

ORIGINAL RESEARCH**Efficacy of Mannheim Peritonitis Index (MPI) Score in Patients with Perforation Peritonitis in a Tertiary Care Setup**

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ABSTRACT

Introduction: Peritonitis is an inflammatory or suppurative response of the peritoneal lining to direct irritation. Surgical treatment for perforation peritonitis is highly demanding and very complex. The combination of improved surgical technique, antimicrobial therapy, and intensive care support has improved the outcome of such case. A scoring system which can compare patient populations and severity of illness, objectively to evaluate the treatment strategy is the required for evaluative research of intensive care. The present study was undertaken to evaluate the efficacy of Mannheim Peritonitis Index (MPI) score in patients with perforation peritonitis.

Materials and Methods: The present prospective study was carried among 50 patients of perforation peritonitis. Using history, clinical examination and lab values risk factors found in MPI were classified according to values indicated and individual variable scores were added to establish MPI score. The cases were grouped into three: those below 21 points, between 21-29 points, and those above 29 points. The data was analyzed, each variable in the MPI score along with other patient variables was analyzed using chi square analysis with various outcomes that were noted in the study. P value <0.05 was taken as significant in this study.

Results: Around 80% of high risk group (MPI > 29) required more than 5 days of ICU stay. High risk group (MPI>29) has more complications than intermediate(MPI 21 TO 29) and low risk group.(MPI <21).Most common complication found in this study is Surgical site infection. Up to 60% patients with score >29 developed surgical site infection in post operative period which was about 42% in patients with score 21 -29 and about 19% in patients with score <21.Around 69% of patient who required inotropic support in post operative period had score of >29 and only one (7%) required inotropes with score <21. 75% of patient who developed endotoxic shock in post operative period had score >29. 40% patients with score >29 developed multi organ dysfunction. All the patients who developed MODS died. Thus, development of MODS post operatively is bad predictor of mortality.

Conclusion: Among the various variables of the scoring system duration of pain, organ failure on presentation and presence of feculent exudates these factors had a significant hand in predicting the eventual outcome of the patient.

Keywords: Peritonitis; Mannheim Peritonitis Index; Surgical Site Infection.

INTRODUCTION

Peritonitis is an inflammatory or suppurative response of the peritoneal lining to direct irritation.¹ Primary (spontaneous) peritonitis (SBP) occurs in the absence of gastrointestinal perforation and is caused mainly by hematogenous spread but occasionally by transluminal or direct bacterial invasion of the peritoneal cavity. Impairment of the hepatic reticuloendothelial system and compromised peripheral destruction of bacteria by neutrophils promotes bacteremia, which readily infects ascitic fluid that has reduced bacterium-killing capacity. The pathogenesis of SBP remains unclear; however, several lines of evidence suggest that bacterial translocation from the gastrointestinal tract plays an important role in the development of this infection.² Secondary peritonitis results from bacterial contamination originating from within viscera or from external sources (e.g., penetrating injury). It most often follows disruption of a hollow viscous.³

Systemic sepsis due to peritonitis occurs in varying degrees depending on the virulence of the pathogens, the bacterial load, and the duration of bacterial proliferation and synergistic interaction.⁴ Many patients present late with pre-established sepsis and septic shock, which are associated with a high mortality rate. The algorithm leading to sepsis and multi-organ failure has also been worked out in much detail, but no medical agent has proven useful in reversing this cascade in clinical trials.⁵ Surgical treatment for perforation peritonitis is highly demanding and very complex. The combination of improved surgical technique, antimicrobial therapy, and intensive care support has improved the outcome of such cases.⁶ A scoring system which can compare patient populations and severity of illness, objectively to evaluate the treatment strategy is the required for evaluative research of intensive care.⁷ The present study was undertaken to evaluate the efficacy of Mannheim Peritonitis Index (MPI) score in patients with perforation peritonitis.

MATERIALS AND METHODS

The present prospective comparative study was carried among 50 patients in which diagnosis of peritonitis was made on the basis of history, clinical examination, blood investigation and radiological finding which was confirmed by operative findings or surgical interventions during management over a period of 18 months. The Study was conducted after obtaining permission from the Institutional Ethics Committee(IEC). Nonrandomized sampling technique was used for sample selection. Inclusion criteria comprised of patients of both male and female patients aged between 15-70 years of peritonitis secondary to hollow viscous perforation due to trauma and non-traumatic causes attending our institute during the study period were included in the study. Exclusion criteria consisted of all patients with primary peritonitis or spontaneous bacterial peritonitis, patients with peritonitis due to anastomotic dehiscence or leak, immune compromised, age less than 15 and more than 70 years, conservatively managed patients of pancreatitis and spontaneous bacterial peritonitis, patients on peritoneal dialysis, abdominal injuries with associated solid organ or vascular injuries and poly-trauma patients.

Details of the study and treatment modalities were explained to the patients. A written informed consent of every patient was taken according to the prescribed format, before enrolling them in the study. Patient data was collected according to information in case record sheet and preoperative, intraoperative and post operative findings were noted. Once diagnosis of peritonitis was determined by operative findings, the patient was enrolled into the study. Using history, clinical examination and lab values risk factors found in MPI were classified according to values indicated and individual variable scores were added to establish MPI score. The cases were first grouped into three, as described by Billing: those below 21 points, between 21-29 points, and those above 29 points. In addition to personal data such as name, age, sex, etc., the following information was registered: file number; dates of

admission and discharge from the hospital; days hospitalized; date of surgery and information related to illness (surgical findings, medical treatment and evolution of illness).

Patient evolution was followed, occurrence of complications and discharge due to improvement or death. Time elapsed from initial diagnosis to moment of event (death or discharge from hospital) was determined. Out-patient follow-up was continued for 30 days to establish perioperative morbidity and mortality. The minimum possible score was zero, if no adverse factor were present, and maximum was 47 if presence of all were confirmed. Analysis was done with each variable in the scoring system as an independent predictor of morbidity or mortality and the scoring system as a whole.

The data was analyzed, each variable in the MPI score along with other patient variables was analyzed using chi square analysis with various outcomes that were noted in the study. P value <0.05 was taken as significant in this study. The results were averaged (mean + standard deviation) for each parameter for continuous data and numbers and percentage for categorical data presented in table and figure. Proportions were compared using Chi-square test of significance

RESULTS

Males accounted for 86% of the patients in the present study (table 1). 62% of the study population presented with diffuse peritonitis & 38% had localized (table 2). 42% of study population was in low-risk group (score <21) and 20% were in high risk (score >29). Patients with organ failure on admission, longer duration of illness before surgery, diffuse peritonitis, feculent exudates were more likely to have higher scores and hence fall into high-risk group than their counterparts (table 3).

Most common complication found in this study is Surgical site infection. Up to 60% patients with score >29 developed surgical site infection in post operative period which was about 42% in patients with score 21 -29 and about 19% in patients with score <21 . Here p value is 0.001 i.e. (<0.05); There is an association between SSI and MPI Score (table 4), (Chi-Square test value= 5.427, p-value= 0.066 >0.05 indicates Non-Significant).

In this study all patients with score >29 , 70% patients with scores 21-29 had some form of pulmonary complications, none of patient with score <21 had pulmonary complication (table 5). Here p value is 0.000 i.e. (<0.05) (Chi-Square test value= 32.057, p-value= 0.000 <0.05 indicates Significant).

Around 69% of patient who required inotropic support in post operative period had score of >29 and only one(7%) required inotropes with score <21 (table 6) [pvalue is 0.000 i.e. (<0.05)]. Score >29 indicate a higher risk of need for inotropicsupport (Chi-Square test value= 27.242 , p-value= 0.000 <0.05 indicates Significant).

40% patients with score >29 developed multi organ dysfunction. All the patients who developed MODS died (table 7) (Chi-Square test value= 12.807, p-value= 0.002 <0.05 indicates Significant). Thus, development of MODS post operatively is bad predictor of mortality.

Patients presenting with any organ failure due to hollow viscous perforation was significantly associated with [p value is 0.00 i.e. (<0.05)] increase morbidity and mortality (Chi-Square test value= 28.816, p-value= 0.000 <0.05 indicates Significant) (table 8). All patients with organ failure required more duration of ICU stay.

Table 1: Sex Distribution of study subjects

Gender	No. Of Cases	Percent
Female	7	14%
Male	43	86%
Total	50	100%

Table 2: Distribution of study subjects according to type of Peritonitis

Type of Peritonitis	No. Of Cases	Percent
Diffuse	31	62%
Localised	19	38%
Total	50	100%

Table 3: Distribution of study subjects according to MPI Score

MPI Score	No. Of Cases	Percent
< 21	21	42%
21-29	19	38%
> 29	10	20%
Total	50	100%

Table 4: Analysis of Surgical site infection (SSI) with MPI Score

SSI	MPI Score			Total
	< 21	21-29	> 29	
Absent	17	11	4	36
Present	4	8	6	14
Total	21	19	10	50

Table 5: Analysis of Respiratory complications with MPI Score

Respiratory	MPI Score			Total
	< 21	21-29	> 29	
Absent	21	7	0	28
Present	0	12	10	22
Total	21	19	10	50

Table 6: Analysis of requirement of Inotropic support with MPI Score

Inotropic support	MPI Score			Total
	< 21	21-29	> 29	
Not Required	20	16	1	36
Required	1	3	9	13
Total	21	19	10	50

Table 7: Analysis of Multi organ Dysfunction with MPI Score

Multi organ Dysfunction	MPI Score			Total
	< 21	21-29	> 29	
Absent	21	18	6	45
Present	0	1	4	5
Total	21	19	10	50

Table 8: Analysis of organ failure at presentation with MPI Score

Organ Failure	MPI Score			Total
	< 21	21-29	> 29	
Absent	21	17	2	40
Present	0	2	8	10
Total	21	19	10	50

DISCUSSION

There is no ideal scoring system for the pre-operative assessment of patients needing emergency surgery. Some pre-operative scoring systems provide approximate estimates of mortality risk but none have been shown to be sufficiently specific for use on individual patients.

Not only do physiological values vary during the acute admission, making the scores obtained by them unreliable, but there is evidence that to include operative findings and post-operative parameters on ICU improves the accuracy of the prediction. Although a score at initial assessment would help triage and plan treatment, comparative audit with postoperative scores remains the most useful function of scoring systems at present.

Even if accurate pre-operative predictions of outcome were possible by estimation of a risk score, an expert surgical opinion would be required to interpret these predictions at the bedside. An experienced clinician cannot only assess prognosis but also weighs up the local facilities available, the patient's quality of life and ethical issues, as well as considering the patient or relative's wishes. Scoring will never replace clinical judgment.

This study done in tertiary care teaching hospital, included 50 patients who presented to the emergency department and were diagnosed with hollow viscous perforation. All the patients were appropriately assessed and managed according to standard guidelines.

In our study 86% were male & 14% were female which is similar to other studies like CorrieaMM et al⁸ study 73% were male & 26% were female, Jhobta RS et al⁹ regarding the spectrum of perforation peritonitis in India, 422 of the 504 patients studied were males i.e. 84%.

In our study 44% had clear exudates, 30% had purulent exudates and 26% had faecal exudates which is similar to other studies like Rodolf L et al¹⁰ 69.5% has clear exudates and 21.8% had purulent exudates and Jhobta RS et al⁹ 15% had clear exudates, 71% had purulent and 13% had faecal exudates. Purulent and faecal exudates are associated with delayed presentation and presence of varying degree of septicemia.

In our study 80% of the study population shows evidence of organ failure at presentation and in other studies like 48.5% in Corriea MM et al⁸, 11.5% in Rodolf L et al¹⁰ and 20% in Kologlu M et al¹¹ study. In peritonitis a systemic inflammatory response induced by the peritoneal infection may progress to septic shock and multiorgan failure. The high-rate organ failure in our study denotes a delay in presentation of most cases. Delay in the presentation for appropriate treatment should be addressed by means of strengthening the referral services and improving the means of transportation.

In our study a total of 9 patients showed evidence of organ failure and 4 patients died among these 9 patients thus resulting in a mortality rate of 44.4%. As compared to other similar studies like Rodolf L et al,¹⁰ 11 (6.32%) patients died and all of them presented with the variable of organ failure, Daniel A et al¹² in their study found that the crude relative risk of death in patients with systemic sepsis was 13 times greater than those without. Severe sepsis was present in 424 patients (62%) among the 628 decedents. The author concludes that severe sepsis complicates the course of 11% of all patients with peritonitis. Organ failure is not an all or none phenomenon, rather it is a continuation of alterations in organ function

from normal function, through varying degrees of dysfunction, to organ failure. This result mentioned above highlight the importance of early recognition, prevention, and treatment of organ dysfunction in our attempt to improve the short- and long-term outcome in patients with peritonitis. Thus, in spite of improvement in the medical management, availability of new broad-spectrum antibiotics and vast development in the field of intensive care with easy availability of intensive care and life support measure the mortality from perforation peritonitis remains high. Development of organ failure and sepsis are important determinants of mortality. Therefore, research and development should be directed in the understanding of pathogenesis and evolution of these factors so that new and more effective treatment strategies could be evolved.

CONCLUSION

Low risk patients can be monitored in wards and high risk patients' needs ICU stay. Moderate risk patients are closely monitored in wards & shifted to ICU if clinical condition deteriorates. Low risk patients remain mostly vitally stable & they rarely develop respiratory or cardiac complication, at the most they can develop Surgical Site Infection. Moderate risk patients are at risk of developing more of respiratory than cardiac complication & less likely to go into MODS. High risk patients always develop respiratory complications more commonly than cardiac & more than 50% patients can go into MODS. Only pre-op findings which most other systems use cannot accurately predict the outcome, however combination of pre-op assessment & intra -op findings can predict the outcome accurately, Once predicted proper intensive care can be taken & morbidity and mortality can be reduced. Hence MPI system helps to reduce post -op complication & overcome morbidity & mortality of patients having hollow viscus perforation.

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