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Predictability of Morbidity and Mortality using POSSUM Score in post-operative patients.

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Abstract:
Background*: Predicting outcome in GI surgery can be important for several reasons. It is an indicator of quality that can help patients and surgeons in decision-making should the patient be advised to undergo surgery, it can aid in the selection of procedures and suggest the ranges of postoperative morbidity and mortality for these procedures. A risk-scoring system can be utilized for patient counseling and informed consent discussions, for identifying high-risk patients who would benefit from disease optimization, and for risk adjustment when comparing outcomes between institutions.Possum &P Possum are accepted methods of risk scoring. P Possum has predicted morbidity and mortality accurately in various settings and indirectly assesses the quality of health care provided.*
Materials and Methods*: All patients operated between January 2014 and December 2016, were included in the study.The patients' demographics, operating details and outcomes were collected prospectively. Review of their case notes and the medical records via the Clinical Management will be performed. Patient assessment will strictly adhere to universal examination and management protocols Patients' demographics and information necessary for the calculation of the physiologic part of the POSSUM score,the operative severity part of the POSSUM score, such as the operative magnitude, soiling status, urgency status, number of procedures and blood loss were found within operation notes.*
Results*: To evaluate the correlation of predictive factors, a scoring system like POSSUM can be used which can predict the morbidity and mortality risk, which can be explained and discussed in detail with the patients.Post-operative complications were clearly associated with a high-risk POSSUM score, but the low specificity limits its value in clinical practice. High risk POSSUM score also revealed that postoperative complications caused a major increase in resource utilization, in terms of prolonged hospitalization and ICU stay. Mortality rate also increased with higher POSSUM score.*
Key Word*:Possum score, operative outcome*

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I. Introduction

Predicting outcome in GI surgery is an indicator of quality that can help patients and surgeons in decision-making, should the patient be advised to undergo surgery.[1]It can aid in the selection of procedures and suggest the ranges of postoperative morbidity and mortality for these procedures. A risk-scoring system can be utilized for identifying high-risk patients who would benefit from disease optimization, and for risk adjustment when comparing outcomes between institutions. Possum and P Possum are accepted methods of risk scoring.[2][3] P Possum has predicted morbidity and mortality accurately in various settings and indirectly assesses the quality of health care provided. It is often used as a tool to assess and audit the performance of individuals and institutions and is often called surgeon-based scoring system. All these studies mainly involve patients from developed countries, butfew studies have been taken up in developing countries. Keeping in mind the different category of patients who seek surgical care, delayedpresentation, malnutrition limited resources, it was felt that P Possum scoring could be used to assess the health care provided, outcome and compare with others.[4]However, amongst different scoring systems such as the APACHE III(Acute Physiology And Chronic Health Evaluation III), and ACPGBI (The Association of Colo-Proctology of Great Britain and Ireland), forgeneral surgical procedures only POSSUM and its subsequent modified versions incorporated physiological, operative and pathological information.[5][6]Hence this prospective study was taken up in a teaching hospital at a district place catering mainly to the rural population.

II. Material and Methods

All patients who underwent surgical interventions, at the Department of Surgery,MGM hospital, Navi Mumbai, were included in the study.

Study Design: Prospectiveobservational study

Study Location: This was a tertiary care teaching hospital-based study done in Department of General Surgery, MGM hospital, Navi Mumbai.
Study Duration: January 2014 to December 2016
Sample size: 100 patients.
Sample size calculation: The sample size was estimated on the basis of a single proportion design.
Subjects & selection method: The study population was drawn from surgical patients who presented to Mahatma Gandhi Memorial Hospital undergoing surgery between from January 2014 to December 2016.
On the basis of physiological score and Operative severity score.

Inclusion criteria:

1. Either Sex - Male, Female,
2. Age - Above 15 years,
3. Abdominal Surgery - Elective,
4. Emergency

Exclusion criteria:

1. Children under 15 years of age
2. Pregnant Women

Procedure methodology
The study was done over 100 surgical patients by assessing the possum physiological and operative severity score based on the pre-operative, intra-operative and post-operative status. The scores helped in concluding the morbidity and mortality of the patient as per the disease.

Statistical analysis
Statistical analysis was done using SPSS software and statistical tests as per the data retrieved. 'p' value was calculated for important parameters and other significance values were determined.

III. Result

Table 1: POSSUM Score

	Physiology Severity Score	Operative Severity Score	Possum Predicted Morbidity	Possum Predicted Mortality
low risk<25	74	92	43	82
moderate risk 25-50	26	8	32	9
high risk >50	0	0	25	9
Total	**100**	**100**	**100**	**100**

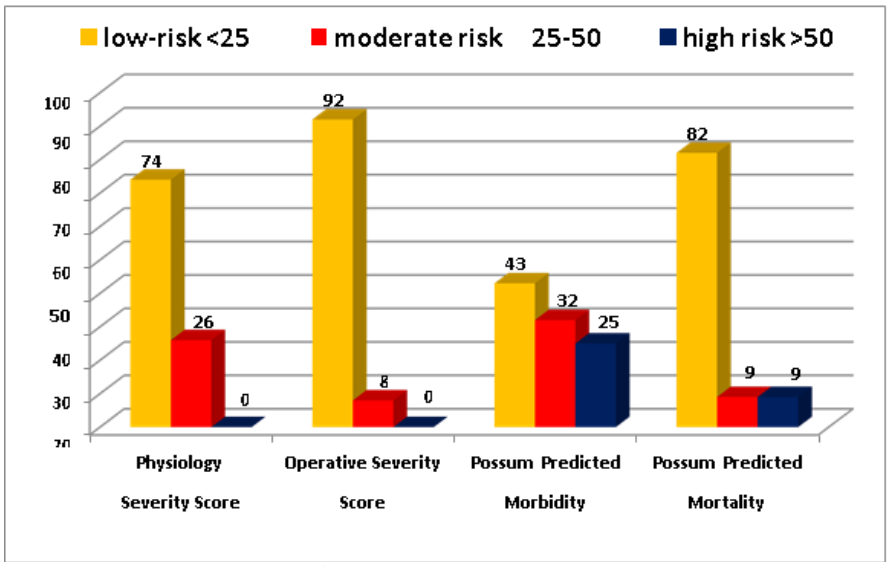

Figure 1: POSSUM score

Based on POSSUM Scoring, patients were categorized into three risk groups. Patients with POSSUM Scores <25 were grouped as "low-risk". Those with scores 25-50 were termed "moderate risk", and those with scores >50 was considered "high risk".

Table: 2- Comparison of duration of hospital stay with POSSUM predictedmorbidity risk

POSSUM PREDICTED MORBIDITY	≤10 days	Prolongation of Hospital Stay(>10days)	Total
Low risk	40	3	43
Moderate risk	23	9	32
High risk	15	10	25
Total	**78**	**22**	**100**

χ^2=11.07, P <0.005

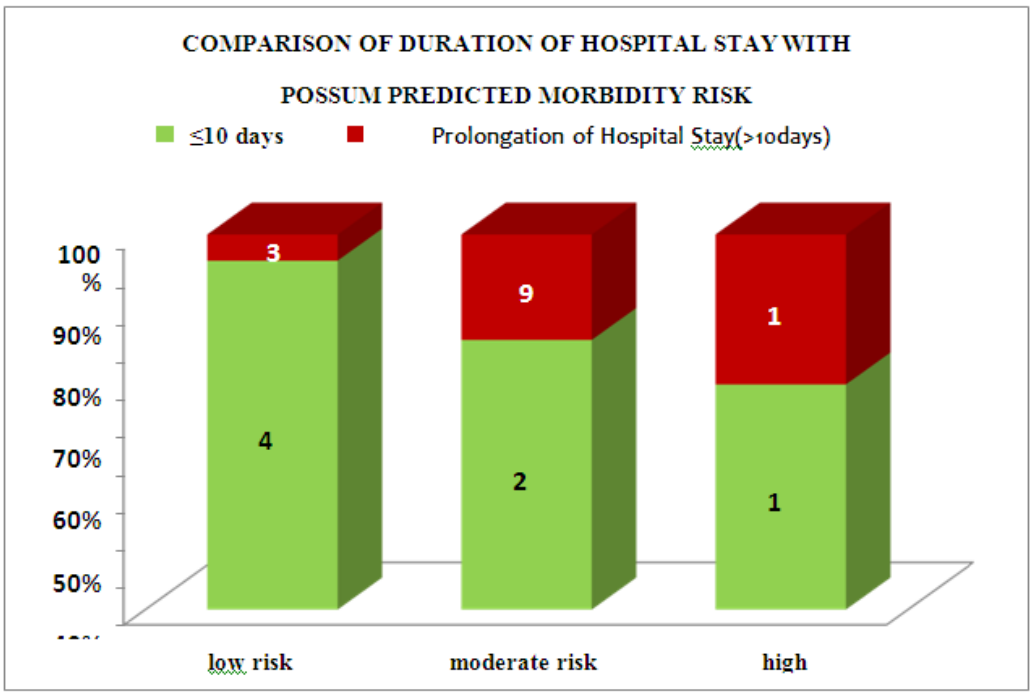

Figure2: Comparison of Duration of Hospital Staywith Possum Predicted Morbidity Risk

InourStudy,06%(03/43)ofthepatientswithlowrisk,28.28%(09/32)withmoderate risk and 40% (10/25) of the patients with high-risk Possum Predicted Morbidity Score had postoperative prolonged hospitalstay.

IV. Discussion

The main objective of this study was to determine the nature and the frequency of cardio-respiratory, surgical and infective complications after gastroenterological operations; their correlation with the predictive factors and assessment of their impact on resource utilization in terms of hospital stay and need for intensive care. We compared our data with that published by other national and international centres. We recorded complications in one third of our study population, which is less than that noted in similar previous published studies. Among the 33 patients with complications, more than 50% had cardiorespiratory complications, while surgical and infective complications constituted the rest.

POSSUM score consisted of 4 different parameters viz. Physiology Severity Score, Operative Severity Score, Possum Predicted Morbidity and Possum Predicted Mortality scores.[7][8] Patients with POSSUM Scores <25 were grouped as "low-risk", those with scores 25-50 were termed "medium risk", whereas those with scores >50 were considered high risk as per categorization done in previous studies. It was observed that patients who had complications had high risk POSSUM scores and that this observation was statistically significant.[9]

It was also observed that more than 50% of the patients with Age > 60years, history of CAD, Hypertension and COPD/Asthma had postoperative complications, which indicates that these are important predictive factors with positive correlation for complication, although our observation was not statistically significant. However positive relationship of diabetes mellitus with the occurrence of post-operative complications showed statistical significance.

Patients with increased duration of surgery, excess blood loss during surgery (> 500ml) and intraoperative hypotension (min) requiring inotropic supports had post-operative complications, with statistically significant P value. According to our study, it was observed that patients with ASA III or more had postoperative complications, prolonged hospital and ICU stay. This means higher ASA grade is a significant predictor for complications and resource utilization. According to our data analysis, maximum complications occurred in patients undergoing exploratory laparotomy whereas 60% of the patients undergoing more than one operative procedure had postoperative complications.[10][11] This indicates that type and number of operative procedures also have positive correlation with post-operative complication. It was observed that patients undergoing emergency surgeries had prolonged (>10days) of hospital stay as well as ICU stay, which indicates that patients undergoing emergency surgeries have increased morbidity and thereby increase the resource utilization in the hospital.

As per our data analysis, >30% of the patients having postoperative cardiorespiratory or more than one complication's had postoperative prolonged hospital stay (>10 days) whereas patients with ≥05 days of postoperative ICU stay had more infective or more than one complication's. This implies that ICU patients have increased morbidity with infective or >1 complication's whereas IPD patients have increased morbidity with cardiorespiratory complications, thereby increasing the resource utilization in the hospital. In our study, it was observed that, patients with high-risk Possum Predicted Mortality Score had Mortality, which was statistically significant.[13] Similarly, patients with high-risk Possum Predicted Morbidity Score had postoperative prolonged hospital stay and ICU stay, which was statistically significant.[14][15] This indicates that POSSUM score predicts the excess utilization of hospital resources by comparing the observed and expected scores.

V. Conclusion

The main findings of this study were that approximately more than one third of patients undergoing gastroenterological surgery had postoperative complications; out of which more than half were cardiorespiratory complications.To evaluate the correlation of predictive factors, a scoring system like POSSUM can be used which can predict the morbidity and mortality risk, which can be explained and discussed in detail with the patients.Outcome and resource utilization play an important role in management of patients of gastroenterological surgery with complications. Patients with high-risk POSSUM score and higher ASA status with comorbidities have been shown to have prolonged hospital and ICU stay, thus increasing the resource utilization. POSSUM may be considered an essential component of surgical audit as it does appear to provide an efficient indicator of the risk of morbidity and mortality in the general surgical patient.

References

[1]. Mohamed K, Copeland GP, Boot DA, Casserley HC, Shackleford IM, Sherry PG, et al. An assessment of the POSSUM system in orthopaedic surgery. J Bone Joint Surg Br 2002;84(5):735-9.

[2]. Griffiths H, Cuddihy P, Davis S, Parikh S, Tomkinson A. Risk-adjusted comparative audit. Is Possum applicable to head and neck surgery? Clin Otolaryngol Allied Sci 2002;27(6):517-20.

[3]. Brunelli A, Fianchini A, Xiume F, Gesuita R, Mattei A, Carle F. Evaluation of the POSSUM scoring system in lung surgery. Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity. Thorac Cardiovasc Surg 1998;46(3):141-6.

[4]. Wijesinghe LD, Mahmood T, Scott DJ, Berridge DC, Kent PJ, Kester RC. Comparison of POSSUM and the Portsmouth predictor equation for predicting death following vascular surgery. Br J Surg 1998;85(2):209-12.

[5]. Neary WD, Heather BP, Earnshaw JJ. The Physiological and Operative Severity Score for the enUmeration of Mortality and morbidity (POSSUM). Br J Surg 2003;90(2):157-65.

[6]. Tran Ba Loc P, du Montcel ST, Duron JJ, Levard H, Suc B, Descottes B, et al. Elderly POSSUM, a dedicated score for prediction of mortality and morbidity after major colorectal surgery in older patients. Br J Surg 2010;97(3):396-403.

[7]. Tong DKH, Fan JKM, Law WL. Outcome of laparoscopic colorectal resection. Surgeon Journal of the Royal Colleges of Surgeons of Edinburgh & Ireland 2008;6(6):357-60.

[8]. Kuhry E, Schwenk W, Gaupset R, Romild U, Bonjer HJ. Long-term results of laparoscopic colorectal cancer resection. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd, 2008.

[9]. Law WL, Lam CM, Lee YM. Evaluation of outcome of laparoscopic colorectal resection with POSSUM, Portsmouth POSSUM and colorectal POSSUM. Br J Surg 2006;93(1):94-9.

[10]. Law WL, Choi HK, Lee YM, Ho JWC, Seto CL. Anastomotic leakage is associated with poor long-term outcome in patients after curative colorectal resection for malignancy. J Gastrointest Surg 2007;11(1):8-15.

[11]. Lazarides M, Arvanitis D, Drista H, Staramos D, Dayantas J: POSSUM and APACHE II scores do not predict the outcome of ruptured infrarenal aortic aneurysms. Ann VascSurg 1997, 11(2):155-158.

[12]. Knaus W, Wagner D, Draper E, Zimmerman J, Bergner M, Bastos P, Sirio C, Murphy D, Lotring T, Damiano A, et al.: The APACHE III prognostic system. Risk prediction of hospital mortality for critically ill hospitalized adults. Chest 1991, 100(6):1619-1636.

[13]. Prytherch D, Sutton G, Boyle J: Portsmouth POSSUM models for abdominal aortic aneurysm surgery. Br J Surg 2001, 88(7):958-963.
[14]. Whiteley M, Prytherch D, Higgins B, Weaver P, Prout W: An evaluation of the POSSUM surgical scoring system. Br J Surg 1996, 83(6):812-815.
[15]. Zafirellis K, Fountoulakis A, Dolan K, Dexter S, Martin I, Sue-Ling H: Evaluation of POSSUM in patients with oesophageal cancer undergoing resection. Br J Surg 2002, 89(9):1150-1155.

N L Vyas, et. al. "Predictability of Morbidity and Mortality using POSSUM Score in post-operative patients." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(01), 2021, pp. 12-16.