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Effectiveness of Mannheim Peritonitis Index in Predicting the Morbidity and Mortality of Patients With Hollow Viscous Perforation

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Abstract

Background: Peritonitis is an inflammatory response of peritoneum to different stimuli caused by bacteria. It can also be fungal or chemical. Secondary peritonitis is due to spillage of gastrointestinal or genitourinary organisms in to peritoneal cavity due to breech in the mucosal barrier. Mannheim peritonitis index (MPI) was developed by Wacha and Linder in 1983. The Mannheim Peritonitis Index (MPI) is a specific score which has a very good accuracy and serves as an easy way to assess clinical parameters allowing the determination of the individual prognosis of patients with peritonitis.

Methods: This prospective observational study was conducted by the Department of General Surgery at Dhanalakshmisrinivasan medical college and hospital from July 2012 to July 2013. A total of 60 patients were included in the study where in diagnosis of peritonitis due to hollow viscous perforation was made by history and clinical examination and relevant investigations.

Results: The mean age group of the subjects was 45.72 years ranging from 15 to 75 yrs. In our study group, 33.3% of the patients had morbidity where in MPI score more than 29 had the highest morbidity (72%) where in the overall mortality rate in our study was 12%.

Keywords: Peritonitis; Mannheim Peritonitis Index; Hollow viscous perforation.

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Introduction

There is a wide variety of advances being made in the medical field but still peritonitis continues to be one of the major infectious problem confronting the surgeon. Peritonitis is an inflammatory response of peritoneum to different stimuli caused by bacteria. It can also be fungal or chemical. Secondary peritonitis is due to spillage of gastrointestinal or genitourinary organisms in to peritoneal cavity due to breech in the mucosal barrier.

Peritonitis secondary to hollow viscous perforation carries high risk of morbidity and mortality. A good scoring system is required for stratifying patients in different groups, use of different treatment modalities and monitoring outcome and improving standard of care.[1, 2] Many scoring systems had been developed successfully to grade the severity and prognosis of patients of acute peritonitis like, Acute physiology and chronic health evaluation (APACHE) II score, Simplified acute physiology score (SAPS), Sepsis severity score (SSS), Ranson score, Imrite score and Mannheim peritonitis index (MPI).

Mannheim peritonitis index (MPI) was developed by Wacha and Linder in 1983 (3–6).

The Mannheim Peritonitis Index (MPI) is a specific score which has a very good accuracy and serves as an easy way to assess clinical parameters allowing the determination of the individual prognosis of patients with peritonitis. Hence this study was carried out to evaluate MPI in predicting morbidity and mortality of patients with peritonitis due to hollow viscous perforation.

Materials and Methods

Source of Data

This prospective observational study was conducted by the Department of General Surgery at Dhanalakshmisrinivasan Medical College and Hospital from July 2012 to July 2013. A total of 60 patients were included in the study where in diagnosis of peritonitis due to hollow viscous perforation made by history and clinical examination and relevant investigations.

Inclusion Criteria

1. Patients with clinical suspicion and investigatory support for the diagnosis of peritonitis due to hollow viscous perforation who are later confirmed by intra operative finding.

Exclusion Criteria

1. Patients with hollow viscous perforation due to trauma.
2. Patients with associated injuries to other organs.
3. Patients with associated vascular and neurogenic injuries.

Procedure

The detailed history and proper clinical findings were entered in a proforma case sheet. The clinical examination was done and necessary investigations were carried out to establish the diagnosis. MPI scoring system was done in all the patients and patients were classified those with score less than 21, 21 to 29 and more than 29. Patient evolution was followed, occurrence of complications and discharge due to improvement or death. Out-patient follow-up was continued for 30 days to establish perioperative morbidity and mortality. Analyzis was done with each variable in the scoring system as an independent predictor of morbidity or mortality and the scoring system as a whole.

Statistical Analyzis

The data was analyzed using SPSS software version 16.3. Each variable in the MPI score along with other patient variables was analyzed using chi-square Analyzis 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, 60 patients with diagnosis of secondary peritonitis were included. Patient with age 16 yrs to 75 yrs was part of study. Males accounted for 62% of the patients in the present study.

Out of 60 subjects enrolled into the study, maximum 28 (46.7%) were in the age group of 31–45 years followed by 21 (35%) from the age Group 45–60 years. Majority of the subjects were male 41 (68.3%) compared to females 19 (31.7%). The mean age of the patients was 45.72 (SD14.66) years ranging from 15 to 75 yrs.

Table 1: Age and sex wise distribution of study subjects

Age	Sex (Male)	Sex (Female)	Total
16–30	5 (83.7%)	1 (16.3%)	6 (10%)
31–45	18 (64.3%)	10 (35.7%)	28 (46.7%)
46–60	14 (66.7%)	7 (33.3%)	21 (35%)
>60	4 (80%)	1 (20%)	5 (8.3%)
Total	41 (68.3%)	19 (31.7%)	60

Morbidity in form of post-operative complications in form of MPI score was recorded. High risk group with MPI>29 (72%) has more complications than intermediate with MPI Score 21 to 29 and low risk group with MPI <21 (4.5%).

Table 2: Morbidity and MPI score

Mpi Score	Wound Infection	Normal	Total
<21	1 (4.5%)	21 (95.5%)	22
21–29	6 (30%)	14 (70%)	20
>29	13 (72%)	5(28%)	18
Total	20 (33.3%)	40 (66.7%)	60

Mortality rate was 28% in high risk group (MPI score >29). There was no mortality in low risk group (MPI score <21). Mortality rate was 10% in intermediate risk group (MPI Score 21–29).

Table 3: Mortality and MPI score

MPI Score	Mortality	Discharged	Total
<21	0 (0%)	22 (100%)	22
21–29	2 (10%)	18 (90%)	20
>29	5 (27.8%)	13 (72.2%)	18
Total	7 (12%)	53 (88%)	60

Discussion

The mean age group of the subjects was 45.72 years ranging from 15 to 75 yrs. The mean age of presentation (in years) in various studies done by Ohmann C et al.[7] which was at 56 yrs and Corroea et al.[8] was at 58.9 which were a bit higher compared to our study but studies done by Murlidhar V A et al.[9] the mean age group was 43.8 respectively which was in consistent with our study.

In our study group, 33.3% of the patients had morbidity where in MPI score more than 29 had the highest morbidity (72%) as compared to (10%) among subjects with MPI Score 21–29 and the least was recorded among subjects with MPI score less than 21. The positive predictive value of MPI score for morbidity is 75% with sensitivity 84.65%and specificity 92.34%.

The overall mortality rate in our study was 12% which was in consistent with the study done by Kumar v et al.[10] where in the mortality rate was 22%, Muralidhar VA et al.[9] where in the mortality rate was 14% and Nachiappan M et al.[11] where in the mortality rate was 16%. The positive predictive value of MPI score for morbidity is 86.34% with sensitivity 100%and specificity 90.16%.

Conclusion

Mannheim peritonitis index (MPI) is specific to particular disease and it is easy for predicting the mortality in patients with peritonitis. Increased scores are associated with poorer prognosis, needs intensive care and hence it can routinely be used in clinical practice. This is a validation study of the Mannheim peritonitis index scoring system for predicting the morbidity and mortality in patients with peritonitis due to hollow viscous perforation. The results of this study proves that MPI scoring system is a simple and effective tool for assessing this group of patients, and can be used as a guiding tool to decide on the management of the patient after the definitive procedure is done.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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