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Original Research Article

Study of factors that help in assessing the outcome of perforative peritonitis

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ABSTRACT

Background: Perforative peritonitis is one of surgical emergency associated with increased morbidity and mortality. The current study aims to evaluate etiological factors of the disease and to assess the effectiveness of Mannheim peritonitis index (MPI) and sepsis score of Elebute and Stoner to predict the outcome.
Methods: This is a prospective hospital based study conducted in our hospital from June 2016 to July 2018 involving a total of 50 patients with perforative peritonitis. Prognostic factors and the validity of scoring systems were analyzed.
Results: Male preponderance was seen in the study (90%). Mortality rate was higher in older patients compared to younger. Mortality rate was more in females (40%). Mortality rate was more in patients with ileal perforation (45%). Delay of >72 hours of presentation was associated with a mortality of 79%. Mortality increased exponentially with MPI score more than 26 (28% mortality) and with sepsis score >20 was 76%.
Conclusions: Age over 50, longer duration of perforation, presence of shock on day one, extent of peritoneal contamination and associated medical illness adversely affect prognosis. Enteric and duodenal perforations carry a higher mortality. Both MPI and sepsis score accurately predicted mortality and morbidity rates.

Keywords: Perforative peritonitis, Scoring systems, Mortality

INTRODUCTION

Peritonitis is the inflammation of peritoneum occurs due to many etiological factors. The condition was recently recognized or described as systemic inflammatory response syndrome.[1] This clinical condition many times requires emergency surgical treatment. Despite many advances in the interventional system, the risk of mortality is unacceptably high in conditions of suppurative peritonitis.[2]

Many scoring systems were developed to provide accurate assessment of patient's condition at a specific point to simplify the interventional strategy. Of the many scoring systems, Mannheim peritonitis index (MPI) was found to be the simplest scoring system that allows the surgeon to easily predict the outcome in patients with peritonitis.[3] Sepsis scoring system developed by Elebute and Stoner is useful for grading the severity of sepsis and indicates the severity that varies with the patient's condition.[4]

The aim of this study was to study the factors which determine the outcome of the disease and to evaluate the use of the scoring systems, MPI and sepsis score of Elebute and Stoner, presently being studied worldwide.

METHODS

This was a prospective study conducted at Sri Siddhartha Medical College, Hospital and Research Centre, Tumkur, Karnataka, over a period of 2 years from June 2016 to July 2018.

The study included 50 patients with perforative peritonitis admitted to the surgical wards of this institution in the above said period. Excluded from the study were patients with peritonitis due to gynecological causes, biliary peritonitis, postoperative peritonitis, traumatic peritonitis and patients below 12 years.

A detailed history was taken and a thorough physical examination done for each patient. Clinical investigations were done for all the patients that included blood investigations– Hb %, TC, RBS/FBS, blood urea, serum creatinine, serum electrolytes, liver function tests, WIDAL test, Serum Amylase; (b) Urine examination; (c) Radiological examination to detect pneumoperitonium; (d) Ultrasound abdomen; (e) ECG; (f) Diagnostic peritoneal tapping; (g) Biopsy from the edge of the perforation wherever possible.

The preoperative preparation of each case essentially consisted of correction of dehydration, overcoming the shock if present, gastric aspiration, urinary catheterization, parenteral broad spectrum antibiotic coverage and tetanus prophylaxis.

The treatment adopted in each case was decided by the attending surgeon. Operative procedure varied according to the location of perforation.

Postoperative complications were studied in the immediate follow up period. MPI and sepsis score of Elebute and Stoner were employed for all patients. Patients with MPI scoring greater than 26 were considered to have high mortality rate. Sepsis scoring is useful in predicting clinically ill patients.

Results were analyzed and presented in numbers and percentages.

RESULTS

Table 1 presents the patient characteristics. Majority of the patients belongs to 41-50 years. There were 90% male patients and 10% female patients with the male to female being ratio of 9:1. About 40% of the patients presented between 24-72 hours. In the current study, 56% of patients had MPI scoring of 20-29 and 20 patients had sepsis score of 10-19. Sepsis score >20 was seen in 21 patients.

Mortality rate was more in extremes of age that is <20 years and >50 years group. Patients aged <50 years did better than older patients with 29% and 58% being their mortality rate respectively (Figure 1). Majority of patients were males– 45; mortality rate was more in females (40%), but this difference was not statistically significant (Figure 2).

Duodenal perforation was the commonest (72%) cause of perforative peritonitis followed by ileal perforation. The mortality rate of duodenal perforation was 36%, while that of ileal perforation was 45%; perforation of appendix and stomach had 0% mortality.

Table 1: Patient characteristics (n=50).

Characteristics	Number (N)	Perentage (%)
Age (in years)		
<20	5	10
21-30	11	22
31-40	10	20
41-50	12	24
51-60	7	14
61-70	4	8
>71	1	2
Sex		
Male	45	90
Female	5	10
Duration of perforation		
<24 hours	16	32
24-72 hours	20	40
4-6 days	14	28
Site of perforation		
Peptic perforation	28	56
Enteric	22	44
Shock		
Shock on day 1	26	52
MPI scoring		
0-9	0	0
10-19	9	18
20-29	28	56
30-39	12	24
40-49	1	2
Sepsis score		
0-9	9	18
10-19	20	40
20-29	19	28
30-39	2	4

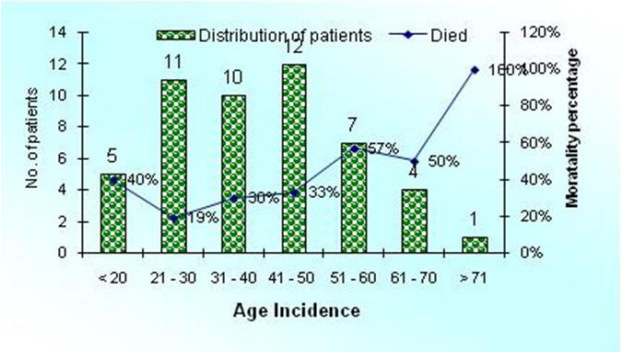


Figure 1: Distribution of patients according to age and mortality percentage.

Mortality increased correspondingly with delay in presentation. Delay in presentation of >24 hours increased the mortality from 6% to 30%. Delay of >72 hours was associated with a mortality of 79%. As many

as 26 patients (52%) presented with shock on day one. They had high mortality of 15 (58%) in comparison to 3 (12%) in patients without shock (Figure 3).

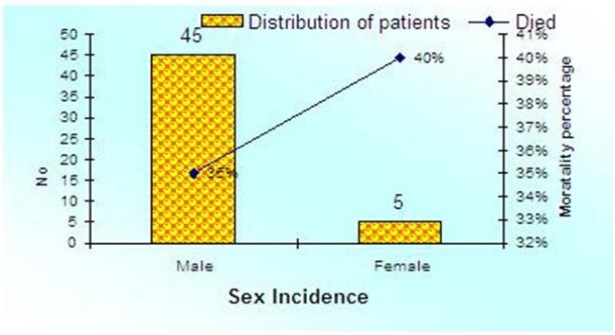
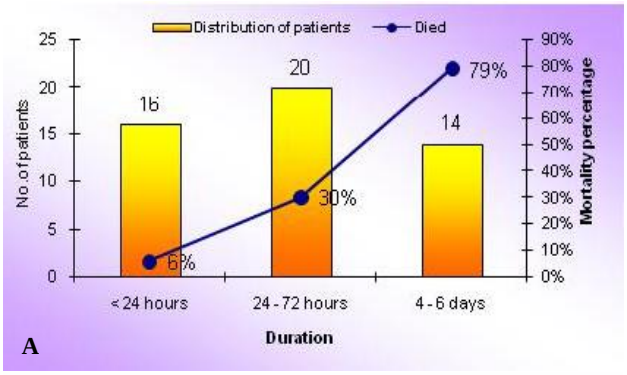


Figure 2: Distribution of patients according to sex and mortality percentage.



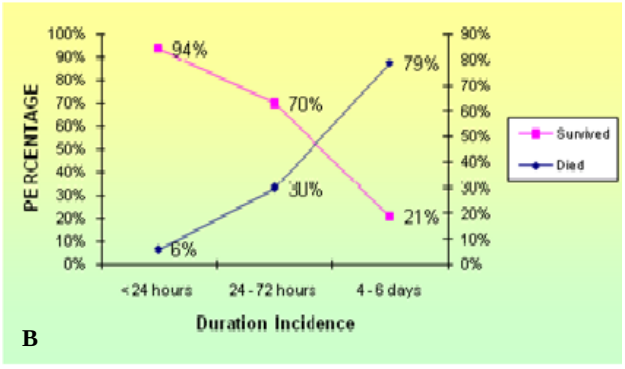
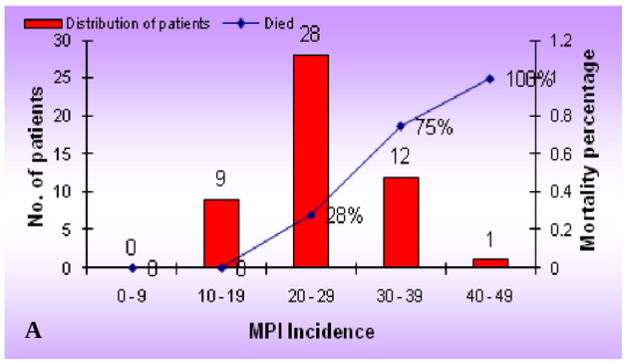


Figure 3 (A and B): Distribution of patients according to duration of disease and mortality percentage.



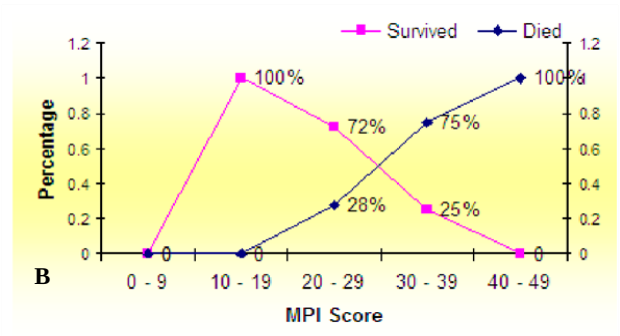
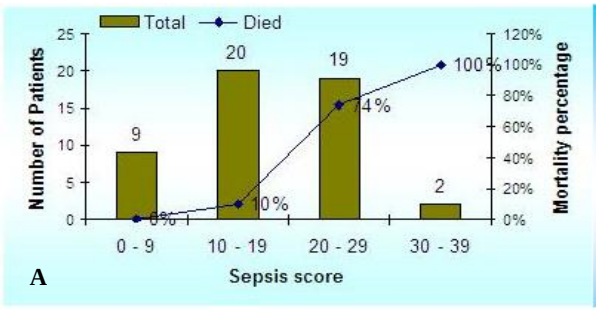


Figure 4 (A and B): Distribution of patients according to MPI score and percentage of mortality rate.



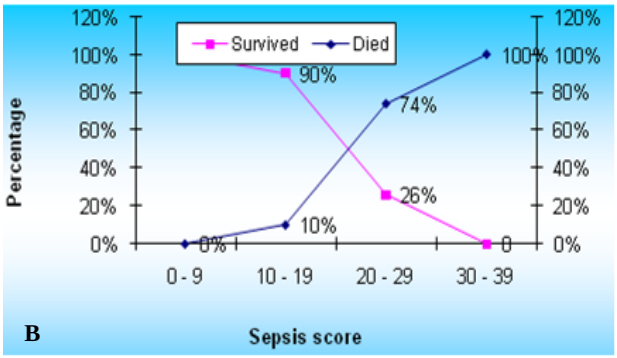


Figure 5 (A and B): Distribution of patients according to sepsis score and percentage of mortality rate.

Mortality increased exponentially with MPI score more than 26 (28% mortality). Mortality rate in sepsis score <20 was 7% while it jumped to 74% with a sepsis score >20 (Figure 4 and 5).

DISCUSSION

Perforation is a dreaded complication and if not treated in time, can terminate fatally. In the present study on 50 patients in District Hospital, Tumkur and Sri Siddhartha Medical College & Hospital, it was found that various factors like old age, associated medical illness, shock at the time of admission, and extent of peritoneal contamination are important adverse prognostic factors.

Age seem to be an important factor in determining the outcome. Age > 50 years was a significant adverse prognostic factor. This is in agreement with studies by

Wacha et al, and was hence incorporated into MPI where age >50 year was given weight age of 5 points of severity.[5] Factors like decreased functional reserve, concomitant other illness such as diabetes and hypertension seem to be the cause of increased mortality in elderly patients.

In the present study, although the mortality rate was apparently higher in females, this difference was not statistically significant. Similar finding with increased mortality in case of females (55.56%) was noted in the similar study conducted by Sharma et al with significant difference when compared to mortality rate in males (9.76%).[6]

In this study, duration of perforations at the time of presentation seemed to have a major impact on mortality. This is in complete agreement with the result of studies done by Tripathi et al and Dandapat et al.[7,8] The value of 4 points given in MPI is in agreement with this. The spread of peritonitis, shock due to delay and onset of sepsis syndrome seem to be the main causes for increase in mortality rate. This has to be weighed against patient factors like age and associated medical problem also. Even after discounting these factors there seem to be definite increase in mortality due to delay in presentation.[9]

As with most studies, duodenal perforation formed bulk of the cases 36/50. They contributed as much as 72% to the mortality due to the number of cases itself. They had a mortality rate of 36%. Enteric perforation had higher mortality of 45%. Delay in presentation, typical clinical features and general complications of typhoid seem to contribute to higher mortality rate.[10]

In the present study, effect of shock on day 1 was associated with significant mortality (58%) which is similar to other studies.[8] MPI also gave seven risk points to multiorgan failure, a culmination of shock and other systemic manifestations.

MPI score was specifically designed to evaluate prognostic factors in peritonitis. It is easy and reliable. The results of the present study correspond to the study by Billing et al.[11] This validates the use of MPI score in peritonitis.

In sepsis score, similar to MPI, the mortality rate increased with increase in score. Mortality rate was 7% for <20, 76% for >20. The findings are similar to previous studies Dominioni et al.[12] The advantage of sepsis score is that it can be used both as a single indicator and for follow up.

CONCLUSION

Age >50 years seems to have an adverse effect on the outcome in perforative peritonitis. The impact of sex on outcome could not be conclusively proved, even though females seem to have poorer prognosis. The type and extent of peritoneal contamination seem to have a bearing on mortality. Delayed presentation has an important adverse effect on both mortality and morbidity. However this is beyond the control of the surgeon. Only adequate health education and a proper referral mechanism can help in this regard.

There is wide scope for the use of MPI and Sepsis Score of Elebute & Stoner. These scoring systems help to determine the risk of patient preoperatively as well as assist the surgeon in his decision regarding surgery. Definitive surgery can be done safely in low score patients; aggressive, newer modalities of treatment need to be tried in high score patients. Cases of peritonitis carry a high mortality which can be reduced by early diagnosis, risk stratification, and appropriate treatment based on risk score.

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