

The POSSUM system is a two-part scoring system that includes a physiological assessment and a measure of operative severity. The physiological part of the score includes 12 variables, each divided into 4 grades. The physiological variables are those apparent at the time of surgery and include clinical symptoms and signs, results of simple biochemical and hematological investigations, and electrocardiographic changes. If a particular variable is not available, a score of 1 is allocated. Some variables may be assessed by means of clinical symptoms or signs or by means of changes on chest radiographic findings. The minimum score, therefore, is 12, with a maximum score of 88 [3]. The 12 physiological variables that were included in the scoring system were Age, Cardiac status, Respiratory status, Blood pressure, Pulse rate, Glasgow coma score, Hemoglobin level, White cell count, Blood Urea, Serum Sodium, Serum Potassium and Electrocardiogram[4].

P-POSSUM uses a different constant and weighted value for physiology and operative severity scores[5]. In this system, the estimated risk applies to an individual. This method uses linear analysis as compared to exponential analysis that was used in POSSUM. As the POSSUM system uses a logistic model, predictions of less than 0% and greater than 100% are impossible. This model more closely approximates the clinical situation, in which we can never be certain that a patient will survive or die after surgery [6].

2. Material and Methods

The study was carried out in the Department of General Surgery, Index Medical College Hospital & Research Centre, Indore from Sep 2018 to Aug 2019. Study has included patients those were admitted in the department of Surgery. A working proforma sheet, containing patient's demography, variables form history, clinical examination, investigations, operation undergone and outcome, was designed. Physiological data were collected at the time of induction of anaesthesia, and operative data were collected at the completion of operation.

3. Result

Table 1: Table showing No. of patients above or below age 60

Age	No. of patients
No. of Patients ≥ 60 years	09
No. of Patients ≤ 60 years	91

Out of total 100 patients studied, 91 patients were below 60 years of age, and 09 were above 60 years of age.

Table 2: Table showing number of patients who survived and who died after surgery

No. of patients survived	91
No. of patients died	09

Out of total 100 patients who underwent surgery, 91 survived and 09 died after operation.

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Table 3: Average mortality risk as calculated by POSSUM in patients who died or survived.

Outcome	No. of Patients	Average Mortality Risk (%)	Expected Mortality	Observed Mortality	O:E Ratio
Patients Who Died	09	61	5.49	09	1.63
Patients Who survived	91	15	14.7	00	0.00

In patients who died, (n- 9) average mortality risk as estimated by POSSUM is 61% corresponding to expected mortality in 5.49 patients out of 9 patients. Similarly, in patients who survived, (n-91) average mortality risk as calculated by POSSUM is 15% corresponding to expected mortality in 14.7 patients out of 91 patients. Total 9 and 0 patients observed mortality in two groups respectively.

Table 4: Comparison of expected and observed mortality using POSSUM mortality equation

Range of risk (%)	No. of patients	Mean Risk (%)	Expected Mortality	Observed Mortality	O:E Ratio
1-20	73	10.36	7.97	00	0.00
21-40	15	26.22	4.71	01	0.21
41-60	06	52.00	3.12	04	1.28
61-80	06	70.83	4.24	04	0.94
81-100	00	00.00	0.00	00	0.00
1-100	100	18.75	20.06	09	0.44

For all patients mean mortality risk as calculated by POSSUM was 18.75%. Expected and observed mortality was 20.06 and 09 patients respectively. 73 patients were having mortality risk in between 01 to 20%, with mean risk of 10.36% corresponding to expected mortality in 7.97 patients but no patient observed mortality. 06 patients were present in a mortality risk group of 41-60% and 61-80% corresponding to expected mortality in 3.12 and 4.24 patients. Total 4 patients died in each group. 15 patients were present in 21-40% risk group having mean risk of 26.22%. Expected and observed mortality in this group was 4.71 and 01 respectively.

4. Discussion

In today's era, where the patient's safety and proper management of patient is very important, it is necessary to assess the expected outcome of the procedure performed. Recognizing patients, who are at high risk to develop complication and have high risk of mortality, would prompt us to take necessary action and help us in the better management of patient[7].

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A surgical scoring system provides us with necessary data, analysing which we can identify patients who are most vulnerable to develop complications and may succumb to death. It should be applicable to the wide range of general surgical procedures, both elective and emergency, and should allow prediction of both mortality and morbidity[8].
In the past, various scoring systems, such as ASA and APACHE II have been used to predict both morbidity and mortality in surgical patients. These existing scoring systems are either too simple or too complex and do not completely meet the expectation as being readily applicable to all patients. POSSUM and P-POSSUM has been proved to be a one of the best scoring system which could predict the morbidity and mortality risk with reasonable accuracy. It has been validated by many authors around the globe. It has been used by many authors in various surgical specialties with success. In many studies it was found to slightly over predict morbidity and mortality[9].

5. Conclusion

Scoring systems can be used to assess the outcome of surgery and would help us in proper management of patients. It can help us in proper utilization of available resources, better patient counselling and improving surgical results. These scoring systems can be used in our set up for better patient's counselling, improving surgical outcome and better management of limited resources and man power.

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