



ARAŞTIRMA/RESEARCH

Role of computed tomography severity index as a predictor of outcome in acute pancreatitis

Akut pankreatit sonucunun tahmininde bilgisayarlı tomografi şiddet indeksinin rolü

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Abstract

Purpose: The severity of acute pancreatitis can range from a mild clinical condition to a life-threatening scenario. Rapid severity assessment remains a challenge, and an obvious clinical need exists for a simple test that can identify patients at risk of developing a severe attack. The aim of the present study was to evaluate the role of computed tomography severity index in acute pancreatitis, and correlating it with morbidity and mortality.

Material and Methods: This is a prospective study done on 50 patients of acute pancreatitis. Computed tomography severity index was used along with contrast enhanced computed tomography.

Results: Maximum complications were noted in patients (91.67%) classified as severe while patients classified as mild had the least morbidity. This was also reflected in mortality and mean duration of hospital stay.

Conclusion: Our study demonstrates that Contrast enhanced computed tomography can clearly prognosticate patients of acute pancreatitis and can predict morbidity, mortality rate and duration of hospital stay in patients of acute pancreatitis and can predict which patients may require surgical intervention, to prevent the progression of disease

Key words: Acute pancreatitis, CT severity index, mortality.

Öz

Amaç: Akut pankreatitin şiddeti hafif seyreden klinik düzeyden hayatı tehdit eden bir senaryoya kadar değişebilir. Ani şiddetin değerlendirilmesinde halen sıkıntılı olmakla beraber belirli bir kriz sırasında uygulanabilecek basit bir test vardır ki bu hastaların gelişen ataklarını teşhis etmekte kullanılabilir. Bu çalışmanın amacı, bilgisayarlı tomografinin akut pankreatit şiddet indeksindeki rolünü değerlendirmek ve morbidite ve mortalite ile ilişkilendirmektir.

Gereç ve Yöntem: Burada 50 akut pankreatit hastasında prospektif bir çalışma olarak yapılmıştır. Çalışmada bilgisayarlı tomografi şiddet indeksi ile birlikte kontrastlı bilgisayarlı tomografi kullanıldı.

Bulgular: Hastalarda maksimum komplikasyonlar belirlendi, (91.67%) şiddetine göre sınıflandırılırken hafif şiddetli olarak sınıflandırılan hastalarda hafif morbidite bulunmaktaydı. Aynı zamanda bu mortalite ve ortalama hastanede kalış süresine yansıtıldı.

Sonuç: Kontrastlı bilgisayarlı tomografiyle açık bir şekilde akut pankreatitli hastaları tahmin edebilir, morbiditeyi ve mortalite oranını öngörebilir, akut pankreatitli hastalarda hastanede kalış süresi ve hastalığın ilerlemesini önlemek için hastalara cerrahi müdahale gerekebilir.

Anahtar kelimeler: Akut pankreatit, CT şiddet indeksi, mortalite

INTRODUCTION

Acute pancreatitis (AP) is an inflammatory process of the pancreas with variable involvement of other regional tissues or remote organ systems¹. The severity of AP may vary from a mild entity to a life

threatening condition². Given the wide spectrum of disease seen, the care of patients with pancreatitis must be highly individualized. Whereas, patients with mild acute pancreatitis generally can be managed with resuscitation and supportive care, those with severe and necrotizing pancreatitis

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require intensive therapy, which may include wide operative debridement of the infected pancreas or surgical management of local complications of the disease. The prognostic methods available to identify the severe cases are generally considered unsatisfactory or too cumbersome. Identification of patients with severe pancreatitis is crucial early in the course of the disease so that early goal-directed therapy may be instituted. However, an objective, reproducible, and universally accepted measure of disease severity is still lacking. Rapid severity assessment remains a challenge, and an obvious clinical need exists for a simple test that can identify patients at risk of developing a severe attack.

Computed tomography severity index (CTSI) is one such scoring system that is rapid as well as less cumbersome in diagnosing as well as prognosticating the disease. Contrast Enhanced Computed Tomography (CECT) has an overall accuracy of 87% with a sensitivity of 100% for detection of extended pancreatic necrosis³. The aim of the present study was to evaluate the role of CTSI in AP, and correlating it with morbidity and mortality.

MATERIAL AND METHODS

This was a prospective study conducted from June 2008 to August 2010 on 50 consecutive patients of AP admitted to Government Medical College, Srinagar. A total of 53 patients were found eligible for the study; out of which one patient had a documented history of contrast allergy and two others refused to participate in the study; rest 50 were included in the study. After detailed clinical history, examination and baseline investigations, patients were subjected to CECT abdomen and pelvis as per the appropriateness criteria laid down by the American College of Radiology (2001) that were revised in 2006⁴. CECT was done on a 32 slice helical scanner (Fxi, GE Medical Systems), typically after 72 hours of admission, when it was optimum to rule out pancreatic necrosis and properly delineate areas of necrosis. Patients were given 20 ml of contrast in 1 liter of water orally 2 hours before the scan and 7 mm contiguous cuts were taken from the dome of diaphragm up to the iliac crest after intravenous administration of 100 ml of 60% iodinated contrast agent at 1mL./sec.

CT was reported by an experienced radiologist vis-à-vis CTSI (Balthazaar Grade + Degree of Necrosis)

and patients were divided into 3 categories of severity⁵:

Group A	Mild	0-3 points
Group B	Moderate	4-6 points
Group C	Severe	7-10 points

CTSI was used to predict the morbidity, mortality and duration of hospital stay of the patients. Patients with known contrast allergy, haemodynamic instability and deranged kidney function test were excluded from the study. Patients were managed on the standardized protocols of AP and were observed for the development of any complication, or any operative intervention needed. Standard operative procedure in our study remained Laparotomy with pancreatic necrosectomy and closed lavage.

Statistical Analysis was done by GraphPad InStat version 3.10 for Windows (GraphPad Softwares Inc., San Diego, CA). To calculate the P-value, "Fisher exact test" or "unpaired t test" was used, as and when needed. A written and informed consent was obtained from the patients who were included in this study. An ethical clearance was obtained from the local ethics committee.

RESULTS

During the study period, 50 cases of acute pancreatitis were admitted. Females outnumbered males by a fraction of 1.38 and majority of the patients were from rural areas of Kashmir (rural: urban::1.39:1). Gall stone pancreatitis (50%) followed by biliary ascariasis (24%) was the most common causes of pancreatitis. All the patients in our study presented with abdominal pain, 38 patients had nausea and vomiting, 10 patients having abdominal distension as concomitant finding. Breathlessness and pedal edema were present in one of the patients suffering from acute necrotizing pancreatitis. Clinically epigastric tenderness was present in all the patients and guarding was present in 70% of the patients. Ultrasonography was diagnostic in 68% of the patients while in the rest of the patients it revealed gaseous abdomen. Biochemically, serum amylase was elevated in 39 patients.

The most common finding on CECT was that of peripancreatic fluid collection, which was noted in 88% of the patients and gas in the lesser sac, was noted in two of our patients suggesting emphysematous pancreatitis. Maximum

complications were noted in Group C patients (91.67%) while Group A patients had the least morbidity (P value 0.0001). Mortality was found to be the highest among Group C patients (16.67%) indicating the severe nature of disease in them and no mortality was noted in Group A patients. In terms of hospital stay, mean duration of hospital stay of patients in Group A was 9.25 days, Group B 12.0 days and in Group C 24.58 days (P value A vs. C < 0.001). Out of the 12 patients who fell in Group C, 4 required surgical intervention in the form of exploratory laparotomy and pancreatic necrosectomy followed by closed lavage. Two patients expired in the postoperative period.

DISCUSSION

Acute pancreatitis is a common ailment encountered by the surgeons, in any part of the world, and forms a good proportion of emergency admissions in surgical emergency units. Staging of the severity of this disease and early recognition of severe cases is essential so that most suitable treatment can be provided for each patient, with the aim of reducing morbidity and mortality and also duration of hospital stay, so that important hospital resources are not wasted especially in a developing country, like ours. Clinical assessment of acute pancreatitis is not reliable, with as many as 50% of patients being incorrectly classified.

It is of utmost importance to assess the diagnosis and the severity of acute pancreatitis in the beginning to identify those patients with severe or necrotizing disease who benefit from an early initiated intensive care therapy.

Many studies have been conducted worldwide, to establish the role of computed tomography in diagnosing and prognosticating acute pancreatitis. This is the first study to come from this part of the world. In our study, sex distribution was 1.38 females to 1 male, which is conflicting with most of the other studies worldwide, possibly explained by the fact that ours is a conservative society and alcoholism is very rare in this part of the world. The mean age of males was 47.71 years and for females was 51.48 years. Balthazaar EJ reported a mean age of 52 years in his study⁵. Majority of our patients were from the rural areas of Kashmir, probably because of higher number of referrals from the peripheral hospital due to lack of intensive care facilities in those hospitals.

The commonest etiology in our study was that of the biliary tract pathology which included gallstones (50%) and biliary ascariasis (24%). Steinberg et al mentioned that biliary disease is the most common cause of acute pancreatitis in Asia⁶. Presenting symptoms in our study were abdominal pain (100%) followed by nausea and vomiting (76%), distension (20%), fever (12%), constipation (6%) and breathlessness (2%), figures compatible with study conducted by Webster PD and Shah SSH et al^{7,8}. Abdominal findings on presentation in our patients was tender epigastrium in all the patients and guarding (70%). Similar presentation was noted by Sheehy⁹. In 32% of the patients, ultrasonography evaluation revealed gaseous abdomen finding similar to study by Gamaste¹⁰. In 22% of our patients diagnosed to have pancreatitis by computed tomography, had normal amylase on admission. Clavien et al stated in their study that serum amylase alone cannot be used in the diagnosis of acute pancreatitis, because up to 19% of such patients show normal amylase values at admission¹¹. With regards to morbidity, patients with CTSI OF 0-1 and 2-3 (MILD), had complications to the tune of 6.25%, whereas CTSI 4-6 (MODERATE) had complications in 36.37% and those with CTSI 7-10 (SEVERE) had complications in 91.67%, indicating that with the increase in severity grade on the basis of CTSI, there was an increasing trend towards occurrence of complications of different nature. Balthazaar EJ noted morbidity of 0% in patients with CTSI 0-1, 8% in patients with CTSI 2-3, 35% in patients with CTSI 4-6 and 92% in patients with severity index of 7-10⁵.

Biliary Ascariasis is a unique cause of acute pancreatitis and was seen in 12 (24%) patients of our study. As this part of the world is endemic to *Ascaris lumbricoides*, it is fairly a common etiology of acute pancreatitis and other biliary disorders¹². The migration of the worm into common bile duct or more rarely into pancreatic duct, causing partial or complete obstruction to the pancreatic drainage is involved in the pathogenesis of the disease. The mean age of patients with pancreatitis due to biliary ascariasis was 16.23 + 2.3 years, which parallels the prevalence of ascariasis in the general population. Eleven of these patients (91.67%) had a mild course of disease and resolved with supportive care with the migration of worm back into duodenum. Endoscopic retrograde cholangio-pancreaticographic extraction of worm was needed

in one of the patients (8.33%) who developed severe pancreatitis with cholangitis.

Overall the most common complication was pleural effusion. Wongnai Anchalee et al had pleural effusion as the most common extra pancreatic complication in their study¹³. In our study we found a mortality of 0% in patients with CTSI of 0-1 and 2-3 (MILD), 4.5% in patients with CTSI of 4-6 (MODERATE) and 16.67% in patients with CTSI of 7-10 (SEVERE) revealing an increasing trend towards mortality with increase in CTSI. Simchuk et al mentioned that the CTSI <3 had a 3% mortality, whereas patients with a CTSI >7 had a mortality rate to the tune of 17%¹⁴. The mean duration of hospital stay of patients in Group A (CTSI 0-3) was 9.25 +3 days, Group B (CTSI 4-6) 12.0 + 1.87 days and in Group C (CTSI 7-10) 24.58 +4.44 days. Balthazar EJ (1985) noted an average hospital stay of 14.75 days in group A patients, 24.9 days in group B patients and 41 days in group C patients¹⁵.

Four of our patients belonging to group C needed surgical intervention in view of infected necrosis as revealed by Computed tomography in the form of emphysematous pancreatitis and clinical deterioration. Shah SSH et al noted that 16% of their patients with severe pancreatitis underwent laparotomy, washout and drainage⁸.

From the study, it can be concluded that Contrast enhanced computed tomography can clearly prognosticate patients of acute pancreatitis and can predict morbidity, mortality rate and duration of hospital stay in patients of acute pancreatitis and can predict which patients may require surgical intervention, to prevent the progression of disease. Since improved outcome in the severe form of AP is based on early identification of disease severity and subsequent focused management of these high-risk patients, we advocate the use of contrast enhanced computed tomography as a routine investigation in patients of acute pancreatitis, to predict a severe attack of acute pancreatitis early in the course of disease and thus decrease overall mortality and burden of disease.

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