

Original Research Article


Evaluation of POSSUM scoring in patients undergoing emergency laparotomy for hollow viscus perforation

Manivannan Dhanraj¹, Prabhakaran Murugan², Vinodh Duraisami^{3*}, Vinayak Rengan⁴

¹Assistant Professor, ²Resident, ³Assistant Professor, ⁴Resident

Department of General Surgery, Madras Medical College, Chennai, Tamil Nadu, India

*Corresponding author email: donvinodh@yahoo.co.in

	International Archives of Integrated Medicine, Vol. 5, Issue 5, May, 2018. Copy right © 2018, IAIM, All Rights Reserved. Available online at http://iaimjournal.com/ ISSN: 2394-0026 (P) ISSN: 2394-0034 (O)	
	Received on: 12-04-2018 Source of support: Nil	Accepted on: 19-04-2018 Conflict of interest: None declared.
How to cite this article: Manivannan Dhanraj, Prabhakaran Murugan, Vinodh Duraisami, Vinayak Rengan. Evaluation of POSSUM scoring in patients undergoing emergency laparotomy for hollow viscus perforation. IAIM, 2018; 5(5): 21-26.		

Abstract

Introduction: Crude morbidity and mortality rates are limited indicators of quality of care, and can be misleading when the results of emergency surgery are compared between different units and hospitals. Scoring systems that group patients based on the severity of illness before treatment can allow a meaningful analysis of morbidity and mortality rates. Risk-adjusted comparisons can then be made between surgeons and hospitals.

The aim of the study: To evaluate the efficacy of POSSUM scoring as a risk assessment tool in predicting morbidity and mortality for patients undergoing emergency laparotomy for hollow viscus perforation.

Materials and methods: Totally 100 patients who underwent emergency laparotomy from January 2015 to September 2015 at Madras Medical College and Hospital were studied. Data were collected prospectively on a pro forma prepared for the study. All patients had their physiological score recorded on admission.

Results: In our study, using POSSUM score the morbidity prediction ranges from 91 – 100% morbidity rates seen in 21 patients and 31 – 40% morbidity rates seen in 22 patients. But the morbidity was observed in 63 patients out of 100. On comparing the predicted and the observed morbidity, the prediction using POSSUM and the observed morbidity was found similar.

Conclusion: From our study, it has been evaluated that POSSUM scoring in patients with perforation peritonitis is a significant tool to evaluate the mortality and morbidity outcomes of the patients.

Key words

POSSUM score, Peritonitis, Sepsis, Intestinal Obstruction.

Introduction

The Physiological Operative Severity Score for the enumeration of Mortality and morbidity (POSSUM) is widely used to predict morbidity and mortality in widely used to predict morbidity and mortality in a variety of surgical settings and provides a tool for risk adjustment and comparison [1]. In contrast Acute Physiological And Chronic Health Evaluation II, it takes the operative findings into consideration. All 12 physiological and 6 operative variables required for POSSUM scoring can be recorded easily and reproduced satisfactorily by resident staff with minimal difficulty [2]. Any comparative system that over predicts mortality and morbidity has the effect of making poor results look better. The Portsmouth predictor modification (P-POSSUM) proposed by Whiteley, et al. counters the overprediction of mortality in low-risk patients by POSSUM [3]. The variables used are the same but a different formula is used to predict the risk of death. Differences in predictive values of two scoring systems are related to the method of analysis. Wijesinghe, et al. directly compared the exponential and linear methods of analysis; use of linear analysis for POSSUM or exponential analysis for P-POSSUM yielded spurious results by overpredicting mortality [4]. The case mix of patients undergoing emergency laparotomy is varied, especially in developing countries. Those seeking medical help are of low socioeconomic status, are nutritionally depleted and at times present very late in the course of their illness. Comparing the outcome for such patients using data from developed countries or centers with selection bias may be misleading. Risk scoring seeks to quantify a patient's risk of death or morbidity based on the severity of the illness derived from the data available at an early stage of the hospital stay. It is currently of particular importance in surgical practice [5]. A number of scores that aim to predict outcome in specific conditions are already widely used, such as Ranson score for pancreatitis, the Child

classification of liver failure and the burns index. A more general scoring system that would be applicable to all surgical patients would prove a useful tool to simplify comparative audit and research [6]. A risk score obtained for an individual could be used to predict the individual's prognosis, or the scores for a group of patients can be considered collectively. Scoring systems are usually better suited to one or other of their uses. If a score accurately predicts the outcome for an individual, this information could influence the treatment decisions and might also be used in rationalizing resources [7]. On the other hand, a scoring system that allows groups of patients to be stratified according to the severity of their illness before treatment is implemented permits meaningful analysis of morbidity and mortality rates for the group. Only if mortality and morbidity incorporate an adjustment for the patients' risk can comparisons of outcome be made between units and hospitals [8].

Materials and methods

100 patients who underwent emergency laparotomy from January 2015 to September 2015 at Madras Medical College and Hospital were studied. Data were collected prospectively on a proforma prepared for the study. All patients had their physiological score recorded on admission. An operative severity score was calculated based on the findings of the operative surgeon on the pro forma. Any postoperative morbidity and death within 30 days were recorded. After admission, short history was taken and appropriate workup done on each patient admitted to surgery department for laparotomy. Baseline investigations, as routinely required, were done, followed by imaging studies. Patients were then explained about their disease process and the possible line of management. All the necessary information regarding the study was explained to the patients or their valid guardian. Informed written consent

was taken from the patients or their guardian willing to participate in the study. The thorough physical examination was done in each case. Data collection sheets were filled in by the investigator himself. All of the preoperative factors related to the patient were noted down in the datasheet. After proper evaluation and preparation, patients who required surgical management were taken up for surgery. All patients were operated under general anesthesia. Strict aseptic precautions were followed during the operation. Meticulous techniques were practiced as far as possible. The operation procedure and related preoperative factors were observed directly and recorded in the data collection sheet instantly. The data were entered into Microsoft Excel {Microsoft Corporation, Redmond, Washington, USA} for analysis. The

risk of morbidity and death was calculated using POSSUM and P-POSSUM equations, A chi-square test was used to detect any differences between predicted and observed rates of morbidity and mortality. $P < 0.050$ was accepted as significant.

Results

In our study of 100 patients who presented with signs of perforation peritonitis, the following findings were obtained and a diagnosis made out following intraoperative findings. From that, Most of the patients found to be diagnosed with Duodenal perforation (n=75; 75%) and appendicular perforation (n=11; 11%) and Ileal perforation was found in 7 patients (n=7; 7%) as per **Table - 1**.

Table – 1: Various diagnosis among patients.

Diagnosis					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	appendicular perforation	11	11.0	11.0	11.0
	colon Perforation	3	3.0	3.0	14.0
	duodenal perforation	75	75.0	75.0	89.0
	gastric perforation	3	3.0	3.0	92.0
	gastric perforation with growth	1	1.0	1.0	93.0
	ileal perforation	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

Table – 2: Different surgery procedures among patients.

Procedure					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	appendectomy	11	11.0	11.0	11.0
	colostomy	1	1.0	1.0	12.0
	hemicolectomy	1	1.0	1.0	13.0
	ileostomy	1	1.0	1.0	14.0
	omenta patch closure	75	75.0	75.0	89.0
	primary closure	7	7.0	7.0	96.0
	primary closure with FJ	1	1.0	1.0	97.0
	resection and anastamosis	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

Table – 3: POSSUM predicted morbidity.

POSSUM scoring		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 10	2	2.0	2.0	2.0
	21-30	9	9.0	9.0	11.0
	31-40	22	22.0	22.0	33.0
	41-50	15	15.0	15.0	48.0
	51-60	12	12.0	12.0	60.0
	61-70	7	7.0	7.0	67.0
	71-80	10	10.0	10.0	77.0
	81-90	2	2.0	2.0	79.0
	91-100	21	21.0	21.0	100.0
	Total	100	100.0	100.0	

Table – 4: Mortality.

POSSUM scoring		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 to 10	46	46.0	46.0	46.0
	11 to 20	26	26.0	26.0	72.0
	21-30	5	5.0	5.0	77.0
	31-40	2	2.0	2.0	79.0
	41-50	3	3.0	3.0	82.0
	51-60	8	8.0	8.0	90.0
	61-70	2	2.0	2.0	92.0
	81-90	3	3.0	3.0	95.0
	91-100	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

In our study of 100 patients who presented with signs of perforation peritonitis, following the intraoperative diagnosis of the cause for perforation, most of the cases found to be duodenal perforation and appendicular perforation and ileal perforation. Hence, the most common technique employed surgically was the Omental patch closure done in 75 patients and appendectomy done in 11 patients. Primary closure of the perforation done in 8 patients, Ileostomy in 1 patient and Resection and anastomosis did in 3 patients (Table – 2).

In our study, Using POSSUM score the morbidity prediction ranges from 91 – 100% morbidity rates were seen in 21 patients and 31 – 40% morbidity rates were seen in 22 patients. But the morbidity was observed in 63 patients out of 100. On comparing the predicted and the observed morbidity, the prediction using

POSSUM and the observed morbidity was found similar (Table – 3).

In our study, the mortality prediction by POSSUM scores has mortality rates between 1 – 20% in about 68 individuals. And More than 80% mortality rate was predicted in 4 patients. In our observed mortality, only 4 patients expired and they are from more than 80% mortality rate prediction using POSSUM scores (Table – 4).

Discussion

In our study there were a total of 100 patients studied .among them 87 were males and 13 were females. The age of patients studied was from 15 to 80.most of the patients were in age group of 40 to 50 [9]. All the patients underwent midline laparotomy incision with varying procedures like appendectomy, resection anastomosis, omental patch closure and primary closure of the

perforation. Two patient had malignant etiology one with gastric growth and the other with colon growth. 37 percent of the patients developed morbidity [10]. The most common being wound dehiscence, followed by wound infection, UTI, Pneumonia, ARDS and anastomotic leak. Four patients among the study group died due to MODS with regards to mortality, the low rates in the study preclude meaningful analysis. Among the four patients died, the POSSUM predicted mortality percentage was more than ninety percent in three of the patients [11]. This indicates a high level of sensitivity in predicting the mortality. But in the case of morbidity, the expected and observed ratios differed. Chi-square analysis of the significance of POSSUM score to predict morbidity and mortality among the study group showed a high level of significance for mortality of <0.005 but in case of morbidity, it is about 0.3. Risk scoring seeks to quantify a patient's risk of death or morbidity based on the severity of the illness derived from the data available at an early stage of the hospital stay [12]. It is currently of particular importance in surgical practice [13]. A number of scores that aim to predict outcome in specific conditions are already widely used, such as Ranson score for pancreatitis, the Child classification of liver failure and the burns index. A more general scoring system that would be applicable to all surgical patients would prove a useful tool to simplify comparative audit and research [14]. A risk score obtained for an individual could be used to predict the individual's prognosis, or the scores for a group of patients can be considered collectively. Scoring systems are usually better suited to one or other of their uses. If a score accurately predicts the outcome for an individual, this information could influence the treatment decisions and might also be used in rationalizing resources [15]. On the other hand, a scoring system that allows groups of patients to be stratified according to the severity of their illness before treatment is implemented permits meaningful analysis of morbidity and mortality rates for the group. Only if mortality and morbidity incorporate an adjustment for the

patients' risk can comparisons of outcome be made between units and hospitals [16].

Conclusion

From our study, it has been evaluated that POSSUM scoring in patients with perforation peritonitis is a significant tool to evaluate the mortality and morbidity outcomes of the patients.

References

1. Sagar PM, Hartley MN, Mancey-Jones B, Sedman PC, May J, Macfie J. Comparative audit of colorectal resection with the POSSUM scoring system. *Br J Surg.*, 1994; 81: 1492-1494.
2. Copeland GP, Jones D, Wilcox A, Harris PL. A comparative vascular audit using POSSUM scoring system. *Ann R Coll Surg Engl.*, 1993; 75: 175-177.
3. Copeland GP, Sagar P, Brennan J, Roberts G, Ward J, Cornford P et al. Risk-adjusted analysis of surgeon performance: a 1-year study. *Br J Surg.*, 1995; 82: 408-411.
4. Murray GD, Hayes C, Fowler S, Dunn DC. Presentation of comparative audit data. *Br J Surg.*, 1995; 82: 329-332.
5. Lyons C, Gumpert R. Medical audit data: counting is not enough. *BMJ*, 1990; 300: 1563-1566.
6. Jones HJS, de Cossart L. Risk scoring in surgical patients. *Br J Surg.*, 1998; 86: 147-159.
7. Copeland GP. Comparative audit: fact versus fantasy. *Br J Surg.*, 1993; 80: 1424-1425.
8. Copeland GP. Surgical scoring risk assessment and the surgeon. *J R Coll Surg Edinb.*, 1992; 37: 145-148.
9. Copeland GP, Jones D, Walters M. POSSUM: a scoring system for surgical audit. *Br J Surg.*, 1991; 78: 355-360.
10. Whiteley MS, Prytherch DR, Higgins B, Weaver PC, Prout WG. An evaluation of the POSSUM surgical scoring system. *Br J Surg.*, 1996; 83: 812- 815.
11. 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.
12. Wijesinghe LD, Mahmood T, Scott DJA, Berridge DC, Kent PJ, Kester RC. Comparison of POSSUM and the Portsmouth predictor equation for predicting death following vascular surgery. Br J Surg., 1998; 83: 209-212.
13. Brunelli A, Fianchini A, Xiume P, Gesuita R, Mattei A, Carle F. Evaluation of POSSUM scoring system in lung surgery. Physiological and Operative Severity Score for the enUmeration of Mortality and Morbidity. Thoracic Cardiovasc Surg., 1998; 46: 141-146.
14. Copeland GP. The POSSUM system of surgical audit. Arch Surg., 2002; 137: 15-19.
15. Neary WD, Heather BP, Earnshaw JJ. Physiological and Operative Severity Score for the enumeration of Mortality and Morbidity (POSSUM). Br J Surg., 2003; 90: 157-165.
16. R.S. Mohil, D. Bhatnagar, L. Bahadur, Rajneesh, D.K. Dev, M. Magan. POSSUM and P-POSSUM for a risk-adjusted audit of patients undergoing emergency laparotomy. Br J Surg., 2004; 91: 500-503.