

Original article:

Study of comparison of scoring systems: Mannheim peritonitis index (MPI) and Jabalpur peritonitis index (JBI), in predicting mortality in patients of secondary peritonitis

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Abstract:

Introduction: Secondary peritonitis following a perforated hollow viscus remains a potentially fatal condition. Despite advanced techniques in diagnosis, surgical techniques, ant-microbial therapy and intensive care support, secondary peritonitis has a poor prognosis.

Methodology: This study was conducted in The Institute of General Surgery, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai. Fifty cases of acute bacterial peritonitis secondary to gastro intestinal tract perforations were encountered during the study period of one year from 01.10.2019 to 31.10.2020. Nature of the study was retrospective study and cases were included into the study by application of following criteria.

Results: Receiver Operator Characteristic (ROC) curve analysis of MPI Index were AUC (Area Under the ROC curve)=0.973 , $p=0.0005<0.01$ which shows highly statistical significant difference with sensitivity=88.5%, specificity=91.70% and cut off=27. Similarly in Receiver Operator Characteristic (ROC) curve analysis of Jabalpur Index were AUC (Area Under the ROC curve)=0.902 , $p=0.0005<0.01$ which shows highly statistical significant difference with sensitivity=80.80%, specificity=83.30% and cut off=10,which shows that MPI Scoring system better than the Jabalpur index Scoring system to predict the mortality.

Conclusion: Secondary peritonitis, encountered in emergency surgical wards is commonly due to bowel (hollow viscus) perforation. This condition needs emergency evaluation, resuscitation, proper utilization of severity scoring system, with prognostic tools and timely and effective management, including operative surgery, without which the mortality rate may reach 100 percent

Keywords : Secondary peritonitis , fatal condition , Mannheim peritonitis index, Jabalpur peritonitis index

Introduction:

Secondary peritonitis following a perforated hollow viscus remains a potentially fatal condition. Despite advanced techniques in diagnosis, surgical techniques, ant-microbial therapy and intensive care support, secondary peritonitis has a poor prognosis.¹ Many severity index scores are in vogue, with each institution following a particular or more than one scoring system. Most commonly used scoring system includes Boey's Index, Mannheim Peritonitis Index (MPI), Jabalpur Peritonitis Index (JPI), the Physiological and Operative Severity Score for the Enumeration of Mortality and Morbidity (POSSUM) score, Simplified Acute Physiology Score (SAPS), Multi- organ Dysfunction Score (MODS), Sepsis Related Organ Failure Assessment (SOFA), and Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring systems.^{2,3,4}

Methodology:

This study was conducted in The Institute of General Surgery, Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai. Fifty cases of acute bacterial peritonitis secondary to gastro intestinal tract perforations were encountered during the study period of one year from 01.10.2019 to 31.10.2020. Nature of the study was retrospective study and cases were included into the study by application of following criteria.

Inclusion Criteria

1. Peritonitis secondary to hollow viscus perforation.
2. Age group between 12 to 90 yrs.
3. Both males and females were included in the study.

Exclusion Criteria

1. Perforation secondary to trauma
2. Perforation in paediatric population (less than 12 years)

All the necessary preoperative data were recorded. Blood sample and relevant basic investigation details were collected. Urethral catheter monitoring data collected from the record sheets. The data for the evaluation of various parameters stipulated by Manheim’s Peritonitis Index (MPI) and Jabalpur Peritonitis Index (JPI) were collected from the case sheets and analyzed systematically.

Results:

Table 1: Comparison between Exudate with Outcome

Exudate		Outcome		Total	χ^2 - value	p-value		
		Dead	Recovered					
Clear	Count	0	16	16	25.733	0.0005 **		
	%	0.0%	66.7%	32.0%				
Cloudy	Count	7	3	10				
	%	26.9%	12.5%	20.0%				
Facial	Count	8	2	10				
	%	30.8%	8.3%	20.0%				
Purulent	Count	11	3	14				
	%	42.3%	12.5%	28.0%				
Total	Count	26	24	50				
	%	100.0%	100.0%	100.0%				
** Highly Statistical Significance at p < 0.01 level								

Table 2: Comparison between Co-morbidity with Outcome

Co-morbidity		Outcome		Total	χ^2 - value	p-value
		Dead	Recovered			
Present	Count	18	7	25	8.013	0.005 **
	%	69.2%	29.2%	50.0%		
Absent	Count	8	17	25		
	%	30.8%	70.8%	50.0%		
Total	Count	26	24	50		
	%	100.0%	100.0%	100.0%		
** Highly Statistical Significance at p < 0.01 level						

Table 3: Comparison of Heart rate with Outcome by Unpaired t-test

Variable	Outcome	N	Mean	SD	t-value	p-value
Heart rate	Dead	26	120.9	17.1	4.792	0.0005 **
	Recovered	24	101.4	10.6		
** Highly Statistical Significance at p < 0.01 level						

Table 4: Comparison of Pre op duration with Outcome by Unpaired t-test

Variable	Outcome	N	Mean	S.D	t-value	p-value
Pre op duration	Dead	26	58.3	29.9	4.638	0.0005 **
	Recovered	24	22.6	23.8		
** Highly Statistical Significance at p < 0.01 level						

Table 5: Comparison of MPI Index with Outcome by Unpaired t-test

Variable	Outcome	N	Mean	S.D	t-value	p-value
MPI Index	Dead	26	31.3	4.7	11.276	0.0005 **
	Recovered	24	11.7	7.4		
** Highly Statistical Significance at p < 0.01 level						

Table 6: Comparison of Jabalpur Index with Outcome by Unpaired t-test

Variable	Outcome	N	Mean	S.D	t-value	p-value
Jabalpur Index	Dead	26	13.5	6.0	5.603	0.0005 **
	Recovered	24	5.6	3.5		
** Highly Statistical Significance at $p < 0.01$ level						

Table 7: Receiver Operator Characteristic (ROC) curve analysis of MPI Index, Jabalpur Index

Area Under the Curve							
Test Result Variable(s)	Area	p-value	95% C.I		Cut off	Sensitivity	Specificity
			LB	UB			
MPI Index	.973	0.0005 **	.933	1.000	27	88.5%	91.70%
Jabalpur Index	.902	0.0005 **	.819	.986	10	80.80%	83.30%
** Highly Statistical Significant at $p < 0.01$ level							

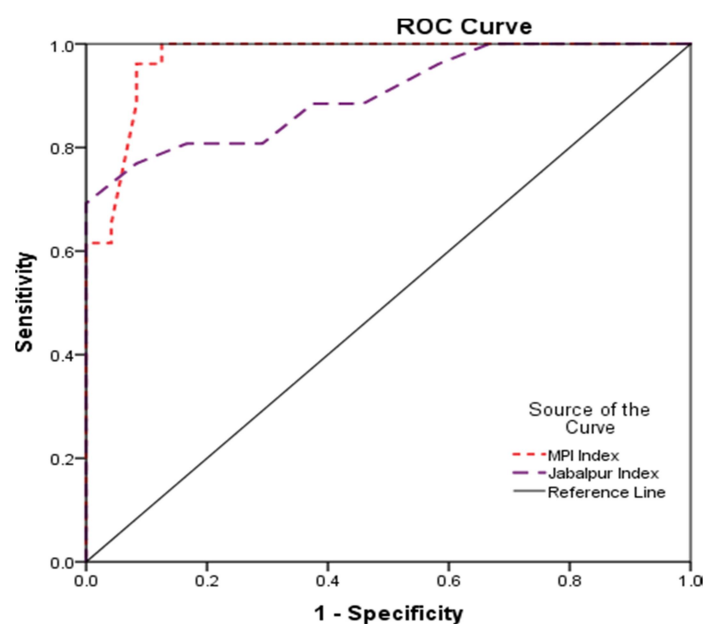


Figure 1

The above table shows Receiver Operator Characteristic (ROC) curve analysis of MPI Index were AUC (Area Under the ROC curve)=0.973 , $p=0.0005<0.01$ which shows highly statistical significant difference with sensitivity=88.5%, specificity=91.70% and cut off=27. Similarly in Receiver Operator Characteristic (ROC) curve analysis of Jabalpur Index were AUC (Area Under the ROC curve)=0.902 , $p=0.0005<0.01$

which shows highly statistical significant difference with sensitivity=80.80%, specificity=83.30% and cut off=10, which shows that MPI Scoring system better than the Jabalpur index Scoring system to predict the mortality.

Discussion:

In our study, age distribution were 8.0% is 18-20 years, 8.0% is 21-30 years, 12.0% is 31-40 years, 20.0% is 41-50 years, 18.0% is 51-60 years, 22.0% is 61-70 years, 10.0% is 71-80 years, 2.0% is Above 80 years. Gender distribution were 24.0% are Female, 76.0% are Male. Outcome distribution were 52.0% is Dead, 48.0% is Recovered. Age with Outcome by Pearson's chi-squared test were $\chi^2=5.486$, $p=0.601>0.05$ which shows no statistical significant association between Age and Outcome. Gender with Outcome by Pearson's chi-squared test were $\chi^2=0.025$, $p=1.000>0.05$ which shows no statistical significant association between Gender and Outcome.^{5,6}

Paralytic ileus with Outcome by Pearson's chi-squared test were $\chi^2=20.852$, $p=0.0005<0.01$ which shows highly statistical significant association between Paralytic ileus and Outcome. Organ failure with Outcome by Pearson's chi-squared test were $\chi^2=39.224$, $p=0.0005<0.01$ which shows highly statistical significant association between Organ failure and Outcome. Malignancy with Outcome by Pearson's chi-squared test were $\chi^2=1.745$, $p=0.351>0.05$ which shows no statistical significant association between Malignancy and Outcome. Origin of sepsis with Outcome by Pearson's chi-squared test were $\chi^2=3.904$, $p=0.563>0.05$ which shows no statistical significant association between Origin of sepsis and Outcome. Diffuse generalised peritonitis with Outcome by Pearson's chi-squared test were $\chi^2=25.962$, $p=0.0005<0.01$ which shows highly statistical significant association between Diffuse generalised peritonitis and Outcome.^{7,8,9}

MPI Index with Outcome by Unpaired t-test were t-value=11.276, $p=0.0005<0.01$ which shows highly statistical significant difference between MPI Index and Outcome. Jabalpur Index with Outcome by Unpaired t-test were t-value=5.603, $p=0.0005<0.01$ which shows highly statistical significant difference between Jabalpur Index and Outcome. Receiver Operator Characteristic (ROC) curve analysis of MPI Index were AUC (Area Under the ROC curve)=0.973, $p=0.0005<0.01$ which shows highly statistical significant difference with sensitivity=88.5%, specificity=91.70% and cut off=27. Similarly in Receiver Operator Characteristic (ROC) curve analysis of Jabalpur Index were AUC (Area Under the ROC curve)=0.902, $p=0.0005<0.01$ which shows highly statistical significant difference with sensitivity=80.80%, specificity=83.30% and cut off=10.

Conclusion:

Secondary peritonitis, encountered in emergency surgical wards is commonly due to bowel (hollow viscus) perforation. This condition needs emergency evaluation, resuscitation, proper utilization of severity scoring system, with prognostic tools and timely and effective management, including operative surgery, without which the mortality rate may reach 100 percent

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