



A Study to Evaluate the Efficacy of the Prognosis of Mannheim Peritonitis Index Score in Patients with Perforation Peritonitis

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Introduction

Peritonitis caused by hollow viscous perforation continues to be one of the most challenging conditions confronted by a surgeon. It is one of the frequently encountered surgical emergencies in tropical countries like India and most of the times it affects young males in the productive phase of their life^{1,2,3,4}.

Peritonitis following perforation of the gastrointestinal tract remains an important problem in the field of abdominal surgery. The clinical symptoms of peritonitis vary depending largely on the site of perforation as the contents and / or bacterial flora are not uniform throughout the gastrointestinal tract and thus the therapy for peritonitis should always be based on such facts. By now it has been established that the spectrum of etiology of perforation in Indian subcontinent differs from its western counterpart². Majority of the patients present late, with purulent peritonitis and septicemia⁵. Surgical treatment of perforation peritonitis is highly demanding and very complex, combination of improved surgical

technique, anti microbial therapy and intensive care support has improved the outcome of such cases⁶.

Although, a number of advancements have been made in surgical techniques, antimicrobial therapy and intensive care support yet management of peritonitis continues to be highly demanding, difficult and complex. Consecutively, the prognosis of patients with perforation peritonitis and intra-abdominal infections is generally poor⁷. Perforation peritonitis might be responsible for multi organ failure, thus increasing the severity of morbidity and mortality⁸.

Interestingly, there has been seen to be differences in the location of perforation in different geographical regions across the world. In eastern countries such as India and Pakistan, the proximal part of the gastrointestinal tract (GIT) is affected more commonly² whereas in western population distal gut perforation is more common. Overall, duodenum is the most common site of perforation⁹.

In majority of cases the presentation to the hospital is late with well established generalized peritonitis with purulent/fecal contamination and varying degree of septicemia. The signs and symptoms are typical and it is possible to make a clinical diagnosis of peritonitis in all patients². Moreover, complex nature of surgical infections, the multifaceted aspects of treatment, and the complexity of Intensive Care Unit (ICU) support makes evaluation of new diagnostic and therapeutic advances in this field very difficult¹⁰.

One of the reasons for difficulty in predicting the outcome is lack of precise classification. Keeping in view this difficulty, need for a scoring system to quantify the severity of perforation peritonitis and to predict the outcome has been felt.

Although, several scoring systems have been proposed to stratify the patients with peritonitis. Some of these scoring systems include: Peptic Ulcer Perforation (PULP) score, Acute Physiology and Chronic Health Evaluation, BOEY score, Simplified acute physiology score (SAPS), Sepsis severity score (SSS), Ranson score, Imrie score and Mannheim peritonitis index (MPI)^{11,12,13,14,15,16,17}.

Among various scoring systems available, Mannheim peritonitis index (MPI) was developed by Wacha and Linder in 1983. It was based on the retrospective analysis of data from 1253 patients with peritonitis, in which 20 possible risk factors were considered. Of these only 8 proved to be of prognostic relevance and were entered into the Mannheim Peritonitis Index, classified according to their predictive power¹⁸.

The MPI is a specific score, which has a good accuracy and provides an easy way to handle with clinical parameters, allowing the prediction of the individual prognosis of patients with peritonitis¹⁹. The wide applicability, validity and reliability of MPI is regarded even nearly four decades after its introduction^{7,10,20}. Considering its wide usage throughout the world, in present study we also make an attempt to evaluate Mannheim Peritonitis

Index score for predicting the outcome in patients with perforation peritonitis.

Aim

Evaluation of Mannheim Peritonitis Index score for predicting the outcome in patients with perforation peritonitis

Objectives

- To evaluate the patients with perforation peritonitis on MPI.
- To compare the pre and intra operative MPI with post operative outcome.
- To study how effective is MPI in predicting outcome in patients with perforation peritonitis.

Material and Methods

Prospective study of 49 patients admitted and operated for perforation peritonitis in Era's Lucknow Medical College & Hospital. The structured scoring system i.e. MPI was applied along with other clinical and biochemical parameters recorded in pre-structured proforma. Data was analysed for predicting mortality and morbidity using EPI info and SPSS software.

Results

The present study was conducted to evaluate Mannheim Peritonitis Index score for predicting the outcome in patients with perforation peritonitis. Out of patients presenting to surgery OPD or Emergency with clinical features of perforation peritonitis, 48 patients confirmed on clinical and radiological evaluation were included in the study. Following results were observed:

- 1) Age of patients ranged from 18 to 68 years, mean age was 41.52 ± 12.74 years, only 25.0% patients were aged >40 years. Majority of the patients enrolled in the study were males (70.8%).
- 2) Most common presenting symptoms of patients were distension (97.9%), constipation (95.8%) and abdominal pain (87.5%) while

less common presenting symptoms were Fever (66.7%), Vomiting (45.8%) and Flatus (2.1%). Gastric site perforation was most common (54.2%), other common sites were Ileal (18.8%), Appendicular (16.7%).

- 3) All the patients enrolled had non-colonic sepsis and generalized extension of peritonitis. Malignancy was found in only 1 (2.1%) while organ failure was reported among 2 (4.2%) cases. Clear exudate was found in majority of the cases (56.3%), exudate was purulent and fecal among 18.8% and 25.0% cases respectively.
- 4) Mannheim Peritonitis Index (MPI) score of majority of the cases enrolled in the study was ≤ 20 (56.3%), only 6.3% cases had MPI score ≥ 30 .
- 5) Out of 48 cases enrolled in the study 4 (8.3%) expired during the treatment, rest 44 (91.7%) were discharged after treatment. Average duration of hospital stay was 12.22 ± 2.12 days (Range 8-18 days).
- 6) Association of outcome with various factors of Mannheim Peritonitis Index score was found to be statistically significant only with Age > 50 years, Organ failure and Malignancy, incidence of above factors was significantly higher among expired patients as compared to discharged.
- 7) MPI ≥ 30 was found to be 50.0% sensitive and 97.7% specific for outcome mortality but no significant association of MPI score with duration of hospital stay was observed.

Conclusion

The present study showed usefulness of MPI in stratification of mortality risk among patients waiting surgical intervention for perforation peritonitis. An increasing MPI score is indicator of an increased mortality. The component scores might help the healthcare providers to prepare adequate strategies to address the individual specific treatment needs in order to improve the outcome.

References

1. Dorairajan LN, Gupta S, Deo SV, Chumber S, Sharma LK. Peritonitis in India: A decade experience. *Tropical Gastroenterol.* 1995;16:33–8.
2. Sharma L, Gupta S, Soin AS, Sikora S, Kapoor V. Generalised peritonitis in India - tropical spectrum. *Jpn J Surg.* 1991;21:272–7.
3. Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India: A review of 504 consecutive cases. *World J Emerg Surg.* 2006;1:26.
4. Gupta S, Kaushik R. Peritonitis: The eastern experience. *World J Emerg Surg.* 2006;1:13.
5. Ersumo T, W/MESKEL y, Kotisso B: Perforated peptic ulcer in Tikur Anbessa Hospital; a review of 74 cases. *Ethiop Med J* 2005, 43(1):9-13.
6. Bosscha K, van Vroonhoven TJ, Werken C van der: Surgical management of severe secondary peritonitis. *Br J Surg* 1999, 86(11):1371-7.
7. Rangaswamy P, Rubby SA, Prasanna CM. Clinical study of perforative peritonitis and the role of mannheim peritonitis index in predicting its mortality. *Int Surg J.* 2016 Nov;3(4):2016-2021.
8. Bohnen J, Boulenger M, Mackin JL. Prognosis in generalized peritonitis, relation to cause and risk factors. *Arch Surg.* 1983;118:285-90.
9. Melangoni MA, Inui T. Peritonitis: The western experience. *World J Emerg Surg.* 2006;1:25.
10. Sharma S, Singh S, Makkar N, Kumar A, Sandhu MS. Assessment of Severity of Peritonitis Using Mannheim Peritonitis Index. *Nigerian Journal of Surgery: Official Publication of the Nigerian Surgical Research Society.* 2016;22(2):118-122.

11. Irvin TT. Mortality and perforated peptic ulcer: a case for risk stratification in elderly patients. *Br J Surg.* 1989;76:215–18.
12. Moller MH, Engebjerg MC, Adamsen S, Bendix J, Thomsen RW. The Peptic Ulcer Perforation (PULP) score: a predictor of mortality following peptic ulcer perforation. A cohort study. *Acta anaesthesiologica Scandinavica.* 2012;56(5):655–62.
13. Moller MH, Adamsen S, Thomsen RW, Moller AM. Preoperative prognostic factors for mortality in peptic ulcer perforation – a systematic review. *Scand J Gastroenterol.* 2010;45:785–805.
14. Moller MH, Shah K, Bendix J, Jensen AG, Zimmermann-Nielsen E, Adamsen S, Moller AM. Risk factors in patients surgically treated for peptic ulcer perforation. *Scand J Gastroenterol.* 2009;44:145–52.
15. Knaus WA, Zimmerman JE, Wagner DP, Draper EA, Lawrence DE. APACHE-acute physiology and chronic health evaluation: a physiologically based classification system. *Critical Care Medicine.* 1981;9.
16. Boey J, Choi SKY, Alagaratnam TT, Poon A. Risk stratification in perforated duodenal ulcers. *Ann Surg.* 1987;205:22–6.
17. Bion J. Outcome in Intensive care. *BMJ.* 1993;307:953-54.
18. Linder MM, Wacha H, Feldmann U, Wesch G, Streifensand RA, Gundlach E. [The Mannheim peritonitis index. An instrument for the intraoperative prognosis of peritonitis] *Chirurg.* 1987;58(2):84–92.
19. Bosscha K, Reijnders K, Hulstaert PF, Algra A, van der Werken C. Prognostic scoring systems to predict outcome of peritonitis and intra-abdominal sepsis. *Br J Surg.* 1997; 84(11):1532-34.
20. Kumar P, Singh K, Kumar A. A comparative study between Mannheim peritonitis index and APACHE II in predicting the outcome in patients of peritonitis due to hollow viscus perforation. *Int Surg J.* 2017 Feb;4(2):690-696.