



"TO STUDY THE ROLE OF MANNHEIM PERITONITIS INDEX SCORING SYSTEM IN PREDICTING THE MORTALITY AND MORBIDITY IN PERITONITIS DUE TO HOLLOW VISCUS PERFORATION"

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ABSTRACT

Background: Hollow Viscus Perforation is characterized by loss of gastrointestinal wall integrity with leakage of enteric contents. **Aim:** To Study the Role of Mannheim Peritonitis Index (MPI) scoring system in predicting the Mortality and Morbidity in peritonitis due to Hollow Viscus Perforation. **Materials and Methods:** This is a hospital based cross sectional study which was carried out at Department of General Surgery from November 2017 to October 2019 at Katuri Medical College and Hospital, Chinakondrupadu, Guntur, Andhra Pradesh. Mannheim Peritonitis Index score was used. **Results:** Mean age group of the patients was 52.35 ± 11.09 . Majority of the patients i.e. 19(31.7%) were seen in 51 – 60 years age group. Among the 39(65%) male patients, majority were identified to be in 51-60 years. Among the 21(35%) Female patients, majority i.e. 8 patients were identified to be in 61-70 years. **Conclusion:** The present study suggests that Multiple attempts at developing a scoring system to predict the risk of mortality and morbidity in patients with peritonitis due to hollow viscus perforation undergoing emergency laparotomy. Most of the scoring systems cannot assess individual patient risk. MANNHEIM PERITONITIS INDEX scoring system is an easy and very useful tool for predicting the risk of morbidity and mortality in patients with peritonitis due to hollow viscus perforation.

KEYWORDS : Hollow Viscus Perforation, Peritonitis, Mannheim Peritonitis Index

I. INTRODUCTION

Hollow viscus perforation is one of the gravest surgical emergencies. Though rapid advances in medical field, these patients mostly require aggressive operative intervention. Although spontaneous bacterial peritonitis is also seen, it remains an uncommon cause of peritonitis in clinical practice¹ Acute abdominal pain observed in 40% of emergency surgical hospital admissions, and a large percentage of these patients have perforated hollow viscus or imminent gastrointestinal perforation. Early diagnosis and Early intervention are key, as mortality for patients with hollow viscus perforation and secondary peritonitis exceeds 20%²

Hollow Viscus Perforation is characterized by loss of gastrointestinal wall integrity with leakage of enteric contents. Perforation can occur at any site inside the alimentary tract, from mouth to anus, and the site of the perforation determines significantly the patient's presentation and clinical course²

The prognosis of peritonitis remains poor despite growth in diagnosis and management. Early detection of patients with severe peritonitis may help in triaging patients for aggressive surgical approach³

A Good scoring system is required for triaging patients in different groups, so that a better treatment interventions and monitoring outcome can be delivered to improve standard of care.

Mannheim peritonitis index (MPI) scoring system was developed by Linder and Wacha in 1983¹. It was created based on the retrospective evaluation of data from 1253 patients with peritonitis, in which 20 potential risk factors were thought. Of these only 8 demonstrated to be of predictive relevance and were entered into the Mannheim Peritonitis Index, classified corresponding to their predictive power. Patients with a score above 26 were defined as having a high mortality rate⁴.

The present study was conducted to predict the risk of mortality and morbidity by applying Mannheim Peritonitis Index (MPI). The study also intended to evaluate the prognostic value of MPI scoring system and assess it as a clinical tool in stratifying patients according to individual surgical risk in patients with peritonitis due to Hollow Viscus Perforation admitted to Department of General Surgery, Katuri Medical college and Hospital, Guntur.

II. MATERIALS AND METHODS

This is a Hospital based cross sectional study which was carried out at Department of General Surgery from November 2017 to October 2019 at Katuri Medical College and Hospital, Chinakondrupadu, Guntur, Andhra Pradesh.

Patients with features of peritonitis (pain abdomen, rigidity, guarding, etc...) who are attending to the department of general surgery, Katuri Medical College & Hospital

Study Design: A Hospital based cross-sectional survey.

Study Location: This was a tertiary care teaching hospital based study done in Department of General Surgery, at Katuri Medical College and Hospital, Chinakondrupadu, Andhra Pradesh.

Study Duration: November 2017 to October 2019

Sample Size: 60 patients with peritonitis due to hollow viscous perforation.

Sample Size Calculation:

Sample size was calculated using Epi Info V.7 to predict the risk of mortality and morbidity of Peritonitis by applying Mannheim Peritonitis Index, with a confidence level 95% and a margin of error of 5%.

Subjects and selection method:

Patients with features of peritonitis (pain abdomen, rigidity, guarding, etc...) who are attending to the department of general surgery, Katuri Medical College & Hospital. The study was approved by the institutional ethics committee.

Inclusion criteria:

1. Patients with hollow viscous perforation peritonitis.
2. Patients who have given consent.

Exclusion criteria:

1. Patients who have not given consent.
2. Patients with blunt injury abdomen who had other associated solid organs vascular, neurosurgical injuries.

Procedure Methodology:

Mannheim Peritonitis Index score was used. Patients were given score based on the data available preoperatively and operative findings according to MPI. Patients were followed

up for the outcome, and results were analysed with the score of MPI.

MPI Risk factor scoring.

RISK FACTOR	SCORES
Age > 50 years	5
Female sex	5
Organ failure	7
Malignancy	4
Preoperative duration of peritonitis > 24 h	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
Exudate	0
Clear	0
Cloudy, purulent	6
Faecal	12

Method of Data collection:

Diagnosis of peritonitis due to hollow viscous perforation was made by.

1. History and clinical examination
2. X-ray chest PA view with both domes of diaphragm which shows air under diaphragm.
3. Detailed history of presenting illness and history suggestive of chronic health disorders such as cardiac, renal, hepatic conditions noted.
4. All biochemical investigations done on admission and relevant clinical details noted.
5. Standard operative procedures were followed for different causes of perforative peritonitis.

Once the diagnosis of peritonitis was made by operative findings, the patient was enrolled into the study after taking informed consent. Using detailed history, clinical and physical examination and biochemical investigations risk factors found in MPI were classified based on values indicated and individual scores were added to the corresponding MPI score. The cases were first grouped into three categories, as described by Billing: those <21 pts, between 21- 29 pts, and those > 29 pts.

Along with the personal data such as age, name, gender, etc., the following information such as date of hospitalization and discharge from the hospital; days hospitalized; date of surgery and detailed information related to illness (surgical findings, medical treatment, and evolution of illness).

Patient evaluation was followed, occurrence of complications and discharge due to improvement or death. Time elapsed from initial diagnosis to moment of event (death or discharge from hospital) was determined.

Out-patient follow-up was continued for 30 days to establish perioperative morbidity and mortality. The minimum possible score was zero, if no adverse factor were present, and maximum was 47 if presence of all were confirmed.

Analysis was done with each variable in the scoring system as an independent predictor of morbidity or mortality and the scoring system.

Statistical Data:

The data was tabulated in Excel 2013 and analyzed using SPSS software version 16. Each data variable in the MPI score were correlated with other variables using nonparametric statistic i.e. chi square analysis with various outcomes that were noted in the study. P value <0.05 was considered as statistically significant in this study.

Quantitative and Qualitative variables were expressed in terms of Descriptive statistics like (mean + standard deviation), frequencies and percentages.

III. RESULT

Table 1: Age distribution

Age group	Frequency	Percentage
31 – 40	13	21.7
41 – 50	10	16.7
51 – 60	19	31.7
61 – 70	18	30.0
Total	60	100%
Mean ± SD	52.35 ± 11.09	

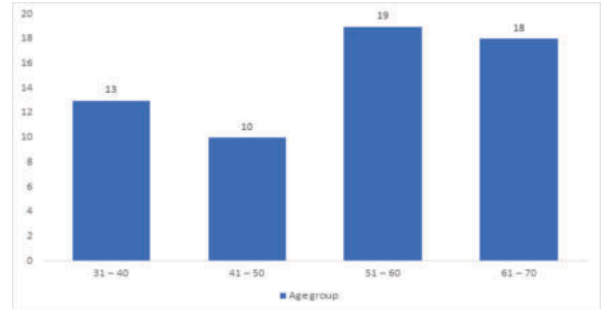


Figure 1: Age distribution

Table 2: Gender distribution

Gender	Frequency	Percentage
Male	39	65
Female	21	35
Total	60	100

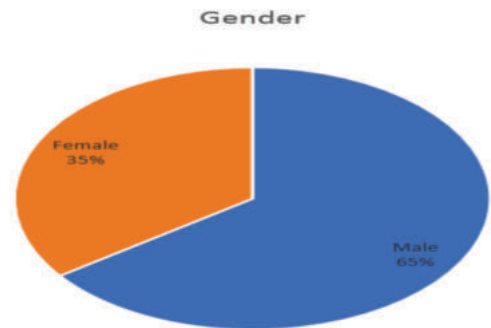


Figure 2: Gender distribution

Table 3: Age and Gender Distribution

Age group	Male	Female
31 – 40	9	4
41 – 50	7	3
51 – 60	13	6
61 – 70	10	8
Total	39	21

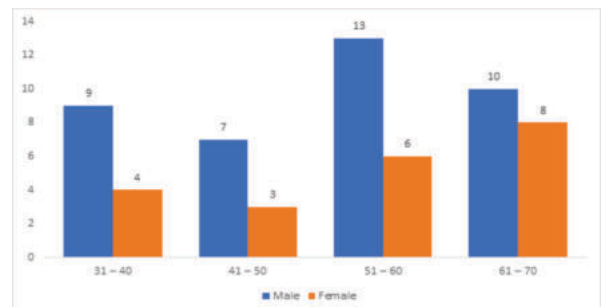


Figure 3: Age and Gender Distribution

Table 4: Site of Perforation

	Frequency	Percent
Appendix	11	18.3
Colorectal	10	16.7

Duodenum	10	16.7
Ileum	14	23.3
Jejunum	8	13.3
Stomach	7	11.7
Total	60	100.0

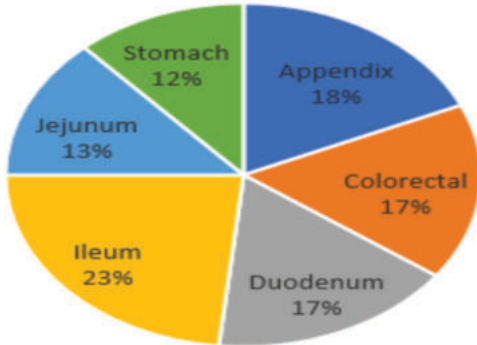


Figure 4: Site of Perforation

Table 5: Clinical presentation

	Frequency	Percent
Fever	31	51.7%
Vomiting	29	48.3%
Anorexia	30	50%
Constipation	28	46.7%
Abdominal Distension	34	56.7%
Total	60	100.0

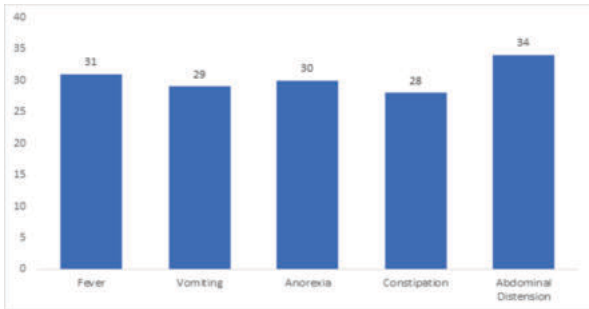


Figure 5: Clinical presentation

Table 6: Organ failure

Organ failure	Frequency	Percent
No	42	70.0
Yes	18	30.0
Total	60	100.0

Organ failure

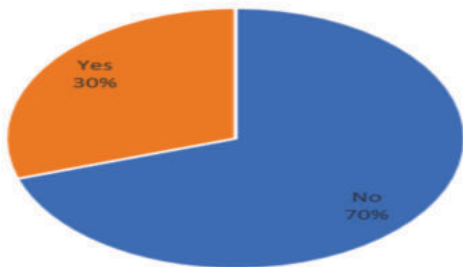


Figure 6: Organ failure

Table 7: Malignancy

	Frequency	Percent
Yes	1	1.7
No	59	98.3
Total	60	100.0

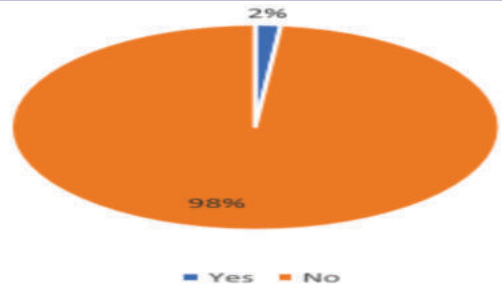


Figure 7: Malignancy

Table 8: Pre-op Duration > 24 hrs

Pre-op Duration > 24 hrs	Frequency	Percent
Yes	28	46.7
No	32	53.3
Total	60	100.0

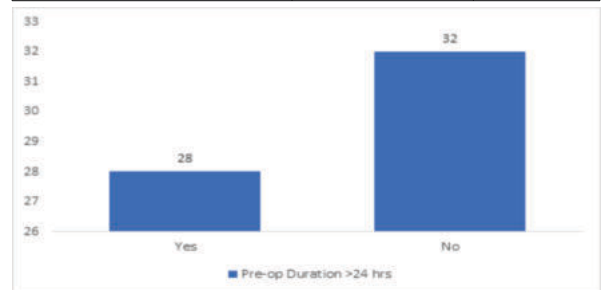


Figure 8: Pre-op Duration > 24 hrs

Table 9: Peritonitis type

	Frequency	Percent
Diffuse	41	68.3
Localized	19	31.7
Total	60	100.0

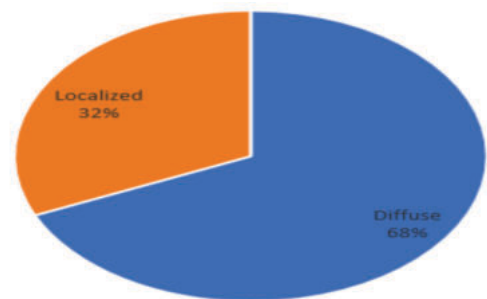


Figure 9: Peritonitis type

Table 10: Characteristics of Exudates

	Frequency	Percent
Clear	15	25.0
Cloudy	43	71.7
Fecal	2	3.3
Total	60	100.0

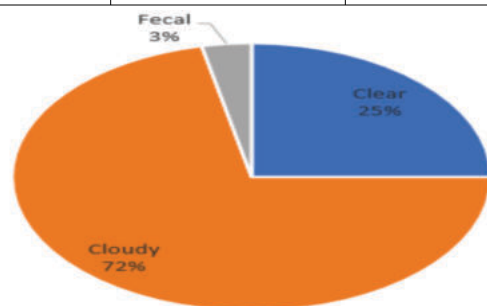


Figure 10: Characteristics of Exudates

Table 11: Outcome

	Frequency	Percent
Death	8	13.3
Survived	52	86.7
Total	60	100.0

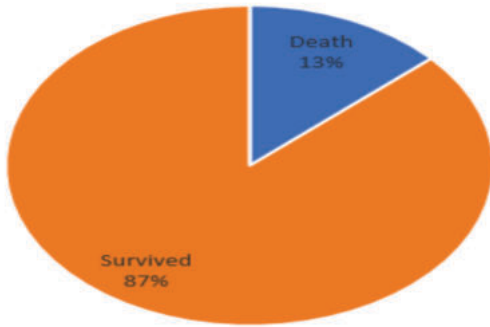


Figure 11:

Table 12: Mannheim Peritonitis Index Score

	Frequency	Percent
<15	26	43.3
15 - 26	27	45.0
>26	7	11.7
Total	60	100.0

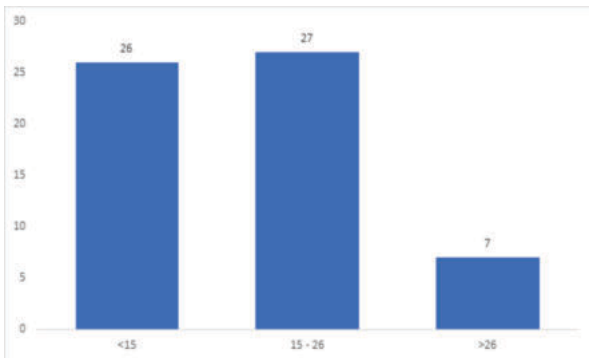


Figure 12: Mannheim Peritonitis Index Score

Table 13: Age distribution and MPI score

Age	MPI Score			Total
	<15	15 - 26	>26	
31 - 40	7	5	1	13
41 - 50	5	4	1	10
51 - 60	6	11	2	19
61 - 70	8	7	3	18
Total	26	27	7	60

Chisquare value : 2.68 , df : 6 , p-value 0.84 ; p-value >0.05 (Not significant)

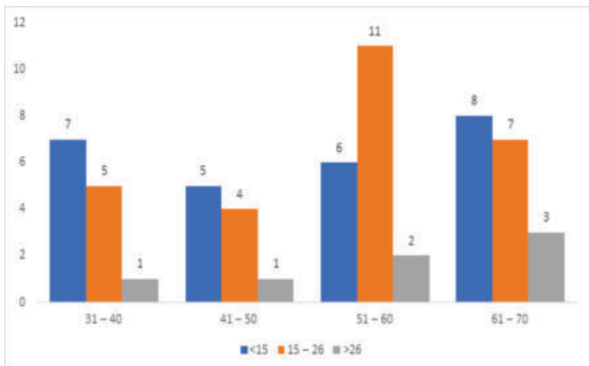


Figure 13: Age distribution and MPI score

Table 14: Age distribution and Outcome

	Died	Survived	Total
31 - 40	1	12	13
41 - 50	1	9	10
51 - 60	2	17	19
61 - 70	4	14	18
Total	8	52	60

Chisquare value : 1.81 , df : 3 , p-value 0.61 ; p-value >0.05 (Not significant)

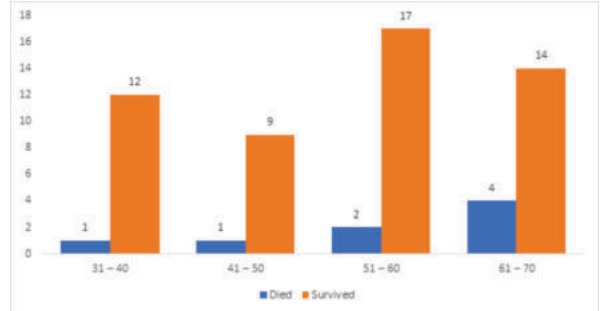


Figure 14: Age distribution and Outcome

Table 15: Gender and MPI score

	MPI Score			Total
	<15	15 - 26	>26	
Male	23	14	2	39
Female	3	13	5	21
Total	26	27	7	60

Chisquare value: 12.42, df: 2 ; p value <0.05* Statistically significant

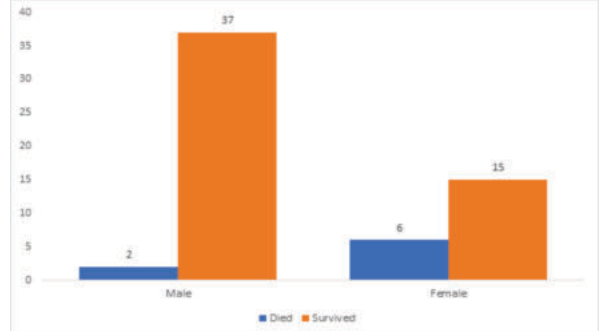


Figure 15: Gender and MPI score

Table 16: Gender and outcome

	Died	Survived	Total
Appendix	3	8	11
Colorectal	0	10	10
Duodenum	2	8	10
Ileum	1	13	14
Jejunum	1	7	8
Stomach	1	6	7

Chisquare value: 4.24, df: 2 ; p value >0.05 Not significant

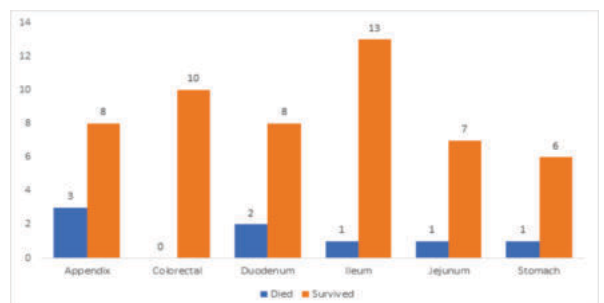


Figure 16: Gender and outcome

Table 17: Site of Perforation and Outcome

	<15	15 – 26	>26	Total
Appendix	2	6	3	11
Colorectal	5	5	0	10
Duodenum	5	3	2	10
Ileum	9	4	1	14
Jejunum	4	4	0	8
Stomach	1	5	1	7

Chisquare value : 12.70 , df: 2 ; p value >0.05 Not significant

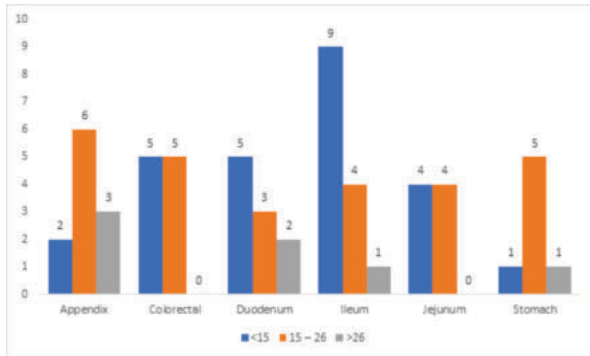


Figure 17: Site of Perforation and Outcome

Table 18: Site of Perforation and MPI score

	<15	15 – 26	>26	Total
Appendix	2	6	3	11
Colorectal	5	5	0	10
Duodenum	5	3	2	10
Ileum	9	4	1	14
Jejunum	4	4	0	8
Stomach	1	5	1	7

Chisquare value : 12.70 , df: 2 ; p value >0.05 Not significant

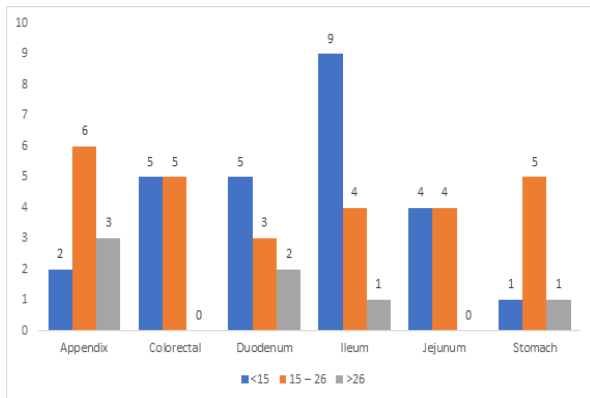


Figure 18: Site of Perforation and MPI score

Table 19: Comparison of outcome with variables

		Died	Survived	P value
Organ failure	Yes	6	12	<0.05
	No	2	40	
Malignancy	Yes	1	0	>0.05
	No	7	52	
Preop duration >24 hrs	Yes	4	24	>0.05
	No	4	28	
Peritonitis	Diffuse	8	33	<0.05
	Localised	0	19	
Charectestic of Exudate	Clear	0	15	<0.05
	Cloudy	6	37	
	Fecal	2	0	

Table 20: Comparison of MPI score with variables

		<15	15 – 26	>26	P value
Organ failure	Yes	24	17	1	<0.05
	No	2	10	6	
Malignancy	Yes	0	0	1	<0.05
	No	26	27	6	
Preop duration >24 hrs	Yes	13	12	3	>0.05
	No	13	15	4	
Peritonitis	Diffuse	9	25	7	<0.05
	Localised	17	2	0	
Charectestic of Exudate	Clear	9	6	0	<0.05
	Cloudy	17	21	5	
	Fecal	0	0	2	

Table 21: Outcome and MPI score

MPI score	Survived	Dead
<15	26	0
15 – 26	26	1
>26	0	7

Chisquare value : 51.66 , df: 2 ; p value <0.05* Statistically significant

IV. DISCUSSION

The outcome of surgical intervention whether death or uncomplicated survival, complications or long-term morbidity is not solely dependent on the abilities of the surgeon in isolation. The patient's physiological status, the disease that requires surgical correction, the nature of the operation and the pre-operative and post-operative support services have a major effect on the ultimate outcome.

Age distribution & Gender Distribution

In the present study, the mean age group of the patients was 52.35 ± 11.09. Majority of the patients i.e. 19(31.7%) were seen in the age group of 51 – 60 years. 18(30%) cases present in the age group of 61 – 70 years. 31 – 40 years age group had 13 patients, 41 – 50 years age group had 10(16.7%) of the cases. Male cases patients the majority i.e. 65% & female patients 35%.

Among the 39(65%) male patients , majority were identified to be in the age group of 51-60 years followed by 61-70 years age group with 10 patients, 9 patients were in the age group of 31-40 years and 7 patients in 41-50 years age group. Among the 21(35%) Female patients, majority i.e. 8 patients were identified to be in the age group of 61-70 years followed by 51-60 years age group with 6 patients, 4 patients were in the age group of 31-40 years and 3 patients in 41-50 years age group.

Site of Perforation

Majority in the study had a perforation observed in Ileum i.e. 14(23.3%). Appendix perforation was observed in 11 patients (18.3%). Colorectal and Duodenal perforation were observed in 10 patients each and 8(13.3%) had stomach perforation.

Clinical presentation

Abdominal distension was observed in 34(56.7%) patients. Fever was observed in 31(51.7%) patients. Anorexia was observed in 30(50%) patients. Vomiting was seen in 29(48.3%) patients. Constipation was seen in 28(46.7%) patients.

Organ failure , Malignancy and Pre-op Duration > 24 hrs

18(30%) patients had signs of organ failure and 42(70%) patients had no organ failure. 1(1.7%) had malignancy. 28(46.7%) with a pre-op duration of >24hrs and 32(53.3%) had pre op duration of <24 hrs.

Peritonitis type

41(68.3%) patients had Diffuse peritonitis and 19(31.7%) patients had localized peritonitis.

Characteristics of Exudates

43(71.7%) patients had cloudy exudates, 15(25%) had clear

exudates and 2(3.3%) had exudates with fecal.

Outcome

Mortality was observed in 8(13.3%) patients and 52(86.7%) survived.

Mannheim Peritonitis Index Score

Patients were given score based on the data available preoperatively and operative findings according to MPI. MPI score of <15 was observed in 43.3% of patients, MPI score of 15 – 26 in 45% of the patients, MPI score of >26 in 11.7% of patients.

Age distribution and MPI score

Among Patients with MPI score of <15 i.e. 26 patients, majority were seen in 61 – 70 years age group followed by 31-40 years age group. 51-60 years age group had 6 patients.

Among Patients with MPI score of 15 - 26 i.e. 27 patients, majority were seen in 51 – 60 years age group followed by 61-70 years age group. 31-40 years age group had 5 patients, 41-50 years age group had 4 patients.

There was no statistically significant difference observed between the MPI score and age of the patients as the p value calculated using the chisquare test showed a p value of >0.05

Age distribution and Outcome

Age and outcome of peritonitis were studied together using non parametric statistic and there was no statistically significant difference observed between the age and outcome as p value calculated to be >0.05. in this study, 8 patients who were died due to peritonitis majority i.e. 4 patients belonged to 61 – 70 years age group, 2 patients belonged to 51-60 years age group, 1 patient each in the age group of 31-40 and 41-50 years.

Gender and MPI score

There was a statistically significant difference observed between MPI score and gender and the p value calculated using non parametric statistic with a p value <0.05.

Among the 39 male patients, majority i.e. 23 had MPI score < 15, 14 patients had MPI score of 15-26, MPI score of >26 was seen in 2 patients.

Among the 21 female patients, majority i.e. 13 had MPI score of 15-26, >26 score was shown by 5 patients and 3 patients had MPI score of <15.

Gender and Outcome

Among the 8 patients who died due to peritonitis 6 were female and 2 patients were male.

There was a statistically significant difference observed between the gender and outcome as the p value calculated to be <0.05.

Site of perforation and Outcome

Among those 8 patients who died due to peritonitis, 3 cases were due to Appendix perforation, 2 cases due to duodenum perforation, 1 cases each with ileum, jejunum and stomach perforations.

There was no statistically significant difference observed between Site of perforation and outcome as the p value calculated to be >0.05.

Site of Perforation and MPI score

MPI score and site of perforation were assessed together to identify any significant difference between the two groups. Among those with MPI score of <15, Majority had ileal

perforations i.e. 9 patients.

MPI score of 15 – 26 identified majority of cases with appendix perforations, and MPI score of >26 had majority of cases with appendix perforation.

There was no statistically significant difference observed between the MPI score and site of perforation in the present study as p value >0.05

Out of 8 cases where mortality observed 6 patients had organ failure and there was a statistically significant difference between organ failure and mortality with p-value <0.05.

Mortality was observed with patients having diffuse peritonitis and this was identified to be statistically significant as p value <0.05.

Cloudy exudates were the characteristic of the exudate in majority of cases who died due to peritonitis. This finding was statistically significant as p value calculated to be <0.05.

MPI score in our study is significantly associated with organ failure, diffuse peritonitis and characteristic of exudates.

Outcome and MPI Score

MPI score was >26 in 7 patients out of 8 who died due to peritonitis in the present study and 1 patient had MPI score of 15-26 and this finding was statistically significant with p-value calculated to be <0.05.

Therefore, in planning the treatment of perforative peritonitis patients, MPI and age should be taken into account both in the choice of the surgical approach and in post-operative care. Although the prognosis in these subgroup of patients is not related to the type of surgery, we stress the opportunity to adopt less complex surgical procedures and to plan a post-operative admission to an intensive care unit.

V. CONCLUSION

- To conclude, the present study suggests that Multiple attempts at developing a scoring system to predict the risk of mortality and morbidity in patients with peritonitis due to hollow viscus perforation undergoing emergency laparotomy.
- Most of the scoring systems cannot assess individual patient risk.
- This study proves that the MANNHEIM PERITONITIS INDEX scoring system is an easy and very useful tool for predicting the risk of morbidity and mortality in patients with peritonitis due to hollow viscus perforation.
- This score can stratify patients according to their individual surgical risk in patients with peritonitis due to hollow viscus perforation.
- Among different variables of scoring system duration of pain, age, organ failure on presentation, and the presence of feculent exudates had a significant role in predicting the outcome of the patient.

VI. Limitations

Limitations of the study include small sample size. and History of Physical co-morbidities were not taken into consideration

VII. Conflict of Interest : No competing interests

VIII. Funding : None

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