



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 3(I), pp. 25258-25261, March, 2018

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

OUTCOME OF SECONDARY PERITONITIS BASED ON APACHE II SCORE

Jaspreet Singh Shergill., Sanjeev Sharma and Babu Lal Sunkaria

Department of Surgery, Govt. Medical College & Hospital, Amritsar,
Ravinder Kaur: MD Anaesthesia

DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0903.1826>

ARTICLE INFO

Article History:

Received 15th December, 2017
Received in revised form 25th
January, 2018
Accepted 23rd February, 2018
Published online 28th March, 2018

Key Words:

Outcome, Secondary Peritonitis, Apache II
Score scholars, works cited.

ABSTRACT

Secondary peritonitis follows an intraperitoneal source usually from perforation of a hollow viscus. Despite advances in diagnosis, surgical technique, antimicrobial therapy and intensive care support, secondary peritonitis remains a potentially fatal affliction. Several scoring systems were developed to evaluate and compare the outcome of treatment.

Aim: The aim of the study was to compare the outcomes of secondary peritonitis using APACHE II score.

Material and Method: This prospective study was conducted for a period of 12 months on 50 patients admitted as cases of secondary peritonitis in the Department of Surgery, Government Medical College & Hospital, Amritsar, Punjab, India. The acute physiological parameters of APACHE II score were assessed and recorded at the time of admission. Postoperative outcomes were assessed and compared with the APACHE II scores.

Result: Patients who had a score between 0-9 had the most favorable prognosis and worst prognosis was seen with scores above 20. The lowest mortality was seen in patients with scores less than 20.

Conclusion: APACHE II score, as measured before the treatment of secondary peritonitis, correlates significantly with the outcome of the disease with respect to both morbidity and mortality.

Copyright © Jaspreet Singh Shergill., Sanjeev Sharma and Babu Lal Sunkaria, 2018, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Peritonitis is inflammation of the peritoneum and is most commonly due to a localized or generalized infection. Currently, peritonitis is organized into three divisions based upon the source and nature of microbial contamination. Primary peritonitis is an infection without any visceral perforation, usually from extra-peritoneal source and monomicrobial in nature. Secondary peritonitis follows an intraperitoneal source usually from the perforation of a hollow viscus. Tertiary peritonitis develops following treatment failure of secondary peritonitis. Despite advances in diagnosis, surgical technique, antimicrobial therapy and intensive care support, secondary peritonitis remains a potentially fatal affliction. Several scoring systems were developed to evaluate and compare the outcomes of treatment. In 1981, Knauss *et al.* developed the Acute Physiology And Chronic Health Evaluation Score (APACHE) based on 34 physiological parameters. APACHE II was later developed as a simplified clinically useful system using 12 physiological variables.^{1,2}

Aim of the Study

The aim of the study was to compare the outcomes of secondary peritonitis using APACHE II score.

MATERIAL AND METHODS

This prospective study was conducted for a period of 12 months on 50 patients admitted as cases of secondary peritonitis in the Department of Surgery, Government Medical College, Amritsar, which is a major tertiary health care center in the state of Punjab, India. All the patients clinically diagnosed as secondary peritonitis including abdominal trauma and patients of both sexes and all age groups irrespective of the duration of illness and etiology were included in the study.

Clinical evaluation as well as hematological, biochemical and radiological investigations were carried out to confirm the diagnosis.

The following acute physiological parameters of APACHE II score were assessed and recorded at the time of admission: Temperature (°C), Mean arterial pressure (mm Hg), Heart rate, Respiratory rate (non-ventilated), Oxygenation (PaO₂ in mmHg with FiO₂<0.5 record PaO₂), Arterial pH, Serum Sodium (mmol/l), Serum potassium (mmol/l), Serum creatinine (mg/dl), Haematocrit (%), White blood count.

These values were scored in accordance to the APACHE II chart scoring for abnormally high or low range. The score ranged from 0 to 4 on each side of the normal value. Zero score

*Corresponding author: Jaspreet Singh Shergill

Department of Surgery, Govt. Medical College & Hospital, Amritsar, Ravinder Kaur : MD Anaesthesia

represents a normal value; an increase to 4 indicates the extreme end of high or low abnormal levels. These parameters represent the Acute Physiological Scores (APS).²

Age points for adults were included in the study as follows: <44=0, 45-54=2, 55-64=3, 65-74=5, >75=6. Age points were modified as follows for children: 15=0, 10-14=2, 5-9=3, 1-4=5, and <1=6.2

Chronic Health Points (CHP) were added if the patient had a history of severe organ system insufficiency or was immunocompromised: 2 for elective post-operative patients; 5 for non-operative or emergency post-operative patients.

The Glasgow coma score (GCS) ranging from 3-15 was also assessed in the study.

APACHE II Score = Temp + MAP + HR + RR + paO₂ + pH + Na + K + Cr + HCT + WBC + (15-GCS) + Age points + CHP.2 (TABLE-1)

Table 1 APACHE II Severity of Disease Classification System

Physiological Variables	+4	+3	+2	+1	0	+1	+2	+3	+4
Temp (°C)	>41	39-40.9		38.5-39.9	36.38-5	34-35	32-33.9	30-31.9	<29.9
Mean arterial pressure	>160	130-159	110-129		70-109		50-69		<49
Heart rate	>180	140-179	11-139		70-109		55-69	40-54	<39
Respiration rate	>50	35-49		25-34	12-24	10-11	6-9		<5
Oxygenation PaO ₂ (mmHg)	>500	350-499	200-349		<200				
Arterial pH	>7.7	7.5-7.39		7.5-7.39	7.35-7.49		7.25-7.32	7.15-7.24	<7.15
Serum Na ⁺ (mmol/l)	>180	160-179	155-159	150-154	130-149	3-3.4	120-129	111-119	<110
Serum K ⁺ (mmol/l)	>7	6-6.9		5.5-5.9	3.3-3.4		2.5-2.9		<2.5
Serum creatinine (mg/dl)	>3.5	2-3.4	1.5-1.9		0.6-1.4		<0.6		
Hematocrit (%)	>60		30-39.9	46-49.9	30-45.9		20-29.9		<20
White blood count (total/mm ³)	>40		20-39.9	15-19.9	3-14.9		1-2.9		<1
Serum HCO ₃ (mmol/l) (not preferred, use if no ABG)	>52	46-51.9		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		

** Age points are as follows for children: 15=0, 10-14=2, 5-9=3, 1-4=5, and <1=6) Age points for adults are as follows: <44=0, 45-54=2, 55-64=3, 65-74=5, >75=6.)

APACHE II = -3517 + (APACHE II \pm 0.146) + 0.603 (if emergency surgery) + diagnostic result predicted death rate = e^{-0.035(1+0.075*APACHE II)}

Patients were resuscitated with intravenous fluids along with correction of electrolyte imbalances. Broad-spectrum antibiotics cover was given to all the patients. All patients who were fit to withstand general anesthesia were subjected to exploratory laparotomy to evacuate the purulent material from the abdomen and to stop the source of infection.

Bilateral flank drainage or conservative management was done to those who were unfit for surgery. Postoperative outcomes were assessed and compared with the APACHE II scores.

RESULTS

The age of the patients ranged from 6-82 years with a mean of 38.12 years. The commonest presenting symptom was

abdominal pain (100%), followed by distension of the abdomen (82%), constipation, vomiting and fever.

The most common cause of secondary peritonitis encountered in this study was perforation of the gastrointestinal tract, the commonest being perforation of the anterior wall of the first part of the duodenum (42%). (TABLE-2)

Table 2 Causes of Secondary Peritonitis (n=50)

CAUSE	PATIENTS		MALE		FEMALE	
	Count	%	Count	%	Count	%
DUODENAL/ GASTRIC PERFORATION	21	41%	21	100%	0	0%
SMALL BOWEL PERFORATION	13	26%	12	92.3%	1	7.7%
COLON PERFORATION	2	4%	1	50%	1	50%
GALL BLADDER PERFORATION	1	2%	1	100%	0	0%
UTERINE PERFORATION	1	2%	0	0%	1	100%
APPENDICULAR PERFORATION	1	2%	1	100%	0	0%
MECKEL'S DIVERTICULUM	2	4%	1	50%	1	50%
BLAUNT ABDOMINAL TRAUMA	8	16	6	75%	2	25%
STAB INJURY OF THE ABDOMEN	1	2%	1	100%	0	0%

Bilateral flank drainage was done in 5 patients and 8 patients were put into conservative management because of too low general condition to withstand any kind of surgical intervention. (TABLE-3)

Table 3 Mode of Management

TREATMENT DELIVERED	NO. OF PATIENTS
PRIMARY REPAIR OF DUODENAL PERFORATION WITH OMENTAL PATCH	13
PRIMARY CLOSURE OF SMALL INTESTINE PERFORATION	10
FLANK DRAINAGE	5
RESECTION & ANASTOMOSIS OF ILEUM / JEJUNUM	2
RESECTION & ANASTOMOSIS OF SMALL INTESTINE + MECKEL'S DIVERTICULUM	3
PRIMARY REPAIR OF DUODENAL PERFORATION WITH OMENTAL PATCH + FEEDING JEJUNOSTOMY + GASTROJEJUNOSTOMY	1
PRIMARY REPAIR OF SMALL INTESTINE PERFORATION + REPAIR OF THE DOME OF THE DIAPHRAGM	1
PRIMARY REPAIR OF SMALL INTESTINE PERFORATION + REPAIR OF THE RECTUM	1
APPENDECTOMY + CHOLECYSTECTOMY	1
RESECTION OF SMALL INTESTINE + ILEOSTOMY	1
PRIMARY REPAIR OF DUODENAL PERFORATION WITH OMENTAL PATCH + FEEDING JEJUNOSTOMY	1
PRIMARY REPAIR OF SMALL INTESTINE PERFORATION + SUBTOTAL HYSTERECTOMY + ILEOSTOMY	1
PRIMARY REPAIR OF SMALL INTESTINE PERFORATION + ILEOSTOMY	1
PRIMARY REPAIR OF LARGE INTESTINE PERFORATION + COLOSTOMY	1
CONSERVATIVE	8

On analysis of the postoperative complications encountered in the study in relation to APACHE II score, it was observed that wound infection was the most common morbidity (40%) in patients having a low score. Incidence of septicemia was higher in patients having higher APACHE II score. (TABLE-4)

Table 4 Distribution of Patients with Postoperative Complications according to APACHE II Score

Apache II Score	No. of Patients	Wound Infection	Septicemia	Burst Abdomen	Fecal Fistula
0-4	9	4	0	0	0
5-9	11	9	0	0	1
10-14	10	3	2 (2 LAMA)	1	0
15-19	6	2	1 (1 Expired)	0	0
20-24	10	1	4 (1 LAMA 3 Expired)	0	0
25-29	3	1	0	0	0
30-34	0	0	0	0	0
>34	1	0	0	0	0

The mean duration of hospital stay was shorter in patients having a low score. Further, in patients having an APACHE II score above 20, the duration of hospital stay decreased as most of the patients expired or left against medical advice. (TABLE-5) (FIG-1)

Table 5 Distribution of Patients according to APACHE II Score with Mean Hospital Stay

Apache II Score	No. of Patients	Mean Hospital Stay
0-4	9	13.3
5-9	11	15.13
10-14	10	18.5
15-19	6	21.17
20-24	10	10.1
25-29	3	9.67
30-34	0	0
>34	1	1

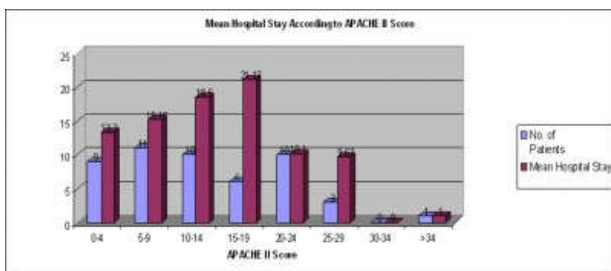


Figure 1

The patients who had a score between 0-9 had the most favorable prognosis and worst prognosis was seen with scores above 20. The lowest mortality was seen in patients with scores less than 20. (TABLE-6) (FIG-2).

Table 6 Distribution of Patients according to APACHE II Score with Outcome

Score Range	No. of Patients	Survived	Expired	LAMA	Observed mortality
0-4	9	9	0	0	Nil
5-9	11	11	0	0	Nil
10-14	10	7	1	2	10%
15-19	6	4	2	0	33%
20-24	10	2	5	3	50%
25-29	3	1	2	0	67%
30-34	0	0	0	0	Nil
>34	1	0	1	0	100%

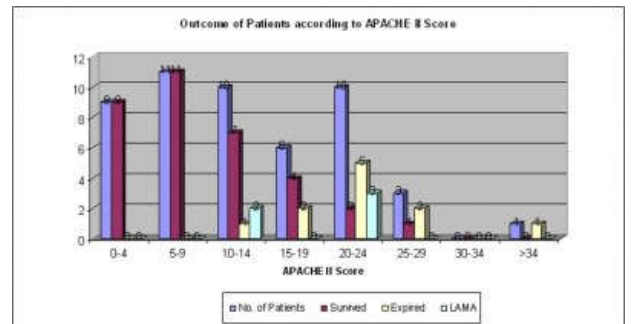


Figure 2

The observed mortality rate was 67% in the group with scores of 25-29 which was comparable to the predicted mortality of 62.5%. (TABLE-7) (FIG-3)

Table 7 Comparison of Observed and Predicted Mortality in the Study

Score Range	No. of Patients	Expired	Mortality	
			Observed	Predicted
0-4	9	0	Nil	3.20%
5-9	11	0	Nil	4.40%
10-14	10	1	10%	15.40%
15-19	6	2	33%	27.70%
20-24	10	5	50%	39.20%
25-29	3	2	67%	62.50%
30-34	0	0	Nil	Nil
>34	1	1	100%	85.10%

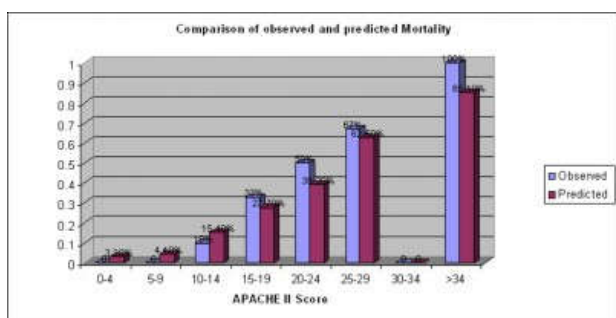


Figure 3

DISCUSSION

APACHE II parameters have shown a stronger relationship to the outcome than previous groupings by anatomical criteria, cause, abnormality, age and chronic ill health.

The study by Adesunkanmi *et al.* showed an incidence of postoperative complications of 42.4% similar to our study with an incidence of 58%. Patients having higher APACHE II scores had higher incidences of postoperative complications.³

The mean length of hospital stay following treatment in survivors was 17.4 days as compared to 18 days in the study by Bohlen *et al.*⁴ The mean length of stay of non-survivors was 8.2 days and these patients had higher APACHE II scores. In their study of colonic perforations, Komatsu *et al.* found that APACHE II scores of 19 or more were significantly related to poor prognosis, as seen in our study.⁵

The mean APACHE II score among survivors in our study was 8 and amongst the non-survivors it was 22.4, comparable to the studies done by different other authors. Mortality is thus directly linked with higher scores.^{4, 6, 7}

This study also confirms the ability of APACHE II score to predict the mortality and morbidity rate in secondary peritonitis patients.^{8, 9}

We have adapted the APACHE II scoring system to pre-treatment estimation of risk in patients with secondary peritonitis. Knaus *et al.* stated that physiological classification is more appropriate when assigned early in the course of disease, independent of the effects of the treatment.²

CONCLUSION

APACHE II score, as measured before the treatment of secondary peritonitis, correlates significantly with the outcome of the disease with respect to both morbidity and mortality.

References

1. Knaus WA, Zimmerman JE, Wagner DP, Draper EA, Lawrence DE. APACHE - acute physiology and chronic health evaluation: a physiological based classification system. *Crit Care Med.* 1981;9:591-7.
2. Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II - acute physiology and chronic health evaluation: a severity of disease classification system. *Crit Care Med.* 1985;13:818-29.
3. Adhesunkanmi ARK, Badmus TA, Agbakwuru EA, Ogunronbi AB. Acute generalized peritonitis in adult African patients: assessment of severity using APACHE II score. *Annals of the College of Surgeons of Hong Kong.* 2003; 7:23-28.
4. Bohlen JM, Mustard RA, Oxholm SE, Schouten BD. APACHE II score and abdominal sepsis. A prospective study. *Arch Surg.* 1988;123:225-9.
5. Komatsu S, Shimomatsuya T, Nakajima M, Amaya H, Kobuchi T, Shiraishi S, Konishi S, Ono S, Maruhashi K. Prognostic factors and scoring system for survival in colonic perforation. *Hepatogastroenterology.* 2005;52:761-4.
6. Adhesunkanmi ARK, Oseni SA, Adejuyigbe O, Agbakwuru EA. Acute generalized peritonitis in African children: assessment of severity of illness using modified APACHE II score. *ANZ J Surg.* 2003;73:275-9.
7. Agarwal S, Sharma D, Raina VK. Arterial pH and arterial oxygenation are not essential for risk stratification in perforation peritonitis. *Indian J Gastroenterol.* 1999;18:5-6.
8. Koperna T, Semmler D, Marian F. Risk stratification in emergency surgical patients: is the APACHE II score a reliable marker of physiological impairment? *Arch Surg.* 2001; 136:55-9.
9. Adhesunkanmi ARK, Badmus TA, Fadiora FO, Agbakwuru EA. Generalized peritonitis secondary to typhoid ileal perforation: Assessment of severity using modified APACHE II score. *Indian J Surg.* 2005;67:29-33

How to cite this article:

Jaspreet Singh Shergill., Sanjeev Sharma and Babu Lal Sunkaria.2018, Outcome of Secondary Peritonitis Based on Apache II Score. *Int J Recent Sci Res.* 9(3), pp. 25258-25261. DOI: <http://dx.doi.org/10.24327/ijrsr.2018.0903.1826>
