



EVALUATION AND OUTCOME OF EMERGENCY GIT SURGERIES

General Surgery

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ABSTRACT

Background: Emergency gastrointestinal surgeries are frequently performed procedure which have mortality and morbidity much more than that of elective surgery, they carry a substantial risk of operative and postoperative complications and death. A system was developed to allow for the first time an assessment of surgical quality that was risk adjusted for the patient's acute and chronic physiological status and for the nature of operation. The POSSUM audit system was designed to be easy and rapid to use and to have wide application across the general surgical spectrum both in the elective and emergency settings. **Methods:** Our study was conducted on 96 Patients of acute abdomen and blunt injury undergoing emergency GIT surgery and patients which develop postoperative complications admitted in department of surgery, RD Gardi Medical College, Ujjain between November 2018 to April 2020 **Results:** Our study Signifies that Forty-three percent patients had morbidity in these group of patients, among which wound related complication has the predominant cause of morbidity, pulmonary complication were also common. In total eight patients died in patients undergoing emergency laparotomy four because of of MODS three due to SIRS and one due to sepsis. In our study, five patients had cardiac risk. Respiratory signs were more prevalent seventeen patients having them, Blood loss was also higher with eleven patients having more than 1000 ml blood loss. Peritoneal soiling was also very common, with thirty seven patients having localised pus collections in forty-one, spillage of bowel contents seen in seventeen patients and hemoperitoneum in four patients **Conclusions.** Recognizing patients who are at high risk to develop complications and who have high risk of mortality would prompt us to take necessary and timely action and aid us in the better management of the patient. POSSUM mortality equation over predicts mortality especially in low risk groups, while predictive value improves significantly when exponential analysis is used. Hence POSSUM scoring system has an undeniable advantage in our set up for better patient counseling, improving the surgical outcomes in emergency wards and for better management of limited resources and manpower.

KEYWORDS

Emergency git surgeries, POSSUM scoring system

INTRODUCTION

Emergency gastrointestinal surgeries are frequently performed procedure which have mortality and morbidity much more than that of elective surgery, they carry a substantial risk of operative and postoperative complications and death. Measuring the end result of emergency surgical procedures is crucial for each patient and health provider for achieving improvement in health services¹

Risk evaluation quantifies a patient's risk of adverse outcome on the premise of severity of ill health. Therefore data available at an early stage of the hospital stay plays a crucial role for evaluation. So the scoring system should cover all aspects of patient care and should be easy to use, fast, and comparable among different patient groups²

There are various factors due to which chances of intraoperative complications increases, so we will measure the association of risk factor with occurrence of complication so that preventive steps could be taken to decrease these intraoperative complications.³ Risk management is an important health care issue. Prediction of complications is an essential part of risk management in surgery. Knowing which patient is at risk of developing complications contributes to the quality of surgical care and cost reduction in surgery. The possible outcome of surgery must be determined to cause evolution of more effective treatment regimens.

Therefore, there is a need for an accurate risk adjusted scoring system, which should be specific to the patient being studied, should incorporate the influence of the diagnosis for which he is being subjected for surgery, whether elective or emergency and allow for assessment of variable presentation of each patient, to allow assessment of the efficiency of the particular procedure performed. With this in mind a system was developed to allow for the first time an assessment of surgical quality that was risk adjusted for the patient's acute and chronic physiological status and for the nature of operation. By using a process of multivariate discriminate analysis, a scoring system was developed that could accurately predict 30 day

mortality and morbidity. The POSSUM audit system (the physiological and operative severity score for enumeration of mortality and morbidity) was designed to be easy and rapid to use and to have wide application across the general surgical spectrum both in the elective and emergency settings.⁵

Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity (POSSUM) has been used to produce numerical estimate of expected mortality and morbidity after variety of surgical procedures. It can be used in hospital setting to provide educational information. It integrates well in the existing hospital programs without causing any disruption

Aims And Objectives

AIM: To study the outcome of emergency GIT surgeries among patients admitted in surgery department at C.R.Gardi hospital ; R D Gardi Medical college Surasa Ujjain : A hospital based study

OBJECTIVE :

The Physiological and Operative Severity Score for the enumeration of Mortality and morbidity (POSSUM) is a patient risk prediction model based on 12 patient characteristics and 6 characteristics of the surgery performed. The objective of the present study is to assess the accuracy of POSSUM in predicting mortality and morbidity in patients undergoing laparotomy in emergency settings .

MATERIALS AND METHODS

1. Type of study : Prospective and descriptive study
2. Study approval : Prior to commencement of this study Ethical committee of R D Gardi Medical College and research centre has approved the thesis protocol
3. Place of study : R D Gardi Medical College and Research Centre and C R Gardi hospital Surasa Ujjain (M.P)
4. Period of study : Duration starting from November 2018 to April 2020
5. Sample size : 96

6. Selection of patient

Inclusion Criteria :

Cases of acute abdomen and blunt injury undergoing emergency GIT surgery and patients which develop postoperative complications.

Exclusion Criteria :

Patients not fulfilling the inclusion criteria and not willing to participate in the study

Sample Size:

96 cases for estimating mortality, morbidity and post-operative complications

Observation & Results

Table No. 01

Age And Sex Distribution of Patient In Study Group

AGE	MALE	FEMALE	TOTAL
< 29 Yr	19	06	25 (26%)
30-39 Yr	12	08	20(20.3%)
40-49 Yr	09	07	16(16%)
50-59 Yr	10	09	19(19%)
>60 Yr	11	05	16(16%)
TOTAL	61(63.5%)	35(36.4%)	

Table No 02

Prevalance of Risk Factors In Patient

RISK FACTOR	NUMBER OF CASES
Cardiac Risk	05
Respiratory Risk	17
Total	22

Table No.03

Analysis of Vital Parameters

Parameters	With In Range	Outside Range
Systolic Blood Pressure	68	28
Pulse Rate	14	87
Glasgow Coma Scale	78	18

Table No.04

Analysis of Blood Investigations In Patient

PARAMETERS	Within Range	Outside Range
Haemoglobin	76	20
TLC	58	38
Urea	67	29
Na+	82	14
K+	56	40

Table No.05

Analysis of Procedural Details in patient

Procedure details	Parameters	No. of cases
Operative severity	Major	96
	Major +	0
Blood loss	< 100 ml	01
	100-500 ml	71
	500-1000 ml	13
	>1000ml	11
No. of procedures	One	90
	Two	04
	>Two	02
Peritoneal soiling	None	34
	Local pus	41
	Bowel contents	17
	Blood	04
Malignancy	None	-
	Primary alone	-
	Nodal spread	-
	Distant spread	03

Table No.06

Prevalance of Morbidity Among The Patient

MORBIDITY	No. OF CASES
ARDS	03
Basal atelectasis	01
Anastomotic leak	03

DVT	01
Wound Infection	10
Wound Dehiscence	10
Pulmonary Embolism	03
Pneumonia	06
Hypokalemia	-
AKI	02
UTI	03
TOTAL	42

Table No.07

Prevalence of Mortality Among Patient

MORTALITY	No. OF CASES
MODS	04
SIRS	03
Sepsis	01
Total	08

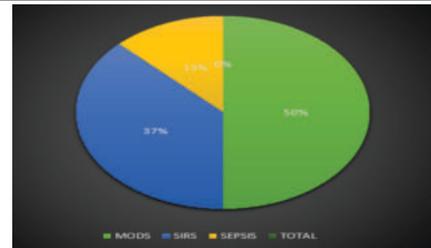


Table No 08

Comparison of Possum Predicted Morbidity With Observed Morbidity In Our Group

Predicted risk for	Total no. of cases	Observed morbidity	Expected morbidity	O:E Ratio	P Value
0 - 10	03	0	0	-	0.001
10-20	01	0	0	-	
20-30	09	01	02	00.50	
30-40	16	02	03	00.67	
40-50	10	04	05	00.80	
50-60	10	03	04	00.75	
60-70	04	01	01	01.00	
70-80	10	06	06	01.00	
80-90	07	05	07	00.71	
90-100	26	20	18	01.11	
Total	96	42	46	00.91	

Table No.9

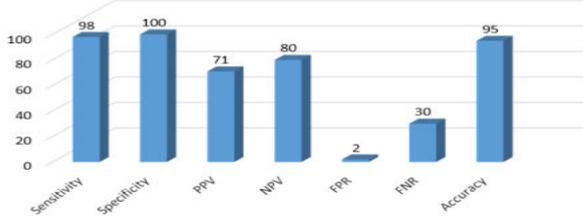
Comparison of Possum Predicted Mortality With Observed Mortality In Our Group

Predicted risk for mortality	Total no. of Patients	Observed mortality	Expected mortality	O:E ratio	P-Value
0-10	37	0	00	00	0.031
10-20	19	0	00	00	
20-30	11	01	02	00.50	
30-40	05	0	00	00	
40-50	03	0	00	00	
50-60	04	0	00	00	
60-70	06	00	01	00	
70-80	03	00	00	00	
80-90	03	00	01	00	
90-100	05	07	09	00.78	
Total	96	08	13	00.61	

MORBIDITY

Measure of agreement Kappa = 0.394

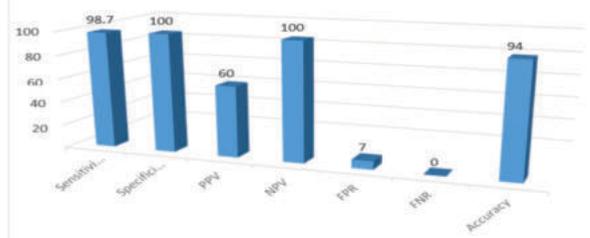
Measures	Values (%)
Sensitivity	98
Specificity	100
Positive Predicted Value	71
Negative Predicted Value	80
False Positive Rate	2
False Negative Rate	30
ACCURACY	95



MORTALITY

Measure of agreement Kappa = 0.717

Measures	Values (%)
Sensitivity	98.7
Specificity	100
Positive Predicted Value	60
Negative Predicted Value	100
False Positive Rates	7
False Negative Rates	0
ACCURACY	94



Analysis for Significance of POSSUM score for morbidity

	Value	Df	Asymp.Sig
Pearson chi Square	18.949a	9	0.026
Likelihood ratio	16.039	9	0.066
Linear by linear Association	10.121	1	0.001
No. of valid cases	96		

a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .10.

Analysis for Significance of POSSUM score for mortality

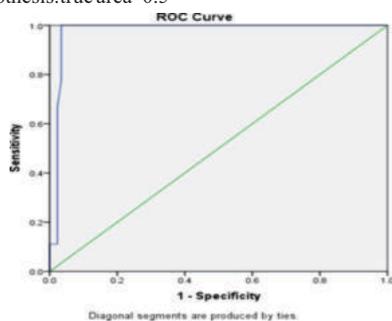
	value	Df	Asymp sig
Pearson chi Square	86.08a	9	0.000
Likelihood ratio	31.46	9	0.000
Linear by linear association	36.4	1	0.000
No. of valid cases	96		

a - 12 cells (60.0%) have expected count less than 5. The minimum expected count is .06

Roc Curve For Possum Predicted Score For Mortality

Area Under the Curve				
Test Result Variable(s): POSSUM MORTALITY				
Area	Std. Error	Asymptotic Sig.b	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.976	.015	.000	.987	1.000

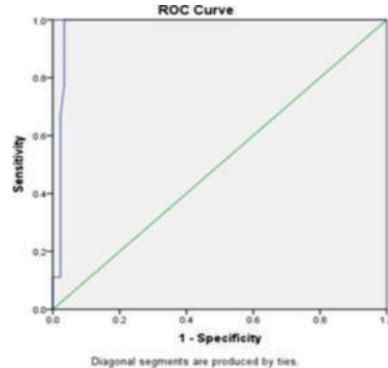
a. Under the nonparametric assumption
b. Null hypothesis:true area= 0.5



Roc Curve For Possum Predicted Score For Morbidity

Area Under the Curve				
Test Result Variable(s): POSSUM MORBIDITY				
Area	Std. Error	Asymptotic Sig.b	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.994	.006	.000	.983	1.000

a. Under the nonparametric assumption
b. Null hypothesis:true area= 0.5



DISCUSSION

The study was carried out with a view to determine the validity of POSSUM scoring in predicting the morbidity and mortality of patients undergoing emergency laparotomy. The standards of our institution compared to the general accepted level of morbidity and mortality.

Details of Procedure :

In our analysis, ninety-six patients had a major surgery, with six patients having one or more repeat surgeries. Blood loss was also higher with eleven patients having more than 1000 ml blood loss. Peritoneal soiling was also very common, with thirty seven patients having localised pus collections in forty-one , spillage of bowel contents seen in seventeen patients and hemoperitoneum in four patients. Only three patients had malignant disease.

Prevalence of Morbidity :

Forty-three percent patients had morbidity in these group of patients , among which wound related complication has the predominant cause of morbidity, pulmonary complication were also common

Prevalence of Mortality :

In total eight patients died in patients undergoing emergency laparotomy four because of of MODS three due to SIRS and one due to sepsis

Relevance of POSSUM Score for Morbidity & Mortality

In these group of patient, the correlation was significant with the predicted morbidity levels being the same as what was actually seen in the study. Out of the 50 odd patients who had a morbidity predicted percentage of more than seventy, forty two patients developed post surgical complications indicating a high level of sensitivity and specificity for the score to predict morbidity With regards to mortality, the low rates of mortality in the study precludes any meaningful analysis. Among the eight patients who died, their POSSUM predicted mortality percentage was more than ninety in seven of the cases and conversely out of the eight patients who had a POSSUM score of more than ninety percent, seven patients died. This again indicates a high level of sensitivity and specificity of the score to predict mortality.

O:E ratio morbidity (table no.8) shows good correlation between observed and expected values at higher predicted values of morbidity. The relationship was found significant (p = 0.001). O:E ratio mortality (table no.9) shows good correlation between observed and expected values at higher predicted values of mortality. The relationship was found significant (p=0.031).

Chi Square analysis of the significance of POSSUM score to predict morbidity and mortality among our study group patient showed a high level of significance < 0.001 for both mortality and morbidity.

Sensitivity—98.7% Specificity—100%

A ROC curve for POSSUM predicted score for morbidity indicated a sensitivity of 98% and specificity of 100%, while for the predicted score for mortality had a sensitivity of 98.70% and specificity of 100%. The statistical analysis shows highly reliable evidence that POSSUM score can be used to determine the percentage of risk for morbidity and mortality in patients undergoing laparotomy, especially in the emergency s

CONCLUSION:

In today's era, where the patient's safety and proper management of patient is of utmost importance, it becomes only necessary to assess the expected outcome of the procedure performed. Recognizing patients who are at high risk to develop complications and who have high risk of mortality would prompt us to take necessary and timely action and aid us in the better management of the patient.

An ideal scoring system should be applicable to a wide range of general surgical procedures, especially emergency and should allow the prediction of both morbidity and mortality with reasonable sensitivity and specificity.

It has been validated by many authors around the world and has been a successful tool in surgical audit. It has been used by many authors in various surgical specialties with success, though it was found to slightly over predict morbidity and mortality.

POSSUM morbidity equation can reasonably predict morbidity in high risk groups whereas the sensitivity falls in elective conditions. Predictive value improves when linear analysis is used and results improve dramatically when exponential analysis is applied. POSSUM mortality equation over predicts mortality especially in low risk groups, while the predictive value improves significantly when exponential analysis is used. Hence POSSUM scoring system has an undeniable advantage in our set up

for better patient counseling, improving the surgical outcomes in emergency wards and for better management of limited resources and manpower.

DECLARATIONS

Conflict of interest: None

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Ethical approval: approved

REFERENCES:

- Hota PK, Yellapragada H. Assessment of surgical outcome in emergency gastrointestinal surgeries using P-POSSUM score. 2017;5(7):3007-11.
- Factors R, Abdomen B, Laparotomy E. Original Article. 2017;46(2):38-42.
- Article O. Postoperative Complications in Emergency Laparotomies at Bahawal Victoria Hospital, Bahawalpur. 2013;7(4):897-900.
- Sreeharsha H, Rai SP, Sreekar H, Reddy R. Efficacy of POSSUM score in predicting the outcome in patients undergoing emergency laparotomy. Pol Prz Chir Polish J Surg. 2014;86(4):159-65.
- Ahmed A, Dauda M, Garba S, Ukwenya Y. Emergency abdominal surgery in Zaria, Nigeria. South African J Surg. 2010;48(2):59-62.
- Mohil RS, Bhatnagar D, Bahadur L et al.: POSSUM and P- POSSUM for risk- adjusted audit of patients undergoing emergency laparotomy. Br J Surg 2004; 91: 500-03.
- Copeland GP, Jones D, Walters M. POSSUM: a scoring system for surgical audit. Br J Surg 1991; 78(3):355-360.
- Rana DS, Singh A, Gupta P, Singh V, Bandyopadhyay G. Evaluation of POSSUM Score for Outcome Prediction in Patients Undergoing Emergency Laparotomy. Ann. Int. Med. Den. Res. 2018; 4(4): SG01- SG05
- Mohil RS, Bhatnagar D, Bahadur L, Rajaneesh, Dev DK, Magan M. POSSUM and P-POSSUM for risk-adjusted audit of patients undergoing emergency laparotomy. Br J Surg. 2004
- Prytherch DR, Whiteley MS, Higgins B, Weaver PC, Prout WG, Powell SJ. Br J Surg 1998; 85:1217-20
- Prytherch DR, Sutton GL, Boyle JR. Portsmouth POSSUM for abdominal aortic aneurysm surgery. Br J Surg 2001; 88(7): 958-963.
- Goyena R, Fallis A. 濟無No Title No Title. Vol. 53, Journal of Chemical Information and Modeling. 2019. 1689-1699 p
- Bailey & Love textbook of surgery 27th edition, The Oesophagus 1088
- Best LM, Mughal M, Gurusamy KS. Laparoscopic versus open gastrectomy for gastric cancer. Cochrane Database Syst Rev. 2016; Mar 31;3:CD011389.
- Sano T, Aiko T. New Japanese classifications and treatment guidelines for gastric cancer: revision concepts and major revised points. Gastric Cancer 2011; 14: 97-100
- Brandt LJ, Boley SJ: AGA technical review on intestinal ischemia. Gastroenterol 118:954, 2000.
- Manual of surgery schwartzs 8th edition Small intestine 727
- Human anatomy B D Chaurasia's fourth edition volume 2 The Intestine 250 19.Demetri GD, Mehren M, Blanke C, et al: N Engl J Med 347:472, 2002
- Kahai P, Mandiga P, Wehrle CJ, Lobo S. StatPearls [Internet]. StatPearls Publishing; Treasure Island (FL): Aug 10, 2020. Anatomy, Abdomen and Pelvis, Large Intestine. 1.
- Nivatvongs S, Stern HS, Fryd DS. The length of the anal canal. Dis Colon Rectum. 1981;24:600-1
- Rociu E, Stoker J, Eijkemans MJ, Laméris JS. Normal anal sphincter anatomy and age- and sex-related variations at high-spatial-resolution endoanal MR imaging. Radiology. 2000;217:395-401
- Gordon PL, Nivatvongs S (eds): Principles and Practice of Surgery for the Colon,

- Rectum, and Anus, 2nd ed. St. Louis, Quality Medical Publishing, 1999.
- Shafik A. A new concept of the anatomy of the anal sphincter mechanism and the physiology of defecation. III. The longitudinal anal muscle: anatomy and role in anal sphincter mechanism. Invest Urol. 1976;13:271-7.
- Goligher JC, Leacock AG, Brossy JJ. The surgical anatomy of the anal canal. Br J Surg. 1955;43:51-61.
- Randal Bollinger R, Barbas AS, Bush EL, Lin SS, Parker W. Biofilms in the large bowel suggest an apparent function of the human vermiform appendix. J. Theor. Biol. 2007 Dec 21;249(4):826-31
- Afridi SP, Malik F, Rahman SU, Shamim S, Khurshid AS. Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience. World J Emerg Surg. 2008;3:31 doi:10.1186/1749-7922-3-31
- Kitara DL, Kakande I, Mugisa BD. POSSUM Scoring System In Patients Undergoing Laparotomy In Mulago Hospital. East and Central African Journal of Surgery 2006;12(2):133-142
- Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India – Review of 504 consecutive cases. World J 12. Emerg Surg 2006; 1:26.
- Ramchandra ML, Jagdeh B, Chandra SBC. Clinical study and management of secondary peritonitis due to perforated hollow viscous. Arch Med Sci. 13. 2007;3(1):61-68.
- Malangoni MA, Inui T. Peritonitis – the Western experience. World J Emerg 14.Surg. 2006;1:25. doi:10.1186/1749-7922-1-25
- Dorairajan LN, Gupta S, Deo SV, Chumber S, Sharma L. Peritonitis in India-a decade's experience. Trop Gastroenterology 1995;16(1):33-38.
- Chen SC, Lin FY, Hsieh YS, Chen WJ. Accuracy of ultrasonography in the diagnosis of peritonitis compared with the clinical impression of the surgeon. Arch Surg 2000; 135(2):170-74
- Jones HJ, de Cossart L. Br J Surg 1999; 86:149-57
- Copeland GP, Jones D, Walters M. POSSUM: a scoring system for surgical audit. Br J Surg 1991; 78: 355-360.
- Copeland GP. Comparative audit: fact versus fantasy (for debate). Br J Surg 1993;80: 1424-1425.
- Morgan GE, Mikhail MS, Michael J. Clinical Anaesthesiology. 3rd ed. New York: McGraw-Hill; 2002.
- Knaus WA, Wagner DP, Draper EA, Zimmerman JE, Bergner M, Bastos PG, et al. The APACHE III prognostic system. Risk prediction of hospital mortality for critically ill hospitalized adults. Chest. 1991;100(6):1619-36.
- Goldman L, Caldera DL, Nussbaum SR, Southwick FS, Krogstad D, Murray B, et al. Multifactorial index of cardiac risk in noncardiac surgical procedures. N Engl J Med. 1977;297(16):845-50.