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Original Article

To study the Utility of Modified Glasgow Score and CT Severity Score in Acute Pancreatitis- A Clinical Study

Sudarshan Kapoor[1], Deep Singh[2], Ramesh Chander[3]

[1]Prof. and HOD, [2]Junior Resident, Department of Surgery, [3]Prof. and HOD of Dept. of Radiology, GMC Amritsar, Punjab, India

***ABSTRACT*:**

Background: Acute pancreatitis is a common condition presenting as acute abdomen.The aim of the study was to correlate the severity of anatomical damage (CECT findings) and physiological derangements (Glasgow score), outcomes with respect to mortality and morbidity. **Materials & Methods:** It comprised of thirty (30) cases of acute pancreatitis. In all patients a detailed history and a thorough physical examination were carried out. The severity of pancreatitis was assessed as follows: Markers of severity at admission and during the first 48 hours. It includes GLASGOW score, SIRS, azotemia, haemoconcentration and organ failure. Data in both the scores were then statistically analyzed to assess the significance of correlation. P value less than 0.05 was considered significant. **Results:** There were 19 (63.33%) males and 11 (36.67%) females. The difference was significant (P< 0.05). The mean serum albumin value in patients was 3.16 g/dl. Mean arterial PO_2 was 84.92%. Mean serum calcium value was 8.52mg/dl. Mean RBS was 166.27mg/dl. Mean LDH value was 501.14 IU/l. Mean BUN value in patients was 36.82. Significant correlation was observed between the mortality rate and patients who had mean CT grading of more than 3.60. There was significant correlation between CT score, mortality, and prolonged stay (>30 days.) as shown in spearman's rank correlation test. **Conclusion:** We conclude that Glasgow and CTSI are important to predict the severity of acute pancreatitis. But there was no significant correlation existed between Balthazar score and Glasgow score when compared with patients having varied severity of pancreatitis.

Key words: Acute pancreatitis, CT score, Glasgow score

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Corresponding Author: Dr. Deep Singh, Junior Resident, Department of Surgery, GMC Amritsar, Punjab, India

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INTRODUCTION

Acute pancreatitis (AP) is defined as an inflammatory process of the pancreas with possible peripancreatic tissue and multiple organ involvement inducing multiple organ dysfunction syndrome (MODS) with an increased mortality rate.[1]

The incidence of acute pancreatitis per 100,000 population ranges from 5 to 80 cases per year, with the highest incidence rates being seen in Finland and the USA.[2] Acute pancreatitis is a common condition presenting as acute abdomen. Acute pancreatitis may be classified based on pathology, etiology, disease severity or the presence of necrosis. In approximately 10 - 20% of patients no etiology is identified.[2]

Acute pancreatitis is the most common complication of ERCP. Prospective studies have documented an incidence of approximately 5% with most cases being mild pancreatitis. Risk factors include young age, normal pancreatic ducts, operator inexperience, multiple injections of the pancreatic duct with acinarization, pancreatic sphincterotomy, SOD and biliary or pancreatic sphincter manometry. The addition of the parameter points yields the Glasgow prognostic criteria. The score can range from 0 to 8. If the score is >2, the likelihood of severe pancreatitis is high. If the score is <3, severe pancreatitis is unlikely. Regarding imaging dynamic contrast-enhanced CT (DCT), it is the imaging modality of choice for staging acute pancreatitis and for detecting complications.[3]

CT severity index (CTSI) that was developed by Balthazar and coworkers and then simplified and extended to monitor organ failure by Silverman, Banks and colleagues in 2004. The aim of the study was to correlate the severity of anatomical damage (CECT findings) and physiological derangements (Glasgow score), outcomes with respect to mortality and morbidity.

MATERIALS & METHODS

The present study consisted of patients attending surgery and medicine OPD and emergency at Government Medical College, Amritsar. It comprised of thirty (30) cases of acute pancreatitis with in duration of study period.

In all patients a detailed history and a thorough physical examination were carried out. Those patients who fulfilled the inclusion criteria were subjected to laboratory and biochemical tests such as screening haemogram, serum LDH, serum albumin, blood urea, serum creatinine, blood glucose level, serum calcium, serum electrolytes, PaO2 (ABG) and serum pancreatic enzymes such as amylase and/or lipase.

Following this, contrast enhanced computed tomography (CECT) was done after 72 hours to assess pancreatic necrosis, if the condition of the patient deteriorates. The severity of pancreatitis was assessed as follows: Markers of severity at admission and during the first 48 hours. It includes GLASGOW score, SIRS, azotemia, haemoconcentration and organ failure.

Markers of severity during hospitalization include persistent organ failure lasting more than 48 hours and pancreatic necrosis. Patients were re-evaluated after 72 hours to assess improvement or deterioration and CECT was advised if required. Balthazar score was calculated accordingly. Patient outcome was assessed in terms of mortality and morbidity. Morbidity including: ICU requirement, prolonged hospital stay (more than 30 days) and patients need for surgical intervention. Data in both the scores were then statistically analyzed to assess the significance of correlation. P value less than 0.05 was considered significant.

RESULTS

Table 1: Distribution of patients according to gender

Total- 30				
Gender	**Males**	**Percentage**	**Females**	**Percentage**
Number	19	63.33	11	36.67

In present study, there were 19 (63.33%) males and 11 (36.67%) females. The difference was significant (P< 0.05).

Figure I

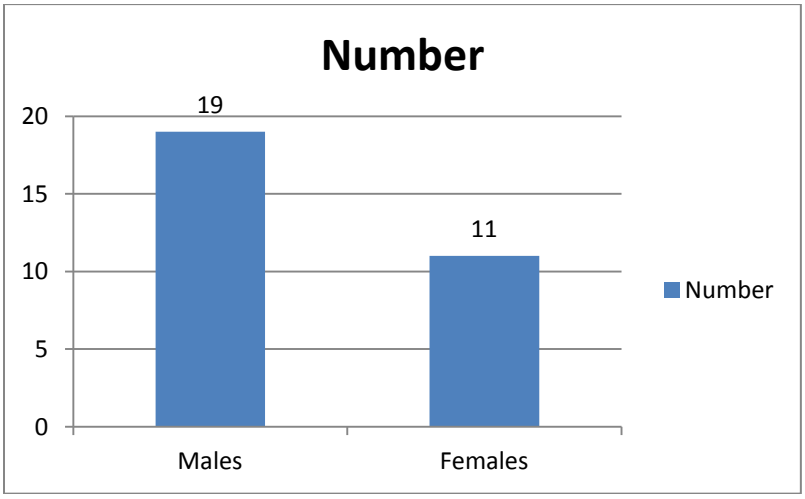

Table II: Mean value of glasgow variables

Variables	Min.	Max.	Mean± S.D
Serum albumin	1.1	4.9	3.16± 0.82
PO_2	15.5	173.0	84.92± 25.83
Serum calcium	6.4	10.1	8.52± 0.95
RBS	59.00	496.0	166.27± 85.62
LDH	164.0	1125.0	501.14± 248.18
BUN	10.0	162.0	36.82± 29.44
Total count	4530	21300.0	12736± 4984

Table II shows that mean serum albumin value in patients was 3.16 g/dl. Mean arterial PO_2 was 84.92%. Mean serum calcium value was 8.52mg/dl. Mean RBS was 166.27mg/dl. Mean LDH value was 501.14 IU/l. Mean BUN value in patients was 36.82.

Table III: Comparison of mortality status with respect to Glasgow, CT grading, necrosis and Balthazar total scores

Variable	Mortality	Mean± S.D	P- value
Glasgow total score (69)	Yes	2.60± 1.94	
	No	2.24± 1.54	0.59
CT grading (76)	Yes	3.60± 0.55	
	No	2.32± 1.40	0.04
Necrosis score (36)	Yes	3.60± 1.67	
	No	0.72± 1.40	0.005
Balthazar total score (112)	Yes	7.20± 2.17	
	No	3.04± 2.26	0.004

Significant correlation was observed between the mortality rate and patients who had mean CT grading of more than 3.60. Significant correlation was observed between the presence of necrosis (3.60) and mortality. There was no correlation of Glasgow total score with mortality rate (P> 0.05).

Table IV: Correlation between Glasgow, CT grading, Necrosis and Balthazar total scores with age, mortality status, ICU stay and Stay >30days by Spearman's rank correlation method

Dependent variables	Independent variables	P- value
Age (34.14 yrs)	Glasgow total scores	0.2821
	CT grading	0.4267
	Necrosis scores	0.5308
	Balthazar total scores	0.3754
Mortality	Glasgow total scores	0.5977
	CT grading	0.0278
	Necrosis scores	0.0004
	Balthazar total scores	0.0020
ICU stay	Glasgow total scores	0.0147
	CT grading	0.0067
	Necrosis scores	0.0001
	Balthazar total scores	0.0001
Stay >30days	Glasgow total scores	0.3095
	CT grading	0.1898
	Necrosis scores	0.1689
	Balthazar total scores	0.1742

In present study, there was significant correlation between CT score, mortality and prolonged stay (>30 days) as shown in Spearman's rank correlation test.

DISCUSSION

In present study, we evaluated the utility of Glasgow score and Balthazar score in prediction of the mortality, ICU stay and prolonged hospital stay (>30 days) in 30 patients. We correlated the scores in predicting the outcome as to which is the better predictor of the outcome. We also correlated between the scores in patients with acute pancreatitis .In present study of 30 patients with acute pancreatitis there was male preponderance with 19 (63.33%) males and 11 (36.67%) females. Irshad AB et al[5] in their study found that out of 50 cases, 33 (66%) were male and 17 (34%) were females with a male to female ratio of 2:1.

Anubhav H K et al[6] in their study with sample size of 72 found male preponderance of 51.4% whereas females were seen in 48.6%**.** In present study, age group <= 30 years had 6 (20%) patients and >=31 years had 24 (80%) patients. Mean± S.D was 34.14± 14.28.Rao B et al[7] in their study found that the mean age of patients was 42.1 years with range of 20-64 years. In our study we compared the correlation between Glasgow score and CT Balthazar score in prediction of outcomes such as mortality, ICU stay and >30 days of hospital stay. Mean serum albumin value in patients was 3.16 g/dl. Mean arterial PO2 was 84.92%. Mean serum calcium value was 8.52mg/dl. Mean RBS was 166.27mg/dl. Mean LDH value was 501.14 IU/l. Mean

BUN value in patients was 36.82. The mean Glasgow score was 2.88 and 10 (33.33%) of patients had Glasgow score of >=3 which indicates severe pancreatitis. In our study mean LDH value was 502.13 and mean blood urea value was 34.80 which did not correlate with severity of pancreatitis. In the study conducted by Zuleta MG et al,[8] there was significant correlation between mean LDH value and blood urea levels with severity of pancreatitis. The observed mean calcium level was 7.9mg/dl in cases of acute severe pancreatitis.In the same study mean observed RBS levels was 138.5mg/dl in patients with acute severe pancreatitis.

In present study patients with acute severe pancreatitis did not show any significant correlation between Glasgow scores and mortality. In our study there was significance correlation between Glasgow score of >3 indicating acute pancreatitis and ICU stay.In a similar study conducted by Mofidi Ret al[9] there was significant correlation between mortality and Glasgow score of >3.

In our study, Glasgow score who had mean value of more than 2.88 showed correlation with ICU stay. Patients who had Balthazar score of 5.24 or more showed correlation with ICU requirement. Even with patients having minimal necrosis of <30% showed the correlation with the need for ICU stay. 17 patients with acute pancreatitis required ICU stay. There is significance correlation between the Glasgow score >2.88 and CT score of more than 5.24 with ICU requirement.

In our study population of 30 patients with acute pancreatitis, 6(20%) of the patients had stay in hospital for more than 30 days. On spearman's rank correlation test shows significant correlation between CT score, mortality and prolonged stay (30 days). Balthazar score shows constant and significant association between mortality and CT grading of severity. According to Simchuk EJ et al[10] the CTSI score of <3 had a mortality of 3% and those with score of >7 had mortality of 17% it is likely that 5-6 times mortality rate in CTSI >7.

In a study conducted by Casas JD et al[11] demonstrated that if the CTSI is more than 5 the patients are under the danger of death. In a study conducted by Bradley EL et al[12]their results showed that CTSI of >8 is index of death. None of our study patients required surgical intervention as a modality to treat acute pancreatitis.

Glasgow and Balthazar score are at present useful in clinical practice fortheir simplicity and low costs. Glasgow score and Balthazar score gives useful information in patients with amore severe form of acute pancreatitis. The sensitivity and specificity of these scoring systems for predicting severe acute pancreatitis range between 55% and 90%, depending on the cut-off number and the timing of scoring. Balthazar score is used in CT severity index (CTSI) for grading of acute pancreatitis. CTSI includes grading of pancreatitis (A-E) and the extent of pancreatic necrosis.

CONCLUSION

Prediction of severity by Glasgow score and CTSI in assessing the outcome was possible but there was no correlation between the severity assessed by Glasgow score with mortality or prolonged stay of >30 days. We could also conclude that there was no significant correlation existed between Balthazar score and Glasgow score when compared with patients having varied severity of pancreatitis.

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