

Evaluation of the Mannheim's Peritonitis Index in Predicting Mortality in Patients with Perforative Peritonitis

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Abstract

Aim: To study the applicability of the Mannheim's peritonitis index in predicting mortality in patients with perforative peritonitis. **Methods:** A total of 50 patients diagnosed as perforative peritonitis based on history, clinical examination, and plain skiagram abdomen erect antero-posterior view were studied. The Mannheim's peritonitis index was calculated at first laparotomy. **Results:** Overall post-operative mortality rate was 10%. Middle age population (35-55 years) was predominantly affected (48%) with male preponderance (75%). Peptic ulcer perforation was the most common cause of peritonitis. Malignant perforation of hollow viscus accounted for only 4% of cases. Mean MPI Score of survivors was 22.04, and that of non survivors was 33.2. Mortality rate was highest in patients with high MPI Score. **Conclusion:** Mannheim's peritonitis index is easy to use, with all variables easily available at first laparotomy, with reproducible results and is a reliable predictor of mortality.

1. Introduction

The mortality rate of diffuse suppurative peritonitis remains unacceptably high in spite of advances in antimicrobial agents and supportive care.

Commonest cause of perforative peritonitis is perforation of the gastro-intestinal tract, which requires emergency surgical intervention and has high mortality and morbidity.

According to the aetiology, India has larger incidence of upper gastrointestinal tract perforations in contrast to Western world with larger incidence of lower gastrointestinal tract perforations¹.

Perforative peritonitis has many facets of treatment as it involves multiple systems and requires complex ICU support. Scoring system that helps us to understand the

problem by providing guidance in evaluation of patient's condition, to anticipate difficulties in management of individual patient and whether the line of management needs to be changed.

This study will help forming a management protocol in cases of perforation peritonitis.

2. Materials and Methods

We operated 50 patients with perforative peritonitis diagnosed on the basis of history, clinical examination, and plain skiagram abdomen erect antero-posterior view.

Patients with perforation of stomach and small intestine underwent closure with interrupted silk sutures with overlying omental patch. Patient with appendicular perforation underwent appendectomy. Patients with

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malignant perforation of colon underwent resection and anastomosis.

The Mannheim's peritonitis index was applied to each patient after collecting necessary data pre and intra-operatively.

Mannheim's Peritonitis Index²

RISK FACTOR SCORES

Age > 50 years	5
Female sex	5
Organ failure*	7
Malignancy	4
Preoperative duration of peritonitis > 24 hours	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
Exudate	
Clear	0
Cloudy, purulent	6
Fecal	12

*Kidney failure = creatinine level > 177 umol/L or urea level > 167mmol/L or oliguria < 20ml/hour;
 Pulmonary insufficiency = PO2 < 50 mmHg or PCO2 > 50 mmHg;
 Intestinal obstruction/paralysis > 24hours or complete mechanical ileus, shock hypodynamic or hyperdynamic

The patients were followed up till discharge/death and applicability of the Mannheim's peritonitis index to predict mortality assessed.

Statistical analysis was performed with the Chi-square test and the Fischer's exact t test using the SPSS software version 16.

This study has the approval of Institutional Ethical Committee.

3. Results

The most common age group affected: 35-45 years. The youngest patient: 12 years old with traumatic Jejunal perforation. The eldest patient: 73 years old with malignant Caecal perforation.

In this study 74% of patients were males and 26% females, the sex ratio being 2.84:1.

Peptic ulcer perforation involving the stomach and duodenum constituted 70% of cases and is the most common type with duodenum affected in 74% of these cases. Enteric perforations constituted the next common

group with 16% cases. Colonic perforation was found in 4% of cases. Appendicular perforation was the least common with only 2% cases attributed on record in this study.

Two patients had malignant perforation of the gastrointestinal tract out of the fifty studied patients giving a 4% incidence of malignancy causing perforation. Both were males, one having sigmoid malignant perforation and the other had caecal malignant perforation. Both patients survived, were discharged and advised adjuvant chemotherapy.

14 patients (28%) developed post-operative complications in our study.

Wound infection was the most common complication occurring in 18% of patients. Burst abdomen occurred in 6% of patients and was preceded by wound infection in all cases. Lower respiratory tract infection occurred in 12% of patients. Septicaemia occurred in 10% of patients and was fatal in all cases. Acute respiratory distress syndrome occurred in 4% of patients. There was no case of any fistula development.

The rising trend of post-operative complication with higher MPI scores is clearly seen in Chart 1. The sensitivity of MPI score at 26 is 78.57%, and specificity is 83.33%. The positive predictive value is 64.71%, and negative predictive value is 90.90%.

The data was analysed using SPSS software version 16. Pearson Chi Square test value is 11.664 at degree of freedom (df) of 2. Fischer's exact test gives p value of 0.002, which is highly significant.

5 out of the 50 studied patients succumbed to their illness with a consequent 10% mortality rate in our study.

There were 13 patients with MPI score less than 21, and no mortality occurred in this group (mortality 0%). There were 30 patients with MPI score between 21 and

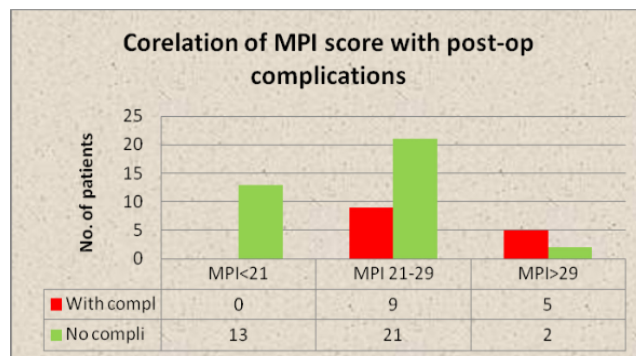


Chart 1. Corelation of MPI score with post-op complications.

29, and there was no mortality in this group too (mortality 0%). Of the 7 patients that constituted the third group with MPI score more than 29, only 2 survived and 5 expired (mortality 71.42%).

All of the 5 patients that expired were females. These females were in different age groups ranging from 18-70 years old.

The other 2 patients were males, who responded well to treatment and survived despite having high MPI score.

Thus female gender, with high MPI score, irrespective of age, has a higher mortality rate and should be managed aggressively for better outcome.

The data was analysed with the SPSS software version 16. Pearson Chi Square test value is 34.127 at degree of freedom (df) of 2. Fischer's exact test gives p value 0.000 which is very significant. This concludes that there is high association of mortality with rising MPI scores (Chart 2).

Thus our study along with the data from other studies conducted over a larger study sample size clearly depicts the increase in mortality rate with rising MPI score.

4. Discussion

Mortality in patient with peritonitis remains high, many multi centric studies confirm this fact. Many factors responsible for this are type of underlying pathology, condition of the patient, nature of treatment offered to the particular patient. Hence it is difficult to predict the prognosis in these patients³.

The disease process of peritonitis is complex in nature, to understand this a scoring system which provides objective description of patients condition at point is needed.

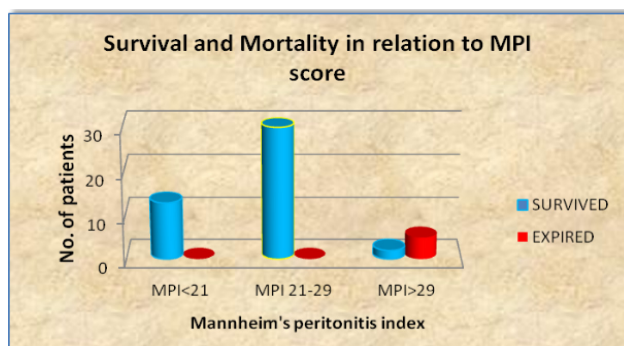


Chart 2. Survival and Mortality in relation to MPI score.

The Mannheim's peritonitis index is one such effort towards developing a comprehensive and reliable scoring system for peritonitis.

Mannheim Peritonitis Index was originally derived from data collected from 1253 patients with peritonitis treated between 1963 and 1979, and was developed by discriminant analysis of 17 possible risk factors, by Wacha². 8 of these were of prognostic relevance and are currently employed widely for predicting mortality from peritonitis. The information is collected at the time of admission and first laparotomy.

The original reports excluded postoperative peritonitis and appendicitis, but further investigations proved that extension to these groups did not reduce the predictive value.

In this study the MPI Score was found to be a good indicator of poor prognosis with 5 out of 7 patients of score more than 29 having succumbed to the disease.

Morbidity can also be judged using the MPI Score as validated by the fact that 9 out of 30 patients with score between 21 and 29 developed post-operative complications.

Similar results have been obtained by other investigators^{4,5}.

Our study showed high mortality in female patients with a high Mannheim's peritonitis index, irrespective of their age.

Malignancy of the gastrointestinal track presenting as perforation peritonitis is rare but with aggressive management these patients can also be saved.

5. Conclusion

In conclusion, in the management of patients with generalized peritonitis, scoring helps in forming various risk groups, intensive care can be provided when indicated, appropriate operative procedure can be selected, outcome can be predicted and can help in future clinical research. Mannheim peritonitis index is easy to use, with all variables easily available at first laparotomy, with reproducible results and is a reliable predictor of mortality.

6. References

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