



Atlanta Classification for Acute Pancreatitis- A Study Protocol

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Authors' contributions:

This work was carried out in collaboration among all authors. Author VS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RPD and GM managed the analyses of the study. Author GM managed the literature searches. All authors read and approved the final manuscript.

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Study Protocol

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ABSTRACT

Background: Acute pancreatitis is one of the most common abdominal pathologies having variable outcome ranging from self limiting abdominal pain to high mortality and morbidity due to organ failure, over the past five decades, various classification systems have emerged to classify pancreatitis according to its severity, and the associated complications have emerged to classify acute pancreatitis and its various complications, such as Apache Scoring, Ct Severity, Modified Ct Severity, Ransien and Atlanta Classification.

Objectives: We in our study will be classifying patients suffering from acute pancreatitis according to the revised Atlanta classification to divide them into interstitial edematous pancreatitis and necrotizing pancreatitis. The local complications will be classified according to CT imaging findings into acute necrotic collection, pseudocyst, acute necrotic collection and walled of necrosis. Organ failure will be assessed according to modified marshal scoring system into transient or persistent organ failure.

Methodology: We will be carrying forward our study on Siemens 16 slice computer tomography machine over a sample of 140 patients coming to the outpatient department of our hospital which will be followed by a routine clinical follow up of the patient to find out their prognosis.

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Results: Will be tabulated at the end of the study using SPSS version 26 software.
Conclusion: The revised Atlanta classification for acute pancreatitis, in conjunction with the Modified Marshall Scoring System for organ failure, if found useful, in our series in improving the prognosis of the patients, then it can be incorporated in management.

Keywords: Acute pancreatitis; atlanta classification; organ failure; computer tomography.

1. INTRODUCTION

1.1 Background

Acute pancreatitis (AP) a common abdominal pathology having a wide clinical spectrum with its prevalence increasing every year in India .Current prevalence stands at 7.9 per 100,000 with men and women having prevalence of 8.6 and 8.0 per 100,000 respectively in India. Few southern states of India have reported an incidence rate of 125-200/100,000 population [1]. The common risk factors leading to acute pancreatitis include alcohol intake, gall stones, trauma, drugs, and infections. Over the last many decades, several classification systems on pancreatitis have emerged as acute pancreatitis has varying grades of severity. It can be self limiting (80%) or can have life threatening sequels (10- 20%). since it can have variable outcomes the treatment modality for each case is different, for example in daytoday practice treatment of acute pancreatitis can be conservative or supportive, but severe pancreatitis needs surgical or minimally invasive intervention [2]. Hence, It is of utmost importance to evaluate the severity of pancreatitis as early as possible and initiate early treatment at a center with adequate facilities. This has been made possible by assessing severity of the condition by monitoring clinical severity scores, laboratory parameters, and contrast enhanced computer tomography findings [3]. Over last many decades many scoring systems have been designed to assess the prognosis of the patient, which consider clinical and laboratory data for the accurate and early detection of patients at greatest risk of developing clinically severe AP(acute pancreatitis). However these scoring systems have been accurate for 70% to 80% of times. In the current time , imaging on CT and MRI play a major role not only in diagnosis but also in detection of local pancreatic complications and guided interventional procedures for its management [4]. The Atlanta Classification (1992) was formed in an international symposium on AP and was only based on the clinical data of the patient. The Atlanta Classification categorized acute

pancreatitis as "mild" to "severe. However over a period of time many limitations were noted-

1. The Atlanta Classification has been helpful, but few definitions were confusing like- Patients who were diagnosed with "severe acute pancreatitis" consisted of subgroups having very different clinical outcomes, The ones with higher risks of mortality, such as necrotizing pancreatitis were not described or categorized accurately • type of organ failure as transient or persistent was not categorized adequately.
2. Then, Over the passing years as the understanding of patho physiology of organ failure and necrotizing pancreatitis improved with advancing diagnostic imaging made it mandatory to revise the Atlanta Classification [5]. In 2008 revision was made in the existing Atlanta classification by the Acute Pancreatitis Classification Working Group to establish a more accurate classification system. The highlight feature of the revised classification is that acute pancreatitis is classified into two phases- early phase (1st week) and late phase (after the first week) [6]. Following which the 3rdrevision of the Atlanta classification in 2012 took into consideration of the flaws in earlier systems and proposed few modifications which included-(a) To Address the clinical duration and severity of the underlying disease.(b) To Divide the AP into interstitial edematous pancreatitis and necrotizing pancreatitis.(c) Take into account of multiple organ failure [2].

We in our study on 140 patients will be using the revised Atlanta classification for the accurate diagnosis and to see the effect of this classification on the management and outcome of the patients.

1.2 Rationale

CT scan has primary role in evaluation of acute pancreatitis. With the modification of revised

Atlanta classification CT scan can help in improving the prognosis of the patient by categorizing the patients according to the severity which will help in the further management of these patients.

1.3 Aim

To evaluate the efficacy of Revised Atlanta Classification for Acute Pancreatitis in patients having acute pancreatitis in a rural hospital in central India.

1.4 Objectives

1. To evaluate the type of fluid collection.
2. To assess the absence or presence of organ failure.
3. To compare the type of fluid collection with the patients clinical outcome specifically the presence of organ failure, length of ICU stay, hospital stay and outcome.

2. MATERIALS AND METHODS

2.1 Study Design

Prospective analytical cross sectional study.

2.2 Setting

Our study will be carried forward in the Department of Radio-diagnosis, Acharya Vinoba Bhave Rural Hospital, Datta Meghe institute of medical sciences, Sawangi (Meghe), Wardha. The study will be conducted in the time frame of 2019-2021.

2.3 Participants

Sampling procedure: All patients referred to the department of Radio diagnosis (Acharya Vinoba Bhave Rural Hospital, Datta Meghe institute of medical sciences, Sawangi (Meghe), WARDHA) with clinical suspicion of acute pancreatitis will be subjected for the study.

2.4 Inclusion Criteria

1. All patients with clinical and laboratory findings (serum amylase & serum lipase) suggestive of acute pancreatitis
2. Old diagnosed cases of pancreatitis presenting with acute pain in abdomen.
3. Patients who are diagnosed acute pancreatitis on ultrasonography.

4. Patients of all age groups irrespective of sex.

2.5 Exclusion Criteria

1. Patients who do not give informed consent.
2. Patients of acute pancreatitis in whom CT contrast is not possible- eg-history of allergy to contrast, elevated creatinine.
3. Operated cases of pancreatitis.
4. patients who opt out the study voluntarily anytime during the study.

2.6 Study Size

140 Patients.

$Z_{1-\alpha/2}$ = at 95% 1.96, at 99% 2.576, at 90% 1.645, at 80% 1.282

p = Expected Proportion = 15%

d = Marginal Error Rate = 0.06

Estimated minimum sample size = 140.

2.7 Data Collection Tool

Siemens Somatom 16 slice computed tomography machine.

2.8 Duration of Study

2019 – 2021 – 2 years.

2.9 Statistical Analysis

Appropriate statistical analysis will be applied using SPSS statistical software.

2.10 Study Protocol

CT Technique: The study shall be done on 16 slice multidetectors CT (Siemens).

1. Patient will be kept nil per oral for 6 to 8 hours before taking him/her for the CT study.
2. Serum creatinine will be investigated before the patient is taken for the CT study.
3. Patient will be placed on gantry table in supine position with both hands above the head.
4. Initially a non contrast CT scan will be taken. (Only oral contrast is given. Most commonly used here is negative contrast – mannitol-1.5 liters of mannitol is consumed

- orally over a span of 45 minutes to 1 hour prior the scan)
- Then the oral and intravenous contrast will be given to the patient and then Contrast enhanced CT scan will be taken (commonly used intravenous Contrast in AVBRH is positive contrast Omnipaque or Ultravist both 2ml per kg of body weight is injected over a rate of 3-5 ml/sec)
 - A total of 3 sequences are taken, 1) Non contrast/control scan 2) followed by post contrast 35-40 second scan (pancreatic phase) 3) 70 second scan (venous phase)
 - Axial sections will be taken of slice thickness of 5mm and then reconstructed to thickness of 1.5mm
 - Then the lateral decubitus view will be taken.
 - All images will be viewed in a range of soft tissue window settings on dedicated work stations.

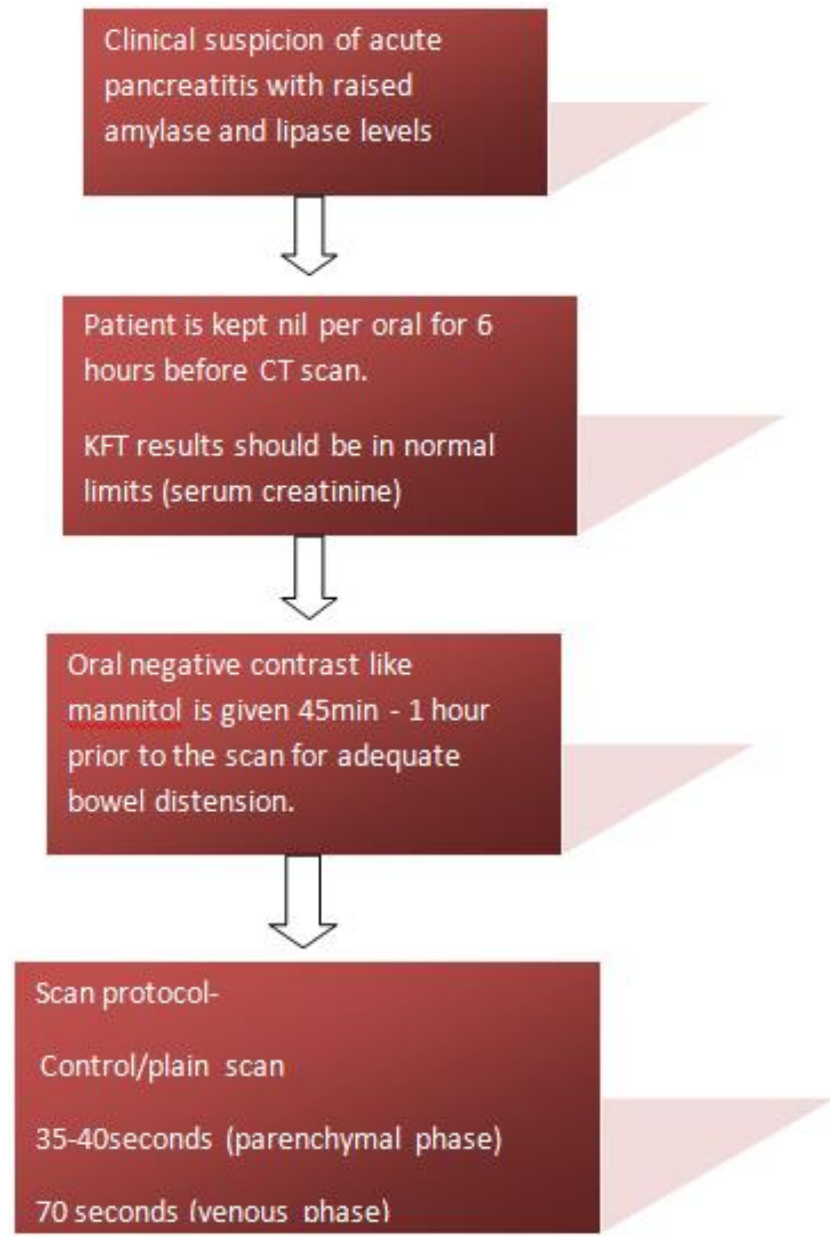


Image 1. Ct protocol

3. IMAGE ANALYSIS

The CT images will be analyzed on dedicated work Stations.

Changes of pancreatitis shall be noted which will include –

1. Presence of bulky pancreas with or without necrosis and peri pancreatic inflammation.
2. The fluid collections will be noted and shall be classified as "Acute Peri pancreatic fluid collection" if there is homogenous fluid around the pancreas confined by peripancreatic facial planes and no recognizable walls.
3. And as "Acute necrotic collection" which will be a collection consisting of both Fluid and solid components (necrotic material), it will be heterogeneous in nature with no encapsulating wall. A specific note will be made of whether the collection is intrapancreatic or extra pancreatic.
4. The collections which persist shall be followed up with CECT and shall Be classified after four weeks as pseudo cysts which is defined as a well Circumscribed, thin walled homogenous round or oval fluid collection with no solid component, occurring in settings of non necrotic Interstitial edematous pancreatitis. The location of psuedocyst is always

extrapancreatic according to The revised Atlanatas classification.

5. We may also find walled off necrosis which will be mature encapsulated necrotic collection of heterogeneous density having a well defined wall and can be intra pancreatic or extra pancreatic.

4. CLINICAL VARIABLES AND OUTCOME

These will be collected from the case Sheets,direct patient visit , interaction with clinician , hospital information system and medical records department . The variables will include:

1. Duration of hospital stay (in days)
2. Need for ICU care and length of ICU stay.
3. Presence of organ failure- Organ failure will be diagnosed and classified according to the modified marshal scoring system.(1)Score more than 2 is considered as organ failure.
4. Type of organ failure –
Mild and transient of less than 48 hours
Severe and persistent of longer than 48 hours
5. Evidence of infection (combination of fever and elevated WBCcount>11000/mm³; or evidence of infection proved with culture and sensitivity testing or gram staining of the specimens)
6. Presence of any mortality –yes/no.

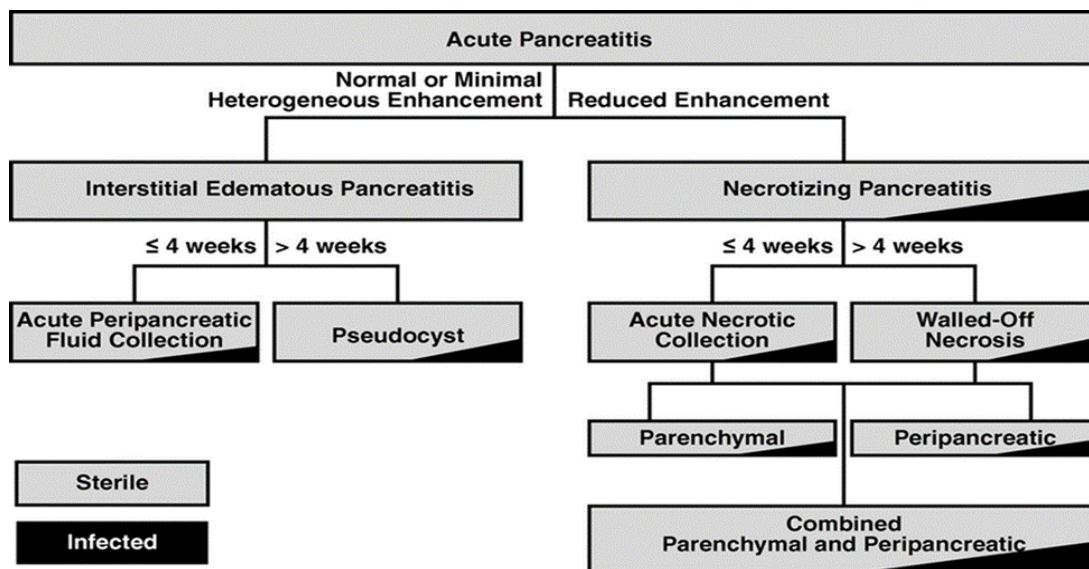


Image 2. Results of local fluid collection will be declared according to the revised atlanta classification 2012 as described above

5. DISCUSSION

Acute pancreatitis being a common abdominal pathology and being mostly self limiting is often managed conservatively, but few cases 15- 20% having a severe outcome needs to be managed surgically with treatment of the systemic and adjacent local complications.

The modified Atlanta classification helps in classifying the acute pancreatitis into mild, moderate and severe categories keeping clinical, laboratorial and radiological parameters in consideration, hence being accurate, cheap and convenient way of classifying acute pancreatitis.

The original method of classification of various categories of acute pancreatitis only specified two types – either mild or severe pancreatitis mainly basing its logic upon presence or absence of organ failure. This also specifies a third category of moderate pancreatitis in order to collate the missing phase of acute pancreatitis reported to be causing high morbidity based upon arising systemic complications [7,8].

Talking about the incidence of organ failure, it has been observed that mild phase of pancreatitis does not show such changes [9]. These changes creep in moderate and severe phases of pancreatitis as the disease progresses further. Also, the newly added category of 'moderately severe acute pancreatitis' is seen to cause organ failure as both transient organ failure with a timeline of less than 2 days or 48 hours precisely with complications – either local or systemic in nature. The local ones are those which comprise of fluid collections in or around the pancreas. However, the systemic ones are those which lead to comorbid conditions as they advance. These are noted to occur in the 2nd week of acute pancreatitis in general and are suspected clinically when the patient presents with recurring abdominal pain with an elevation in the pancreatic enzyme levels which may or may not cause simultaneous organ failure and / or sepsis [10]. Few related studies were reviewed [11-12] in the same direction of thought.

When organ failure is persistent for more than 2 days or 48 hours, it can be considered that acute pancreatitis has progressed in its severity. Therefore to address this point, the Revised Atlanta classification has now included the Modified Marshall Scoring System for gradation of organ failure. This takes into its account a multi systemic horizon – measurement of partial

pressure of oxygen/ fraction of inspired oxygen which is represented as PaO₂/FiO₂, serum creatinine levels concerning the status of renal excretory system and the systolic blood pressure in mmHg(5) [13].

5.1 The Modified Marshall Scoring System has been Divided as Follows

Table 1. Respiratory system

SCORE	PaO ₂ /FiO ₂
0	>400
1	301-400
2	201-300
3	101-200
4	<100

Table 2. Renal excretory system

SCORE	Serum creatinine level
0	less than or equal to 1.4 mg/dl
1	1.5-1.8mg/dl
2	1.9-3.5mg/dl
3	3.6-4.9mg/dl
4	More than equal to 5mg/dl

Table 3. Cardiovascular system

SCORE	Systolic blood pressure (mmHg)
0	>90
1	<90(responding to fluid therapy)
2	< 90 (NOT responding to fluid therapy)
3	< 90 (pH < 7.3)
4	< 90 (pH < 7.2)

If any system of these 3 included, shows a score of 2 or more than 2, indicates organ failure, when lasting for less than 48 hours they are labeled as transient organ failure. When they persists over 48 hours they are termed as persistent type. The main reason why the Revised Atlanta Classification of Acute Pancreatitis includes the Modified Marshall Scoring System for organ failure is proper and apt representation of what is happening at the cellular level as well as organic level in and around the pancreas and how this is affecting the multisystemic balance in the body of the patient. Studies on pancreatitis and related conditions were reported [14-16]. Related studies by Parihar et al. [17], Singh et al. [18] Sonawane et al. [19] and studies on Global Burden of Disease [20,21] were reviewed.

Our study mainly focuses on evaluation of the efficacy of the Revised Atlanta Classification of Acute Pancreatitis also including the Modified Marshall Scoring System with regards to the presenting type of fluid collection with the patients clinical outcome specifically the presence of organ failure with reference to whether transient or persisting based on the time duration, length of ICU stay with reference to number of days, hospital stay with reference to number of days and overall clinical outcome.

6. CONCLUSION

The revised Atlanta classification for acute pancreatitis, in conjunction with the Modified Marshall Scoring System for organ failure, if found useful, in our series in improving the prognosis of the patients, then it can be incorporated in management of patients leading to a timely outcome and better results with regards to focused radiological reporting, physician's diagnosis and thereby clinical management and treatment.

CONSENT

As per international standard or university standard, patients' written consent approval will be taken by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval will be taken by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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