

# Correlation of outcome in patients of peritonitis using mannheim peritonitis index (MPI) in western Rajasthan, India

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## Abstract

**Introduction:** Peritonitis is a life-threatening condition and one of the reasons for high mortality. Peritonitis due to perforation affects the general condition and leads to complications causing multiple organ failure, renal failure, overwhelming sepsis and post op Respiratory failure. Reproducible scoring systems that allows a surgeon to determine the severity of the intra abdominal infection are essential to: 1) ratify the effectiveness of different treatment regimens, 2) scientifically compare surgical intensive care units, 3) help indicate individual risk to select patients who may require a more aggressive surgical approach and 4) be able to inform patient's relatives with greater objectivity. In the past 30 years, many prognostic scoring systems have been developed for critical patients. Presently, most accepted scores is APACHE II (which intergrates various physiologic variables during the first 24 h within the intensive care unit (ICU)), the Mannheim Peritonitis Index (MPI;{13} and the Peritonitis Index Altona 11(PIA 11). Last both scores are based on information collected before and during operation and include physiological and general variables as well as those specific to peritonitis. The use of scores for the accurate and reliable prediction of mortality or morbidity in individual patients with peritonitis has not yet been analysed fully. We have therefore carried out a prospective trial to test Manheim prognostic scoring system's ability to predict outcome (death or survival) in patients with peritonitis.

**Keywords:** Peritonitis, Multiple organ failure, APACHE II, Peritonitis Index Altona, Mannheim Peritonitis Index.

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## INTRODUCTION

Peritonitis is one of most common infectious problem that a surgeon has to face. Despite the progress in use of antimicrobial agents and intensive care treatment, the present day mortality of diffuse suppurative Peritonitis, continues to be unacceptably high, about 10-15%. Peritonitis, inflammation of the serosal membrane lining the abdominal cavity and contained viscera have a large surface area<sup>3</sup>. In the past 30 years, many prognostic

scoring systems have been developed for critical patients. Despite their design for general application, some have proven specifically useful in septic patients<sup>4</sup>. Presently, one of the most accepted scores is ( in 1982, Knaus and others) APACHE II, which intergrates various physiologic variables during the first 24 h within the intensive care unit (ICU) with age and chronic health status of the patient<sup>5,6</sup>. This initial stratification of risk factors and predicative equation estimate patient outcome. They are, however, both complex and time cosuming<sup>7-9</sup>. Two other scores have been developed specifically for peritonitis: the Mannheim Peritonitis Index, MPI;<sup>10</sup> and the Peritonitis Index Altona I1 (PIA 11;<sup>1,2</sup>. Both scores are based on information collected before and during operation and include physiological and general variables as well as those specific to peritonitis. In clinical trial they are used to define risk, to compare treatment, to define inclusion and exclusion criteria, and to measure outcome in trials that do not involve comparisons. The Mannheim peritonitis index emerged as a reliable marker for assessing the severity and prognosis of intra-abdominal

infection with sensitivity and specificity comparable to APACHE II score which has been adopted as the gold standard by surgical infection Society. The score designed specifically for peritonitis, combines preoperative and operative data and is easy to apply<sup>11</sup>. The use of scores for the accurate and reliable prediction of mortality or morbidity in individual patients with peritonitis has not yet been analysed fully. We have therefore carried out a prospective trial to test Manheim prognostic scoring system's ability to predict outcome (death or survival) in patients with peritonitis.

### MATERIAL AND METHODS

This clinical study is done on 100 patients admitted in surgical department, M.G. Hospital associated with Dr. S.N. Medical College, Jodhpur, India.

#### Study Design

It is a prospective study; all the eligible cases that are encountered during the period of study were taken up in the study.

#### Inclusion criteria

- Peritonitis secondary to hollow viscus perforation.
- Non traumatic perforation peritonitis.
- Peritonitis of other etiologies like appendicular, cholecystitis or pancreatitis.

#### Exclusion Criteria

- Post op peritonitis due to anastomosis leak, etc.
- Perforation peritonitis patients managed conservatively.

### OBSERVATIONS AND RESULTLS

**Table 1:** Age sex wise distribution of study subjects

Age (in yrs)	Male (%)	Female (%)	Total
15-30	21 (58.33)	15 (41.67)	36 (100)
31-45	18 (72)	7 (28)	25 (100)
46-60	11 (64.71)	6 (35.29)	17 (100)
>60	18 (81.82)	4 (18.18)	22 (100)
<b>Total</b>	<b>68 (68)</b>	<b>32 (32)</b>	<b>100</b>

In the study, mean age of patients was 42.43 (SD 19.13) years ranging from 15-85. Majority of 36 patients belonged to age group of 15-30 years. There was male preponderance (68%) with male to female ratio of 2.1:1.

**Table 2:** Clinical presentation in the study

Symptoms	No. of cases	Percentage
Pain Abdomen	100	100
Vomiting	89	89
Fever	52	52
Abdominal distension	37	37
Oliguria	18	18
Altered bowel habits	8	8
Weight Loss	1	1

Most common presentation of peritonitis was pain abdomen which was present in almost 100% of the patients. Second most common presentation was vomiting in about 89%, followed by fever (52%), abdominal distension (37%), oliguria (18%), abnormal bowel habits (8%) and weight loss (1%).

**Table 3:** Distribution of study subjects and MPI score

MPI score	Dead	Wound Infection	Normal	Total
<21	0 (0)	2 (4)	48 (96)	50 (100)
21-29	1 (3.03)	14 (42.42)	18 (54.55)	33 (100)
>29	10 (58.82)	7 (41.18)	0 (0)	17 (100)
<b>Total</b>	<b>11 (11)</b>	<b>23 (23)</b>	<b>66 (66)</b>	<b>100</b>

In the study, 50% of patients had MPI score has <21, of which 4% of patients developed wound infection with 0% mortality and 96% of patients being normal. 33% patients were MPI score 21-29, in that 42.42% had morbidity (wound infection) and the mortality rate is 3.03%. In patients with MPI score >29, the morbidity rate is 41.18% and mortality rate is 58.82%. The chi square value is 0.030 with significant p-value of 0.001.

**Table 4:** Etiology and MPI score

Etiology	<21	≥21	Total
Caecal Perforation	0 (0)	1 (100)	1 (100)
Duodenal Perforation	27 (46.55)	31 (53.45)	58 (100)
AppnedicularPeritonitis	15 (93.75)	1(6.25)	16 (100)
Ileal Perforation	0 (0)	8 (100)	8 (100)
Jejunal Perforation	2 (100)	0 (0)	2 (100)
Gastric Perforation	7 (46.67)	8 (53.33)	15 (100)
<b>Total</b>	<b>51 (51)</b>	<b>49 (49)</b>	<b>100</b>

In the study of 100 subjects, duodenal perforation was seen in 58% of patients, followed by appnedicular (16%), gastric (15%), ileal (8%), jejuna (2%) and caecal perforation (1%) as the etiologies of peritonitis.

**Table 5:** correlation of total leucocyte count and MPI score

Total Leucocytes count	Mpi Score		Total
	<21	≥21	
<4000	7 (87.50)	1 (12.50)	8 (100)
4000-12000	22 (84.62)	4 (15.38)	26 (100)
>12000	22 (33.33)	44 (66.67)	66 (100)

In the study of 100 patients majority of patients 66% have total leucocytes count >12000 of which MPI score ≥21 is (33.33%) and MPI score ≥21 is 66.67% and 26% patient have total leucocytes count between 4000-12000 of which MPI score <21 is (84.62%) and MPI score ≥21 is (15.38%) and 8% patients have total leucocytes count <4000 of which MPI score <21 is (87.50%) and ≥21 is (12.50).

**Table 6:** Correlation between time and mortality

Duration of symptoms	Mortality	Normal	Total
One day	0 (0)	21 (77.78)	27 (100)
2 to 5 days	5 (7.81)	44 (68.75)	64 (100)
>5 days	6 (66.67)	0 (0)	9 (100)

In the study, 64% presented to the hospital after 24 hrs of onset of symptoms and the mortality of those patients who presented within 2 to 5 days and after 5 days was 7.81% and 66.67% respectively. The chi square value of these patients is 13.12 with p-value of 0.0002.

**Table 7: Correlation between time and morbidity**

Duration of symptoms	WI/SICU	Normal	Total
One day	6 (22.22)	21 (77.78)	27 (100)
2 to 5 days	15 (23.44)	44 (68.75)	64 (100)
>5 days	3 (33.33)	0 (0)	9 (100)

In the study, the morbidity in patients who presented in one day, 2 to 5 days and >5 days is 22.22%, 23.44% and 33.33%. The chi square value of these patients is 8.35 with a significant p-value of 0.003.

## DISCUSSION

Peritonitis is a hot spot for the surgeons despite advancements in surgical technique and intensive care treatment. Various factors like age, sex, duration, site of perforation, extent of peritonitis and delay in surgical intervention are associated with morbidity and mortality. A successful outcome depends upon early surgical intervention, source control. Also various methods and scoring systems are used to identify the risks and to morbidity and mortality in those patients. In our study the most common etiology of peritonitis was duodenal perforation (58%), followed by appendicular (16%), gastric (15%) and ileal (8%). Results are in line with the Ohmann *et al*<sup>12</sup>. In this study observations given a clear message that earlier these patients report for treatment, lesser is the ensuing morbidity and mortality. Witman DH (1994) *et al*<sup>13</sup> has also found in his study, high mortality rate (40%) when diagnosis of peritonitis was made after 24 hours, which are in line with our studies. In our study 50% of patients had MPI score has <21, of which 4% of patients developed wound infection with 0% mortality and 96% of patients being normal. 33% patients were MPI score 21-29, in that 42.42% had morbidity (wound infection) and the mortality rate is 3.03%. In patients with MPI score >29, the morbidity rate is 41.18% and mortality rate is 58.82% (Similar to Billing A, Frohlich D, Schildberg FW<sup>14</sup> and Batra P, Gupta D, *et al*<sup>15</sup> in 2013). After comparing with our results we have found that results similar when score is <21 and >29, but there is less mortality in 21-29 score. This difference in results could be attributed to early aggressive intervention, better pre-operative, intra operative and post-operative management of patients. After comparing the results of our study with Barrera Melgarejo E, Rodriguez Castro M, BordaLuque G, Najjar Trujillo N, *et al*, we found the mortality rate >58.82% in patients with score >29 which is in line of this study. CS Agrawal *et al*<sup>16</sup> in 2009 studied on 124 cases and found that M:Fratio 4.4:1 and 71.1%

patients presented >24 hour of onset of symptoms of peritonitis. Most common cause was duodenal perforation 37%, f/b appendicular peritonitis 25.8%. Patients with MPI score <26 have mortality 4.2% and >26 MPI score have mortality 60%. In our study results are in line with result of CS Agrawal *et al*.

## SUMMARY AND CONCLUSION

Patients of various age groups were included in the study ranging from 15 to 85 years. Male to female ratio 2.1:1. Most patients presented with history of pain abdomen (100%), vomiting (89%), fever (52%), abdominal distension (37%) and oliguria (18%) with varying duration. Duodenal perforation was seen in 58% of patients, followed by app. perforation (16%), gastric, ileal, jejunal and caecal perforation as the etiologies of peritonitis. 50% of patients had MPI score has <21, of which 4% patients developed wound infection with 0% mortality and 96% of patients being normal. 33% patients were MPI score 21-29, in that 42.42% had morbidity (wound infection) and the mortality rate is 3.03%. In patients with MPI score >29, the morbidity rate is 41.18% and mortality rate is 58.82%. 23 patients had morbidity (wound infection) and 11 patients had mortality. MPI score system is a score easy to apply, with minimum data which can be found pre operatively and intra operatively and even can be collected from old record sheets or patients. MPI score <21 have lesser morbidity and mortality and MPI score >29 have higher morbidity and mortality. With our study we can conclude with reasonable authority that Mannheim Peritonitis Index is a simple, practical scoring system with good accuracy in predicting mortality and morbidity in patient of perforation peritonitis of various aetiology.

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