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## Evaluation of Modified APACHE-II Score as a Severity Predictor in Peritonitis Due To Hollow Viscus Perforation.

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### ABSTRACT

Acute generalized peritonitis from Gastrointestinal hollow viscus perforation is a potentially life threatening condition, often associated with high morbidity and mortality. Empirically based risk assessment for important clinical events has been extremely useful in evaluating new therapies, in monitoring resources for effective use and improving quality of care many scoring systems have been designed and used successfully to grade the severity of acute peritonitis and abdominal sepsis. The most widely used index APACHE (Acute physiology and chronic Health Evaluation) was developed from a mixed group of medical and surgical patients. It has been successfully used to assess critically ill general surgical patients and also been compared with other scoring systems with good results. The present study is aimed to assess the severity of generalized peritonitis from hollow viscus perforation using modified APACHE II Score and to correlate morbidity and mortality patterns using the modified APACHE II Score. Modified APACHE II scoring is very efficient in predicting mortality, which was significant irrespective of the aetiology of peritonitis. Higher scores are associated with serious morbidity. Modified APACHE II Scores can be used easily and effectively to identify high risk patients for intensive therapy. Modified APACHE II Scores can be used as a tool for surgical audit and research for improving the quality of intensive care and thus the care provided to the society

**Keywords:** Peritonitis, Modified APACHE II Score, Hollow viscus perforation, Mortality

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**INTRODUCTION**

Acute generalized peritonitis from Gastrointestinal hollow viscus perforation is a potentially life threatening condition, often associated with high morbidity and mortality. [1,2] Empirically based risk assessment for important clinical events has been extremely useful in evaluating new therapies, in monitoring resources for effective use and improving quality of care [3-5]. Many scoring systems have been designed and used successfully to grade the severity of acute peritonitis and abdominal sepsis. The most widely used index APACHE (Acute physiology and chronic Health Evaluation) was developed from a mixed group of medical and surgical patients. It has been successfully used to assess critically ill general surgical patients and also been compared with other scoring systems with good results. [3, 6-9]

The introduction of injury severity scale by Baker’s et al [10] in 1974 and abbreviated injury scale [11] in 1981 successfully opened avenues for further development of severity grading systems. Scoring systems give an objective method to assess the severity of disease and outcome.

APACHE – Acute physiology and chronic health evaluation; has been further modified into APACHE I, II, III systems taking more variables into consideration.

APACHE II has been the most validated and is now been widely accepted in intensive care setting. Since generalized peritonitis is an acute surgical problem. APACHE II SCORES are well correlated in assessing the severity of the disease and outcome.

The APACHE II system gives a score, which is sum total of

- Age Points
- Acute physiological score (APS)
- Chronic health points

In APACHE – II – APS is made of multiple variables. The weightage system is based on a scale of 0 (normal range) to 4 ( high or low abnormal). The most deranged physiological value for each parameter on admission is used.

**Age Points:** Chronological age is an independent variable in its own right and for this reason points are assigned to the age in years as follows.

AGE	SCORE
44 & Below	0
45-54	2
55-64	3
65-74	5
75 & Above	6

Physiological Variables	+4	+3	+2	+1	0	+1	+2	+3	+4
Temp. in C	>41	39-40.9		38.5-38.9	36-38.5	34-35.9	32-33.9	30-31.9	<29.9
Mean Arterial BP in mm Hg	>160	139-159	110-129		70-109		50-69		<49
Heart Rate	>180	140-179	110-139		70-109		55-69	40-54	<39
PaO2	>500	350-499	200-349		<199				
Arterial PH	>7.7	7.6-7.69		7.5-7.59	7.33-7.49		7.25-7.32	7.15-7.24	<7.15
Serum Na+ (mmol/L)	>180	160-179	155-159	150-154	130-149		120-129	111-119	<110
Serum K+	>7	6.-6.9		5.5-5.9	3.5-5.4	3.0-3.4	2.5-2.9		<2.5
Serum Creatinine	>3.5	2-3.4	1.5-1.9		0.6-1.4	<0.6		<0.6	
Haematocrit%	>60		50-59.9	46-49.9	30-45.9		20-29.9		<20
WBC x 1000/mm3	>40		20-39.9	15-19.9	3-14.9		1-2.9		<1
Serum HCO3 Venous	>52	41-51.9		32-40.9	22-31.9		18-21.9	15-17.9	<15
Serum Urea mmol/L	>15	9-14	5-9		1.4.9		<1		

**Physiological Variables**

**Chronic ill – health evaluation (severe organ insufficiency) points:**

Presence of chronic illness in patients requiring the following:

- Liver – biopsy proven cirrhosis, Portal hypertension – Upper GI bleed due to portal hypertension. Prior episodes of hepatic failure / encephalopathy/coma.
- Cardiovascular : New York Heart Association Class IV
- Respiratory : Chronic restrictive, obstructive or vascular disease resulting in severe excise restriction documented chronic hypoxia, hypertension > 40 mm Hg or Respiratory dependent.
- Renal : Receiving chronic dialysis.
- Immuno compromised – The patient has received therapy that suppresses resistance to infection (eg Immunosuppression, chemotherapy, radiation, steroids, diseases like leukemia, AIDS, lymphoma.

(a) for non – operative or emergency postoperative patients – 5; (b) for elective post operative patients – 2 points. In our study we have used the modified APACHE II scores as suggested by Meakin et al in generalized peritonitis 1,18.

**Data analysis:** Mean and standard deviation of the total modified APACHE II Score was compared for each of the complication and mortality for the study. ‘t’ – test was used to compare the statistical significance of the mean values, p value <0.05 was considered as statistically significant.

**RESULTS**

Two Hundred cases of Peritonitis due to hollow viscus perforation were taken into study. The clinical study was done by interviewing, detailed examination and subjecting to relevant investigations. The scoring was applied in accordance with the Modified APACHE II chart, scoring the abnormality high or low levels.

**Table 1: Modified APACHE II SCORE BASED UPON THE SITE OF PERFORATION**

No	Etiology	Modified APACHE II scores				Total No of cases
		0-4	5-9	10-14	15-20	
1	Duodenal	28	40	12	8	88
2	Gastric ulcer	-	8	16	-	24
3	Jejunal	-	-	4	4	8
4	Ileal		8	24	8	40
5	Appendicular	4	24	4	-	32
6	Colonic			1	1	2
	Total	32	80	64	24	200

**Table 2: MODIFIED APACHE II SCORE AND POST OPERATIVE COMPLICATIONS**

	APACHE scores				Total no of cases
	0-4	5-9	10-14	15-20	
No of cases with complications	28	60	28	16	132

**Table 3: MODIFIED APACHE II SCORE AND MORTALITY PATTERNS**

No	Aetiology	Death and APACHE score				Total
		0-4	5-9	10-14	15-20	
1	Duodenal			4	8	12
2	Gastric					0
3	Jejunal					0
4	Ileal			4	8	12
5	Appendicular					0
6	Colonic			4		4
	Total			12	16	28

The total mortality was 28 among 200 patients. Twelve among duodenal ulcer perforations, Twelve among small bowel perforations, and four in colonic perforation. The Mortality rates were very high in the group of 10 - 14 and 15 – 20 range of modified APACHE scores.

**Table 4: Statistical analysis of post operative out comes**

Post operative outcome		Mean	Standard Deviation	't' values	'p' values <
Resp. Infection	-VE	8.00	3.64	0.911	0.367
	+VE	6.80	3.64		
Wound Infection	-VE	7.70	3.62	-0.40	0.968
	+VE	7.75	3.784594		
Intra peritoneal abscess	-VE	7.675	3.7	-0.299	0.767
	+VE	8.333	3.214		
Fecal fistula	-VE	7.58	3.66	-1.109	0.274
	+VE	10.50	2.12132		
Wound dehiscence	-VE	7.58	3.53	-1.109	0.274
	+VE	10.500	6.3639		
Death	-VE	7.7209	3.64055	-5.799	0.001
	+VE	16.1429	2.96808		

The mean APACHE II Score for survivors was 7.72 +3.6 and for the Non survivors was 16.1429 + 2.9 p < 0.001

In this study it was observed that there is an increase in mean apache scores for patients having severe post operative complications like intraperitoneal abscess, fecal fistula and wound dehiscence. This study helps to identify high risk groups where severe morbidity can be expected.

Higher modified APACHE II scores statistically influenced mortality in all the patients irrespective of aetiology, with p < 0.001 which is statistically significant.

**CONCLUSION**

Modified APACHE II scoring is very efficient in predicting mortality, which was significant irrespective of the aetiology of peritonitis. Higher scores are associated with serious morbidity.

Modified APACHE II Scores can be used easily and effectively to identify high risk patients for intensive therapy. Modified APACHE II Scores can be used as a tool for surgical audit and research for improving the quality of intensive care and thus the care provided to the society.

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