EARLY COMPUTERIZED TOMOGRAPHIC SCAN IN MILD PANCREATITIS MAY BE DECEIVING: AN EXPERIENCE OF TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: *To assess the justification of Computerized Tomographic (CT) scan for the diagnosis of acute pancreatitis at early stage and its impact on mortality and morbidity of patients*

Methodology: *It was a retrospective study conducted at Radiology Department Dow University of Health Sciences from April 2009 to August 2011. Patients were diagnosed as acute pancreatitis both clinically and radiologically. Severity of acute pancreatitis was clinically assessed by Ranson's criteria and radiologically by Balthazar CT Grading and CT Severity Index.*

Results: *Fourteen of the total 131 included patients underwent early CT scan at 4-12 hour after start of symptoms of abdominal pain and vomiting and were normal radiologically(10.68% out of total 131 patients presented with acute pancreatitis. These patients revisited at 24-36 hours, with severe epigastric pain and on follow-up CT scan on re-admission, two patients showed intra and peripancreatic collections, swollen pancreas with peripancreatic fat necrosis without necrotizing pancreatitis (Balthazar Grade-E) and moderate pancreatitis according to CT Severity Index(four points); Three patients had 30% pancreatic necrosis with Balthazar grade-E changes and according to CT Severity Index moderate pancreatitis(2+4=6); Two patients had 30-50% necrosis and rated as Balthazar Grade-E and labeled as severe necrotizing pancreatitis according to CT Severity Index(4+4=8); while Seven patients showed severe necrotizing pancreatitis with >50% of pancreatic necrosis according to CT Severity Index(6+4) along with Balthazar Grade-E pancreatitis(6+4=10). Patients with severity index of 10 had 100% mortality.*

Conclusion: *Early CT scan has very little role in diagnosing and determining severity of disease or in predicting prognosis of patients.*

Key Words: *Necrotizing pancreatitis, Acute Pancreatitis, Pancreatitis with CT scan*

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INTRODUCTION

Acute pancreatitis is an acute inflammatory disorder of the pancreas that involves the pancreas and peripancreatic tissues however can affect other organ systems as well. Acute pancreatitis is a common disease in the developing and developed world and characterized by a diffuse inflammatory process affecting the pancreas which in turn triggered by the leakage and extravasation of activated pancreatic secretions. Acute pancreatitis leads to a wide range of local and systemic pathophysiology alterations and to a large variability in the clinical manifestation and prognosis [1–5]. The initial evaluation of patients with acute pancreatitis involves determining the cause and assessing the severity of disease since this guides subsequent management. Acute pancreatitis is the third most common inpatient gastrointestinal diagnosis in the United States[6].

Acute pancreatitis is a heterogeneous disease ranging from minimal pancreatic inflammation seen in mild interstitial pancreatitis to extensive pancreatic necrosis with liquefaction in severe attacks. Diagnosis is based on the

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presence of at least 2 of 3 features: abdominal pain; increased pancreatic enzyme, serum amylase, and/or lipase levels to 3 times the upper limit of normal; and imaging tests showing characteristic findings of acute pancreatitis [7]. Acute pancreatitis remains a disease characterized by significant morbidity and mortality, with several reports noting an increasing annual incidence of disease[8]. Contrast enhanced CT scan is the imaging modality of choice for evaluating the pancreas and the surrounding tissues as well as acute pancreatitis and associated complications [9, 10]. However study shows that as many as 20% of adults with pancreatitis may have a normal CT [11]. So time of ct scanning is important as early normal CT scan with mildly raise in amylase can be misleading and clinician may consider non pancreatic disorder like peptic ulcer disease, gall stone disease, hepatitis, therefore the diagnosis and hence management of acute pancreatitis can be delayed. This can lead to serious consequences such as necrotizing pancreatitis which is associated with high morbidity and mortality. Serum amylase and lipase can also be normal or mildly raise in early phase of acute pancreatitis however can also be found elevated in non pancreatic conditions. Symptoms of acute pancreatitis can be misinterpreted as spine pain radiating to back or due to peptic ulcer disease.

METHODOLOGY

It was a retrospective study conducted at Radiology Department Dow University of Health Sciences from April 2009 to August 2011. Patients with acute abdomen having early CT scan normal and mildly raised serum amylase and or lipase were included and patients with acute on chronic pancreatitis and early CT scan positive for acute pancreatitis were excluded from the study.

Total numbers of patients diagnosed as acute pancreatitis clinically and radiologically were 131. In fourteen patients out of 131, an early CT scan was carried out at 4-12 hour after start of symptoms of acute abdomen and reported normal radiologically. Ultrasound of these patients was also carried out. We selected this group of patients because these patients revisited at 24-36 hours, with severe epigastric pain and follow up CT scan revealed changes of severe pancreatitis and pancreatic necrosis with different grades and severity index. This group of patients was considered to have non pancreatic pain and sent home on symptomatic treatment. This had resulted in delayed management and hence increased morbidity and mortality. Diagnosis of acute pancreatitis was based on epigastric pain radiating to back, three fold rises of serum amylase and or lipase above normal range and typical diagnostic radiological appearance on CT scan abdomen. Severity of acute pancreatitis clinically assessed by Ranson's criteria (Table-1), radiologically by Balthazar et al CT Grading (Table-2) and CT Severity Index (Table-3). Normal laboratory references are as follow, normal amylase level <132 IU/l, lipase normal level <52 IU/l, AST 10-30 IU/L, LDH 5-40 IU/L, blood glucose levels 80-120 mg/ ml, BUN 5-20 mg /100 ml, serum calcium level 8.4-10.4 mg/100 ml. Clinical diagnosis of severe pancreatitis was based on Ranson's criteria(table-1). All examinations were performed on an MDCT scanner (Toshiba Aquilion 16). Pre and post contrast images were obtained. The post contrast scan was performed in the arterial phase at 30 second and Porto venous phase, 60-70 seconds after intravenous contrast administration of 100-120 mL of ionic contrast media 350 mg/mL with flow rate of 3ml/ second. Reconstruction thickness was 5 mm and reconstruction interval, 5 mm; and helical scanning was performed during a single breath-hold period.

RESULTS

Out of 131, fourteen patients underwent early CT scan at 4-12 hour after start of symptoms of acute abdomen and were normal radiologically, making 10.68% of total number of patients. Ultrasound showed cholelithiasis with mild gall bladder wall thickening, reported as chronic cholecystitis while pancreas was not properly evaluated due to bowel gas shadows in five cases. These fourteen patients presented with mild epigastric pain or upper abdominal pain of mild variety or symptoms of peptic ulcer disease or gall stones with mildly raised level of amylase and or lipase as compared to normal levels. Three patients had history of gastro esophageal reflux, six patients presented with history of chronic peptic ulcer disease and five patients were known case of cholelithiasis. Seven patients had diabetes mellitus, five had hypertriglyceridemia with levels ranged 1160-1300 iu/l and two patients were known case of hepatitis B and C positive. Six patients presented with epigastric pain, two patients with spinal or back pain, and eight patients with upper abdominal pain. Serum amylase ranged 200-325

Table 1: Ranson's Criteria

At Admission	Within next 48 hours
Age older than 55 years (older than *70 years*)	
White blood cell count >16,000/µL (>18,000/µ*L*)	Decrease in hematocrit by >10% (same)
Blood glucose level >200 mg/dL (>220 *mg/dL*)	Serum calcium level <8.0 mg/dL (same)
Serum lactate dehydrogenase level >350 IU/L (>400 *IU/L*)	Blood urea nitrogen level increase >5 mg/dL after intravenous fluid hydration (>2 mg/dL)
Serum aspartate aminotransferase level >250 IU/L (same)	PaO_2 < 60 mm Hg

(Paracenthesis for diabetes patients)

Table 2: Computerized Tomographic Balthazar Grading of Acute Pancreatitis

Grades	CT Scan Findings
A	Normal
B	Enlarge and edematous
C	Grade B+ pancreatic and peripancreatic inflammation(peripancreatic fat stranding)
D	GRADE C+ Single small peripancreatic fluid collection
E	GRADE D+ Large or several fluid collections or retroperitoneal air

Table 3: Computerized Tomographic Severity Index

Balthazar classification of pancreatitis		Pancreatic necrosis		CT severity index
CT grades	points	percentage	Additional point	Points + additional points
A	zero	zero	zero	zero
B	01	zero	zero	01
C	02	<30	02	04
D	03	30-50	04	07
E	04	>50	06	10

IU/l. lipase level ranged from 60-90 iu/l on first visit. WBC count ranged 11000-12000/µl. These patients also underwent ultrasound abdomen which shows radiolucent gall stones in five patients with mild wall thickening and labeled as chronic cholecystitis with cholelithiasis. These patients revisited at 24-36 hours in emergency department with severe epigastric pain and multisystem compromised functions. Five patients out of fourteen, showed severe pancreatitis and nine patients had severe necrotizing pancreatitis on clinical basis (Ranson's criteria) Table 1 and on radiological basis (Balthazar et al CT Grading and CT Severity Index) Table 2, 3. Septicemia documented in four cases, four patients showed acute renal failure and six patients showed multi organ failure including hepatorenal shutdown, respiratory failure and bleeding phenomena. Despite of aggressive treatment, at 48-60 hours of symptoms, seven patients died and seven patients survived and showed high morbidity with renal failure, recurrent abdominal abscesses. In cases of severe necrotizing pancreatitis, Serum amylase was raised and ranged 1200-1800 i.u and lipase ranged 200-340 on readmission of patients. White blood cell count ranged 17, 000-19000/µL. Serum lactate

dehydrogenase level ranged 400-470 IU/l. Serum aspartate aminotransferase level ranged 265-280. Serum calcium level ranged 5.8-7.7 mg/dl .Blood glucose levels ranged 225-310 mg/dl. Blood urea nitrogen level ranged 4.7-5.9 mg/dl above normal levels. On follow-up CT scan at re-admission, two patients showed intra and peripancreatic collections, swollen pancreas with peripancreatic fat necrosis without necrotizing pancreatitis (Balthazar Grade-E) and moderate pancreatitis according to CT Severity Index(four points). Three patients had 30% pancreatic necrosis, two patients had 30-50% necrosis and seven patients showed severe necrotizing pancreatitis with >50% of pancreatic necrosis(Table 2,3). Patients with severity index of 10 points were died while patients with moderate severity ct index, showed high morbidity with long term complications including renal failure, recurrent pseudo pancreatic cysts, abdominal abscesses etc.

DISCUSSION

Acute pancreatitis is an acute inflammatory process of the pancreas that can occur as an isolated event or relapsing episodes. Acute pancreatitis remains a disease characterized by significant morbidity and mortality, with several reports noting an increasing annual incidence of disease[8]. The mortality incidence is less than 1% in mild pancreatitis, with a striking increase to 10–23% in the presence of pancreatic necrosis[3,12,13] while In this study overall mortality rate was 14.5%(total 131 patient), in excluded cases 9.4%(117 patients) and included cases(fourteen patients) show 50% mortality rate . Different studies have shown that more than 50-70% of deaths do not occur immediately, but rather within a few weeks after an acute episode secondary to abdominal complications and occur mainly in patients with pancreatic necrosis [1, 13, 14] while in this study surprisingly within 48-60 hours of symptoms, seven patients were died. Early diagnosis of severe acute pancreatitis is important so that aggressive treatment can be implemented. Scoring systems commonly used in clinical practice are Ranson's criteria [15], Glasgow criteria [16] APACHE II [17] and CT severity index [18] the presence of 3 or more of Ranson's criteria (table1) predicts adverse outcome but the analysis cannot be completed before 48 hours. APACHE II, which can be used at 24 hours and then daily thereafter, predicts complications and mortality at a score of 8 or higher [19]. A score of 7 or higher on the CT severity index (table 2, 3) usually signify severe acute necrotizing pancreatitis with high mortality and morbidity[20]. In this study, nine patients showed severe acute necrotizing pancreatitis both on clinical basis (Ranson's criteria) and CT severity index. Time of CT scan is very important because CT scan at early period, can be normal and patients who has acute mild pancreatitis, due to delay in management on the basis of early normal ct scan, can go into severe acute pancreatitis especially necrotizing pancreatitis because of ignorance on first visit resulting from indeterminate clinical situations or lack of typical lab results(even serum amylase and or lipase can be normal in acute pancreatitis due to different associated diseases [21-24]) as well as normal early ct scan. This fact has documented in different international journals. Different studies have mentioned that 14-30% of cases were normal on early ct scans [10, 21, 25, 26]. Therefore early CT scan is not routinely indicated in mild acute pancreatitis on clinical basis unless there are clinical or other signs of deterioration [9, 27].

CONCLUSION

Early CT scan is not routinely indicated in mild acute pancreatitis on clinical basis unless there are clinical or other signs of detoriation and also early CT scan in significant percentage turn out normal. It can lead to delay in management and hence increased mortality and morbidity. In cases with indeterminate clinical picture or picture is mimicker of other non pancreatic diseases and without typical high values of lab test for acute pancreatitis, such patients should be kept under close observation and repeat lab tests of serum amylase and lipase within 24 hour of worsening symptoms so as early as possible aggressive management can be started in order to reduce mortality and morbidity. Acute pancreatitis should not be excluded by an early ct scan as it can be misleading and can delay the diagnosis and hence management of patients.

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CONTRIBUTORS

AAK conceived the idea, planned the study, did the data collection and analyzed the study. AT helped in the date collection. Both the authors contributed significantly to the research that resulted in the submitted manuscript.