

Severity Assessment, Prognostication and Risk Stratification Using Apache II and CECT in Cases of Severe Acute Pancreatitis in Prospective Study

Dr. Manish Kumar Khare¹, Dr. Tarun Kumar Naik¹, Dr. M.K. Devedi², Dr. Madhusoodan Gupta³

¹Assistant Professor Department of Surgery CCM Medical College, Durg (CG)

²Assistant Professor Department of Radiology CCM Medical College, Durg (CG)

³Sr. Consultant Gen. Surgery JLNH & RC Bhilai (CG)



Abstract:

Purpose: - The present to grade the severity of severe acute pancreatitis using APACHE II scoring, the severity using CECT abdomen, the utility of each as prognostic indicator in Severe Acute Pancreatitis, the prognosis and stratify the risk using both APACHE II and CECT for management of the patient admitted at Chandulal Chandrakar Memorial Medical College and Hospital Kachandur, Durg.

Methods: - This prospective study was carried out on patients hospitalized for acute pancreatitis in the surgery department of Chandulal Chandrakar Memorial Medical College Kachandur, Durg. A total of 50 patients with the diagnosis of acute pancreatitis admitted between Jan 2015 to June 2017 were included in the study, out of these 50 patients 36 patients had severe acute pancreatitis and 14 patients had mild acute pancreatitis. Patients with history of treatment elsewhere, recurrent episodes in the past were excluded from the study. Patients enrolled in the study were subjected to the study design viz; ongoing APACHE II assessment, CECT on 72 hrs and CECT on 15th day. However certain patients were in the study who could not be subjected to all the 3 parameter because of death / deranged RFT or irregular follow up.

Results and Conclusion: - Correlation between APACHE II within 48 hours of admission and Contrast enhanced CT Scan of abdomen in 72 hours had the sensitivity of 78.57% and specificity of 88.89%. Correlation between APACHE II within 48 hours of admission and Contrast enhanced CT Scan of abdomen on 15th day was better with 85.19% sensitivity and 88.89% specificity. Patients with an APACHE II Score of 8 or more within 48 hours of admission had a severe course with a mortality rate of 32.72 % compared to nil mortality rates in those with APACHE II Score < 8. The ease and accuracy of APACHE II Scoring System identified that subset of patients who had Severe Acute Pancreatitis and thereby needed intensive care. Patients with APACHE II score of 8 or more are likely to develop loco-regional complications of pancreatitis like sterile pancreatic necrosis, infected necrosis or WOPN.

Keywords: - APACHE, CECT, WOPN, Acute pancreatitis, SAP, GCS, ERCP, CT, CTSL.

Introduction

Acute pancreatitis (AP) is an acute inflammatory condition of the pancreas that may extend to local and distant extra-pancreatic tissues typically presenting with acute abdomen associated with varied level of pancreatic enzymes in blood and urine. AP is broadly classified as mild or severe. Mild Acute Pancreatitis is often referred to as interstitial pancreatitis, based on its radiographic appearance. Severe Acute Pancreatitis (SAP) implies the presence of organ failure, local complications, or pancreatic necrosis.

AP is a disease of varying severity. Up to 80% cases are mild & self-limiting, but in 20% cases disease process is unrelenting & complications of AP set in viz; pseudo cyst, abscess & infective pancreatic necrosis.^[1] Challenge facing

the clinician is to prognosticate the disease process & to stratify the risk of development of complications & thus enable him to intervene at the optimal time to reduce the morbidity and mortality.

Traditionally acute physiology score and the chronic health evaluation II (APACHE) has been used for progression of disease, CECT (Contrast Enhanced Computer Tomography) has been used for diagnosis and for complications of AP. Patients may exhibit a wide spectrum of presentation ranging from those who appear completely well to those who from the time of admission are gravely ill with profound shock, toxicity and confusion and failure to make diagnosis early in such cases is particularly liable to a fatal outcome.

The APACHE were used in the first major attempts to quantify the severity of the illness in ICU patients, by Knaus et al in 1981. This was later modified in 1985 by the same author as APACHE II.^[2,4] It contains 12 continuous variables from the original APACHE system and also takes into account the age of the Patient, the pre-morbid conditions and the Glasgow coma scale (GCS). The major advantage of the APACHE II scoring system, as compared to the other systems, is that it can be used in monitoring the patient's response to therapy while the Ranson and the Glasgow scales are mainly meant for the assessment at presentation.^[2,5] The APACHE II scoring system takes into account 12 variables which include, Body temperature, Mean arterial pressure, Heart rate, Respiratory rate, Oxygenation, PH, Na⁺, K⁺, Creatinine, Haematocrit, total leucocytes count and the Glasgow coma score. To eliminate the problem of the missing values and concerns about the assumption that an unmeasured variable was normal, the measurement of all the 12 variables was made mandatory for the usage of APACHE II. The recorded values of the variables are based on the most deranged values during the past 24 hours. Because age and severe chronic health problems reflect a diminished physiological reserve, they have been directly incorporated into APACHE II.

Also, emergency surgery and non-operative patients with severe, chronic organ system dysfunction were given five additional points in comparison to the elective surgical patients who were given only two points because patients with severe chronic conditions are not considered to be candidates for elective surgery.^[2,6]

CT scan abdomen is able to depict and quantify pancreatic parenchymal injury and evaluate surrounding tissues; therefore, it is very helpful in the diagnosis and staging of the disease. Contrast enhanced computed tomography (CECT) abdomen has been shown to be sensitive and accurate in detection of early and late complication of severe acute pancreatitis. CT scan abdomen has shown an overall accuracy of 87% with a sensitivity of 100% for detection of extended pancreatic necrosis, and a sensitivity of 50% if only minor necrotic areas are present at surgery.^[7] Thus, for staging purposes of severe acute pancreatitis, CECT scan abdomen provides more reliable results. With the limitation on of all scoring systems, early prognosis in severe acute pancreatitis subjects has been a tough task however, and an extensive search for objective tools that predict severity and outcome at the time of hospital admission remains a major challenge.

Objectives of Study

1. To grade the severity of severe acute pancreatitis using APACHE II scoring.
2. To grade the severity using CECT abdomen.

3. To assess the utility of each as prognostic indicator in Severe Acute Pancreatitis.
4. To predict the prognosis and stratify the risk using both APACHE II and CECT for management of the patient.

Materials & Methods

This prospective study was carried out on patients hospitalized for acute pancreatitis in the surgery department of Chandulal Chandrakar Memorial Medical College Kachandur, Durg from January 2015 to June 2017.

A total of 50 patients with the diagnosis of acute pancreatitis admitted between Jan 2015 to June 2017 were included in the study, out of these 50 patients 36 patients had severe acute pancreatitis and 14 patients had mild acute pancreatitis. Patients with history of treatment elsewhere, recurrent episodes in the past were excluded from the study. Patients enrolled in the study were subjected to the study design viz; ongoing APACHE II assessment, CECT on 72 hrs and CECT on 15th day. However certain patients were in the study who could not be subjected to all the 3 parameter because of death / deranged RFT or irregular follow up.

Selection of patients:

50 patients with the diagnosis of first attack of acute pancreatitis of both sexes and all age groups were selected for the study. The diagnosis of acute pancreatitis was accepted when a compatible clinical symptoms

1. Abdominal pain suggestive of pancreatitis (epigastria pain often radiating to the back), with the start of such pain considered to be the onset of acute pancreatitis;
2. Serum amylase and lipase levels more than three times normal, the upper limit of normal range. Patients with history of treatment elsewhere, recurrent episodes in the past do not fit into the design of this study and were excluded.

Alcohol was considered the etiology when patient volunteered a history of a recent binge of alcohol or reported a regular high intake. Gallstone related disease was based on identification of gallstone by ultrasound, endoscopic retrograde cholangio pancreatography (ERCP) or CT scan abdomen. Ultrasonography was done routinely performed for all patients to diagnose to have severe acute pancreatitis and CECT abdomen was done on all these patients within 72 hours and 15th day of admission to confirm the diagnosis and grade the severity of the disease and related complications. All these patients were scored using the APACHE II scoring system within 48 hours of admission and ongoing score.

APACHE II Score (8)

Physiologic Variable	High Abnormal Range					Low Abnormal Range				Points
	+4	+3	+2	+1	0	+1	+2	+3	+4	
Temperature - rectal (°C)	≥41°	39 to 40.9°		38.5 to 38.9°	36 to 38.4°	34 to 35.9°	32 to 33.9°	30 to 31.9°	≤29.9°	
Mean Arterial Pressure - mm Hg	≥160	130 to 159	110 to 129		70 to 109		50 to 69		≤49	
Heart Rate (ventricular response)	≥180	140 to 179	110 to 139		70 to 109		55 to 69	40 to 54	≤39	
Respiratory Rate (non-ventilated or ventilated)	≥50	35 to 49		25 to 34	12 to 24	10 to 11	6 to 9		≤5	
Oxygenation: A-aDO ₂ or PaO ₂ (mm Hg) a. FIO ₂ ≥0.5 record A-aDO ₂ b. FIO ₂ <0.5 record PaO ₂	≥500	350 to 499	200 to 349		<200					
Arterial pH (preferred)	≥7.7	7.6 to 7.69		7.5 to 7.59	7.33 to 7.49		7.25 to 7.32	7.15 to 7.24	<7.15	
Serum HCO ₃ (venous mEq/l) (not preferred, but may use if no ABGs)	≥52	41 to 51.9		32 to 40.9	22 to 31.9		18 to 21.9	15 to 17.9	<15	
Serum Sodium (mEq/l)	≥180	160 to 179	155 to 159	150 to 154	130 to 149		120 to 129	111 to 119	≤110	
Serum Potassium (mEq/l)	≥7	6 to 6.9		5.5 to 5.9	3.5 to 5.4	3 to 3.4	2.5 to 2.9		<2.5	
Serum Creatinine (mg/dl) Double point score for acute renal failure	≥3.5	2 to 3.4	1.5 to 1.9		0.6 to 1.4		<0.6			
Hematocrit (%)	≥60		50 to 59.9	46 to 49.9	30 to 45.9		20 to 29.9		<20	
White Blood Count (total/mm ³) (in 1000s)	≥40		20 to 39.9	15 to 19.9	3 to 14.9		1 to 2.9		<1	
Glasgow Coma Score (GCS) Score = 15 minus actual GCS										
A. Total Acute Physiology Score (sum of 12 above points)										
B. Age points (years) ≤44=0; 45 to 54=2; 55 to 64=3; 65 to 74=5; ≥75=6										
C. Chronic Health Points (see below)										
Total APACHE II Score (add together the points from A+B+C)										

CT severity index score of severe acute pancreatitis was calculated as mentioned by Balthazar et al in 1985.

Grade	Score	Finding
A	0	Normal gland
B	1	Focal/diffuse gland enlargement
C	2	Peripancreatic inflammatory change
D	3	Single pancreatic fluid collection
E	4	2 or > peripancreatic fluid collection Or pancreatic abscess

Presence of necrosis is scored as:

- 0 : None
- 2 : <30% Pancreatic necrosis
- 4 : 30-50% pancreatic necrosis
- 6 : >50% Pancreatic necrosis

CTSI Score	Mortality	Morbidity
0-3	3%	8%
4-6	6%	35%
7-10	17%	92%

The severity of severe acute pancreatitis was stratified according to the CT severity index (CTSI) score described above. Patients with a CTSI score of 7-10 were predicted to have a severe acute pancreatitis as this group of patients had a mortality of 17% and morbidity of 92%. Patients with a CTSI score 4-6 were also predicted to have a severe course of this illness because apart from the mortality of 6% in this group of patients, they had a morbidity of 35% and it is to these two groups of patients, in whom aggressive treatment in the intensive care was instituted on diagnosis. All complications were managed with appropriate surgical

approaches. Patients APACHE II scores were compared with the CTSI score (within 72 hours and on 15th day) and were assessed for grading and the severity of the disease and predicting the outcome.

Data Analysis

Data analysis was done by calculating the following: Ratio, Percentage SD \pm Mean and Chi Square test. A statistical analysis was performed using the Stastical Package for the Social Science program (SPSS, 23.0). Frequencies and percentages were used for the categorical measures. Probability values $p < 0.05$ were considered statistically significant.

Inclusion Criteria: All consecutive patients with documented episodes of acute pancreatitis

Exclusion Criteria: Patients with history of initial treatment elsewhere, recurrent episodes in the past and known case of chronic pancreatitis were excluded from the study.

Table 1: Shows age wise distribution of patients

Age Group	No of patients	% of Patients
<20	1	2
20-30	5	10
30-40	9	18
40-50	16	32
50-60	7	14
60-70	12	24

Table 1 shows age wise distribution of patients. In this study, the youngest patient was of 15 years and the oldest

Table 4: CTSI score in 72 hours

Sex	Total	CTSI Score (72 Hours)				P value
		MAP (0-3)		SAP (4-10)		
		No of Patients	% of Patients	No of Patients	% of Patients	
Male	30	6	20 %	24	80 %	0.204 NS
Female	7	3	42.86 %	4	57.14 %	

Table 4 shows CTSI score in 72 hours was done in 37 patients, in which 30 patients were male and 7 patients were female, In this subset of patients CTSI Score 0-3 was found in 9 patients and CTSI Score 4-10 in 28 patients, In 13

Table 5: CTSI score on 15th day

Sex	Total no of Patients	CTSI Score (15th Day)				P value
		MAP (0-3)		SAP (4-10)		
		No of Patients	% of Patients	No of Patients	% of Patients	
Male	30	7	23.33 %	23	76.67 %	0.18 NS
Female	6	3	50 %	3	50 %	

Table 5 shows CECT was done on 15th day in 36 patients, in which 30 patients were male and 6 patients were female. in this subset, CTSI Score 0-3 was found in 10 patients and

was 68 years. The maximum numbers of patients were in 5th decade of life and constituted a maximum of 32%.

Table 2: Shows sex wise distribution of AP patients

Sex	No of Patients	% of patients
Male	39	78 %
Female	11	22 %
Only Alcohol	30	60 %
Only Gallstones	15	30 %
Alcohol / Gallstones	2	4 %
Others	3	6 %

Table2 shows sex wise distribution of AP patients. Male constituted 78% of the total patients and female were 22%. 60% patients drink only alcohol, 30% patients having gallstones, 2 patients are alcohol drinker with having gallstones and 3 patients are other means not having gallstones and never drink alcohol.

Observations and Results

Table 3: Grading by apache II score system within 48 hours

Apache II Score – n = 50			
<8		≥8	
No of Patients	% of Patients	No of Patients	% of Patients
14	28 %	36	72 %

Table 3 shows the according to APACHE II score, 36 patients were predicted to have severe acute pancreatitis and 14 patients were predicted to have mild acute pancreatitis within 48 hours of admission.

patients CECT could not be done in 72 hours due to deranged RFT or patients died, within 72 hours of admission.

CTSI Score 4-10 in 26 patients, and in 14 patients CECT was not done on 15th day due to patients death or patients being referred out or went LAMA.

Table 6: correlations between apache II within 48 hours and CTSI in 72 hours

APACHE II Score	CTSI 72 Hours				P value
	SAP (4-10)		MAP (0-3)		
	No of Patients	% of Patients	No of Patients	% of Patients	
>=8	22	95.65 %	1	4.35 %	0.0002 HS
<8	6	42.86 %	8	57.14 %	

Highly significant association found between apache and CTSI (72 hrs)

Table 6 shows SENSITIVITY 78.57%, SPECIFICITY 88.89%, POSITIVE PREDICTIVE VALUE 95.65%, NEGATIVE PREDICTIVE VALUE 57.14%. Of the 28 patients with severe acute pancreatitis, only 22 patients had Apache II of 8 or more in 72 hours CECT. In 6 patients

CTSI Score was more than 4 but there APACHE II Score less than 8. In the course of study these patients settled with conservative management and did not develop any locoregional complications and were discharged home and did not return with any complication.

Table 7: Correlation between APACHE II within 48 hours and CTSI on 15th day

APACHE Score	CTSI 15th Day				P value
	SAP (4-10)		MAP (0-3)		
	No of Patients	% of Patients	No of Patients	% of Patients	
>=8	23	95.83 %	1	1.17 %	0.0004 HS
<8	4	33.33 %	8	66.47 %	

Highly significant association found between apache II and CTSI (72 hrs)

Table 7 shows SENSITIVITY 85.19%, SPECIFICITY 88.89%, POSITIVE PREDICTIVE VALUE 95.83%, NEGATIVE PREDICTIVE VALUE 66.67%. Of the 27

patients with severe acute pancreatitis, only 23 patients had APACHE II of 8 or more on 15th day of CECT.

Table 8: mortality rate by APACHE II within 48 hours

APACHE IIScore	Number of Patients	Number of Deaths	Mortality Rate
<8	14	0	0
≥8	36	11	32.72 % (+_ 2SD)

Table 8 shows the mortality rate of APACHE II Score <8 were nil, and APACHE II Score 8 or more were 32.72%.

Out of 36 patients 11 patients died they all had APACHE II score > 8.

Table 9: total mortality after conservative treatment and after surgical treatment

Treatment	Died		Improved		Mortality Rates (%)	P value
	No of Patients	% of Patients	No of Patients	% of Patients		
Surgery	2	40 %	3	60 %	40%(±2SD)	0.20
Conservative Treatment	9	20 %	36	80 %	20%(± 2SD)	

Table 9 shows the mortality in this study was 11 out of 50 patients, approximate 22%. In these 11 patients APACHE II on admission revealed severe acute pancreatitis. Out of these 6 patients died within 72 hours they had APACHE II Score

in 48 hours range from 21 to 32, remaining 5 patients improved marginally. In this subset of study 45 patients treated conservatively and had mortality of 20%. 5 patients had undergone surgical treatment and had mortality of 40%.

Table 10: Shows the complications

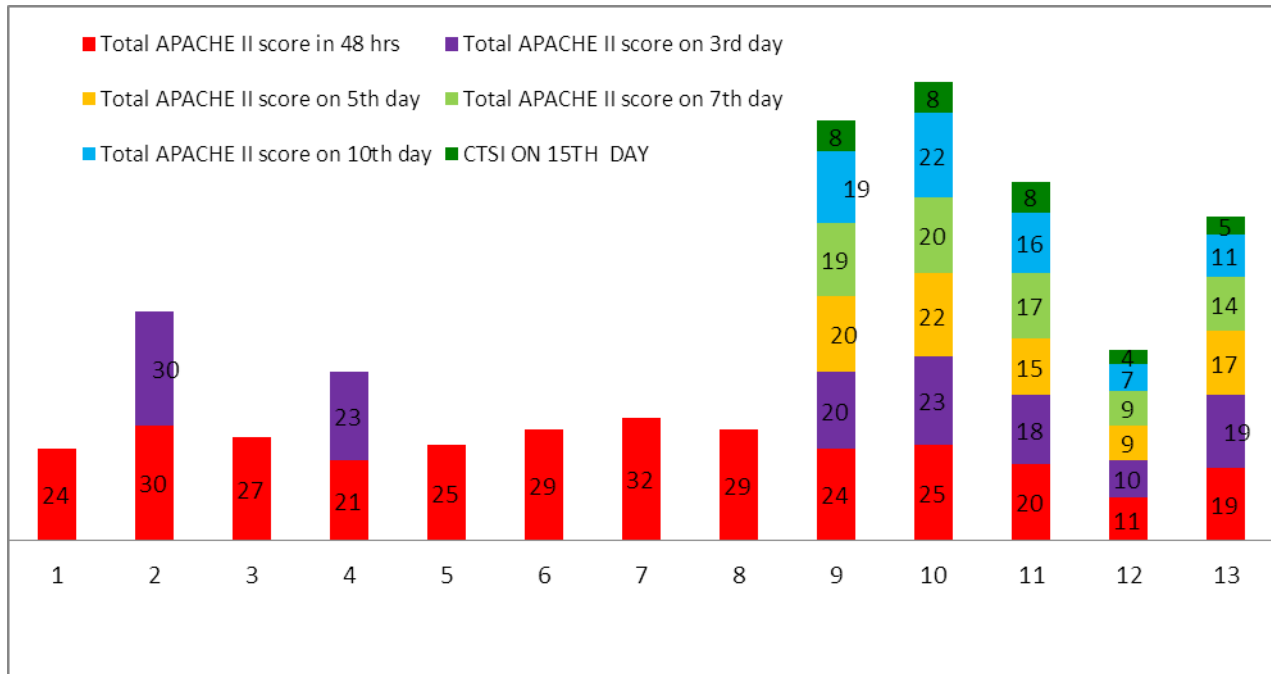
Complications	No of Patients	% of Patients
Acute fluid collection	19	38 %
PA	10	20 %
PN	35	70 %
PULM	24	48 %
RENAL	13	26 %

Table 10 shows the Local complications were seen in 35 out of 36 patients with severe acute pancreatitis and systemic complications were seen in 25 out of 36 patients with severe acute pancreatitis. Some patients with local complications also had systemic complications. Local complications were seen in 3 of the 7 patients with mild acute pancreatitis and

had no systemic complications. Out of 50 patients APACHE II Score of 36 patients revealed severe acute pancreatitis (because of renal or respiratory organ dysfunction). Out of these 13 patients, 3rd day CECT was not done due deranged KFT. They were improving clinically and there ongoing APACHE II score were also improving

Table 11: Representing the prognosis of patients in whom CECT could not be done on 3rd day.

No of patients	Total APACHE II score in 48 hrs	Total APACHE II score on 3rd day	Total APACHE II score on 5th day	Total APACHE II score on 7th day	Total APACHE II score on 10th day	CTSI SCORE IN 72 HOURS	CTSI ON 15TH DAY	Outcome
1	24	-	-	-	-			DIED
2	30	30	-	-	-			DIED
3	27	-	-	-	-			DIED
4	21	23	-	-	-			DIED
5	25	-	-	-	-			DIED
6	29	-	-	-	-			DIED
7	32	-	-	-	-			DIED
8	29	-	-	-	-			DIED
9	24	20	20	19	19		8	IMPROVED
10	25	23	22	20	22		8	IMPROVED
11	20	18	15	17	16		8	IMPROVED
12	11	10	9	9	7		4	IMPROVED
13	19	19	17	14	11		5	IMPROVED

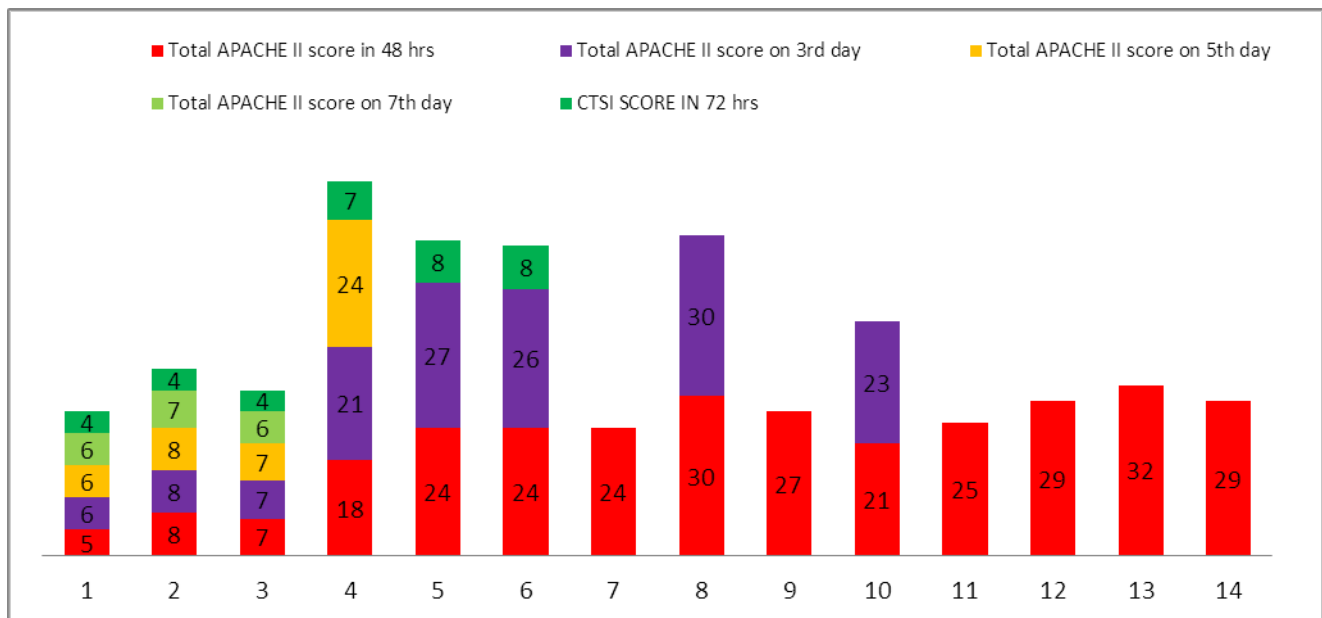


Graph no 1 representing the prognosis of patients in whom CECT could not be done on 3rd day. 72 hours CECT was not done in 13 patients due to raised serum creatinine, out of these 8 patients died. They had APACHE II score range from 21-32 in 48 hours. 15th day CECT of remaining 5

patients was done after serum creatinine had touch to normal level. They had CTSI of 5-8 and it suggestive of severe acute pancreatitis. APACHE II score within 48 hours range from 11-25 which progressively decrease to 7-22 on 10th day.

Table 12: Representing the prognosis of patients in whom CECT could not be done on 15th day.

No of Pts.	Total APACHE II score in 48 hrs	Total APACHE II score on 3rd day	Total APACHE II score on 5th day	Total APACHE II score on 7th day	Total APACHE II score on 10th day	CTSI SCORE IN 72 hrs	CTSI ON 15th day	Outcome
1	5	6	6	6	-	4		Improved
2	8	8	8	7	-	4		Improved
3	7	7	7	6	-	4		Improved
4	18	21	24	-	-	7		Died
5	24	27	-	-	-	8		Died
6	24	26	-	-	-	8		Died
7	24	-	-	-	-			Died
8	30	30	-	-	-			Died
9	27	-	-	-	-			Died
10	21	23	-	-	-			Died
11	25	-	-	-	-			Died
12	29	-	-	-	-			Died
13	32	-	-	-	-			Died
14	29	-	-	-	-			Died

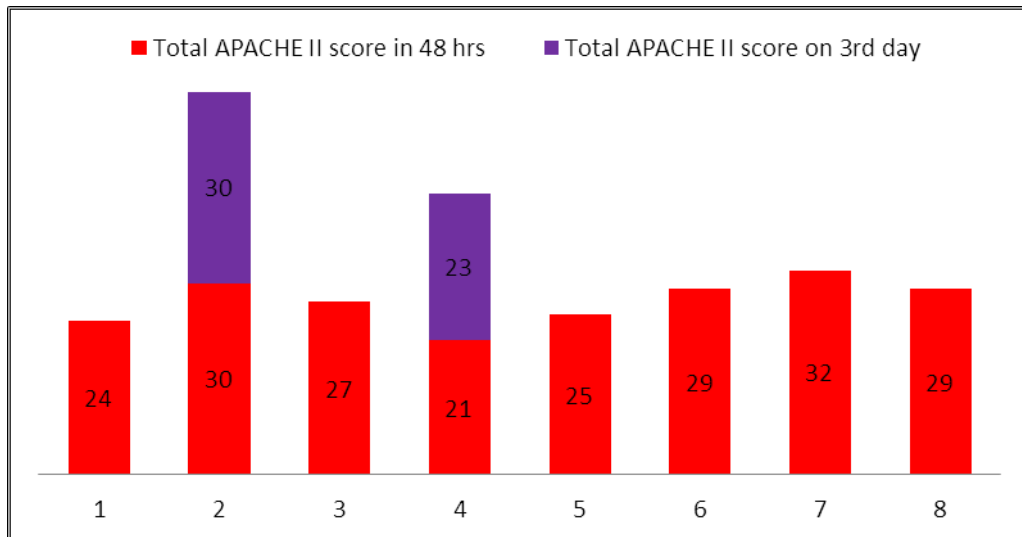


Graph no 2 Chart representing the prognosis of patients in whom CECT could not be done on 15th day. In this study 15th day CECT was not done in 14 patients due to patients dead or referred out or LAMA. Out of these 11 patients died. They had APACHE II score 18-32 in 48 hours. In 72

hours CECT was done in 6 patients out of these 3 patients died who had APACHE II score of 18-24 in 48 hours. CT Severity Score in these patients was 7-8, suggestive of severe acute pancreatitis. Remaining 3 patients were managed conservatively and discharged.

Table 13: Representing the prognosis of patients in whom CECT could not be done on 3rd day and 15th day.

No of patients	Total APACHE II score in 48 hrs	Total APACHE II score on 3rd day	Total APACHE II score on 5th day	CTSI SCORE IN 72 hrs	CTSI ON 15th day	Outcome
1	24	-	-			DIED
2	30	30	-			DIED
3	27	-	-			DIED
4	21	23	-			DIED
5	25	-	-			DIED
6	29	-	-			DIED
7	32	-	-			DIED
8	29	-	-			DIED

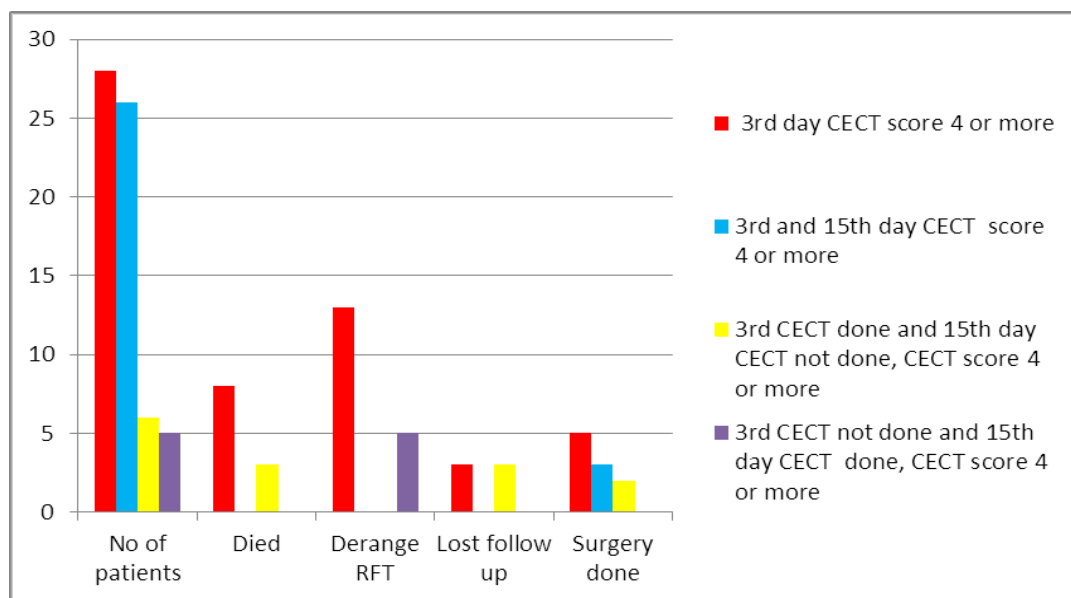


Graph no 3 Representing the prognosis of patients in whom CECT could not be done on 3rd day and 15th day In 8 patients CECT could not be done on 3rd and 15th day. They

all died. APACHE II Score in these patients range from 21-32, suggestive of severe acute pancreatitis. In one patients APACHE II Score increased from 21 to 23 on 3rd day.

Table 14: analysis of data by CECT 3rd and 15th day

	3rd day CECT score 4 or more	3rd and 15th day CECT score 4 or more	3rd CECT done and 15th day CECT not done, CECT score 4 or more	3rd CECT not done and 15th day CECT done, CECT score 4 or more
No of patients	28	26	6	5
Died	8	0	3	0
Lost follow up	3	0	3	0
Surgery done	5	3	2	0



Graph no 4 represents analysis of data by CECT 3rd and 15th day 3rd day CECT Score of 4 or more were seen in 28 patients. In this subset 8 patients died. 13 patients showed deranged RFT and 3 patients were lost follow up. 5 patients underwent surgery. 3rd and 15th day CECT Score of 4 or more were seen in 26 patients. In this subset 3 patients underwent surgery. In 6 patients 3rd day CECT was done and 15th day CECT was not done. In this subset 3 patients

died and 3 patients lost follow up. In 5 patients 3rd day CECT was not done because of deranged RFT.

Discussion

The study was aimed to grade the severity of disease using APACHE II Scoring system and try to attempt prognosticate the severity and risk stratification of the disease on the basis of APACHE II and CECT. The advantage of APACHE II

scoring system is purely a clinico-biochemical scoring system, easy to perform, can be done readily, can be repeated during stay in hospital and does not require any sophisticated skills, hence can be at no additional cost to the patient or the hospital i.e. saving cost and resources; at the same time helping the clinician to predict the likely course of the illness before instituting the proper treatment to these patients.

In this study, the mean age was 45.5 yrs and the range was from 15 to 68 years. Almost all the female patients had biliary disease etiology of the disease in this study and most of the male patients had the disease due to alcohol etiology. In review of acute pancreatitis by Marshall JB et al^[9], he also documented the same finding. A study in a multiethnic population by Kandasami P et al^[10] also reported that the incidence of alcohol association with acute pancreatitis was significantly increased in males, while gallstone pancreatitis was predominantly a disease of the female.

In this study, 15 (30%) patients had only biliary etiology of the disease and 30 (60%) patients had only alcoholic etiology of the disease. Alcohol was the predominant etiology factor in this study. Kandasami et al,^[10] also found alcohol association to be significantly increased among Indians when compared to other races. He found 47.7% patients had alcohol association as the etiological factor in the disease.

In this study, together alcohol and biliary disease etiology constituted approx 94% of all the cases, including two patients who had both alcohol and biliary disease etiology.

Marshall JB et al,^[9] reported alcohol and gallstone accounted for about 65-80% of the cases. Acosta JM et al,^[11] also accounted approx. 90% of the cases of acute pancreatitis with alcohol and gallstone etiology. In this study other causes in the etiology of acute pancreatitis included post ERCP (endoscopic retrograde cholangiopancreatography) in 1 patient and 2 patients had gall bladder and CBD sludge as detected by ultrasonography abdomen. Studies in early 90s suggested that occult biliary microlithiasis and biliary sludge may be the etiology of idiopathic pancreatitis.^[9]

In this study, 28 patients had Severe Acute Pancreatitis (SAP) according to CTSI score in 72 hours, out of them, 22 patients were predicted to have a severe outcome by APACHE II Score of 8 or more within 48 hours of admission. Thus APACHE II Scoring System had a sensitivity, specificity, positive predictive value and negative predictive value to be 78.57% 88.89% 95.65% 57.14% respectively.

In this study, 27 patients had Severe Acute Pancreatitis (SAP) according to CTSI score on 15th day, out of them, 23

patients were predicted to have a severe outcome by APACHE II Score of 8 or more within 48 hours of admission. Thus APACHE II Scoring System had a sensitivity, specificity, positive predictive value and negative predictive value to be 85.19% 88.89% 95.83% 66.67% respectively. CECT is a valuable tool in correctly diagnosing and grading the severity of the disease as in this study, CECT scan abdomen correctly diagnosed all the cases of severe acute pancreatitis, which were missed by the APACHE II Scoring System.

In a prospective study by Simoes et al,^[12] of APACHE II within 48 hours of admission had ,the sensitivity of APACHE II 79.4%, specificity of 83.1%, positive predictive value of 64.3%, and negative predictive value of 91.4%.

A prospective study of 51 patients who were admitted to the AJ Institute of Medical Sciences^[13] had APACHE II score 10 or more had sensitivity 71.4% specificity 75.8% positive predictive value 68.2% and negative predictive value 78.6%. The mortality rate of Severe Acute Pancreatitis as predicted by APACHE II Scoring system 32.76% in this study. APACHE II Score^[14] between 10-24 predict the mortality rate approximately 15-40%. In this study all 11 patients died had APACHE II Score between 18-32 with a mortality rate of 32.76%.

In our study 5 patients had surgical intervention 2 patients before 15th day and 3 patients after 15th day of admission. The APACHE II consequently high and had organ dysfunction which did not Improved by conservative measure. 2 patients who were intervening within 15 days were deteriorating despite management in HDU. In 3 patient's organ dysfunction Improved but developed regional complications.

On the basis of above observation it can be deduced that APACHE II Scoring indicating Severe Acute Pancreatitis on early days of admission and which continue to remain high, these patients have likelihood of developing local complications. This prediction of developing local complications augmented by doing high quality CECT abdomen. Observational errors are likely in CECT reading which carefully weight against clinical background. Decision to intervene has to be carefully based on CECT finding and clinical observation. In this study 45 patients treated conservative and out of them 9 patients died and having mortality rate of 20%, and 5 patients had treated surgically and out of them 2 patients died and having mortality of 40%.

Bailey and Love's Textbook of Surgery, 24th edition also documented a mortality rate of 20-25 % in patients of Severe Acute Pancreatitis. The incidence of complications like pancreatic necrosis, pancreatic abscess, acute fluid collection of pancreas, renal failure in this study were

similar to the study by London NJM et al^[15] in United Kingdom.

APACHE II Score at the time of admission and ongoing assessment of improvement or worsening of patients condition, it can be done with reasonable accuracy by resident or nursing staff and can be assessed with good sensitivity and specificity for prognostication of disease process.

In this study the correlation between APACHE II and CECT Abdomen in 72 hours and on 15th day, both taken into account yield results of very severe acute pancreatitis. Whether to intervene surgically or not cannot be based purely on this ground. In this study in certain subset of patients, CECT could not be done on 3rd day due to increase creatinine level. High APACHE II Score reveals in these groups of patient's severe acute pancreatitis because of their renal and respiratory organ involvement, but with conservative management in HDU (high dependency unit) they Improved and were subsequently discharge in satisfactory condition.

This observation leads to an interesting deduction that between mild acute pancreatitis and severe acute pancreatitis and can be categorized as Moderate Acute Pancreatitis (MOAP). These patients come in bad condition but with focused conservative management they improved. The patients who categorized as Moderate Acute Pancreatitis were called again and subjected to CECT on 15th day, CECT on 15th day reveled CTSI Score 4 or more but clinically they improving so they were in regular follow up. In this study CECT done on 3rd day and 15th day has reveled CTSI Score of 4 or more in 20 patients, but out of these patients only 5 patients were subjected to surgery and the decision also was not based purely on CECT. It was based on clinical condition complemented by CECT finding. Thus CECT has a tendency to over predict the severity of disease process. This short coming can be explained by peripancreatic edema and edema in tissue of lesser sac, which compress the fragile vessels and hence there is non- enhancement or reduced enhancement of pancreas and peripheral tissue, it is interpreted as necrosis, but infect it is area of hypo enhancement than non-enhancement.

Acute pancreatitis is a disease in which the clinician who are managing it should have a clear understanding of the natural history of disease process and its likely complication and the timing of their appearance and be able to decide when to abundant the policy of 'wait and see' and to adopt 'look and see' (surgical intervention). Timing and mode of intervention is to be based upon clinical finding and CECT abdomen. CECT abdomen alone should never be a guide to clinician for its inherent short coming of over prediction. Treatment

has to be customized for particular patients. There cannot be one answer to all the question, many times treatment modality outside the preview of laid down principle may be justified on clinical ground.

The Acute Physiology And Chronic Health Evaluation II (APACHE II) system is superior to other systems like Ranson's^[16], because it is the only system which takes into account all the major risk factors that influence the outcome from the disease including the acute physiological derangements, as well as the patients ability to recover which may be diminished by advancing age or chronic disease. Another advantage is that it can be calculated immediately after admission and can be repeated every day, unlike other scoring systems for acute pancreatitis.

Peritoneal lavage has been investigated as a single criterion prognostic predictor and is 82-90% accurate.^[17] Over the past few years, Interleukin-6, C-Reactive Protein and Phospholipids A has been used increasingly with promising results.^[18]

To conclude, there is no absolute single scoring system for reliably predicting the outcome of pancreatitis. The use of one or more such system, combined with clinical judgment remains the cornerstone and deciding how to monitor and treat patients.

Conclusion of our study

- Correlation between APACHE II within 48 hours of admission and Contrast enhanced CT Scan of abdomen in 72 hours had the sensitivity of 78.57% and specificity of 88.89%.
- Correlation between APACHE II within 48 hours of admission and Contrast enhanced CT Scan of abdomen on 15th day was better with 85.19% sensitivity and 88.89% specificity.
- Patients with an APACHE II Score of 8 or more within 48 hours of admission had a severe course with a mortality rate of 32.72 % compared to nil mortality rate in those with APACHE II Score < 8.
- The ease and accuracy of APACHE II Scoring System identified those subset of patients who had Severe Acute Pancreatitis and thereby needed intensive care.
- Patients with APACHE II score of 8 or more are likely to develop loco-regional complications of pancreatitis like sterile pancreatic necrosis, infected necrosis or WOPN (walled off pancreatic necrosis).

References

- [1] Papachristou GI, Whitecomb DC. Predictors of severity and necrosis in acute pancreatitis. Gastroenterol Clin N Am 2004; 33:871;90.

- [2] <http://www.jcdr.net/articles/pdf/1372/2253~final.pdf>.
- [3] Knaus et al: APACHE, a physiologically based classification system. Crit Care Med 1981; 9:591.
- [4] Knaus et al: APACHE II. A severity of disease classification system Crit Care Med 1985; 13: 818.
- [5] Wahab Shagufta, Ahmed Khan Rizwan, Ahmed Ibne, Wahab Arif; Imaging and clinical diagnostic indicators of acute pancreatitis: a comparative insight. Acta Gastroenterologica Latinoamericana 2010 September; 40/ 3: 283-28.
- [6] Theodoros E Pavlidis, Efstathios T Pavlidis and Athanasios K Sakantamis; Advances in prognostic factors in acute pancreatitis: a mini-review. Hepatobiliary Pancreat Dis Int October 15, 2010; 9/5:889.
- [7] <http://www.ncbi.nlm.nih.gov/pubmed/1955135>.
- [8] Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med 1985 Oct; 13 (10): 818-29.
- [9] Marshall JB, John B. Acute pancreatitis. Arch Intern. Med. 1993; 153; 1185-98.
- [10] Kandasami P, Hanafiah harunarashid, Harjit Kour. Acute pancreatitis in a Multi Ethnic Population, Singapore Med J 2002; 43(6); 284-88.
- [11] Acosta JM, Pellegrini CA, et al. Etiology and pathogenesis of acute biliary pancreatitis. Surgery 1980; 88; 118-25.
- [12] www.gastrores.org/index.php/Gastrores/article/download/364/414.
- [13] www.jcdr.net/articles/pdf/1372/2253~final.pdf.
- [14] Knaus et al: APACHE II. A severity of disease classification system Crit Care Med 1985; 13: 818.
- [15] London NJM, Neoptolemos JP, Lavelle J, Bailey I, James D. Contrast Enhanced abdominal computed tomography scanning and prediction of severity of acute pancreatitis; A prospective study. Br J Surg 1989; 76; 268-72.
- [16] http://www.jcdr.net/article_fulltext.asp?issn=0973-709x&year=2011&month=June&issue=3&id=1372.
- [17] Mayer Ad, McMahon MJ. The diagnosis and prognostic value of peritoneal lavage in patients with acute pancreatitis. Surg Gynecol Obstet 1985; 160; 507-12.
- [18] Viedma JA, Perez Mateo M, Dominguez JE, Carbalio F. Role of interleukin 6 in acute pancreatitis. Comparison with C-Reactive protein and phospholipase A Gut 1992, 33, 1264-67.

Corresponding Author -

Dr. Manish Kumar Khare

Assistant Professor Dept. of Surgery, CCM Medical College, Durg (CG)

Email id - ambad.sawan@gmail.com