



Evaluation of POSSUM Score As Predictor of Morbidity And Mortality in Gastrointestinal Surgeries.

* **Dr. Sachin Naik**

Professor and Head, Dept. of Gen. Surgery, MIMER Medical College, Talegaon Dabhade, Pune. * Corresponding Author

Dr. Pankaj Nemade

Senior Resident, Dept. of Gen. Surgery, MIMER Medical College, Talegaon Dabhade, Pune.

Dr. Sandesh Gawade

Assistant Professor, Dept. of Gen. Surgery, MIMER Medical College, Talegaon Dabhade, Pune.

ABSTRACT

There is high risk of postoperative complications in patients undergoing abdominal surgery. It may lead to prolonged hospital stay, disproportionate use of resources and increased mortality and morbidity. We assessed impact of complications in terms of hospital stay and ICU stay by study of predictive factors, the nature and frequency of postoperative complications in this retrospective observational study of 100 patients undergoing abdominal surgeries for various diseases in our centre. The incidence of cardiorespiratory, infective and surgical complications was assessed.

POSSUM (Physiological and Operative Severity Score for the enumeration of Mortality and morbidity) score was used for evaluation.

High-risk patients could be identified by simple clinical criteria. Development of clinical pathways would prove valuable. 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.

KEYWORDS

POSSUM score, Gastrointestinal surgery, ASA.

Introduction

Recovery from surgery is fast and uncomplicated in most patients and the overall mortality rate after non-cardiac surgery is approximately 1-2 percent.¹ Established risk factors include increasing age, impaired cardiovascular function and type of surgery.² In gastroenterological surgery postoperative complications occur more frequently and the postoperative mortality rate is higher (4 percent) than in many other specialties.³ Patients who develop complications and whose hospital stay is prolonged may consume a disproportionately large share of the available resources.⁴

Definitions of complications and risk factors related to gastroenterological surgery vary extensively.³ The reported incidence of complications is also greatly dependent on patient selection. Recent studies have shown that preoperative screening may facilitate the selection of patients for appropriate perioperative management.⁵ Perioperative intervention on high risk patients undergoing major surgery may be beneficial to reduce the postoperative complications, risk of death or the length of hospital stay.

Aims and objectives

The objective of this study was to see the feasibility and predictivity of possum score for morbidity and mortality in patients undergoing gastrointestinal surgeries. And further to determine the nature and the frequency of cardiorespiratory, surgical and infective complications after gastroenterological operations; their correlation with the predictive factors and assessment of their impact in terms of hospital stay and need for intensive care.

Materials and methods

This study was an observational study incorporating 100 patients admitted at MIMER hospital, Pune who underwent gastroenterological surgeries for various diseases from Feb 2010 to July 2012. We compared our data with that published by other national and international centers.

POSSUM score was used for evaluation of the study patients. POSSUM score consisted of 4 different parameters viz. Physiology Severity Score, Operative Severity Score, Possum Predicted Morbidity and Possum Predicted Mortality scores. 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.

The following predictors were recorded viz. Age(years), Coronary heart disease, Heart failure, Hypertension, Diabetes, Duration of operation (min), Duration of intraoperative hypotension (min), Blood loss during surgery(ml), COPD/Asthma; and the correlation with the postoperative complications was studied.

Results

It was 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.

It was observed that the patients with increased duration of surgery, excess blood loss during surgery (> 500ml) and intraoperative hypotension (min) requiring inotropic supports had postoperative complications, with statistically significant P value.

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.

Maximum complications occurred in patients undergoing exploratory laparotomy whereas 60% of the patients undergoing more than one operative procedure had postoperative complications. This indicates that type and number of operative procedures also have positive correlation with postopera-

tive complications.

It was noted 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.

More than 30% of the patients having postoperative cardiorespiratory or more than one complications had postoperative prolonged hospital stay (>10 days) whereas patients with ≥05 days of postoperative ICU stay had more infective or more than one complications. This implies that ICU patients have increased morbidity with infective or >1 complications whereas IPD patients have increased morbidity with cardiorespiratory complications, thereby increasing the resource utilization in the hospital.

In our study, patients with high risk Possum Predicted Mortality Score had Mortality, which was statistically significant. Similarly, patients with high risk Possum Predicted Morbidity Score had postoperative prolonged hospital stay and ICU stay, which was statistically significant. This indicates that POSSUM score predicts the excess utilization of hospital resources by comparing the observed and expected scores.

Fig. 1 Comparison Of Complications With Possum Predicted Morbidity Score.

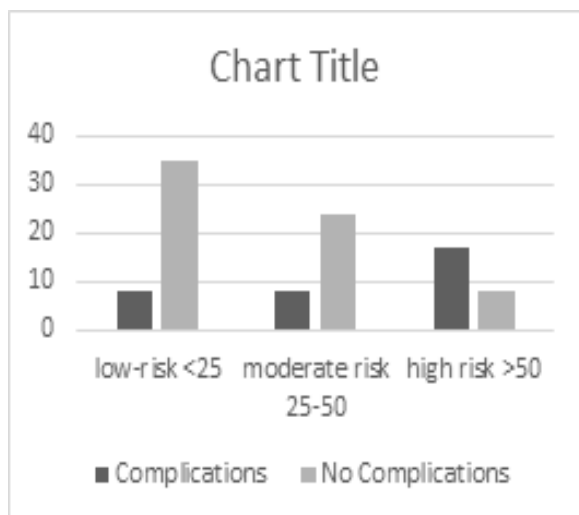


Fig. 2 Comparison Of ASA with Complications

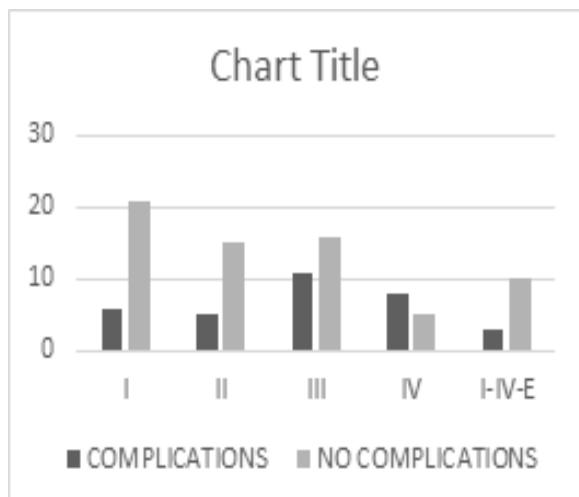


Fig. 3 Comparison of duration of Hospital stay with POSSUM predicted Morbidity risk

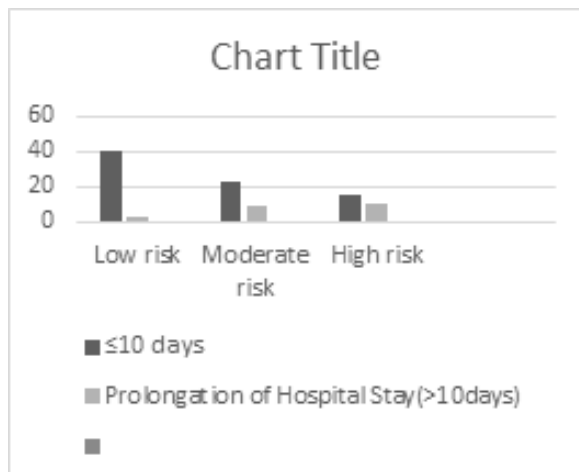


Fig. 4 Comparison of ICU stay with POSSUM predicted Morbidity risk

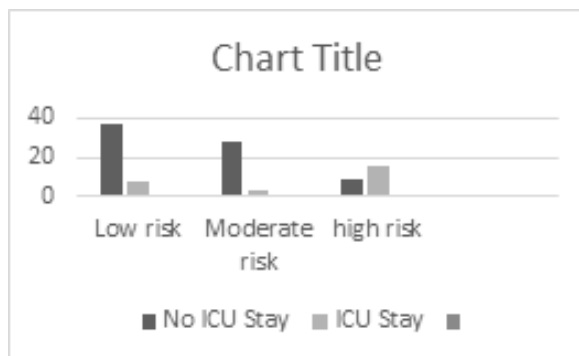
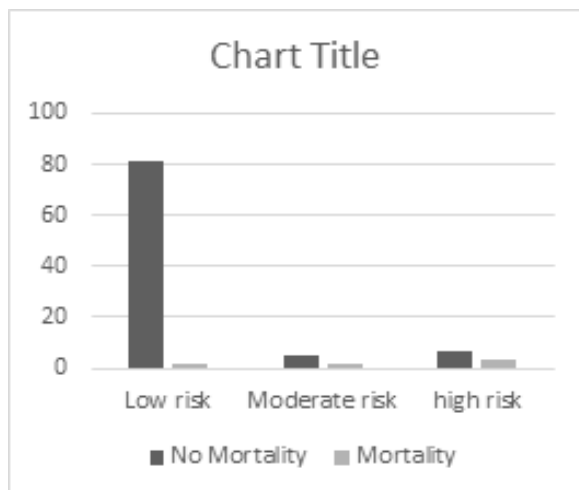


Fig. 5 Comparison of Mortality with POSSUM predicted Mortality risk



Discussion

According to the study by M. Lang, M. Niskanen, et al⁶, the main findings were that approximately one-half of patients undergoing gastroenterological surgery had postoperative complications, which resulted in a twofold increase in the length of hospital stay and costs of care. Complications have been reported to occur in up to two thirds of patients undergoing gastroenterological surgery, presumably because of wide definitions⁷.

According to our study, Cardiorespiratory complications occurred in 52.72% (29/55), whereas Surgical complications occurred in 14.5% (8/55) and infective complications occurred in 32.72% (18/55) of the complicated patients.

Complications were associated with easily recognizable clinical factors, such as increasing age, cardiovascular diseases and a prolonged operation, and occurred most often with rectal surgery as noted previously.¹

According to the study by G. P. Copeland et al.⁸ to be of use in surgical audit, the scoring system must produce a valid assessment of the risk of mortality and morbidity.

Forrest and colleagues⁹ showed that ASA classes III and IV were major predictors for severe cardiorespiratory outcome in a study which included only patients for elective surgery. According to another study by G. Prause et al.¹⁰, the best predictor of survival was ASA grade II (0.4% mortality). For patients who were ASA grade III, the mortality ranged from 1.4% to 3.2%.

In our study, 61.5% (8/13) patients with Grade IV ASA had complications, whereas 40% (11/27) of grade III, 25% (5/20) of grade II, and 22.2% (6/27) of Grade I had complications; but it was not statistically significant with P>0.05.

Type and duration of surgery have long been known to influence the risk of postoperative complications.^{11,12} According to the study by Dr. Michael Patrick¹³, duration of surgery was associated with postoperative length of stay (P <0.001) using univariate linear regression analysis. Therefore, it is important to control for these factors in estimating incidence of pulmonary and cardiac complications.

In our Study, 42.18% (27/64) with extended duration of surgery (>120min) had postoperative complications; whereas 16.6% (06/36) with <120min duration of surgery

It is widely agreed that the morbidity associated with anaesthesia and surgery is much higher in geriatric patients, especially in patients undergoing major surgery. Fowkes et al.¹⁴ have found that the relative risk, in relation to anaesthesia and surgery of a concurrent disease such as ischemic heart disease was decreased with advancing age. This may imply that in the older age groups co-existing disease may be less important than other risk factors in determining morbidity.

As per our study, 52% (13/25) with Age >60 years had postoperative complications; whereas 48% (12/25) with Age >60 years had no postoperative complications; while the rate of post-operative complications was between 10-32% in <60 years age group in ascending chronological order but it was not statistically significant with P >0.05

As per our study, 100% (03/03) with >500ml blood loss during Surgery had postoperative complications; whereas 30.9% (30/97) with <500ml Blood loss during Surgery had postoperative complications. This result was statistically significant. (P <0.01)

In our Study, out of the total 100 patients undergoing all types of operative procedure; 33 patients had postoperative complications; out of which 39.39% (11/33) of the patients had cardiorespiratory complications; whereas 12.1% (04/33) of the patients had surgical, 27.7% (8/33) of the patients had infective and 21% (7/33) had more than 1 postoperative complications. This indicates that rate of cardiorespiratory complications were maximum after Exploratory Laparotomy and Cholecystectomy/Biliary Tract Surgeries with 16% and 19% incidence respectively.

In our Study, 16.6% (08/43) of the patients undergoing elective surgeries had postoperative prolonged hospital stay (>10 days); whereas 28.28% (16/57) of the patients undergoing emergency surgeries had postoperative prolonged hospital

stay (>10 days). This difference was not statistically significant. P >0.05

As per our Study, 06% (03/43) of the patients with low risk, 28.28% (09/32) with moderate risk and 40% (10/25) of the patients with high risk Possum Predicted Morbidity Score had postoperative prolonged hospital stay. This result was statistically significant. (P <0.005)

According to our data analysis, 02.4% (02/83) of the patients with low risk, 28.57% (02/07) with moderate risk and 30% (03/10) of the patients with high risk Possum Predicted Mortality Score had Mortality. This result was also statistically significant. (P <0.0001).

In our Study, 15.9% (07/44) of the patients with low risk, 09.6% (03/31) with moderate risk and 64% (16/25) of the patients with high risk Possum Predicted Morbidity Score had postoperative ICU stay. This result was statistically significant. (P <0.0001)

Patients with ASA grades I or II had a shorter post-operative length of stay (mean 12.6 days, median 10 days) than those in grades III or IV (mean 16.4 days, median 12 days). As per our data analysis, 37% (10/27) of the patients with ASA III, and 30% (04/13) of the patients with ASA IV had prolonged postoperative hospital stay. This result was not statistically significant. (P >0.05)

Conclusions

1. More than 1/3 patients undergoing Gastroenterological surgeries have complications including cardiorespiratory, surgical or infective, out of which more than 1/2 are cardiorespiratory complications.

2. The predictors like presence of CAD, Hypertension, DM, increased duration of surgery, increased amount of blood loss, increased duration of intra operative hypotension, higher ASA grade are associated with increased post-operative complications.

3. Scoring systems like POSSUM utilize these factors and can predict the morbidity and mortality risk. Higher POSSUM scores are associated with increased morbidity and mortality causing impact on 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.

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