ORIGINAL RESEARCH

ASSESSMENT OF ROLE OF MANNHEIM PERITONITIS INDEX (MPI) SYSTEM IN EVALUATION OF MORBIDITY AND MORTALITY AMONG PATIENTS WITH HOLLOW VISCUS PERFORATION: AN INSTITUTIONAL BASED STUDY

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ABSTRACT
Introduction: A scoring system which can compare patient populations and severity of illness, objectively predict mortality, morbidity and can help to evaluate the treatment strategy is the dire need for evaluative research of intensive care. Thus, present study was undertaken to access the role of Mannheim Peritonitis Index (MPI) system in evaluation of morbidity and mortality among patients with hollow viscus perforation.
Materials and Methods: The present prospective comparative study was carried among 50 patients in whom diagnosis was of peritonitis. Using history, clinical examination and laboratory values risk factors found in MPI were classified according to values indicated and individual variable scores were added to establish MPI score. 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: In this study, 50 patients with diagnosis of secondary peritonitis were included. Patients with age 15 years to 70 years were part of study. Majority of patients (42%) belong to age group 20-35 years. Patient with less MPI score required less number of ICU stay. Around 80% of high-risk group (MPI > 29) required more than 5 days of ICU stay. Mortality rate was 40% in high-risk group (MPI score >29). There was no mortality in low-risk group (MPI score <21). Mortality rate was 5.26% in intermediate risk group. Chi-Square test value is 15.601, p-value is 0.000, < 0.05 indicates significant Mortality vs MPI Scores.

Conclusion: Mannheim peritonitis index scoring system is accurate for predicting the morbidity and mortality in patients with peritonitis due to hollow viscus perforation. It helps in identification of high-risk patients and it helps to identify the patients using for intensive post-operative or ICU care.
Keywords: Mannheim Peritonitis Index; Morbidity; Mortality Peritonitis.

INTRODUCTION

Peritonitis due to perforation of the gastrointestinal tract is the most common surgical emergency all over the world[1] and it continues to be one of the commonest surgical emergencies in India. Despite many advances in peri-operative care, antimicrobial therapy and intensive care support, patients with peritonitis still suffer high morbidity and mortality.[2] Different scorings are used to predict the outcome in patients with peritonitis. Scoring systems providing objective descriptions of patient's conditions at specific points in the disease aid for better understanding of these problems.[3] A scoring system which can compare patient populations and severity of illness, objectively predict mortality, morbidity and can help to evaluate the treatment strategy is the dire need for evaluative research of intensive care.[4]Thus, present study was undertaken to access the role of Mannheim Peritonitis Index (MPI) system in evaluation of morbidity and mortality among patients with hollow viscus perforation.

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 between15-70 years of peritonitis secondary to hollow viscus 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, immunocompromised, age less than 15 and more than70 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

In this study, 50 patients with diagnosis of secondary peritonitis were included. Patient with age 15 years to 70 years was part of study. Majority of patients (42%) belong to age group 20-35 years (table 1). Patient with less MPI score required less number of ICU stay. Around 80% of high-risk group (MPI > 29) required more than 5 days of ICUstay (table 2). Mortality rate was 40% in high-risk group (MPI score >29). There was no mortality in low-risk group (MPI score <21). Mortality rate was 5.26% in intermediate risk group (table 3). Chi-Square test value is 15.601, p-value is 0.000, < 0.05 indicates significant Mortality vs MPI Scores.

Table 1: Distribution of study subjects according to Age

Age Group	No. of Cases	Percent
< 20	3	6.0%
20-35	23	46.0%
36-50	11	22.0%
>50	13	26.0%
Total	50	100%

Table 2: MPI Score and Morbidity (ICU stay)

MPI Score	ICU Stay			Total
	<=1 day	2 - 5 days	> 5 days	
< 21	21	0	0	21
21-29	5	7	7	19
> 29	0	2	8	10
Total	26	9	15	50

Chi-Square test value= 39.395, p-value=0.0000000577

Table 3: Mortality vs MPI Score

Outcome	MPI Score			
	< 21	21-29	> 29	Total
Discharged	21	18	6	45
Dead	0	1	4	5
Total	21	19	10	50

Graph 1: Mortality vs MPI Score
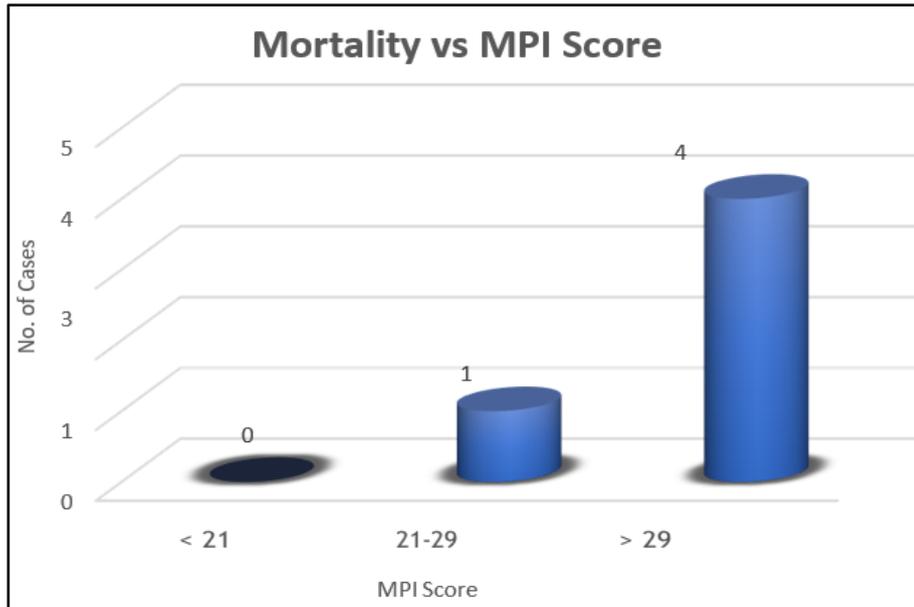
Table 4: Analysis of Malignancy with MPI Score

OrganFailure	MPI Score			
	< 21	21-29	> 29	Total
Positive	0	1	2	3
Negative	36	8	3	47
Total	36	9	5	50

Chi-Square test value= 12.963, p-value= 0.002 < 0.05 indicates Significant

Table 5: Mortality and different variables

Variables		Outcome				
		Discharge		Dead		
		Count	Row N %	Count	Row N %	p-value
Age	> 50	7	53.8%	6	46.2%	0.000*
SEX	Female	3	60.0%	2	40.0%	0.042*
Organ Failure	Positive	5	55.6%	4	44.4%	0.001*
Time	> 24	28	100.0%	0	0.0%	0.003*
Malignancy	Positive	0	0.0%	3	100.0%	0.000*
Peritonitis	Positive	43	87.8%	6	12.2%	0.709
P fluid	Clear	23	100.0%	0	0.0%	

	Fecal	8	80.0%	2	20.0%	0.053
	Purulent	13	76.5%	4	23.5%	
Origin of Sepsis	**Noncolonic**	36	90.0%	4	10.0%	0.384

*p-value < 0.05 therefore significant

DISCUSSION

In our study Age distribution 20-35years was most common age group which is similar to other studies like Rodofo L et al[5] had 34years as most common age group and Jhobta RSet al[6] the mean age was 36.8years. The increased prevalence of the perforation in the age group of 31- 60 years in our study can be attributed to the fact that gastro duodenal perforations due to peptic ulcer disease is a major cause of perforation peritonitis in our study and the increased prevalence of the etiological risk factors such as smoking, alcoholism and NSAID abuse in this age group.

In our study Mortality rate was 40% in high-risk group (MPI score >29). There was no mortality in low-risk group (MPI score<21). Mortality rate was 5.26%in intermediate risk group in comparison to other studies like Notash AY et al[7] have shown important cut-off points to be 21 and 29 when using the MPI, with mortality of 60%, and up to 100% for scores of more than 29. A retrospective analysis by Ermolov AS et al,[8] 100 case histories of patients with diffuse peritonitis The patients were divided into 3 groups according to the amount of scores: in the first group (12-20 scores) there were no lethal issues, in the second group (21-29 scores) 42% of the patients died.

In our study, Out of 50 patients 13 patients were of age more than 50 years in which 6 (46.2 %) patients died as compared to other studies like Pacelli F et al[9] confirms age as a decisive factor related with mortality. They showed that patients with age of less than 70 years had a mortality rate of 17.2% compared to mortality rate of 37.7% in patients with age more than 70 years , Notash AY et al[7] confirms that the risk of in hospital death was higher in patients aged above 60 years, Kusumoto Y et al[10] in their study of patients operated on for intra-abdominal infection found that there was no mortality in less than 50 years age group, while mortality occurring only in patients older than 50 years and Svanes CE et al[11] in their study found that among 581 patients with age < 49, 18 patients died i.e., a mortality of 3.09% , while in patients with age >49 years the mortality was 11.94%.

In our study we confirm that patients over 50 years undergoing emergency surgery for laparotomy have a higher risk of mortality. Mortality after surgery undoubtedly increases with age but this could be because of increased prevalence of co-morbid medical conditions in the elderly.

In our study 3 patients had malignancy. All 3 patients expired thus placing the mortality rate in presence of malignancy to a whopping 100% as compared to other studies like Correia MM et al[12] found that in presence of malignancy the mortality rate under the score of 21 was of 33.3% and for score equal to or greater than 21 the mortality rate was 70.6% and Chao-Wen Hsu[13] in their study of colorectal perforations found out that although the overall mortality was 36.9% the highest disease specific mortality was due to malignancy (61.5%). Peritonitis in oncologic patients presents high mortality rates, essentially related to the severity of the underlying disease. These patients are less prone to survive serious infections.

Many disturbances of the immune system have been identified in oncologic patients, such as destruction of the anatomic barriers and derangement in the phagocytic activities and humoral and cellular responses. A consumption of opsonins may occur in the course of severe infection leading to failure of the immune system.

CONCLUSION

Mannheim peritonitis index scoring system is accurate for predicting the morbidity and mortality in patients with peritonitis due to hollow viscous perforation. MPI scoring system is a simple and effective tool for assessing such patients and can be used as a guiding tool to decide on the management of the patient after the definitive procedure is done. It helps in identification of high-risk patients, and it helps to identify the patients using for intensive post-operative or ICU care.

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