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CT findings of patients with acute pancreatitis: Clinical and biochemical parameters

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Abstract

The disease process of AP is an inflammatory process and is usually limited to pancreatic tissue, but this may also involve peripancreatic tissues or more distant organ sites. It is commonly a reversible process and may occur as an isolated attack or may be recurrent. In general, patients who present with the symptoms of abdominal pain and tenderness mainly in the upper abdomen are suspected for AP. All male and female patients with complaints of abdominal pain (epigastric pain), vomiting with raised serum amylase & lipase levels and who underwent contrast enhanced MDCT during study period. In our study, most of the patients presented with epigastric pain (81%), then with vomiting being the next common presenting complaint (11%). Least number of patients presented with fever (3%) and jaundice (3%) and only 1 patient out of 50 cases (2%) presented with bowel disturbances.

Keywords: CT, acute pancreatitis, biochemical parameters

Introduction

The cardinal feature of AP is the abdominal pain (95% of patients). Pain, in majority of patients, generalizes to the upper abdomen which radiates to the back, but more localized to the right upper quadrant, epigastric and periumbilical region, or occasionally left upper quadrant. It may manifest from moderately to intensely severe range. The pain is more intense when the patient is supine and is partially relieved by sitting with the trunk flexed and knees drawn up ^[1].

The presence of organ failure determines the outcome in cases that are difficult to manage. The respiratory failure (defined as PO₂ <60) is usually the predominant cause. The other important systemic complications are shock (systolic BP of <90 mmHg and tachycardia >130), renal failure (serum creatinine >2 mg/dL), abdominal bleeding (> 500 mL/24 hrs), central nervous system failure (Glasgow Coma Scale score of less than 6 in the absence of sedation or by the sudden onset of confusion or psychosis), hepatic failure (serum bilirubin levels greater than 100 µmol/L or alkaline phosphatase levels greater than three times the upper limit of the normal range) and hematologic system failure (hematocrit level of less than 20%, WBC of less than 2000/mm³, or platelet count of less than 40,000/mm³). Out of these, presence of respiratory failure, shock, renal failure, and abdominal bleeding are the most important predictors of the outcome ^[2-3].

These patients need intense monitoring, correction of the metabolic abnormalities, and supportive measures. It is a major cause of mortality in the first 2 weeks after an acute episode of pancreatitis.

The presence of local complications is an important cause of morbidity and may further necessitate interventions. It is a significant cause of mortality after 2 to 3 weeks of an acute episode ^[4].

The disease process of AP is an inflammatory process and is usually limited to pancreatic tissue, but this may also involve peripancreatic tissues or more distant organ sites. It is commonly a reversible process and may occur as an isolated attack or may be recurrent. In general, patients who present with the symptoms of abdominal pain and tenderness mainly in the upper abdomen are suspected for AP. No single laboratory or clinical sign is pathognomonic for AP. A group of clinical, laboratory, and radiological findings are required for the diagnosis of AP ^[5].

For the initial diagnosis of AP, pancreatic enzymes in the blood and/or urine are to be tested.

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Primary laboratory examination includes amylase and lipase levels, complete blood count with differential cell counts, metabolic panel (BUN, creatinine, glucose, and calcium levels), triglyceride level, urinalysis, and arterial blood gases. Several biomarkers and inflammatory mediators are helpful in predicting the severity of AP, but confirmatory diagnosis is made by imaging techniques. This helps to rule out other acute abdominal diseases [6].

Imaging techniques plays an important role in the diagnosis, differentiation of the severity, and the management of pancreatitis. Further, these techniques are also used in assessing the complications with image-guided drainage and aspiration. Despite many imaging modalities available, ultrasound is the first investigation suggested by many clinicians, but ultrasound has only few advantages in the diagnosis of pancreatitis or its complications. Contrast-enhanced CT is a clinically useful examination for pancreatitis.

Methodology

Type of study: A prospective study.

Sample size: 50 patients.

All male and female patients with complaints of abdominal pain (epigastric pain), vomiting with raised serum amylase & lipase levels and who underwent contrast enhanced MDCT during study period.

Inclusion Criteria

1. Patients admitted with clinical suspicion of acute pancreatitis who underwent contrast enhanced MDCT and biochemical investigations (serum amylase and serum lipase).

Exclusion Criteria

1. Suspected acute pancreatitis patients with normal pancreas on CT scan and normal serum amylase level.
2. Known case of chronic pancreatitis
3. Patients with acute on chronic pancreatitis.
4. Pancreatitis due to trauma.
5. Pregnant women
6. Patients with complications after previous administration of contrast medium.
7. Patients with deranged renal function tests.

Ethical Clearance

The study required an invasive investigation plain Computed tomography and contrast enhanced Computed tomography of abdomen and pelvis to be conducted on patients. Hence an ethical clearance was obtained from the ethical committee of MVJ Medical College and Research hospital.

Results

Table 1: Age distribution of patients with acute pancreatitis

| Age in years | Number of patients | % |
|--------------|--------------------|-------|
| 1-10 | 3 | 5.9 |
| 11-20 | 4 | 7.4 |
| 21-30 | 15 | 30.1 |
| 31-40 | 12 | 23.1 |
| 41-50 | 6 | 12.5 |
| 51-60 | 5 | 10.3 |
| 61-70 | 5 | 10.3 |
| Total | 50 | 100.0 |

Mean ± SD: 37.10±16.25

Table 2: Gender distribution of patients with acute pancreatitis

| Gender | Number of patients | % |
|--------|--------------------|-------|
| Male | 45 | 89.4 |
| Female | 5 | 10.6 |
| Total | 50 | 100.0 |

Table 3: Etiological factors for acute pancreatitis

| Etiological factor | n (%) |
|--------------------|----------|
| Alcohol abuse | 27 (56%) |
| Gall stones | 23 (44%) |

Table 4: Presenting complaints of patients with acute pancreatitis

| Presenting complaints | n = 50 | % |
|--------------------------------|--------|-----|
| Pain abdomen (epigastric pain) | 41 | 81% |
| Fever | 2 | 3% |
| Jaundice | 2 | 3% |
| Diarrhea (Bowel disturbance) | 1 | 2% |
| Vomitting | 4 | 11% |

Table 5: Levels of serum amylase and lipase in patients with acute pancreatitis

| | No. of cases (n= 50) | | | |
|-------------|----------------------|--------------|--------|--------------|
| | Amylase | Percentage % | Lipase | Percentage % |
| < 100 | 7 | 15.55 | 21 | 42.2 |
| 100 - 200 | 10 | 20 | 6 | 46.6 |
| 201 - 500 | 9 | 17.7 | 4 | 8.8 |
| 501 - 1000 | 10 | 20 | 1 | 2.2 |
| 1001 - 2000 | 7 | 13.3 | 0 | 0 |
| 2001 - 3000 | 6 | 11.1 | 0 | 0 |
| 3001 - 4000 | 0 | 0 | 0 | 0 |
| > 4000 | 1 | 2.22 | 0 | 0 |

Table 6: Laboratory parameters

| Laboratory parameters | Increased % | | Normal % | |
|-----------------------|-------------|------|----------|------|
| Amylase | 42 | 83.4 | 8 | 15.6 |
| Lipase | 41 | 83.6 | 9 | 17.4 |

Discussion

This was a prospective study conducted among 50 Cases diagnosed as acute pancreatitis based on history of abdominal pain (epigastric pain) and vomiting with serum amylase and lipase levels were included in this study. Patients who underwent CECT of the abdomen and pelvis during the study period were included.

Age criteria

Patients with age range from 5 years to 70 years were considered in this study and the minimum numbers of patients were seen below the age of 10 years. The mean age of patients in the study was 37 years. Maximum patients were in the age group 21 to 30 years (30.8%) with range 31 to 40 years group (22%) being the next maximum. Maximum affected age group reflects the etiologies of alcohol and gallstones being most common in the age group 20 to 40 yrs.

Gender distribution

Most of the patients were male (89.7 %) as compared to female (10.3%). No association of age and gender was noted in comparison of severity of pancreatitis based on MCTSI with gender in our study.

Findings in our study related to age group and gender matched with another similar study by Balthazar *et al.* [7], Leung *et al.* [8], Halonen *et al.* [9], Lankish *et al.* [10] on acute pancreatitis showing no correlation between age & gender with severity of acute pancreatitis and maximum incidence of acute pancreatitis was noted in age group 31 to 40 years.

Etiological factor

Alcohol (56%) was the most common etiology for AP, Gallstone (44%) being the next most common cause in our study. In comparison to the study conducted by Bolen *et al.* about 47% of patients had pancreatitis due to alcohol abuse. However, studies by Halonen *et al.* [9] showed gallstones to be the most common cause for AP.

In our study, most of the patients presented with epigastric pain (81%), then with vomiting being the next common presenting complaint (11%). Least number of patients presented with fever (3%) and jaundice (3%) and only 1 patient out of 50 cases (2%) presented with bowel disturbances.

Conclusion

Most of the patients included in the study were having biochemical abnormalities in the form of raised serum amylase (83.4%) and serum lipase (83.6%). Both serum amylase and serum lipase showed very wide range from mild elevation to very high levels.

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