ORIGINAL ARTICLE

Diagnostic Accuracy of Admission C Reactive Proteins in Predicting Severity of Acute Pancreatitis Keeping CT Scan as Gold Standard

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ABSTRACT

Introduction: Acute pancreatitis is common, with an alarming rise in the global incidence. The clinical course of AP is highly variable, ranging from mild, self-limiting symptoms to multiple organ dysfunction and/or death.

Objective: To evaluate the diagnostic accuracy of admission C reactive proteins in predicting the severe acute pancreatitis keeping computed tomography as gold standard.

Material and methods: This Cross-sectional study was conducted at Department of Gastroenterology, Aga khan hospital, Karachi from 19-06-2019 till 19-06-2020. Data was prospectively collected from patients after taking a verbal consent. 181 patients who met the diagnostic criteria were included. Quantitative data was presented as simple descriptive statistics giving mean and standard deviation and qualitative variables was presented as frequency and percentages. Sensitivity, specificity, positive and negative predictive values and diagnostic accuracy was calculated.

Results: A total of 181 patients who met the inclusion and exclusion criteria were included in this study. Mean age, duration of symptoms, BMI, height, weight and CRP in our study was 49.48±10.36 years, 14.88±4.87 hours, 29.8±4.74 kg/m^2, 146.5±10.41 cm, 78.9±8.58 kg and 110.9±28.54 mg/L. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CRP for diagnosis of severe acute pancreatitis by taking CT scan as gold standard was found to be 88.8%, 81.5%, 94.7%, 65.9% and 87.2%.

Conclusion: CRP it is an inexpensive alternative to the conventional severity assessment methods for the prediction of severity and outcome of patients with acute pancreatitis and can serve as an early indicator of the progression of acute pancreatitis into a serious state.

Keywords: Severe acute pancreatitis, C reactive protein and CT scan.

INTRODUCTION

AP is a disorder primarily of the exocrine pancreas that involves varying degrees of inflammation associated with parenchymal injury of the gland.[1,2] In their 2005 guidelines, the UK Working Party on Acute Pancreatitis suggested that the etiology should be determined in at least 80% of cases of acute pancreatitis. Furthermore, the classification of cases of idiopathic acute pancreatitis should be no more than 20%.[3] Therefore, patients are subjected to extensive investigations to determine the underlying etiology. Acute pancreatitis is a very common condition (worldwide incidence of AP ranges between 5&80 per 100,000 population and prevalence of 20%), which is most of the time is of mild nature and self-limiting with minimal systemic manifestations[4] However, 15-20% of patients with severe acute pancreatitis develop systemic and local complications. Multiple scoring systems have been developed over the period of time with each having its own sensitivity and specificity.[5] A patient grumbling of unexpected beginning of epigastric agony emanating to the back, related with queasiness and heaving, requires fast prohibition of a great many hazardous circumstances including the cardiovascular (myocardial dead tissue, burst, or potentially taking apart aortic aneurysm) and gastrointestinal (peptic ulcer sickness with hole or dying, intense pancreatitis) frameworks. The clinician's set of experiences and assessment discoveries are expanded by significant examinations in restricting the differential judgments to ultimately direct the administration and treatment of a specific condition and its related complications.[6,7] These scoring frameworks contain Clinical, lab examinations and radiological examination like BISAP, Qsofa, PANC-3 Rules, CRP-levels, D-dimer levels, CTSI and changed CTSI etc.[8,9]

CRP ascends to 50,000-overlay in intense pancreatitis. It transcends ordinary cutoff points in the span of 6 hours, and tops at 48 hours. While serum catalysts, for example, amylase and lipase are useful in the analysis of pancreatitis, these have no prognostic value.[10] A few ongoing exploration studies have proposed extra markers that might have prognostic worth, including intense stage proteins like C-responsive protein (CRP). Its estimation is usually accessible large numbers of the others are

not. Subsequently, as of now CRP is by all accounts the marker of decision in clinical settings.[11]

Estimating and diagramming C-responsive protein values can demonstrate helpful in deciding sickness progress or the viability of treatments.12 Different scientific techniques are accessible for CRP assurance, like ELISA, immunoturbidimetry, quick immunodiffusion and visual agglutination. Its fixation in sound human serum is generally lower than 10 mg/L.A C-receptive protein level more prominent than 150mg/L in initial 4 days of assault or 120mg/L toward the finish of first week has a prescient worth like different standards.[13,14]

Objectives: To evaluate the diagnostic accuracy of admission C reactive proteins in predicting the severe acute pancreatitis keeping computed tomography as gold standard.

MATERIAL AND METHODS

This Cross-sectional study was conducted at Department of Gastroenterology, Aga khan hospital, Karachi from 19-06-2019 till 19-06-2020. The total sample size was 181, taking prevalence of SAP 57%, 75% sensitivity and 86% specificity of CRP for diagnosing SAP[16] 95% confidence level and 7% margin of error. Data was collected through non-probability consecutive sampling.

Inclusion Criteria: All patients presenting with acute pancreatitis presenting within 24 hours of onset of symptoms, age between 30-60 years, both gender (male/female) were included in the study.

Exclusion Criteria: All the patients already diagnosed as severe acute pancreatitis, patients having known history of chronic pancreatitis were excluded from the study because they would act as confounders and would introduce bias in the study result.

Data Collection Procedure: The current study was carried out after taking approval of the hospital ethical committee. All the patients fulfilling the inclusion criteria i.e. patients presenting with acute pancreatitis presenting within 24 hours of onset of symptoms were enrolled in the study through OPD, Emergency Department of Gastroenterology, Aga khan hospital, Karachi. The reason and the advantages of the review was made sense of for everything the included patients and composed informed assent was acquired. A detail history, clinical assessment, lab examination and radiological

assessment will be performed for the affirmation of intense pancreatitis. 5 cc of blood test was taken from the included patients and will be shipped off medical clinic lab for the conclusion affirmation CRP. All the lab examinations were finished under oversight of expert pathologist (FCPS) having least of five years of involvement. Intense Pancreatitis affirmation C receptive Proteins was named positive assuming that the CRP level is >120mg/L. All patients were exposed to radiology division for CT output to affirm the presence or nonappearance of SAP. All CT checks were accounted for by single encounters radiologist having least of five years of involvement. Every one of the information for example age, orientation, term of whine, weight, level, BMI was recorded on proforma (connected). Rejection rules was completely adhered to keep away from predisposition in concentrate on results.

Statistical Analysis: All the data was recorded on the proforma was entered in statistical software SPSS ver 23 and descriptive analysis was performed. Mean and standard deviation was computed for continuous (numerical) variables i.e. age, duration of complain, weight, height, BMI, serum CRP levels.

RESULTS

A total of 181 patients visiting Department of Gastroenterology, Aga khan hospital, Karachi who met the inclusion and exclusion criteria were included in this study. Out of 181 patients minimum age of the patient was 25 while maximum age of the patients was 60 years. Mean age in our study was 49.48 years with the standard deviation of ±10.36. Whereas, mean duration of symptoms, BMI, height, weight and CRP in our study was 14.88±4.87 hours, 29.8±4.74 kg/m^2, 146.5±10.41 cm, 78.9±8.58 kg and 110.9±28.54 mg/L respectively. Frequency distribution of CT scan showed that out of 181 patients, 143 (79%) and 38 (21%) had and did not have severe acute pancreatitis respectively. Frequency distribution of admission CRP showed that out of 181 patients, 134 (74%) and 47 (26%) had and did not have severe acute pancreatitis respectively. Frequency distribution of age showed that out of 181 patients, 81 (44.8%) and 100 (55.2%) patients were in age group 30-45 years and 46-60 years respectively. Frequency distribution of gender showed that out of 181 patients, 102 (56.4%) were male and 79 (43.6%) were female respectively. Frequency distribution of duration of symptoms showed that out of 181 patients, 128 (70.7%) and 53 (29.3%) had duration < 12 hours and > 12 hours respectively. Frequency distribution of BMI status showed that out of 181 patients, 108 (59.7%) and 73 (40.3%) had BMI < 30 kg/m2 and > 30 30 kg/m2 respectively. Out of 181 patients, sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CRP for diagnosis of severe acute pancreatitis by taking CT scan as gold standard was found to be 88.8%, 81.5%, 94.7%, 65.9% and 87.2% respectively. Stratification for age with respect to sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CRP for diagnosis of severe acute pancreatitis by taking CT scan as gold standard in age group 30-45 years was found to be 92.5%, 78.5%, 95.3%, 68.7% and 90.1% respectively. Stratification for BMI status with respect to sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of CRP for diagnosis of severe acute pancreatitis by taking CT scan as gold standard BMI < 30 kg/m2 was found to be 98.6%, 83.3%, 94.8%, 64.5% and 86.1% respectively.

Table-1: Descriptive Statistics

Variable	Mean ± SD	Standard Deviation	Min-Max
Age (years)	49.48	±10.36	25-60
Duration of symptoms (hours)	14.88	±4.87	4-24
Bmi (kg/m^2)	29.8	±4.74	25-35
Height (cm)	146.5	±10.41	138-162
Weight (kg)	78.9	±8.58	68-115
Crp (mg/l)	110.9	±28.54	71-150

Table-2: Diagnostic Accuracy of Admission CRP for the Diagnosis of Severe Acute Pancreatitis by Taking CT Scan as Gold Standard

Admission CRP	Ct scan		Total
	Positive	Negative	
Positive	127(TP)	7(FP)	134
Negative	16(FN)	31(TN)	47
Total	143	38	181

Table-3: Diagnostic Accuracy, Sensitivity, Specificity, Positive Predictive Valve, Negative Predictive Value of Admission CRP for the Diagnosis of Severe Acute Pancreatitis by Taking CT Scan as Gold Standard

Sensitivity	TP/TP+FN x 100	88.8%
Specificity	TN/TN+FP x 100	81.5%
Positive predictive value	TP/TP+FP x 100	94.7%
Negative predictive value	TN/FN+TN x 100	65.9%
Diagnostic accuracy	TP + TN/TOTAL PATIENTS x 100	87.2%

Table-4: Diagnostic Accuracy of Admission CRP for the Diagnosis of Severe Pancreatitis by Taking CT Scan as Gold Standard According to Age

Age (years)	Admission CRP	CT scan		Total		
		Positive	Negative			
30-45	Positive				SEN	92.5%
	Negative	62(TP)	03(FP)	65	SPE	78.5%
		05(FN)	11(TN)	16	PPV	95.3%
	Total				NPV	68.7%
		67	14	81	DA	90.1%
46-60	Positive				SEN	85.5%
	Negative	65(TP)	04(FP)	69	SPE	83.3%
		11(FN)	20(TN)	31	PPV	94.2%
	Total				NPV	64.5%
		76	24	100	DA	85%

DISCUSSION

Acute pancreatitis (AP) is a common and serious disease of the pancreas with an increasing incidence over the past two decades. The intense fiery cycle in AP varies as per the seriousness of the illness. The Intense Pancreatitis Characterization Working Gathering detailed a 2012 correction of the Atlanta Grouping and re-imagined the seriousness of AP.[15] Extreme AP makes around 20% out of AP cases and is related with a high death pace of generally 20%. Despite the fact that treatment regimens are practically widespread for gentle AP, treatment modalities vary as per nearby and foundational difficulties for serious AP. The distinguishing proof of serious AP utilizing scoring or reviewing frameworks is a significant and complex issue, which is particularly basic for foreseeing the prognosis.[16] Different lab tests, scales, and files, including the Ranson, Glasgow, and Intense Physiology and Persistent Wellbeing Assessment (APACHE) II scores, have been utilized to anticipate the seriousness and mortality of AP. Our review incorporated a sum of 181 patients who met the consideration and prohibition models. Mean age, term of side effects, BMI, level, weight and CRP in our review was 49.48±10.36 years, 14.88±4.87 hours, 29.8±4.74 kg/m2, 146.5±10.41 cm, 78.9±8.58 kg and 110.9±28.54 mg/L. Responsiveness, explicitness, positive prescient worth, negative prescient worth and indicative precision of CRP for finding of extreme intense pancreatitis by taking CT filter as highest quality level was viewed as 88.8%, 81.5%, 94.7%, 65.9% and 87.2%. CRP is an intense stage reactant created by the hepatocytes. Its level ascents in provocative conditions10. The combination of CRP in the liver is actuated by cytokines like interleukins. The time length between beginning of side effects and ascent of CRP is typically around 72 hours.[17] This postponed ascent of CRP levels and its vague nature as a fiery marker are the impediments of its pragmatic use. Notwithstanding this, its wide accessibility, simplicity of estimation and the way that it is modest, make it the most often utilized single biomarker for evaluation of seriousness of intense pancreatitis.[18] Be that as it may, before estimation of CRP, other fiery circumstances, for example, cholangitis and pneumonia ought to be precluded. Not many of the reports on the job of CRP in foreseeing intense pancreatitis were not promising. Tenner et al. revealed that CRP plays no critical prescient part in evaluating the

seriousness of AP in the initial 72 hours after admission.[19] In any case, the discoveries of this study is steady with the discoveries of Deherkar et al, who reasoned that deliberate CRP was a basic and viable strategy to survey the seriousness of intense pancreatitis.[20] Pezzelli et al found that CRP values more prominent than 100 mg/l show extreme intense pancreatitis in 60-80% of the patients with pancreatitis. An aggregate, 11% of patients had SAP, 20% created PNec, and 4.2% died.[21-23] The region under the recipient working trademark bends of CRP at 48 h after medical clinic confirmation for SAP, PNec, and IM were 0.81 [95% certainty stretch (CI) 0.72-0.90], 0.77 (95% CI 0.68-0.87), and 0.79 (95% CI 0.67-0.91), individually. The Hosmer-Lemeshow test P-upsides of CRP at 48 h after clinic affirmation for SAP, PNec, and IM were 0.82, 0.47, and 0.24, separately. The ideal CRP at 48 h after clinic affirmation endpoints for SAP, PNec, and IM determined were 190, 190, and 170 mg/l, separately.[24-25]

CONCLUSIONS

The clinical course of acute pancreatitis greatly varies between patients and this makes the accurate classification and prediction of disease severity very important for both clinical decision-making and research recruitment. Despite intense research on the pathophysiology of AP, overall disease mortality has not significantly improved. Several studies have shown that early aggressive management reduces morbidity and mortality. In this sense, early diagnosis and timely assessment of the severity are essential. However, an ideal multifactorial scoring system and/or biochemical marker for early assessment of the severity of AP has yet to be defined. Based on the analysis of available data from this study CRP as an inexpensive alternative to the conventional severity assessment methods.

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