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To evaluate BISAP clinical rating and result against CT-based pancreatitis severity evaluation using the new Atlanta classification

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Abstract

Background and Objectives: This study aims to classify patients with acute pancreatitis into two groups based on the type of collections seen on contrast-enhanced computed tomography: interstitial edematous pancreatitis and necrotizing pancreatitis, as per the updated Atlanta classification. Then, we'll use the new Atlanta classification to figure out how bad it is.

Materials and Methods: The research took place from October 2014 to September 2015, at the Maharajah's Institute of Medical Sciences' Department of Radiology in Nellimarla, Vizianagaram, Andhra Pradesh. The hospital was the site of this prospective observational study. Two hundred patients made up the study's sample. The researcher gathered primary data from CT scans taken of patients hospitalized to the surgery or medicine wards at Coimbatore Medical College Hospital with a diagnosis of acute pancreatitis.

Results: Our study group was primarily comprised of male patients, with drunkenness being the primary factor contributing to their condition. Furthermore, moderate acute pancreatitis and interstitial edematous pancreatitis were the most common types. There was a moderate degree of acute necrotizing pancreatitis and interstitial edema. On the spectrum from mild to severe are the grades that fall into the fairly severe category. Both the BISAP grade and the revised Atlanta classification showed a favorable correlation with clinical outcomes.

Conclusion: The new Atlanta classification system has made it easier to characterize and document imaging data of acute pancreatitis in clinical practice. With the new Atlanta classification and BISAP clinical grading integrated, patients with acute pancreatitis can be triaged, anticipated, and treated with higher precision.

Keywords: Pancreatitis severity assessment, BISAP, clinical grade and Atlanta classification

Introduction

The clinical course of acute pancreatitis, a common cause of acute abdomen, can take many different forms. According to the categorization of AP patients, over 80% are classified as moderate, while a small percentage are classified as severe. There are two types of AP, each associated with a different morphology: Mild cases, which manifest as oedema, and severe cases, which manifest as necrotizing. Mild cases of the disease are self-limiting and do not significantly impair daily functioning [1, 2].

The presence of various organ dysfunction syndrome and superimposed infections makes the severe form of the disease potentially fatal. The pancreas, surrounding retroperitoneal tissues, and possibly other organs and systems can be affected by the rapidly progressing inflammatory disease known as acute pancreatitis. From relatively minor symptoms like nausea and vomiting to more serious complications including kidney failure, acute respiratory distress syndrome, death, and multi-organ failure, acute pancreatitis displays a wide range of systemic and clinical indications [2-4].

Acute pancreatitis is most commonly caused by biliary system problems and drinking. Many different medical conditions can lead to pancreatic dysfunction, including mechanical blockage, pancreatitis caused by endoscopic retrograde cholangiopancreatography, congenital anomalies such as pancreatic divisum, and many more. Acute pancreatitis has an extremely low overall fatality rate. The death rate, however, spikes dramatically, often reaching 30% in the most extreme cases [3-5].

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The most reliable method for detecting fluid collections and necrosis in acute pancreatitis is contrast-enhanced computed tomography of the abdomen. Important medical decisions regarding illness severity prediction, prognosis, and treatment can be guided by this diagnostic tool. According to multiple studies, computed tomography allows for the direct visualization of acute pancreatitis-related consequences and necrosis. In light of this, CT provides a more accurate assessment of AP severity than numerical grading methods [6-8].

Several investigations have shown that the CT severity index is correlated with the severity of acute pancreatitis. However, there are a few caveats to this correlation that have been uncovered by other studies. Superadded infection, the Modified Rankin Scale, surgical or percutaneous interventional procedure needs, death, or clinical outcome are not significantly correlated with CSI [8-10]. This study aims to compare the BISAP clinical grading system with the Revised Atlanta classification for evaluating pancreatitis severity using computed tomography, as well as the clinical outcomes of each.

Materials and Methods

The research conducted from the Department of Radiology at the Maharajah's Institute of Medical Sciences in Nellimarla, Vizianagaram, Andhra Pradesh, commenced in October 2014 and ended in September 2015. It was in a hospital that this prospective observational study was conducted. In this study, 200 patients were included as a sample. Researchers at Coimbatore Medical College Hospital used CT scans taken from patients admitted to the surgery or medicine wards after a diagnosis of acute pancreatitis to compile main data.

Inclusion Criteria

All patients diagnosed with acute pancreatitis underwent abdominal CT scans based on clinical findings and laboratory tests.

Exclusion Criteria

- People with anomalously elevated renal parameters.
- Women carrying children.
- Patients who do not yet turn eighteen are eligible.

Results

A cohort of 200 individuals suffered from acute pancreatitis, as determined by clinical criteria and transabdominal ultrasonography. The patients were subjected to continuous monitoring until their conditions were effectively treated, either through conservative measures or through intervention. Out of the 200 participants in the study, just 10 were female, while the rest 190 were male.

Table 1: Age distribution

Sr. No.	Age in Years	Patients
1.	< 20	2
2.	21-30	50
3.	31-40	81
4.	41-50	46
5.	51-60	20
6.	> 60	1

All patients must be at least 18 years old to take part. Out of 200 participants, 82 were in the 31-40 age bracket, which was the largest single age group. There were 50 patients between the ages of 21 and 30, 46 between the ages of 41

and 50, and 20 between the ages of 51 and 60. The lowest percentages were 2% for those under the age of 1 and 1% for those over the age of 60.

Table 2: Sex distribution

Sr. No.	Sex	Patients	%
1.	Male	180	90
2.	Female	20	10

Twenty women out of two hundred took part in the research, while eighty-one men did the same. The total number of patients was 200, with males constituting 190 (compared to 10 women). This statistic demonstrates that acute pancreatitis is more common in males than to women.

Table 3: Cause of pancreatitis

Sr. No.	Cause of Pancreatitis	Patients
1.	Alcohol	170
2.	Gall Stone	18
3.	Idiopathic	8
4.	Trauma	4

Acute pancreatitis affected 170 patients in the study population due to alcohol misuse; gallstones affected 18, trauma affected 8, and idiopathic affected 4 people. The total number of patients was 200. Out of those, 170 had necrotizing pancreatitis while the other 100 had interstitial edematous pancreatitis.

Table 4: Organ Failure

Sr. No.	Organ Failure	Patients	%
1.	Present	20	10
2.	Absent	180	90

Twenty patients showed symptoms of organ failure out of a total of 200 patients who were included in the current study; 180 patients showed no organ failure symptoms. Thirteen patients had respiratory failure, six had renal failure, ten showed signs of cardiovascular system (CVS) failure (shock, heart failure, etc.), and two had multiorgan dysfunction syndrome among the thirty-nine people involved in the research. It was also noted that out of the 29 patients in the group, 16 had chronic organ failure and 13 had fleeting organ failure.

Table 5: Mortality

Sr. No.	Mortality	Patients	%
1.	Death	10	5
2.	Alive	190	95

Consistent with the relevant data, eight patients out of a total of two hundred patients died during the course of the study's clinical outcomes analysis. Using the Revised Atlanta grading system, all twelve individuals in this study were deemed to have severe acute pancreatitis. Out of fifteen patients who were diagnosed with severe acute pancreatitis, three managed to recover. Patients diagnosed with mild or moderately severe acute pancreatitis did not experience any mortality.

Discussion

The newly updated Atlanta classification has improved the accuracy of diagnosis and triage for patients with acute pancreatitis, leading to more efficient treatment and better

outcomes. Acute pancreatitis patients have a lower risk of death and morbidity if their severity can be predicted in advance, allowing for faster treatment. A similar approach to evaluating patients with acute pancreatitis is the BISAP clinical grading, which is trustworthy, extensively used, and easy to understand. The radiological and clinical aspects of patient care can be greatly improved by using clinical scoring systems like BISAP in comparison to the Revised Atlanta Classification. These systems have a significant influence on the diagnosis and treatment of patients with acute pancreatitis, which ultimately benefits everyone involved [11, 12].

The Department of Radiodiagnosis at Coimbatore Medical College Hospital enrolled 200 patients who were clinically and ultrasonographically diagnosed with acute pancreatitis and who later received contrast enhanced computed tomography (CECT) of the pelvis and abdomen. Throughout the process, the TOSHIBA 16 slice CT scanner was utilized, utilizing the following parameters: 10 mm slice width, 2.5 mm collimation, 0.75 s rotation time, and 3 mm reconstruction interval. Before and after the surgery, contrast MRIs were conducted. Acute pancreatitis patients are classified and graded using contrast-enhanced computed tomography according to the Revised Atlanta classification of pancreatitis. Patients in this group were all assigned a BISAP score. As part of the patients' follow-up, several metrics were measured, including mortality, indicators of persistent organ failure, infections, intervention requirements, and duration of hospital stay [13-15].

An alcohol-related acute pancreatitis affected 177 patients in the research group, while gallstones affected 20, trauma affected 7, and idiopathic pancreatitis affected 7. This data clearly shows that alcohol misuse is a major risk factor for acute pancreatitis in the people we studied. When it comes to female-specific pain and discomfort, gallstones rank high. S. Hamada *et al.* and Y. Bai *et al.* report that alcohol-related illnesses and gallstones, respectively, are the primary causes of acute pancreatitis [16-18].

Necrotizing pancreatitis is an uncommon illness, occurring in just 47 out of 200 cases. Acute necrotizing pancreatic and peripancreatic collection affected around 18 people. Research done by MW Freeman *et al.* indicates that 15% of all cases of acute pancreatitis are necrotizing pancreatitis. The new Atlanta classification was used to diagnosis severe acute pancreatitis in 9 out of 47 individuals, whereas moderate to severe pancreatitis was used to classify the remaining 35. The severity of acute pancreatitis is higher in cases of necrotizing pancreatitis. Because 8 out of 12 patients who passed away had necrotizing pancreatitis, the mortality rate was significantly greater than that of other types of pancreatitis. In a study conducted by Petrov MS *et al.* [19-21], similar results were discovered.

Among the 200 patients, 29 experienced organ failure in one way or another. Among them, there were 29 instances of respiratory failure, 29 instances of renal failure, 29 instances of cardiovascular shock, and a small number of cases involving a variety of organ dysfunctions. To describe the organ failure, the Marshall scoring system was utilized. There were 16 cases of chronic failure and 13 cases of transient failure among these patients with organ failure [22, 23].

A flawless BISAP score of 0 was achieved by 113 patients, or almost 54% of the total. Interstitial edematous pancreatitis was the most common diagnosis, and the majority of patients had full recoveries and were discharged. Only 12 out of 23

patients who had a BISAP score of 3 or higher survived. Consequently, the BISAP score has proven to be an accurate predictor of mortality in individuals suffering from acute pancreatitis. According to Zhang *et al.*, who also discovered statistically significant changes in mortality and severity related with BISAP, these findings are in line with one another [24, 25].

Among the 147 patients diagnosed with mild acute pancreatitis, 146 had a BISAP score of 3, whereas just one had a BISAP score of 3, indicating a substantial correlation between the two variables. Of the 46 patients diagnosed with moderately severe acute pancreatitis, 37 had a BISAP score below 3, while 9 had a score above 3. Thirteen of the fifteen patients diagnosed with severe acute pancreatitis had BISAP scores of three or above, whereas only two had scores below three. As the Revised Atlanta classification for pancreatitis illness severity rises, so does the BISAP score for people with the condition. As a result, there was a strong correlation between the BISAP clinical grading system and the Revised Atlanta severities [25-27].

In clinical outcome analysis, the death rate is an important metric. Eight out of twelve deaths were caused by acute necrotizing pancreatic and peripancreatic collection, as per the revised Atlanta classification. Their severity was deemed acute by the RAC. The most common reasons for death in this group were sepsis, infection, respiratory failure, and shock. All of them achieved BISAP scores of 3 or higher. The revised Atlanta classification was used to identify Rest 4 as having interstitial edematous pancreatitis with peripancreatic fluid buildup. All of their cases of acute pancreatitis were considered severe according to the new Atlanta classification system. The main causes of early death in these patients were shock and circulatory collapse. On the BISAP scale, three of them got a three or higher, and one got a two or lower. Compared to individuals with necrotizing pancreatitis, those with interstitial edematous pancreatitis spent less time in the hospital. On average, patients requiring acute treatment for moderate to severe conditions spend 11.7 days in the hospital, 12.56 days in the ICU, and 5.1 days in the mildest group. An average of 10.35 days is the length of stay for patients with a BISAP score of 3 or higher, compared to 6.6 days for patients with a lower score. A higher RAC severity grade and BISAP score are associated with an increased average length of stay [25-27].

In the study group, 23 individuals showed indications of infection when infection was examined as a clinical outcome indicator. The number of those classified as having moderately severe acute pancreatitis and severe acute pancreatitis is almost similar, according to the revised Atlanta criteria. Furthermore, 18 of these patients were found to have acute necrotizing pancreatitis. Infection symptoms are more common in patients with acute necrotizing pancreatitis, moderate to severe acute pancreatitis, and other forms of acute pancreatitis. Twelve of the infected people had BISAP values of three or above, while eleven had scores of two or lower. Both moderately severe and severely acute pancreatitis patients needed percutaneous drainage due to acute necrotizing pancreatic and peripancreatic collection, which was found in 14 and 9 patients, respectively. Ten patients out of the thirty-three had BISAP scores of 3 or higher, whereas twenty-three had scores of 2 or lower. Both the Revised Atlanta classification grading and the BISAP score are useful in predicting whether patients with acute necrotizing pancreatitis will require intervention, as a large number of these patients fall into the mild acute grade

category and only require elective intervention later on in the disease's progression^[27-28].

Conclusion

The new Atlanta classification system has made it easier to characterize and document imaging data of acute pancreatitis in clinical practice. The BISAP score is an easy and dependable way to estimate the probability of mortality in acute pancreatitis early on. These two robust clinical and radiological methods, when utilized in tandem, substantially enhance the accuracy of acute pancreatitis patient triage, prediction, and treatment.

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Conflict of Interest

None.

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