



IMPACT OF COMPUTED TOMOGRAPHY ON DIAGNOSIS, CLASSIFICATION, AND TREATMENT APPROACH OF ACUTE PANCREATITIS USING THE REVISED ATLANTA CLASSIFICATION AND MODIFIED CT SEVERITY INDEX: A CROSS-SECTIONAL STUDY IN THE PUDUCHERRY POPULATION

Radiology

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ABSTRACT

Background: Acute pancreatitis is one of the most common causes of gastrointestinal tract that leads to hospital admission. Imaging, particularly CECT helps to confirm the diagnosis, assess the severity of the disease and complications. Revised Atlanta classification was introduced to standardize the imaging technologies and expedite better treatment. Current study is conducted to classify patients with acute pancreatitis and guide management using Revised Atlanta classification and Modified CT severity index with help of Computed Tomography. **Aims & Objectives:** To evaluate the Role of CT imaging in the diagnosis and assessment of severity of pancreatitis using revised atlanta classification and Modified CT severity index. To correlate the revised atlanta classification radiological findings with clinical and lab findings in determination of method of management. **Methods:** A cross-sectional study was conducted on 86 patients presenting with clinical suspicion of acute pancreatitis with requisition for CT abdomen were interviewed and details of the patients like name, age, sex, detailed clinical history were obtained along with the details of clinical examination. Cases of acute pancreatitis were classified according to the Revised Atlanta classification with the help of MDCT.

KEYWORDS

Acute pancreatitis, CT, Atlanta Classification, Modified CT severity index.

INTRODUCTION

Acute pancreatitis is an inflammation of the pancreas that can lead to systemic complications, including organ failure[1,2]. The most common causes are gallstones and alcohol consumption, with other factors including trauma, hyperlipidemia, infections, and medications[3,4]. Patients typically present with epigastric pain, nausea, vomiting, and jaundice, and diagnosis relies on elevated serum amylase and lipase levels, along with imaging techniques like ultrasonography and contrast-enhanced CT (CECT). CT imaging, especially with scoring systems like the CT Severity Index (CTSI) and the Revised Atlanta Classification, helps assess the severity of the condition, distinguishing between mild (interstitial) and severe (necrotizing) pancreatitis. This study aimed to evaluate the severity of acute pancreatitis using initial CT imaging, applying the Revised Atlanta Classification and a modified CTSI, while focusing on predicting clinical outcomes and guiding early management.

MATERIALS AND METHODS

Source Of Data: Cases with clinical suspicion/known case of acute pancreatitis referred for MDCT scan to the Department of Radiodiagnosis, SLIMS Medical College and Hospital, Puducherry were included in this study. The study period was for period of one year from July 2022 to July 2023.

Study Design: Hospital based cross sectional study.

Study Area: SLIMS Medical College and Hospital, Puducherry-605502

Statistical Analysis: Appropriate statistical measurements like percentages, ratios and other appropriate statistical tests were used.

Method Of Collection Of Data:

Patients with clinical suspicion of acute pancreatitis, coming to the department of Radiology, SLIMS Medical College and Hospital, Puducherry with requisition for CT abdomen were interviewed and details of the patients like name, age, sex, detailed clinical history were obtained along with the details of clinical examination.

Cases of acute pancreatitis were classified according to the Revised Atlanta classification with the help of MDCT.

Sample Size Estimation:

As per the biostatistician's opinion, based the mean of number of cases of acute pancreatitis referred to the Department of Radiodiagnosis, SLIMS, Puducherry, the minimal sample size was 50 cases for satisfactory statistical analysis. However more number of cases were included under the advice of the biostatistician with total number of patients in the study being 86.

Inclusion Criteria:

1. Patients who are clinically suspected to have acute pancreatitis.
2. Patients with elevated biochemical markers (serum amylase and lipase levels).
3. Patients who are above 18 years of age.
4. Patients giving consent for the investigation.

Exclusion Criteria:

1. Patients with chronic pancreatitis suggested by intraductal calculi, ductal stricture and parenchymal calcification.
2. Pediatric age group.
3. Cases contraindicated for contrast study.
4. Known cases of pancreatic pathology like pancreatic malignancy, cyst.
5. Patient who underwent pancreatic surgery.
6. Pregnant females.
7. Patients refusing to give consent for the investigation.

Technique:

Imaging was done on 32 slice MDCT scanner manufactured by Siemens (Somatom Scope). Test was performed using following parameters:

- 32 x 0.6 mm collimation
- 0.5 sec rotation time
- 1.2 pitch
- Tube voltage 120 kv
- Tube current 200 mAs
- Section thickness and interval 5mm
- **Anatomical Coverage :** Dome of diaphragm till symphysis pubis.

RESULTS



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DISCUSSION

This study investigates various factors associated with acute pancreatitis, focusing on demographics, clinical presentation, laboratory findings, imaging characteristics, and the severity of the condition. Below is a summary of the key findings:

Demographics:

- The study had a predominance of male patients, with 77% male and 23% female, yielding a male-to-female ratio of 3.3:1. This supports the trend that acute pancreatitis is more common among males, a finding consistent with other studies, such as those by Mortelet KJ et al. and Bollen TJ et al.
- The participants' ages ranged from 18 to 75 years, with the largest proportion (30.23%) falling between 30 and 39 years. In comparison to other studies, such as Maria Gabriella Brizi et al.'s 2021 study, which found the highest incidence in older age groups (60-75 years), the average age in this study was 46 years, slightly younger than the mean ages reported by Mortelet KJ et al. (49.2 years) and Bollen TJ et al. (53 years).
- Alcohol consumption was a frequent etiological factor, with 32.55% of patients having a history of alcohol use. This was higher than the 22% reported by Bollen TJ et al., potentially reflecting the younger, predominantly male cohort in this study.

Clinical Presentation And Laboratory Findings:

- The most commonly reported symptom was severe epigastric pain, followed by vomiting. Elevated serum amylase and/or lipase levels were used for diagnosis, with a notable proportion of patients having elevated levels of both enzymes.
- Laboratory findings showed elevated white blood cell counts, while renal and liver function tests were largely insignificant in most cases. Serum lipase and amylase levels were elevated in the majority of patients.

Imaging Findings:

- On computed tomography (CT) scans, most patients exhibited irregular contours and diffuse enlargement of the pancreas. Ascites and pleural effusion were observed in about half of the cases.
- In terms of diagnostic accuracy, the sensitivity of CT imaging in the first week of symptom onset was very high at 97.36%, though specificity was lower at 75%. After the first week, sensitivity remained high at 97.5%, but specificity dropped to 66.66%.
- CT scans showed a higher sensitivity for detecting acute pancreatitis compared to laboratory tests, but specificity declined post the first week of symptom onset.

Severity And Management:

- Using the Modified CT Severity Index, 12 patients were categorized as mild, 35 as moderate, and 29 as severe in terms of pancreatitis severity.
- In this study there were 2 false positive cases, 3 false negative cases and 5 true negative cases.
- Most patients with mild and moderate severity showed clinical improvement with conservative treatment (medical management), though some required surgical intervention for complications like pseudocysts or walled-off necrosis. Severe cases had mixed outcomes, with some showing improvement after surgery, while others deteriorated despite treatment.
- The study identified interstitial edematous pancreatitis with acute peri-pancreatic fluid collection as the most common diagnosis.

Outcomes:

- Clinical outcomes were closely linked to both the severity categorization based on the Revised Atlanta Classification and the Modified CT Severity Index. These classifications helped guide treatment, with mild cases typically managed conservatively, while more severe cases required more aggressive management, including surgical intervention.
- Although a majority of patients improved with conservative care, a subset experienced clinical deterioration, particularly those with severe interstitial or necrotizing pancreatitis, regardless of severity classification.

Study Limitations:

- One limitation of the study was the absence of a focus on the duration of organ failure, which is a key component in the Revised Atlanta Classification for severity assessment. Instead, the study used initial CT imaging findings combined with the Revised Atlanta classification to predict outcomes and inform management decisions.

CONCLUSION:

Based on the findings of this study it may be concluded that a mixed variety of clinical outcome was seen irrespective of the type of Revised Atlanta classification. Although most of the patients of Interstitial type showed clinical improvement. This could be because of more number of cases of interstitial type.

In this study we have seen that many patients of necrotizing pancreatitis with mild- moderate severity has also shown clinical improvement with both medical management alone and in combination with surgical intervention.

This will help surgeons to take into account the initial approach of treatment and predicting the clinical outcome which will be based on both Revised atlanta classification and Modified CT severity index.

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