IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 11 Ver. 1 (November. 2018), PP 38-41
www.iosrjournals.org

To predict the prognosis in patients of perforation peritonitis using Possum scoring system

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Abstract: *Perforation peritonitis is the one of the commonest emergency encountered by surgeons. physiological and operative severity score for the enumeration of mortality and morbidity (POSSUM) scores has been developed, which would help to identify those patients who are at increased risk of developing complications and deaths. This scoring system is based on 12 physiological characteristics of patient and 6 characteristics of the surgery performed. The aim of this paper is to predict the prognosis in patients of perforation peritonitis using Possum scoring system in a tertiary care hospital in Warangal.* ***Material and Methods:*** *This study was done in Department of surgery at Mahatma Gandhi Memorial Hospital /Kakatiya Medical College, Warangal, from* February 2018 to September 2018 *on 50 patients.* ***Results:*** *The differences in quantitative variables between groups were assessed by means of the unpaired t test. A p-value of < 0.05 using a two-tailed test was taken for its significance in all statistical tests.* ***Conclusions:*** *This study confirms that POSSUM can be used as a reliable tool for estimating in-hospital mortality and for knowing the prognosis.*
Keywords: *Possum, Warangal, Peritonitis, Mortality, Intestinal perforation*

Date of Submission: 20-10-2018 Date of acceptance: 30-10-2018

I. Introduction:

Perforation peritonitis is the one of the commonest emergency encountered by surgeons. physiological and operative severity score for the enumeration of mortality and morbidity (POSSUM) scores has been developed, which would help to identify those patients who are at increased risk of developing complications and deaths. Smoking and use of non steroidal anti inflammatory drugs are important risk factors for perforation. [1] Perforation peritonitis, in tropical countries like India most commonly affects men as compared to the studies in the west where the mean age is between 30 - 50 years. [2-4].

POSSUM was developed by Copeland et al. [5] This present study was undertaken to assess the validity of POSSUM scoring system in patients with perforation peritonitis in this high risk group.

II. Material and Methods:

This study was done in Department of General Surgery at Mahatma Gandhi Memorial Hospital /Kakatiya Medical College, Warangal, from February 2018 to September 2018. The sample size selected for the study was 50 patients.

Inclusion criteria:

1. Age ≥ 18 years.
2. Written informed consent was taken from the study subjects and from their family members.
3. Patients with established peritonitis following hollow viscus perforation.
4. Patients with intra-peritoneal abscess due to hollow viscus perforation.
5. All the patients who were operated for perforation peritonitis and whose OT records were complete were included in the study.

Exclusion Criteria:

1. Study subjects who refused to give consent.
2. Patients with primary peritonitis due to tuberculosis alcoholic cirrhosis, nephrotic syndrome, cardiac failure or systemic lupus erythematosus
3. Patients undergoing emergency explorative laparotomy due to other causes like abdominal trauma.

The study subjects were interviewed by the principal investigator and information was recorded and documented. After preoperative resuscitation the patient underwent exploratory laparotomy. Appropriate treatment was carried out according to the findings. Postoperatively standard care was given to all the patients. Patients were observed for complications and mortality.

Scores were allotted to the physiological and operative factors in the study and expected mortality and morbidity rate were calculated. Complications were assessed by clinical observation. Routine bacteriological screening and postoperative radiological scanning were not carried out, but confirmatory bacteriological and radiological tests were done when clinical suspicion existed.[6]

POSSUM equation for morbidity [6]
Ln R/1 - R = - 5.91 + (0.16 x physiological score) + (0.19 x operative severity score)

POSSUM equation for mortality [6]
Ln R/1 - R= -7.04+ (0.13 x physiological score) + (0.16 x operative severity score)

Where R = predicted risk. [5]

After calculating R (Risk of mortality) for each patient, all patients were divided into different risk-bands on the basis that each band receives enough number of patients and deaths for statistical analysis. The Risk bands according to the predicted mortality were:-
0-5% - Risk Band or group
5-15% - Risk Band or group
15-30% - Risk Band or group
30-45% - Risk band or group
45-100% - Risk band or group

The patients were then followed up for a period of 2 months post operatively and complications were noted upon the criteria as defined by POSSUM scoring system**.**

III. RESULTS

The maximum numbers of patients of gastrointestinal perforations were in the age group of 30-49 years (36%) followed by patients in the age group of 50-69 years (32%) and then followed by patients in the age group of less than 30 years (30 %) and only 2% of patients were more than 70 years of age. There were 40 males (80%) as compared to 10 females (11.46 %).

Table 1: Clinical features among study subjects:

Symptom	**Percentage**
Pain abdomen	100
Vomiting	60
Distension of abdomen	40
Constipation/loose stools	25
Fever	30
Oliguria	10
Cold extremities	4

Note: Multiple clinical presentations by study subjects

Table 2: Causes of peritonitis

Cause	**Number of study subjects**
Duodenal perforation	41
Gastric perforation	1
Jejunal perforation	2
Ileal perforation	3
Appendicular perforation	2
Colonic perforation	1

The maximum number of patients of perforation peritonitis had gastro duodenal perforation (82%) which was followed by small bowel perforations (10%). Small bowel perforations included jejunal and ileal perforations. Appendicular perforations constituted 4%. Colonic perforations were 2%. There was one case of rectal perforation.

Table 3: Complications after surgery

Post-operative complications	**Number of study subjects**

Nil	25
Death	4
Septicaemia	6
Deep infections	4
Wound infections	4
Chest infections	4
Multiple infections	3

Of the 50 patients, 4 (8%) patients died in the postoperative period. Out of the remaining 46 patients who survived 25 patients had no complications and 21 patients had complications. Thus the complication rate in our study was 50%.

Table 4: Observed and expected mortality

Possum Score range	No. of patients	No. observed Death [O]	No. of expected deaths [E]	O:E
18 - 45	21	2	2.2	0.9
45 - 60	20	1	1.2	0.8
60 - 90	9	1	0.9	1.1
Total	**50**	**4**	**4.3**	**0.9**

IV. Discussion

The importance of surgical audit has increased over the past years both, as a means of assessing the quality of surgical care and as an educational process. In this era, the use of crude mortality rate can be misleading. [6]

Males outnumbered females in the present study. Similar pattern of more incidence of perforation peritonitis in males was also seen in various other studies. [7]

Of the 50 patients, 4 (8%) patients died in the postoperative period. Out of the remaining 46 patients who survived 25 patients had no complications and 21 patients had complications. Thus the complication rate in our study was 50%.

In the present study the maximum numbers of patients of gastrointestinal perforations were in the age group of 18 – 45 years (42%) followed by patients in the age group of 45-60 years (40%) and then were the patients in the age group 60-90 years (18%).

The use of POSSUM scoring system can identify those patients who are at increased risk of death or complications. However, it has to be correlated to the general condition of the local population to be more precise. [6] POSSUM and its subsequent modifications incorporate physiological, operative and pathological information and provide a comparison of outcomes between surgeons, units and healthcare systems.[8,9]

In this study, the validity of POSSUM scoring system in 50 patients undergoing emergency laparotomy for perforation peritonitis was assessed by comparing the observed and expected mortality and morbidity rates. 4 (8%) patients died in the postoperative period. POSSUM predicted mortality rate in our study was 8.6%. [10]

On analysis we found no statistical difference between observed and expected mortality rate ($\chi 2 = 3.54$, $p = 0.316$). An O:E ratio of 0.9 was obtained, similar finding was obtained by Prytherach DR et al (O:E = 0.9), Sagar PM et al (O:E = 0.87) and Parihar V et al, (O:E = 0.97). [10-12]

Vishwani A et al studied the efficacy of POSSUM in predicting mortality and morbidity in patients of peritonitis undergoing laparotomy in 89 patients in single surgical unit and found that POSSUM scoring system is reasonably good predictor of mortality (O:E = 0.6) and morbidity (O:E = 0.7) using exponential and linear analysis respectively.[13] Kumar S compared POSSUM and P-POSSUM in 172 cases studied in single surgical unit over period of two years and found that POSSUM over predicted mortality and morbidity by linear and exponential analysis.[14] Kumar S et al validated POSSUM score in enteric perforation peritonitis and concluded that POSSUM is a good predictor of morbidity (O:E = 0.85) and over predicts mortality (O:E = 0.47).[14]

V. Conclusion:

Till today POSSUM scoring system is being used to predict outcome of patients in general surgery, gastrointestinal surgery and vascular surgery etc. and has not been applied specifically for patients of perforation peritonitis and hence more studies are needed to substantiate our data. Strict vigilance and prompt correction of the validated factors can improve the general condition of the patient and decrease the mortality and morbidity.

Funding: No funding sources
Conflict of interest: None declared

Acknowledgement:

We would like to acknowledge all the authors, editors, other sources from where we could cite their literature.

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