ORIGINAL ARTICLE

Outcome in Acute Pancreatitis – An Evaluation of Prognostic Efficacy of Clinical Staging versus CT Severity Index

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ABSTRACT

Objective Acute pancreatitis presents a broad clinical spectrum ranging from cases so mild that symptoms abate before the diagnosis is actively pursued, to cases which progress rapidly to multisystem failure and eventual demise of patient despite current mode of therapy. **Methods** A retrospective study of 50 patients diagnosed as acute pancreatitis was done. Patients suffering from acute pancreatitis due to any cause, in any age group, of either sex, were taken in the study. Blood samples were collected at time of admission and at 48 hours. All CT examinations were performed on SOMATOM ART Seimens machine. Grading was done according to Ranson s criteria, APACHE II and CTSI. **Results** There is statistical difference in the accuracy of CTSI and Ranson or APACHE II when mortality was taken into account. CTSI has accuracy (94%) significantly more than Ranson and APACHE II. In present study accuracy of Ranson and APACHE II is equal (84%) but Ranson has very less sensitivity in predicting the mortality. So CTSI has the best prognostic value in predicting the outcome of patients with acute pancreatitis. **Conclusion** CTSI is the best scoring system in predicting mortality in patients with acute pancreatitis. Ranson and APACHE II have almost equal efficacy in predicting mortality but less than efficacy of CTSI. For predicting cure of the patients APACHE II is the most sensitive criteria but its specificity is very less. CTSI has maximum specificity and overall accuracy in predicting whether patients will be cured or relapsed.

INTRODUCTION

In Greek, word pancreas means all flesh. It was referred to as "The finger of the liver" in TALMUD written between 200 BC and 200AD [1, 2]. The pancreas remained, however, a hidden organ throughout the middle ages and was still considered only a pad- cushion behind the stomach to protect major vessels – at the time when William Harvey described circulation. Apparently Dr Nicholas Tulp published the first clear description of acute pancreatitis in 1652. In 1889, Reginald Fitz presented the first classification system of acute pancreatitis [3].

Acute pancreatitis is nonbacterial inflammation of the pancreatic gland caused by the activation and digestion of the gland by its own enzymes. Hans Chiari suggested the concept of autodigestion, intrapancreatic proenzyme activation, as the cause of pancreatic necrosis in 1896 [4]. Acute pancreatitis embodies a large spectrum of disease, which ranges from mild pancreatitis, comprising of parenchymal edema to severe necrotizing pancreatitis. Fortunately, most patients have self-limited oedematous or interstitial pancreatitis, requiring nothing but ordinary supportive care. About 15% will have a more severe disease process in which necrosis of pancreatic

and peripancreatic tissue takes place with potentially devastating local and systemic consequences. The factors that determine whether any given attack will be mild or severe are incompletely understood [5]. Thus the rationale for assessing the severity of acute pancreatitis is manifold. Mild pancreatitis responds well to appropriate medical therapy and has a favourable outcome where as severe pancreatitis require more intensive therapy and has a more guarded prognosis [6]. Approximately 80% of acute pancreatitis cases are induced by biliary stones and ethanol. In patients with cholelithiasis, the relative risk for acute pancreatitis is approximately seven times higher than those without gall stones [7]. Acute pancreatitis has a rapid onset. It is manifested by upper abdominal pain, vomiting, fever, tachycardia, leukocytosis and elevated pancreatic enzymes Elman was first to describe the association between elevated S. amylase activity and acute pancreatitis. The activity of enzyme increases in serum within 2-12 hours of onset and returns to normal within 3-5 days [8]. The management of acute pancreatitis dwells largely on the severity of the disease and so the stratification of severity is mandatory within 48 hours [9]. Acute pancreatitis still represents a major diagnostic and therapeutic challenge. Not only is the diagnosis controversial and often unsatisfactory in emergency settings, but also the severity of the disease is often underestimated as suggested by McMahon *et al.* who pointed out that only one out of three severe cases of acute pancreatitis is recognized to be severe at an early stage of disease [10]. Several scoring systems are used to assess the severity and predict the outcome and

prognosis of acute pancreatitis. First numeric system, proposed by Ranson *et al*. in 1974 is based on 11 objective signs. More recently, the Acute Physiology and Chronic Health Evaluation (APACHE II) has become more popular, because it is considered to be more reliable. Ranson criteria on admission is age >55 years, Blood glucose >200 mg/dL, WBC >16000/mm^3, LDH> 350 IU/L, SGOT >250 IU/L. Within 48 hours Hematocrit fall >10%, Blood urea nitrogen >5 mg/dL, S. Ca<8 mg/dl, apO^2 <60 mmHg, Base deficit >4 and fluid sequestration >6L. APACHE II is the most commonly used severity of illness scoring systems in North America. It is the sum of acute physiology score (Vital signs, oxygenation, laboratory values) Glasgow coma score, age and chronic health evaluation. Acute physiology score includes rectal temp, mean blood pressure, heart rate, respiratory rate, Arterial Ph, Oxygenation, S. Na, K, S. creatinine, Hematocrit, WBC count, Glasgow coma scale. Age and chronic heath points are also included.

However with the development of CTSI by Balthazar and Ranson in 1990 helped clinician to discriminate between mild, moderate and severe pancreatitis. The CT severity index CTSI derived by Balthazar *et al*. has become widely used for description of CT findings in acute pancreatitis [11]. A CT severity index based on combination of pancreatic inflammation, phlegmon and degree of pancreatic necrosis as seen on the initial CT. Score of 0 is given if normal, 1 if focal/diffuse enlargement, 2 if pancreatic inflammation, 3 if single peripancreatic collection 4 when 2 or more collections are there. Percentage necrosis if<30% 2, 30-50% 4 and >50% 6 score is given. Patients with high CTSI score has 92%morbidity and 17% mortality whereas patients with a low CTSI score had 2% morbidity and no mortality [11]. Acute pancreatitis is not only difficult to diagnose but also the severity of disease is often under –estimated [12]. Only one out of three severe cases of acute pancreatitis is recognized to be severe at an early stage of disease [13]. An improved outcome in the severe form of acute pancreatitis is based on early identification of disease severity and subsequent focused management of the high risk patients. The present study was designed to examine the current best evidence about regarding the effect of using a CTSI on patient outcome and its value in comparison with other widely used scoring systems like Ranson and APACHE II.

MATERIAL AND METHODS

A retrospective chart review of 50 patients diagnosed as acute pancreatitis due to any cause, in any age group, of either sex, were taken in the study. The patients were treated as per standard protocol. The diagnosis of acute pancreatitis in patients presenting with acute abdominal pain was from clinical history, physical examination and laboratory aids. Blood samples were collected at the time of admission and at 48 hours for determination of various parameters. Opacification of GI tract was done by administering 1000-1500 ml of 2% water soluble contrast over 45 minutes. Contrast enhanced CT scans was done 40 sec after i.v. administration of 150 ml of non ionic or ionic contrast media injected at the rate of 3 ml/sec. The clinical course of the patients was monitored according to the scoring systems. The patients were followed up for 3 months.

RESULTS

The mean age of patients presenting with acute pancreatitis is 42.04 years (range 20-75 years). Sex distribution in present study is 82%males and 18% females. Alcohol was the most common cause of acute pancreatitis in 68% cases, biliary for 24%, idiopathic for 6% and drug induced for 2% cases. S. amylase was raised in 84% cases. Mortality rate in this study was 16%. In present study sensitivity, specificity, positive predictive value, negative predictive value and accuracy of Ranson in predicting the cure or relapse is 82.5%, 57.89%, 70.37%, 73.33% and 71.43% respectively. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of APACHE II regarding prediction of cure is 100%,31.58%,63.89%,100% and 69.89 % respectively. Sensitivity of CTSI (73.91%) is lower than Ranson and APACHE II while specificity, positive predictive value, and accuracy is more than Ranson and APACHE II and it is 89.47%, 89.47% and 80.95% respectively. Accuracy of CTSI in predicting whether patient will be cured or relapsed is more than Ranson and APACHE II. CTSI has the best prognostic value in predicting the outcome of patients with acute pancreatitis although Ranson and APACHE II are also choices to be the predictors for mortality but sensitivity of them are lower than CTSI.

DISCUSSION

In the present retrospective study we have compared the prognostic value of Ranson, APACHE II and CTSI. Pancreatitis can affect any age group. Corfield *et al.* [10] in their study on 418 patients found that the median age for acute pancreatitis was 61 years (range 13-92 years). 52% were males and 48% were females. Nordestgaard *et al*. [14] did a study on 51 patients with acute pancreatitis, 35 were men and 16 were women with mean age of 44 years (range 19-78 years). In a study by Ahmed *et al*. [15] on 40 patients 82.5% were males and 17.5% were females. In the present study mean age of patients presenting with acute pancreatitis is 42.04 years (range 20-75 years). In this study 82% were males and 18% females. In an Indian study by Savio G Barreto [16] in Goa Medical College the median age of patients with acute pancreatitis was 48.5 years (range 23-80), 75% were men and 25% women. Jacob *et al*. [17] in a retrospective study on 519 patients found that most of patients presented with pain abdomen. Vomiting was present in 50% cases and back pain in 40% cases. In present study all the patients presented with pain abdomen. Vomiting was present in 32 patients.30 patients had distension and 23 had fever at the time of presentation. The two major etiological factors responsible for acute pancreatitis are biliary and alcohol, although the proportion of pancreatitis attributed to these two factors varies considerably in different counties and regions. In an Indian study by Savio G Barreto in a Goa Medical college it

was found that alcohol was the predominant cause of acute pancreatitis in 92% cases and other etiologies included biliary, trauma, idiopathic etc. In present study alcohol was the most common cause of acute pancreatitis in 68% cases, biliary for 24%, idiopathic for 6% and drug induced for2% cases. In present study S. amylase was raised in 84%cases. In a study by Clavien *et al.* [18] S. amylase was <160 IU/L in 19% patients at the time of admission. Ina study of 40 patients by Ahmed *et al.* [19] 42.5% had mild acute pancreatitis, 25% had moderate and 32.5% patients had severe acute pancreatitis. In the present study when CT severity index was used for the grading, mild, moderate and severe pancreatitis was seen in 38%, 46% and 16% cases respectively. Balthazar [20] in a study found that the overall sensitivity of numeric systems (RANSON, Imrie) ranges from 57 to 85% with a specificity of 68 to 85%. The accuracy of APACHE II at the time of admission was75%. A stastically significant correlation, with a continuous increasing incidence of morbidity and mortality was present. In present study sensitivity, specificity, positive predictive value, negative predictive value of Ranson in predicting the cure or relapse is 82.5%, 57.89%, 70.37%, 73.33% and 71.43% respectively. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of APACHE II regarding the prediction of cure is 100%, 31.58%, 63.89% respectively. Sensitivity of CTSI (73.91%) is lower than Ranson and APACHE II while specificity, positive predictive value, and accuracy is more than Ranson and APACHE II and it is 89.47%, 89.47% and 80.95% respectively. Accuracy, of CTSI in predicting whether patient will be cured or relapsed is more than Ranson and APACHE II but there is no stastical difference in accuracy of CTSI and Ranson or APACHE II. The sensitivity of APACHE II in predicting the cure is more than CTSI but its specificity is very less. Mortality was 12.9% in a study by Jacob *et al*. In the present study 8 patients died mortality rate was 16%. CTSI has accuracy significantly more than Ranson and APACHE II. In the present study accuracy of Ranson and APACHE II is equal (84%) but Ranson has very less sensitivity in predicting the mortality. So CTSI has the best prognostic value in predicting the outcome of patients with acute pancreatitis although Ranson and APACHE II are also choices to be predictors for the mortality but sensitivity of them are lower than CTSI.

Conflict of Interest

The authors declare that they have no competing interests.

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