



REVISED ATLANTA CLASSIFICATION OF PANCREATITIS

Radiodiagnosis

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ABSTRACT

Revised Atlanta classification in the patients of pancreatitis.

Aims & objectives:

- Applying revised atlanta classification in patients with acute pancreatitis.
- To distinguish Interstitial edematous pancreatitis from necrotizing pancreatitis by the imaging appearances.
- Accurate characterization of collections that complicates acute pancreatitis like acute peripancreatic fluid collections, pseudocysts, acute necrotic collections and walled-off necrosis.
- Evaluating complications of the pancreatitis.

Methods: Contrast Abdomen CT scan was performed on 128 slice Philips CT Scanner machine in 70 patients diagnosed with acute pancreatitis, age varying from 20-60 years in our SVP hospital, NHL MMC, Ahmedabad. No gender and age bias was followed. Revised atlanta classification was used to evaluate main type of pancreatitis, its various fluid collections and other complications.

Results and Conclusion: Our study showed that out of 70 patients with pancreatitis; 45 had edematous pancreatitis and 25 had necrotizing pancreatitis. M>F. Gallstones, Common bile duct calculus, Main pancreatic duct calculus, Alcohol and Obesity were the most common risk factors for pancreatitis. Most common complication of Interstitial edematous pancreatitis was pseudocyst formation and of Necrotizing pancreatitis was walled off necrosis.

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None

Conflict of interest:

None declared

KEYWORDS

Acute pancreatitis, Atlanta classification, Edematous pancreatitis, Necrotizing pancreatitis, walled off necrosis, pseudocyst.

INTRODUCTION:

Acute pancreatitis is one of the most common gastrointestinal disease for hospitalization in the India. It is an acute inflammatory process affecting the pancreatic tissue with variable involvement of adjacent vessels and organs. The disease exhibits a wide range of clinical manifestations from the transient local abdominal pain to irreversible systemic complications and may lead to death.

It is important to convey the clinician regarding the type of pancreatitis with multiple peripancreatic collections during the acute attack and four weeks later, which helps them in treating & evaluating the prognosis of the patients. Revised Atlanta Classification was introduced to convey the clinicians regarding the imaging features of acute pancreatitis which is standardized so that it can give uniformly interpreted by the clinicians. Revised Atlanta Classification was made in 2012 which classifies the 4 types of peripancreatic fluid collections in acute pancreatitis depending on the content, degree of encapsulation and elapsed time since the onset. The 2012 revision criteria emphasized on at least two of the following three criteria for diagnosis of pancreatitis: abdominal pain consistent with the disease, a threefold raised serum amylase or lipase level, and imaging findings consistent with acute pancreatitis.

We present a study of 70 patients of acute pancreatitis based on revised atlanta classification.

MATERIALS AND METHODS:**STUDY POPULATION:**

70 patients

Age group: 20-60 years.

STUDY SITE:

SVP Hospital, NHL MMC, Ahmedabad.

METHODS:

- A Retrospective study of the 70 patients undergoing CECT Abdomen for acute pancreatitis.
- All scans were performed on 128 slice Philips CT Scanner, as per the CT protocol of the department; the protocol followed was:
- Written consents were signed by the patients and/ or relatives for getting CT scan study done.
- Patient were asked to remain Nil by mouth with normal serum creatinine levels.
- History of allergy were asked to the patient.
- Breath holding technique was explained to the patient whenever it was feasible.

Scanning options:

Plain CT abdomen scan was done with/without positive contrast followed by Contrast abdomen CT scan in arterial , pancreatic and delayed phase after the injection of 60 ml of the contrast through the antecubital vein.

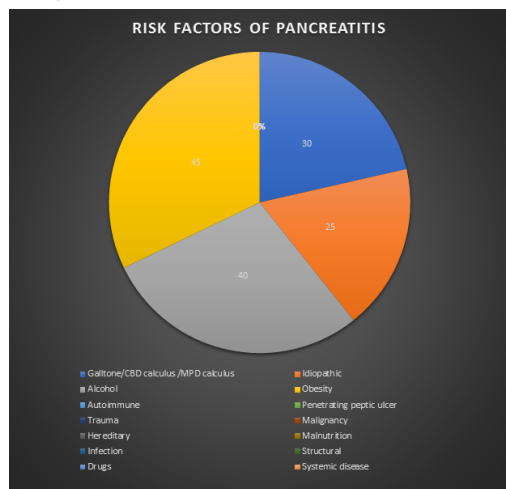
Volumetric data was reconstructed in the multiple planes.

Scan parameters:

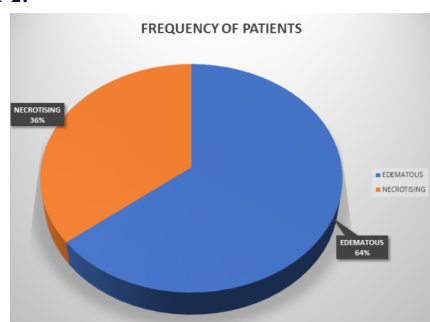
1. Slice thickness- 1.00 mm
2. Collimation- 128 x 1.00
3. Pitch-0.95
4. mAS-160
5. Kvp-120

Statistical analysis

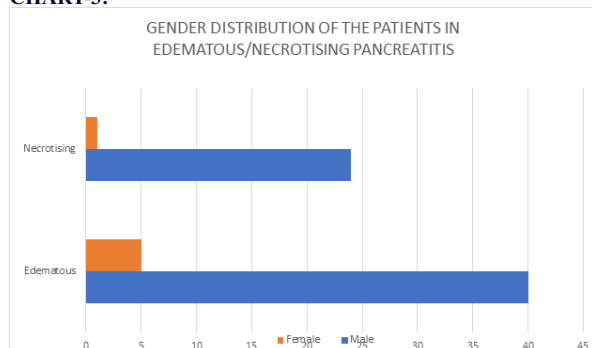
- All data was analysed using the Microsoft Excel software. Statistical analysis of data was done after compiling and tabulation of data.

RESULTS AND ANALYSIS:**CHART-1:**

Gallstones, CBD calculus, MPD calculus, Alcohol and Obesity are the most common risk factors for pancreatitis.

CHART-2:

Edematous pancreatitis was more common than Necrotising pancreatitis.

CHART-3:

Both types of pancreatitis were more in male as compared to females.

Table-1: Percentage Of Necrosis In Patients Of Necrotising Pancreatitis

Percentage of necrosis in necrotising pancreatitis	No of patients
<30%	18
30-50%	4
>50%	3

Majority of patients with necrotising pancreatitis had necrosis of less than 30 % of pancreatic parenchyma.

Average Modified CTSI score in Edematous pancreatitis is 4-6 and in Necrotising pancreatitis is 6-8.

Patients with Necrotising pancreatitis have higher Modified CTSI score compared to edematous pancreatitis.

Table-2: Complication Of Pancreatitis On Follow Up Study:

Type of pancreatitis	Complication on follow-up	No of patients
Edematous	Acute peri-pancreatic collection	15
Edematous	Pseudocyst	20
Edematous	Fistula formation	1
Edematous/Necrotising	Vascular complication	12
Edematous/Necrotising	Abdominal compartment syndrome	0
Necrotising	Walled of necrosis	12
Necrotising	Acute necrotic collection	6
Necrotising	Liquefactive necrosis of pancreatic parenchyma	1

Overall most common complication of edematous pancreatitis is pseudocyst formation and of necrotising pancreatitis is walled off necrosis.

Table-3: Different Sites Of Pseudocyst Formation:

Site of pseudocyst	No of patients
Peripancreatic	10
Lesser sac	8
Right hypochondriac region	3
Splenic hilum	4

Over all most common sites for pseudocysts formation are peripancreatic and lesser sac.

Table-4: Morbidity & Mortality In Types Of Acute Pancreatitis:

Type of pancreatitis	Morbidity (Average days of hospital stay)	Mortality
Edematous	12	1
Necrotising	20	4

Necrotising pancreatitis has higher morbidity and mortality compared to edematous pancreatitis.

DISCUSSION:-

Acute pancreatitis is one of the commonest gastrointestinal emergency encountered in the emergency department. Patients present with acute abdominal pain and vomiting. Acute pancreatitis results in acute inflammation of the pancreatic and peri-pancreatic tissue. This results in multiple fluid collections depending on the types of pancreatitis. Number of conditions can lead to acute pancreatitis commonest being cholelithiasis(35-40%), followed by alcohol(30%)(16)(17). In our study: Gallstones, Common bile duct calculus, Main pancreatic duct calculus, Alcohol and Obesity are the most common risk factors of acute pancreatitis.

In our study the pancreatitis was more common in male as compared to females.

Pathologically Pancreatitis is diagnosed by elevated level of serum amylase and lipase but imaging modality is required to evaluate type of pancreatitis, its extent into per-pancreatic tissue and various other complications for the treatment and prognosis of the patients.

Initially both the CTSI and modified CTSI was used to evaluate findings of acute pancreatitis which was based on point system. This included presence and extent of parenchymal inflammation(score from 0-4), necrosis of pancreatic parenchyma(score from 0-4) and various extra-pancreatic complications (modified CTSI only)(score from 0-2) observed on CT , upto a maximum of 10 points. The score correlates with mortality and indexes of the patient morbidity , thus including the occurrence of pancreatic infection, length of stay in hospital, and need for invasive intervention(18,19)

It is important to convey the clinician regarding the type of pancreatitis with multiple peripancreatic collections during the acute attack and four weeks later, which helps them in treating & evaluating the prognosis of the patients. Revised Atlanta Classification was introduced to convey the clinicians imaging findings of acute pancreatitis which is standardized so that it gives uniform interpretation to the clinicians.

Revised Atlanta Classification was made in 2012 to make the uniform radiological reporting of the disease and convey the findings to the treating clinicians. Atlanta classification includes the two main types

of the pancreatitis: 1. Interstitial edematous pancreatitis 2. Necrotizing pancreatitis. It classifies the 4 types of peripancreatic fluid collections in acute pancreatitis depending on the content, degree of encapsulation and elapsed time since the onset. (14,15,16)

Interstitial edematous pancreatitis is the milder and more common form of acute pancreatitis, seen in 85% of the patients(20) & Necrotizing pancreatitis accounts for only 5%-10% of the cases of acute pancreatitis(14). Even In our study; Interstitial edematous pancreatitis (64%) [FIGURE-1] was more common than necrotizing pancreatitis(36%) [FIGURE-3].

On MDCT, Interstitial edematous pancreatitis appears enlarged and hypodense on CT. It can show intense homogenous enhancement or slightly heterogeneity in enhancement pattern due to edema.. Necrotizing pancreatitis shows confluent non-enhancing areas on imaging. Peripancreatic inflammation may manifest as an irregular pancreatic contour with peripancreatic fat stranding and fluid and typically involves the anterior pararenal space.

Following the episodes of acute pancreatitis multiple intra and peripancreatic fluid collections are seen depending on the type of pancreatitis. According to atlanta classification fluid collections before 4 weeks and after 4 weeks of acute episode following interstitial pancreatitis is called Acute peri-pancreatic fluid collection (APFC) [FIGURE- 2] & pseudocyst[FIGURE-5] respectively. Fluid collection following necrotic pancreatitis before & after 4 weeks is called Acute necrotic collection (ANC) [FIGURE-4] & walled of necrosis (WON) [FIGURE-6] respectively. APFC has no wall formation where as pseudocyst has thin wall. ANC has no well wall formation & WON has variable well formed thick wall with necrotic materials and debris within it. This terminologies are standardized and should be used by radiologist as per atlanta classification. In our study out of 45 patients of interstitial edematous pancreatitis 15 patients had APFC & 20 patients had pseudocyst while out of 25 patients 6 patients had ANC & 12 patients had WON. The CTSI score correlates with mortality and morbidity of the patients and can help us predict length of stay in hospital, and need for invasive intervention(18,19). Our study shows that patients with necrotising pancreatitis and with walled of necrosis had longer hospital stay and mortality as compared to edematous pancreatitis and pseudocyst formation.

The commonest vascular complication includes Splenic vein thrombosis(12), followed by pseudoaneurysm of the splenic, gastroduodenal and pancreaticoduodenal arteries(13). In our study commonest complications of pancreatitis other than fluid collections were splenic vein thrombosis(8 patients) followed by superior mesenteric vein and portal vein thrombosis in(10 patients) and splenic artery pseudoaneurysm in 1 patient. Fistula formation is rare complication of pancreatitis we encountered one patient having pancreaticopleural fistula.

MRI can distinguish between necrotic pancreatic and peripancreatic tissues and adjacent fluid collections or haemorrhage, whereas differentiating between necrosis and adjacent fluid may be difficult on CT(15).

Thus to summarise The Atlanta classification divides acute pancreatitis into two basic types:

Interstitial edematous pancreatitis (IEP) & Necrotising pancreatitis (NP) with terminology used for peri-pancreatic fluid collection depending on the time of onset.

Collection	Time after the onset of pain(weeks)	Subcategory of Pancreatitis	Location	Imaging features
Acute peri-pancreatic fluid collections	<=4	Interstitial Edematous Pancreatitis	Extra-pancreatic	Homogenous fluid attenuation, conforms to the retroperitoneal structures. No wall.
Acute necrotizing collections	<=4	Necrotizing Pancreatitis	Intrapancratic and /or Extra-pancreatic	In-homogenous, non-liquefied components, no wall

Pseudocyst	>4	Interstitial Edematous Pancreatitis	Extra-pancreatic	Homogenous, fluid filled, circumscribed, encapsulated with wall.
Walled-off necrosis	>4	Necrotizing Pancreatitis	Intrapancratic and /or Extra-pancreatic	In-homogenous, non-liquefied components, encapsulated with wall.

CONCLUSION:-

MDCT plays an important role in evaluating imaging features and its complications in cases of acute pancreatitis.

Utilisation of revised atlanta classification in everyday practice conveys standardized reporting format and facilitates documentation of various imaging findings in acute pancreatitis helping the clinicians to prognosticate the outcome of the disease process.



Figure:1 Interstitial edematous pancreatitis in a 42-year-old man with alcohol-related pancreatitis. Axial contrast-enhanced CT image shows peripancreatic inflammation (arrows) in form of peripancreatic fat stranding with normal pancreatic enhancement and no collections.



Figure 2. Axial contrast-enhanced CT image shows peripancreatic inflammation (black arrow) and a homogeneous fluid-attenuation collection in the left anterior pararenal space (white arrow), a finding that is consistent with APFC. Interstitial Edematous pancreatitis with acute peri-pancreatic fluid collections.



Figure 3: Image of pancreatic necrosis shows a large area of encapsulated fat and non-enhancing pancreatic parenchyma (*), defined as Walled off Necrosis. Note a very small amount of residual enhancing parenchyma seen at the periphery (arrows).

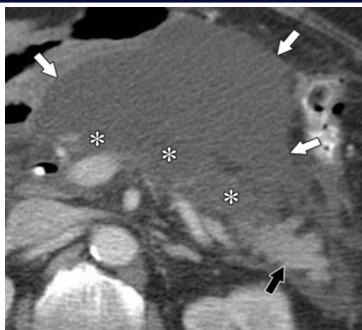


Figure 4: Subtypes of necrotizing pancreatitis on axial contrast-enhanced CT images. (a) Image of combined pancreatic and peripancreatic necrosis in a 58-year-old woman shows nonenhancement of the body (*), normal enhancement of the pancreatic tail (black arrow), and a large ANC in the lesser sac (white arrows).

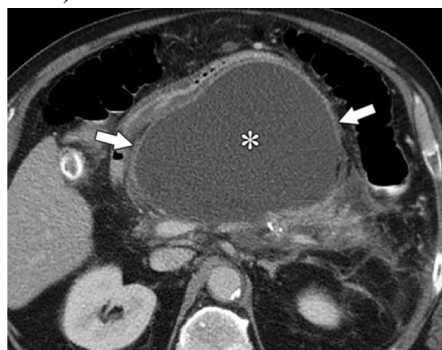


Figure 5: Pseudocyst in a 36-year-old man. Axial CT image obtained 6 weeks after onset of gallstone pancreatitis shows a large homogeneous fluid collection in the lesser sac (*) with no non-liquefied components and a thick enhancing wall (arrows), findings that are consistent with pseudocyst.

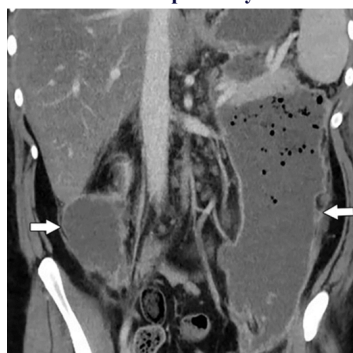


Figure 6 : Organized, heterogeneous, gas-containing collections with thick enhancing walls are present in the pararenal space (arrows), findings that are consistent with infected Walled off Necrosis



Figure 7: CT coronal image of acute pancreatitis shows pancreaticopleural fistula.



Figure 8: Contrast axial abdomen CT image shows the presence of splenic vein thrombosis.

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