Original Research Article

To study the usefulness of other parameters in assessment of mortality and morbidity risk patients undergoing emergency laparotomy using POSSUM

Dr. Meha Ghodawat[1] (Ex Post Graduate Student), Dr. Neelam Kumar Soni[2] (Ex Post Graduate Student), Dr. Pratima Verma[3] (Senior Resident), Dr. Manoj Kela[4] (HOD and Professor) & Dr. Anshita Chouhan[5] (Post Graduate Student)

Sri Aurobindo Medical College and PG Institute, Indore (M.P.)[1,2&4]
Amaltas Institute of Medical Sciences, Dewas, M.P.[5]

Corresponding Author: Dr. Anshita Chouhan

Abstract
Background & Methods: The aim of the study is to study the usefulness of other parameters in assessment of mortality and morbidity risk patients undergoing emergency laparotomy. Physiological data were collected at the time of induction of anaesthesia, and operative data were collected at the completion of operation. Operative severity score was graded according to the guidelines.
Results: Mean morbidity risk as calculated by POSSUM was 57.82%. Expected and observed morbidity was in 61.86 and 41 patients respectively. 62 patients were having morbidity risk in between 61 to 80%, with mean risk of 69.74% corresponding to expected morbidity in 21.61 patients but 19 patients observed morbidity. 58 patients were present in a morbidity risk group of 21-40% and 41-60% corresponding to expected morbidity in 9.23 and 14.51 patients. Total 2 and 1 patients had complication in each group. 36 patients were present in 81-100% risk group having mean risk morbidity 91.61%. Expected and observed morbidity in this group was 16.48 and 19 patients respectively.
Conclusion: POSSUM scoring system can reasonably predicts the morbidity and mortality risk in patients undergoing emergency laparotomy. POSSUM slightly over predicts morbidity in low risk groups. Both serum creatinine level and blood glucose level were high in mortality group, proving it to influence the outcome of surgery.

Keywords: mortality, morbidity, risk, emergency & laparotomy.
Study Design: Observational Study.

1. Introduction

In this modern era, it is very necessary to quantify the morbidity and mortality associated with surgery, as the outcome of all surgical procedure not only depends on the performance of the surgeon, but it also depends on patient's clinical status at the time of surgery. It is the acute and chronic physiological status, current illness, nature and extent of surgical intervention required and co- morbid conditions of patient which determines the final outcome [1].
Emergency laparotomy is one of the most common major procedures performed in emergency. It is important to know the risk of morbidity and mortality in patient undergoing

emergency laparotomy, as these patients are associated with co-morbidities[2]. Emergency laparotomy is a common procedure and has a mortality rate considerably greater than that of elective laparotomy. It is estimated to be as high as 10-55 % [3].

In older patients abdominal pathology more often presents acutely and mortality is greater than that in younger patients[4]. As patient gets older coincident disease are more common. Even if there is no evidence of any disease there may well be a decrease in physiological reserve. The initial disease that requires surgery may be complicated by tissue hypo perfusion and acidosis from vomiting and loss of fluid in to the gastrointestinal tract, or bleeding. Patients may be malnourished or cachectic after prolonged illness[5]. A majority of the patients had poor nutritional status on admission. With the onset of acute emergency, there is a significant relation of nutritional status with disease severity, morbidity and mortality[6&7].

2. Material and Methods

The study was carried out in the Department of General Surgery, Sri Aurobindo Medical College and PG Institute, Indore. Study has included patients those were admitted in the department of Surgery and underwent Laparotomy within 24 hours of admission.

Patients Selection Criteria

All patients who were admitted in Department of General Surgery and underwent exploratory laparotomy within 24 hours of admission.

Procedure

A working proforma sheet, containing patient's demography, variables form history, clinical examination, investigations, operation undergone and outcome, was designed. Sample of such sheet is provided below. Physiological data were collected at the time of induction of anaesthesia, and operative data were collected at the completion of operation. Operative severity score was graded according to the guidelines. Since all surgical procedures were not listed, therefore closest was selected.

3. Result

Table 1: Table showing sex ratio of patients

Sex	No. of patients
No. of Male Patients	174
No. of Female Patients	40

Out of total 214 patients who were studied, 174 were male patients and 40 were female patients.

Table 2: Frequency distribution of patients with different diagnosis

Diagnosis	No. of Patients
Ileal Perforation	46
Pre pyloric perforation	50
Stab injury Abdomen	34
Blunt trauma abdomen	32
Appendicular Perforation	10
Intestinal Obstruction	30

Cecal Perforation	04
Gun Shot Injury Abdomen	04
Pyoperitoneum	02
Duodenal perforation	02

Total 50 patients were diagnosed to have prepyloric perforation. 46 patients were having Ileal perforation. Number of patients with Stab injury abdomen and blunt trauma abdomen were 34 and 32 respectively. 30 patients were operated for Intestinal obstruction. 10 patients were found to have appendicular perforation. 04 patients were having Cecal perforation and 04 patients were operated for gunshot injury abdomen. Pyoperitoneum and duodenal perforation were diagnosed in one patient each.

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

Outcome of Patients	No. of Patients	Average Morbidity Risk (%)	Expected Morbidity	Observed Morbidity	O:E Ratio
Died	18	95	8.55	9	1.05
Survived	196	55	53.9	34	0.63

In patients who died, (n- 18) average morbidity risk as estimated by POSSUM is 95% corresponding to expected morbidity in 8.5 patients out of 9 patients. Similarly, in patients who survived, (n-196) average morbidity risk as calculated by POSSUM is 55 % corresponding to expected morbidity in 53.9 patients out of 196 patients. Total 18 and 34 patients observed morbidity in two groups respectively.

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

Range of risk (%)	No. of patients	Mean Risk (%)	Expected Morbidity	Observed Morbidity	O:E Ratio
01- 20	00	00	00	00	0.00
21-40	58	31.86	9.23	02	0.21
41-60	58	50.06	14.51	01	0.06
61-80	62	69.74	21.61	19	0.87
81-100	36	91.61	16.48	19	1.15
1-100	214	57.82	61.86	41	0.66

For all patients mean morbidity risk as calculated by POSSUM was 57.82%. Expected and observed morbidity was in 61.86 and 41 patients respectively. 62 patients were having morbidity risk in between 61 to 80%, with mean risk of 69.74% corresponding to expected morbidity in 21.61 patients but 19 patients observed morbidity. 58 patients were present in a

morbidity risk group of 21-40% and 41-60% corresponding to expected morbidity in 9.23 and 14.51 patients. Total 2 and 1 patients had complication in each group. 36 patients were present in 81-100% risk group having mean risk morbidity 91.61%. Expected and observed morbidity in this group was 16.48 and 19 patients respectively.

4. Discussion

Campillo-Soto A et. al. studied 105 patients including 24 patients who underwent emergency laparotomy and 81 underwent elective surgery[8]. When the observed results for mortality were compared with those predicted by the POSSUM scoring system, no significant differences were observed in the analysis by risk groups, except in the risk group < 20 %, in which the POSSUM scale overestimated mortality. The risk of morbidity was underestimated by the POSSUM scale in the risk group < 20 %. He concluded that POSSUM scoring system is a useful predictor of morbidity and mortality in patients undergoing emergency and elective laparotomy[9].

Average Serum creatinine level, Random blood glucose level revealed higher value in patients who died than in patients who survived (2.42 vs. 1.67; 152.8 vs. 131.3). Average oxygen saturation was 94.3 in patients who died and 96.1 in survival group. Average delay in presentation to the hospital since the initiation of symptoms was 2.89 days in patients who died and 2.01 days in patients who survived[10].

This study showed that POSSUM is a good method of risk evaluation in patients undergoing emergency laparotomy, in our set up as it predicts mortality and morbidity matched with the observed mortality and morbidity rates. P-POSSUM scoring system is more accurate in predicting mortality[11]. Hence, both POSSUM and P-POSSUM can be helpful in better management of patients by predicting high risk group and taking necessary steps.

5. Conclusion

POSSUM scoring system can reasonably predicts the morbidity and mortality risk in patients undergoing emergency laparotomy. POSSUM slightly over predicts morbidity in low risk groups. Both serum creatinine level and blood glucose level were high in mortality group, proving it to influence the outcome of surgery.

6. References

1. GP Copland; The POSSUM System of Surgical Audit; Arch Surg. 2002;137:15-19.
2. Kumar P, Rodrigues GS; Comparison of POSSUM and P-POSSUM for risk-adjusted audit of patients undergoing emergency laparotomy; Dig Surg. 2009; 26(1):75-9. Epub 2009 Jan 23.
3. Mohil RS, Bhatnagar D, Bahadur L, Rajneesh, Dev DK, Magan M; POSSUM and P-POSSUM for risk-adjusted audit of patients undergoing emergency laparotomy; Br J Surg. 2004 Apr;91(4):500-3.
4. Wijesinghe LD, Mahmood T, Scott DJ, Berridge DC, Kent PJ, Kester RC. Comparison of POSSUM and Portsmouth predictor equation for predicting the death following vascular surgery. Br J Surg 1998;85:209- 212.
5. Amit Nair, Dinker R. Pai, S. Jagdish; Predicting Anastomotic Disruption after Emergent Small Bowel Surgery; Dig Surg 2006;23:38-43.

6. Whitely MS, Prytherch DR, Higgins B, Weaver PC, Prout WG. An evaluation of the POSSUM surgical scoring system. Br J surg 1996;83(6):812-5
7. Prytherch DR, Whiteley MS, Higgins B, weaver PC, Prout WG, Powell SJ. POSSUM and Portsmouth POSSUM for predicting mortality. Physiological and Operative severity score for the enumeration of mortality and morbidity. Br J Surg 1998;85:1217-1220.
8. Campillo-Soto A, Flores-Pastor B, Soria-Aledo V, Candel-Arenas M, Andrés-García B, Martín-Lorenzo JG, Aguayo-Albasini JL; The POSSUM scoring system: an instrument for measuring quality in surgical patients; Cir Esp. 2006 Dec; 80(6):395-9.
9. Shuhaibar JH, Hankins M, Robless P, Whitehead SM. Ann VascSurg 2002;16:736-741.
10. Zafirellis KD, Fountoulakis A, Dolan K, dexter SP, Martin IG, Sue-Ling HM evaluation of POSSUM in patients with esophageal cancer undergoing resection. Br J Surg 2002;89:1150-1159.
11. Neary WD, Heather BP, Earnshaw JJ. The Physiological and Operative Severity Score for the enumeration of mortality and morbidity (POSSUM). BR J Surg 2003;90:157-165.