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Evaluation of the Mannheim Peritonitis Index for Predicting Outcomes in Patients with Hollow Viscus Perforation

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Abstract: ***Background:*** ***Perforation peritonitis due to hollow viscus perforation is a life-threatening surgical emergency associated with substantial postoperative morbidity and mortality. Early risk stratification using the Mannheim Peritonitis Index (MPI) may improve clinical decision-making.*** ***Methods:*** ***This prospective observational study included 100 consecutive adults with non-traumatic hollow viscus perforation treated at a tertiary care center between 2024 and 2025. Demographic, clinical, laboratory, operative, and postoperative data were collected. MPI scores were calculated for all patients. Associations with mortality were analyzed using the independent t-test and Pearson's chi-square test. Diagnostic performance was evaluated by sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV).*** ***Results:*** ***The mean age was 47.44 ± 16.38 years, and 69.0% of patients were male. Overall mortality was 18.0%. Mortality was significantly associated with surgical site infection, sepsis, multi-organ failure, pneumonia, anastomotic leak, and higher MPI categories (all $p < 0.05$). MPI demonstrated a sensitivity of 66.67%, specificity of 97.73%, PPV of 85.71%, and NPV of 93.48%.*** ***Conclusion:*** ***The Mannheim Peritonitis Index is a simple, useful prognostic tool for predicting mortality in perforation peritonitis. Its high specificity and negative predictive value support early risk stratification and perioperative decision-making in emergency surgical practice.***

Keywords: Mannheim Peritonitis Index; Perforation peritonitis; Hollow viscus perforation; Mortality; Risk stratification

1. Introduction

Peritonitis is a serious surgical emergency characterized by inflammation of the peritoneum, which is most often caused by perforation of a hollow viscus. Although surgical techniques and antimicrobial therapy, and the use of intensive care, have improved, perforation peritonitis still contributes to significant morbidity and mortality, especially in developing countries where delayed presentation and sepsis play a major role in the poor outcomes [1, 2].

There are geographic differences in the etiology of perforation peritonitis. Lower gastrointestinal (GI) perforations are more common if caused by diverticular disease or malignancy in Western countries, while upper gastrointestinal (GI) perforations due to peptic ulcer disease and ileal perforations due to enteric fever predominate in India [3, 4]. Patient age, nutritional status, length of symptoms, peritoneal contamination, septic status and timing of surgical intervention all have a role in determining clinical outcomes; therefore, early risk stratification is important to optimize management and improve clinical outcomes [2, 5].
There are several prognostic scoring systems that have been created for predicting outcomes in peritonitis patients, such as the Acute Physiology and Chronic Health Evaluation II (APACHE II), Sepsis Severity Score, Simplified Acute Physiology Score (SAPS) and the Mannheim Peritonitis Index (MPI). However, many of these scoring systems are complex and need a lot of physiological or lab data, which makes them not applicable in emergency and resource-limited situations [6]. Wacha and Linder developed a disease-specific prognostic scoring system called the Mannheim Peritonitis Index, which was based on readily available clinical and intra-operative factors. Several studies have shown its usefulness for predicting postoperative morbidity and mortality of secondary peritonitis, and its simplicity makes it especially appropriate for emergency surgical practice [6–9]. In many centres, however, there is a lack of evidence for its use in patients with hollow viscus perforation, especially in India. Therefore, this study aimed to evaluate the prognostic performance of the Mannheim Peritonitis Index in predicting postoperative morbidity and mortality among patients with perforation peritonitis due to hollow viscus perforation.

2. Materials and Methods

Study Design and Setting: The study was a prospective observational study carried out in the Department of General Surgery, Baba Raghav Das (BRD) Medical College, Gorakhpur, India, from 2024 to 2025. A total of 12 months of data were collected from consecutive adult patients with non-traumatic hollow viscus perforation associated with perforation peritonitis.

Study Participants: Adult patients (>18 years old) who had a hollow viscus perforation, both clinically and radiologically

diagnosed, which required surgery were included. Informed consent was obtained with a written consent form before the participants were enrolled. Patients with non-perforating causes of peritonitis (e.g., pancreatitis or trauma), patients with severe comorbid conditions who were unsuitable for surgery, patients aged ≤18 years, and those patients with incomplete clinical information were excluded.

Sample Size: During the study period, 100 consecutive eligible patients were included.

Data Collection: Demographic data such as age, sex, and comorbidities were noted at admission. The clinical presentation, laboratory investigations, operative findings and postoperative outcome were recorded on a structured case record form. Each patient was assigned a score for peritonitis (MPI score) according to the criteria described by Wacha and Linder. Eight clinical and intraoperative factors are included in the score: age >50 years, female sex, organ failure, malignancy, duration of peritonitis >24 hours prior to surgery, source of sepsis, extent of peritoneal contamination, and nature of the peritoneal exudate. The overall MPI score is a total of 47, with higher scores representing more severity of disease. Follow-up was carried out during the hospital stay until the patient was discharged or died. The main outcome was in-hospital death. Secondary outcomes were hospital stay and postoperative complications.

Variables: Mannheim Peritonitis Index score was the most important predictor variable. The outcomes measured were postoperative complications, in-hospital mortality, and hospital stay. Demographic data, comorbidities, clinical presentation, laboratory and intraoperative data were collected.

Statistical Analysis: All data were entered into Microsoft Excel and analysed in IBM SPSS Statistics 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables were reported as means and standard deviations (SD), or as medians and interquartile ranges (IQR), as appropriate, and categorical variables as frequencies and percentages. An independent samples t-test was used for the differences between discharged and deceased patients regarding continuous variables. The categorical variables were analysed for association by Pearson's chi-square test. For the assessment of the diagnostic performance of the MPI for predicting the prognosis of death, sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. All statistical tests were two-tailed, and p-values < 0.05 were considered statistically significant.

Ethical Considerations: Before the start of the study, the study was approved by the Institutional Human Ethics Committee of Baba Raghav Das Medical College, Gorakhpur. All participants provided written informed consent before entering the study, and confidentiality of patient information was ensured throughout the study.

3. Results

The total number of patients included in the study was 100. The average age was 47.44 ± 16.38 years, while the highest percentage of patients had an age greater than 60 years (24.0%). There were more males (69.0%). Abdominal pain was the most frequent presenting symptom (93.0%), followed by fever (68.0%), abdominal distention (65.0%), and vomiting (56.0%). Hypertension was the most frequent comorbidity (35.0%), followed by diabetes mellitus (25.0%) and immunosuppression (15.0%) (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics of the Study Participants (N = 100)

Variable	Category	Frequency	Percentage %
Age Group (years)	≤20	4	4.0
	21–30	18	18.0
	31–40	14	14.0
	41–50	20	20.0
	51–60	20	20.0
	>60	24	24.0
	Mean ± SD	47.44 ± 16.38	-
Gender	Male	69	69.0
	Female	31	31.0
Presenting Symptoms	Pain	93	93.0
	Fever	68	68.0
	Vomiting	56	56.0
	Distension	65	65.0
	Constipation	39	39.0
	Diarrhea	26	26.0
	Other symptoms	19	19.0
Comorbidities	Hypertension	35	35.0
	Diabetes Mellitus	25	25.0
	Immunosuppression	15	15.0
	Malignancy	13	13.0
	Chronic Liver Disease	10	10.0
	Chronic Kidney Disease	9	9.0

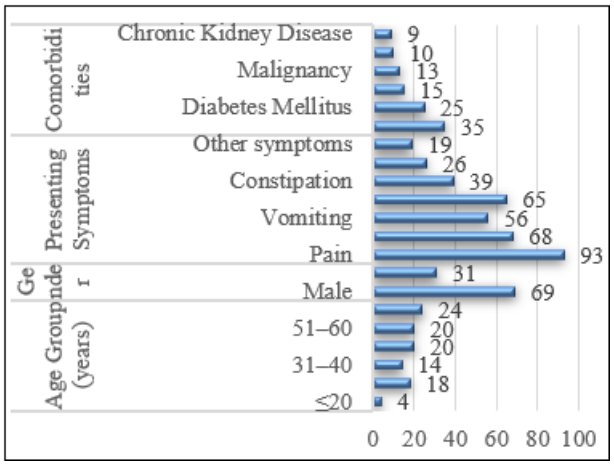

Figure 1: Baseline demographic and clinical characteristics of the study participants

The median time between the onset of symptoms and presentation was 36 hours (IQR: 24–48 hours). The mean heart rate was 102.41 ± 13.61 bpm; the mean systolic and diastolic blood pressure readings were 102.38 ± 16.19 mmHg and 67.67 ± 11.90 mmHg, respectively. The mean GCS score was 12.00 ± 1.39, while the mean oxygen saturation was 95.73 ± 2.34 %. The mean hemoglobin concentration was 10.86 ± 2.10 g/dL, and the mean white blood cell count was 11,999.55 ± 2,920.51/µL. The mean serum creatinine, albumin, and C-reactive protein concentrations were 1.17 ± 0.49 mg/dL, 3.16 ± 0.43 g/dL, and 51.21 ± 21.12 mg/L, respectively. The mean operative time was 116.65 ± 36.71

minutes, while the mean intraoperative blood loss was 356.21 ± 137.20 mL. The median ICU stay was 4 days (IQR: 3–5 days), and the median hospital stay was 11.5 days (IQR: 9–16 days) (Table 2).

Table 2: Baseline Clinical, Laboratory, Operative, and Hospital Course Parameters of the Study Participants (N = 100)

Category	Parameter	Mean ± SD	Median	Min–Max	IQR (25–75)
Clinical Parameters	Symptom onset (hours)	39.72 ± 21.15	36	12–72	24–48
	Pulse (bpm)	102.41 ± 13.61	102	65–132	95–110.75
	Systolic BP (mmHg)	102.38 ± 16.19	103.5	69–148	88–111.75
	Diastolic BP (mmHg)	67.67 ± 11.90	68	31–109	60–75
	Respiratory rate (breaths/min)	21.34 ± 2.63	21	15–28	19–23
	Temperature (°C)	37.96 ± 0.75	37.95	36.39–40.16	37.35–38.47
	SpO_2 (%)	95.73 ± 2.34	96	90–102	94–97
	Glasgow Coma Scale (GCS)	12.00 ± 1.39	12	10–14	11–13
Hematological Parameters	Hemoglobin (g/dL)	10.86 ± 2.10	10.82	6.01–16.99	9.33–12.23
	WBC (/µL)	11999.55 ± 2920.51	11972	5020–20517	10079.25–13927.25
	Platelets (/µL)	239761.29 ± 48153.54	238098.5	139813–386174	207471.5–268608.75
Biochemical Parameters	Urea (mg/dL)	40.29 ± 14.21	39.95	8.5–73.3	30.23–48.83
	Creatinine (mg/dL)	1.17 ± 0.49	1.13	0.06–2.28	0.86–1.47
	Sodium (mEq/L)	134.54 ± 5.10	134.2	121.2–148.1	131.3–138.4
	Potassium (mEq/L)	4.22 ± 0.58	4.22	2.73–5.56	3.88–4.59
	Albumin (g/dL)	3.16 ± 0.43	3.13	1.99–4.36	2.90–3.49
	CRP (mg/L)	51.21 ± 21.12	51.10	6.6–112.9	34.9–64.8
	Lactate (mmol/L)	2.55 ± 1.26	2.54	0.39–5.32	1.61–3.41
Operative Parameters	Operative duration (min)	116.65 ± 36.71	118.5	60–179	83.25–146.5
	Blood loss (mL)	356.21 ± 137.20	357	101–597	247–449.5
Hospital Course	ICU stay (days)	3.78 ± 1.59	4	1–6	3–5
	Hospital stay (days)	11.82 ± 4.24	11.5	5–19	9–16

Features of the disease and clinical outcomes are described in Table 3. Sepsis origin was equally distributed between the two groups (50.0% each), whereas generalized peritonitis and organ failure occurred in 37.0% and 28.0% of patients, respectively. The most common form of organ failure was respiratory failure (20.0%), followed by renal failure (13.0%) and cardiovascular failure (11.0%). Mortality rate was 18.0%, and 41.0% of cases were hospitalized in the ICU. Postoperative complications included surgical site infection (31.0%), sepsis (23.0%), and multi-organ failure (9.0%). Other complications, anastomotic leakage, pneumonia, wound dehiscence, and re-exploration were reported in 32.0%, 16.0%, 15.0%, 13.0%, and 9.0% of patients, respectively (Table 3 and Figure 2).

Table 3: Disease Characteristics, Clinical Outcomes, and Postoperative Complications of the Study Participants (N = 100)

Category	Parameter	Yes, n (%)	No, n (%)
Disease Characteristics	Sepsis origin	50 (50.0)	50 (50.0)
	Generalized peritonitis	37 (37.0)	63 (63.0)
	Organ failure	28 (28.0)	72 (72.0)
Type of Organ Failure	Renal failure	13 (13.0)	87 (87.0)
	Respiratory failure	20 (20.0)	80 (80.0)
	Cardiovascular failure	11 (11.0)	89 (89.0)
Clinical Outcomes	Mortality	18 (18.0)	82 (82.0)
	ICU admission	41 (41.0)	59 (59.0)
	Surgical site infection (SSI)	31 (31.0)	69 (69.0)
	Sepsis	23 (23.0)	77 (77.0)
	Multi-organ failure (MOF)	9 (9.0)	91 (91.0)
Postoperative Complications	Pneumonia	15 (15.0)	85 (85.0)
	Anastomotic leak	16 (16.0)	84 (84.0)
	Wound dehiscence	13 (13.0)	87 (87.0)
	Re-exploration	9 (9.0)	91 (91.0)
	Other complications	32 (32.0)	68 (68.0)

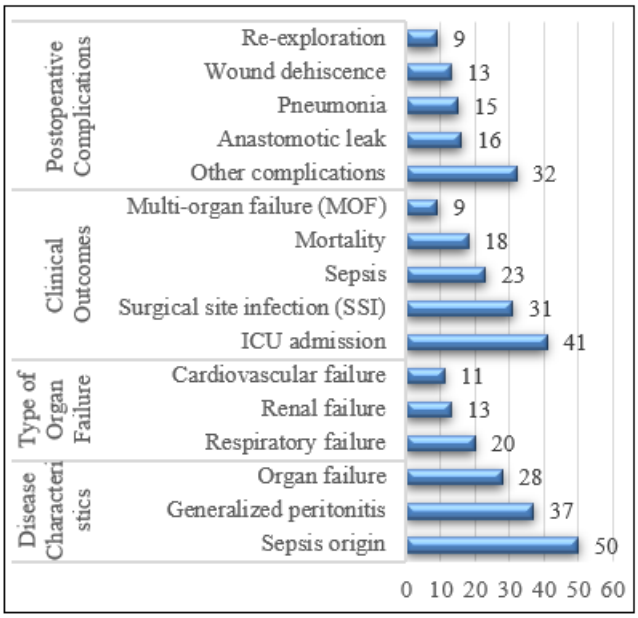

Figure 2. Distribution of disease characteristics, clinical outcomes, and postoperative complications among the study participants

The comparison of clinical, laboratory, operative, and hospital course parameters at baseline between discharged and deceased patients is given in Table 4. Of all the parameters that were compared between the two groups, only the white blood cell count was statistically different (higher among discharged as compared to deceased patients), with a mean WBC count of 12,288.70 ± 2,726.55 vs. 10,682.33 ± 3,465.49 / µL; $p = 0.034$). No statistically significant difference was found in other clinical parameters, biochemical parameters, operative factors, or duration of ICU or hospital stay (all $p > 0.05$).

Table 4: Comparison of Baseline Clinical, Laboratory, Operative, and Hospital Course Parameters Between Discharged and Death Groups

Category	Parameter	Discharged (n=82) Mean ± SD	Death (n=18) Mean ± SD	t-value	p-value
Clinical Parameters	Symptom onset (hours)	41.12 ± 20.14	33.33 ± 24.89	1.42	0.158
	Pulse (bpm)	102.45 ± 13.79	102.22 ± 13.12	0.06	0.949
	Systolic BP (mmHg)	103.39 ± 15.73	97.78 ± 17.93	1.34	0.184
	Diastolic BP (mmHg)	68.52 ± 11.39	63.78 ± 13.68	1.54	0.126
	Respiratory rate (breaths/min)	21.29 ± 2.57	21.56 ± 2.91	-0.38	0.703
	Temperature (°C)	37.97 ± 0.73	37.94 ± 0.83	0.15	0.880
	SpO_2 (%)	95.66 ± 2.49	96.06 ± 1.51	-0.65	0.518
	GCS	11.93 ± 1.43	12.33 ± 1.19	-1.12	0.264
Hematological Parameters	Hemoglobin (g/dL)	10.88 ± 2.14	10.78 ± 1.97	0.18	0.854
	WBC (/µL)	12288.70 ± 2726.55	10682.33 ± 3465.49	2.15	0.034
	Platelets (/µL)	239754.65 ± 49183.08	239791.56 ± 44471.12	0.00	0.998
Biochemical Parameters	Urea (mg/dL)	41.04 ± 13.68	36.88 ± 16.39	1.13	0.262
	Creatinine (mg/dL)	1.16 ± 0.52	1.21 ± 0.35	-0.37	0.715
	Sodium (mEq/L)	134.68 ± 5.02	133.88 ± 5.54	0.60	0.552
	Potassium (mEq/L)	4.21 ± 0.59	4.31 ± 0.53	-0.68	0.499
	Albumin (g/dL)	3.15 ± 0.41	3.22 ± 0.49	-0.65	0.520
	CRP (mg/L)	51.63 ± 20.19	49.27 ± 25.49	0.43	0.669
	Lactate (mmol/L)	2.56 ± 1.27	2.54 ± 1.29	0.06	0.951
Operative & Hospital Course	Operative duration (min)	115.12 ± 35.45	123.61 ± 42.39	-0.89	0.377
	Blood loss (mL)	360.00 ± 143.03	338.94 ± 108.41	0.59	0.558
	ICU stay (days)	3.83 ± 1.62	3.56 ± 1.50	0.66	0.512
	Hospital stay (days)	11.94 ± 4.29	11.28 ± 4.04	0.60	0.551

The relationship between post-operative complications, MPI category, and mortality is given in Table 5. Mortality was found to be significantly related to surgical site infection ($p < 0.001$), sepsis ($p = 0.001$), multiple organ failure ($p < 0.001$), pneumonia ($p = 0.001$), and anastomotic leakage ($p < 0.001$). No significant relationships were seen for intensive care unit admission, wound dehiscence, re-exploration, and other complications ($p > 0.05$). There was also a significant difference in mortality according to MPI category ($p < 0.001$), as most of the deaths occurred among patients having an MPI score ≥30, while the discharged patients mostly had an MPI score <21.

Table 5: Association of Postoperative Complications and MPI Category with Mortality

Variable	Category	Discharged n (%)	Death n (%)	χ^2	p-value
Postoperative Complications	ICU admission	31 (37.80)	10 (55.56)	1.84	0.175
	Surgical site infection (SSI)	18 (21.95)	13 (72.22)	15.62	<0.001
	Sepsis	13 (15.85)	10 (55.56)	11.24	0.001
	Multi-organ failure (MOF)	3 (3.66)	6 (33.33)	14.47	<0.001
	Pneumonia	8 (9.76)	7 (38.89)	10.36	0.001
	Anastomotic leak	8 (9.76)	8 (44.44)	13.65	<0.001
	Wound dehiscence	10 (12.20)	3 (16.67)	0.26	0.610
	Re-exploration	8 (9.76)	1 (5.56)	0.32	0.570
	Other complications	27 (32.93)	5 (27.78)	0.19	0.660
MPI Category	<21	51 (58.0)	1 (5.6)	53.21	<0.001
	21–29	35 (39.8)	5 (27.8)		
	≥30	2 (2.3)	12 (66.7)		

Table 6 demonstrates the diagnostic accuracy of Mannheim Peritonitis Index (MPI) for prediction of mortality. The MPI has shown a sensitivity of 66.67%, specificity of 97.73%, positive predictive value of 85.71%, and negative predictive value of 93.48% for mortality.

Table 6: Diagnostic Performance of the Mannheim Peritonitis Index (MPI) for Predicting Mortality

Diagnostic Parameter	Value (%)
Sensitivity	66.67
Specificity	97.73
Positive Predictive Value (PPV)	85.71
Negative Predictive Value (NPV)	93.48

4. Discussion

Hollow viscus perforation followed by peritonitis remains one of the most challenging surgical emergencies, especially in the developing world where delayed presentation, limited resources and underlying morbidity are likely to increase the risk of complications [10]. The clinical profile and postoperative outcome of 100 patients with non-traumatic hollow viscus perforation was evaluated, and the utility of the Mannheim Peritonitis Index (MPI) in predicting in-hospital mortality was assessed.

Clinically, the mean age of patients was 47.44 ± 16.38 years, and the male patient-to-female ratio was 69.0%, comparable to findings reported from other tertiary care centres. A retrospective study of 468 patients with hollow viscus perforation from a tertiary care centre in north India also

showed the predominance of males (71.6%) and the mean age of 47.1 years [11]. In a study of 100 patients from South India, Chandran et al. reported a higher incidence of males (78%) and a mean age of 43 years [12]. The male preponderance seen in Indian studies has been explained by the high prevalence of smoking, alcohol drinking, occupational stress, and delayed seeking health care [12].

The common symptoms were abdominal pain, fever, abdominal distention, and vomiting, experienced by 93.0%, 68.0%, 65.0%, and 56.0% of the cases, respectively. The median time from onset of symptoms to surgical presentation was 36 hours, consistent with what has previously been reported in resource-limited settings, and is a significant factor in the severity of the disease at the time of operative intervention.

The overall in-hospital mortality rate was 18.0%, which is similar to the results of comparable studies in India and the region. The mortality rate in perforation peritonitis from a tertiary care hospital in Pune, India was 16.7%, and the higher the MPI score, the higher the mortality rate reported by Gupta et al [9]. Ramteke et al. from a rural hospital in India described the mortality rate to be 16% (8/50), with the highest mortality rate seen in the highest MPI group [8]. Gaurav et al., in a study of 111 patients from a tertiary care hospital in Jharkhand, India, found that mortality was significantly higher among patients presenting with organ failure and in those with higher MPI scores [14]. A prospective study from southern Vietnam including 176 patients with secondary peritonitis due to hollow viscus perforation reported an overall in-hospital mortality of 21% [13]. The consistency of elevated mortality rates across these geographically and institutionally varied settings underscores the substantial burden of perforation peritonitis in low- and middle-income countries.

The most common postoperative complications included surgical site infection (31.0%), sepsis (23.0%), anastomotic leak (16.0%), pneumonia (15.0%), and wound dehiscence (13.0%). These rates are in line with published rates, as Gupta et al. reported 44.4% surgical site infection and 16.7% wound dehiscence in their patients, and found higher preoperative MPI scores correlated with acidosis and pneumonia as well as pulmonary complications [9]. In the current cohort, 9.0% of all patients had multi-organ failure, which was significantly associated with in-hospital death ($p < 0.001$).

The difference in WBC count (survivors had a higher mean count, $p = 0.034$) was the only continuous variable that was found to be statistically significantly different between survivors and non-survivors, which may indicate a normal immune response in patients with the ability to develop a leukocytosis, compared with immune exhaustion seen in patients with overwhelming sepsis. The sensitivity, specificity, positive predictive value and negative predictive value of the MPI for in-hospital mortality were 66.67%, 97.73%, 85.71% and 93.48%, respectively. The specificity suggests that the MPI has potential as a rule-in tool: patients with high MPI scores are most likely to be at the highest-risk and can be resuscitated in the ICU at a time to prevent additional complications. Its high NPV (93.48%) indicates that a low MPI score is a useful tool to identify patients with a likely good outcome.

In comparison to previous published research, the specificity was also quite high in the present analysis, but the sensitivity was slightly lower. In a retrospective study of 395 patients with non-traumatic hollow viscus perforation peritonitis in Nepal, Shakya et al. found a sensitivity of 75.8% and a specificity of 56.35% with a cutoff score of 25 [10]. In a prospective study of 235 patients with secondary peritonitis, the index had a sensitivity of 85% (95% CI 74–92) and specificity of 58% (95% CI 50–65) at an MPI cut-off of ≥ 27, which predicted mortality [15]. The prospective study of the Vietnamese researchers found that the area under the ROC curve was 0.944; sensitivity was 91.9%, while the specificity was 79.9% for an MPI ≥ 25 [13]. The study-to-study differences in diagnostic performance are due to the differences in patient populations, chosen cut-off levels, institutional protocols and comorbidity burden.

The relationship between MPI category and mortality in the present cohort was highly significant ($\chi^2 = 53.21$, $p < 0.001$), with 66.7% of deaths occurring in the MPI ≥ 30 category, and 62.2% of survivors in the MPI < 21 category. This is similar to the results from Karki et al., who found that patients with an MPI < 20 were not at risk of dying, while those with an MPI > 29 had a mortality rate of 46%, and Ramteke et al., who reported a mortality rate of 0% for patients with an MPI < 21, and 62.5% for patients with an MPI > 29 [8, 16]. The consistent results from a range of studies in the South Asian region confirm that the three levels of the MPI are a clinically useful risk stratification tool.

Other factors, including surgical site infection ($p < 0.001$), septic peritonitis (or sepsis) ($p = 0.001$), anastomotic leak ($p < 0.001$), multi-organ failure ($p < 0.001$) and pneumonia ($p = 0.001$) all had a significant association with mortality, reflecting the physiological deterioration that ensued from the initial septic process and was sustained by the systemic inflammatory response. The biggest advantage of the MPI is that it is simple and can be calculated during the operation. The MPI is more easily calculated from 8 clinical and operative parameters as compared to the APACHE II or p-POSSUM, which are more complex with laboratory-based inputs, and are thus well suited to the resource-challenged emergency surgical environment [16]. Routine MPI calculation may help identify patients for planned ICU admission, multidisciplinary involvement, and informed prognostic counselling of patients with MPI ≥ 30, whereas patients with MPI < 21 can be managed with standard surgical protocols.

This study has several strengths. It employed a prospective observational design with consecutive patient enrollment, reducing selection bias and reflecting real-world clinical practice. The use of standardized Mannheim Peritonitis Index (MPI) scoring and comprehensive assessment of demographic, clinical, laboratory, operative, and postoperative variables strengthened the evaluation of prognostic performance. Furthermore, the study provides contemporary evidence on the utility of MPI in patients with non-traumatic hollow viscus perforation from a tertiary care center in India, where such data remain limited. However, the

study has certain limitations. It was conducted at a single center with a relatively small sample size, which may limit the generalizability of the findings. The absence of long-term follow-up restricted outcome assessment to in-hospital events, and comparisons with other established prognostic scoring systems, such as APACHE II or p-POSSUM, were not performed. Therefore, larger multicenter studies are needed to validate these findings across diverse patient populations and healthcare settings.

5. Conclusion

The present study demonstrates that the Mannheim Peritonitis Index is an effective and practical prognostic tool for risk stratification in patients with perforation peritonitis secondary to hollow viscus perforation. Higher MPI categories were significantly associated with increased mortality, while postoperative complications including surgical site infection, sepsis, multi-organ failure, pneumonia, and anastomotic leak were strongly associated with poor clinical outcomes. The MPI exhibited high specificity and negative predictive value, indicating its usefulness in identifying both high-risk patients requiring intensive perioperative management and low-risk patients with a favorable prognosis. Owing to its reliance on readily available clinical and intraoperative variables, the MPI can be easily implemented in emergency surgical settings, particularly in resource-limited healthcare systems. Larger multicenter studies are warranted to further validate its prognostic performance and establish standardized cut-off values across diverse patient populations

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