

A Study of the Role of Mannheim Peritonitis Index in Evaluation of Prognosis in Patient with Peritonitis

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Abstract

Background: Peritonitis is one of the most common infections, and an important problem that a surgeon has to face. Despite the advancement in treatment the mortality rate is still high. There is no single, easily available laboratory test that predicts severity or prognosis in patients with peritonitis

Aims: The purpose of this study is to determine the efficiency of Mannheim peritonitis index in determining the prognosis of patients diagnosed with peritonitis.

Methodology: A descriptive study which includes all patients with peritonitis who fulfilled the inclusion criteria in Rajiv Gandhi Government General Hospital during the time period of January 2017 to December 2017. Parameters for MPI Index and the time interval between the onset of perforation and the time of surgery is noted in all patients.

Results: Out of 50 patients included in the study death rate in patients with MPI score < 21 was 0%, 21-29 was 42% and >29 was 93%.

Conclusion: Early evaluation of severity of illness using MPI allows us to estimate the probability of patient's survival.

Keywords: Peritonitis, Mannheim peritonitis index (MPI), Sepsis, Emergency Laparotomy, Mortality.

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I. Introduction

Peritonitis is defined as inflammation of the serous membrane that lines the abdominal cavity and the organs contained therein. Peritonitis is one of the most common infections, and an important problem that a surgeon has to face. Despite the advancement in treatment the mortality rate is still high. There is no single, easily available laboratory test that predicts severity or prognosis in patients with peritonitis. Identifying both prognostic factors and severity scales that provide objective description of the patient condition at specific points such as the preoperative and postoperative period is useful to improve our understanding of the problem involved. Intra-abdominal infections and secondary peritonitis are a frequently encountered surgical emergency in tropical countries like India.

Various scoring systems have been used to indicate prognosis of patients with peritonitis. These scores can be broadly divided into two groups:

A) Disease independent scores for evaluation of serious patients;

- APACHE II score
- Simplified Acute Physiology Score (SAPS II)
- Sepsis Severity Score
- Multiple Organ Dysfunction Score

B) Peritonitis specific score;

- Mannheim Peritonitis Score (MPI)
- Peritonitis Index Altona II
- Left Colonic Perforation Score.

The MPI appears to be more practical than other scoring system, such as the APACHE II, which is time consuming and may be impossible to apply in the setting of intra-abdominal sepsis.

II. Aims & Objectives

1. The purpose of this study is to determine the efficiency of the index in determining the prognosis of patients diagnosed with peritonitis.
2. To determine the factors influencing mortality of patients with peritonitis via this index.

III. Materials And Methods

Study Design: Prospective study

Sample Size: 50

Inclusion Criteria

- Peritonitis due to hollow viscus perforation (traumatic and non traumatic)
- Age :18-80 yrs

Exclusion criteria

- Primary peritonitis
- Pregnant women
- Age < 18 or >80 years

All patients who fit the inclusion criteria of peritonitis in Institute of General Surgery, Madras Medical College – Rajiv Gandhi Government General Hospital were selected. After getting ethics committee clearance, all patients were explained about the disease, benefits & possible side effects of treatment. Informed written consent was obtained from all patients before initiation of treatment. Detailed history were Studied and the following data collected Malignancy, Site of perforation, Pre operative duration, Type of exudates, Length of stay in hospital, Post op complication.

IV. Results

All the above collected data were analysed and conclusions derived through statistical analysis using Mann-Whitney U test for continuous variables and Chi-square test for categorical variables. In our study the site of perforation maximum was seen in duodenal 11(22%) followed by ileal 10 (20%) and gastric 9 (18%) with least in the gastroduodenal region 2(4%). In present study 30 (60%) patients showed presence of organ failure. In our study patient who presented less than <24 hrs were 18 (36%). In study showed patient with malignancy presenting with peritonitis was around 5 (10%). In our study 13 (26%) patients origin of sepsis was colonic while in 37 (74%) patients origin of sepsis was noncolonic. In our study 34 i.e. 68 % patients had Diffuse peritonitis while 16 i.e. 32 % had localised peritonitis. In our study 31 (62%) patients had purulent exudates while clear & fecal exudates were present in 13(26%) & 6 (12%) patients respectively. In 23 (46%) patients total MPI score was < 21 while 12 (24%) patients total score was 21-29 & it was > 29 in 15 (30%) patients. In our study the procedure maximum done was omental patch repair 19 (38%) f/b primary closure 9 (18%) and appendectomy 7(14%) with least was distal gastrectomy and serosal patch repair 1 (2%). In our study around 31 patients were discharged of about 62% and death was seen in 19 (38%). In our study maximum mortality was seen in age group 61 and more followed by 46 -60 yrs with least in 18 -30 years. In correlation between Age > 50 yrs with incidence of mortality, our study showed statistically significant result with **p <0.01**. In correlation of malignancy with incidence of mortality p value in our study was < **0.001** which is statistically significant.

In correlation of organ failure with incidence of mortality p value in our study was < **0.001** which is statistically significant. In correlation of preoperative duration with incidence of mortality, our study showed statistically insignificant result with **p <0.50** and doesn't correlate with MPI. In correlation of site of origin of colonic with incidence of mortality, our study showed statistically significant result with **p <0.017**. In correlation between type of peritonitis with incidence of mortality, our study showed statistically significant result with **p <0.001**. In correlation between character of exudate with incidence of mortality, our study showed statistically significant result with **p <0.01**. In our study mortality rate among patients with MPI score > 29 and with MPI < 21 is statistically significant with **p <0.001**

V. Discussion

- 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.
- There has been a decline in incidence in young people and there has been a rise in elderly population..These changes can be correlated to the cohort phenomenon: ulcer perforation risk is particularly common in the cohorts born after the turn of 20 century and is less common in previous and succeeding cohorts'
- It is also attributed to the increased numbers of traumatic perforations in the younger age group leading to parallel increase in the overall prevalence of perforation peritonitis in this age group. Appendicular perforation is more common in the age group of 20-30 years but no age is exempted. Majority of the ileal perforations are seen in the age group of 10-30 years, typhoid being the main etiological factor.
- The higher death rate among the elderly undoubtedly reflects an increased prevalence of pre existing cardiovascular and other diseases as well as a predictable decline in many physiological functions.

- Even if there is no evidence of disease there may be a decrease in the physiological reserve such as the decrease in the glomerular filtration rate despite a normal creatinine
- The increased number of duodenal perforations in our study is due to increased prevalence of the acid peptic disease.
- The perforations of the proximal gastro intestinal tract are more common than distal gastrointestinal tract
- The classic, pedicled omental patch was first performed by Cellan Jones in 1929, but misleadingly attributed to Graham, who described later.
- In large perforations, there exists threat of postoperative leakage following closure by the simple method. Here other surgical options such as partial gastrectomy, jejunal serosal patch, or gastric disconnection may be needed for the secure closure.
- The reason of prolonged pre op duration is due to unawareness among people and lack of sophisticated investigations in peripheral areas.
- Colonic perforation presents with faecal exudates which induces a severe form of peritonitis.
- Diffuse peritonitis is associated with a severe inflammatory reaction and development of sepsis and multiorgan failure. Localization of peritonitis is body's defense mechanism thereby leads to formation of abscess.
- Purulent and faecal exudates are seen in patients presenting late and usually has severe sepsis.
- Clear exudates are generally sterile to start with so evolution of sepsis is slow. Purulent exudates and fecal exudates had a significant number of microorganisms many of which are gram negative anaerobes and they result in endotoxaemia and septic shock.
- There are disturbances of the immune system in oncologic patients, due to destruction of the anatomic barriers and derangement in the phagocytic activities and humoral and cellular responses. Hence they are more prone to sepsis leading to increased mortality rate.
- In the original study by Wacha and Linder the cut off point of 26 MPI point was used. In our study a wide range was applicable since patients had multiple positive risk factors hence helped in improving the outcome of study.

VI. Conclusion

- In the past 30 years, many prognostic scoring systems have been developed for critical patients. Presently one of the most accepted scores is APACHE II score.
- The MPI is one of the simplest scoring systems in use that allows the surgeon to easily determine the outcome risk during initial surgery.
- Early evaluation of severity of illness using MPI allows us to estimate the probability of patient's survival.
- Death rate in patients with MPI score < 21 was 0%, 21-29 was 42% and >29 was 93%
- The simplicity of MPI makes it ideal for hospitals with serious shortages of staff and resources.

VII. Figures And Tables

1. CHARACTER OF EXUDATES IN STUDY POPULATION

Exudate	Frequency	Percent
Clear	13	26
Purulent	31	62
Fecal	6	12

2. INTRAOPERATIVE PROCEDURES DONE

Intraoperative Procedures	Frequency	Percent
EL & OMENTAL PATCH REPAIR	19	38
EL WITH RA (RESECTION & ANASTOMOSIS)	3	6
EL WITH ILEOSTOMY/JEJUNOSTOMY	5	10
EL WITH PRIMARY CLOSURE	9	18
EL WITH HEMICOLECTOMY	1	2
EL WITH APPENDECTOMY	7	14
HARTMANN'S PROCEDURE	4	8
DISTAL GASTRECTOMY WITH GJ	1	2
JEJUNAL SEROSAL PATCH REPAIR	1	2

3. MANHEIM PERITONITIS INDEX

Study Variable	Adverse factor	Points	Favorable factor	Points
1.Age	>50 yrs	5	< 50 years	0
2.Sex	Female	5		0
3.Organ Failure	Present	7		0
4.Malignancy	Present	4		0
5.Evolution time	>24 hrs	4		0
6.Origin of sepsis	Non-colonic	4		0
7 Extension of peritonitis	Generalized	6		0
8.Character of exudates	Purulent	6	Clear	0
	Fecal	12		

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