

## Role of Computed Tomography In Characterisation Of Fluid Collections In Acute Pancreatitis As Per Revised Atlanta Classification

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### Abstract:

**Introduction:** Acute pancreatitis is an acute inflammatory state involving the pancreas. The human and financial burden of acute pancreatitis appears to be growing. Since many years several classification systems have been developed in order to predict severity. The revised Atlanta classification system facilitated standardized reporting of clinical and imaging data, which can be used as an effective means of communication among the medical team. CECT is the imaging modality of choice in this classification system. This study assesses lesions seen on CECT as defined by the Revised Atlanta classification and to assess the occurrence of fluid collections in acute pancreatitis.

**Methods:** descriptive study involving 67 study subjects clinically suspected to have acute pancreatitis who underwent CECT Abdomen in the department from January 2014 to June 2015. Imaging findings were defined as per Revised Atlanta classification and data collected were analysed using statistical tools.

**Results and conclusion:** It was found in the study that acute pancreatitis was seen to occur most commonly in 30-50 year age group, more in males. The vast majority of patients had fluid collections (82.1%). Walled off necrosis was found to occur more commonly than pseudocyst.

**Keywords:** Acute Pancreatitis; Computed Tomography; Revised Atlanta Classification.

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### I. Introduction

Acute pancreatitis (AP) is an acute inflammatory state involving the pancreas and is categorized conventionally into either mild or severe disease. Majority of patients with acute pancreatitis, approximately 80% to 85% of patients, will have the mild form, with a clinical course which has no complications. On the other hand, 15% to 20% will develop a complicated clinical course characterized by organ failure and/or local complications<sup>1</sup>. Exact prevalence data from India are not readily available so far. Only an idea of incidence may be obtained from patients admitted in tertiary care centers in India. At the All India Institute of Medical Sciences (AIIMS), New Delhi, 276 patients with AP were admitted from January 1997 to June 2002, on an average about 55 patients per year<sup>2</sup>. The human and financial burden of acute pancreatitis appears to be growing. The incidence of acute pancreatitis in the United States of America varies from 4.9 to 73.4 per 100,000 patients<sup>3,4</sup>.

Since many years several classification systems have been developed in order to predict severity. The revised Atlanta classification system facilitated standardized reporting of clinical and imaging data, which can be used as an effective means of communication among the medical team. CECT (Contrast Enhanced Computed Tomography) is the imaging modality of choice in this classification system<sup>5</sup>. This study assesses lesions seen on CECT as defined by the Revised Atlanta classification and to assess the occurrence of fluid collections in acute pancreatitis. Fluid collections in acute pancreatitis as defined by Revised Atlanta classification is summarised in Fig 1.

### II. Study Methodology

This was a descriptive study done from January 2014- June 2015, in all patients with clinical suspicion of acute pancreatitis who came for CECT study in the department. All subjects referred to Radiodiagnosis department with clinical suspicion of acute pancreatitis with age more than 18yrs and time since onset of disease a minimum of one week were included in the study after informed consent. Patients who were unwilling to be part of the study and who did not get adequate CECT scan due to technical reasons were excluded. Data was collected using the study proforma prepared as per the Revised Atlanta Classification of acute pancreatitis<sup>5</sup>. Patients were subjected to computed tomography with iv contrast. Contrast was given by bolus injection at the rate of 2-3ml/sec typically of 100 ml of Iopromide/Ultravist™ (15gI/50ml, with each ml containing 0.623gm Iopromide i.e. equivalent to 300 mg iodine). In cases where positive oral contrast was given the oral contrast is

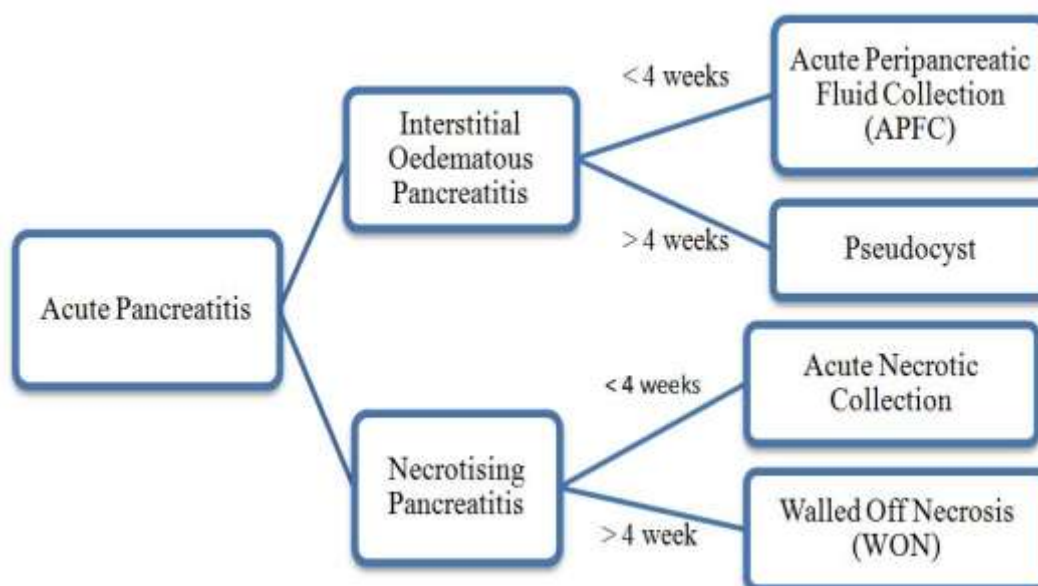
500ml diluted diatrizoate meglumine and diatrizoate sodium (Gastrografin™) approximately 30min prior to examination and an additional 250ml at the time of exam. Sections were taken from the level of diaphragm to pubic symphysis with 5mm thick sections, 6-15mm/sec table speed, and reconstruction of data at 3mm intervals. Multi phase contrast study was then done with image acquired at 30-35 sec for late arterial phase, 70 - 75 sec for portal venous phase after contrast administration. Data collected was entered into Microsoft Excel 2007 worksheet and analysed for obtaining the frequency tables of various variables in the study.

### III. Results

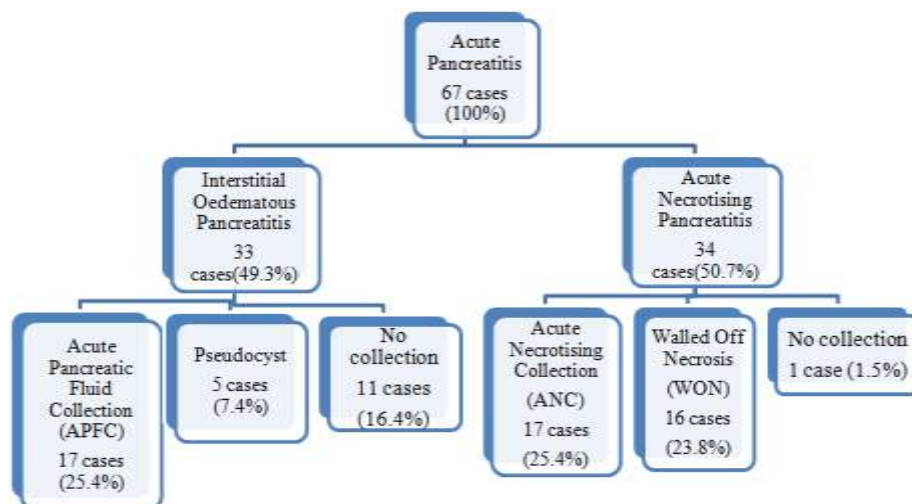
Minimum age of a study subject was 22 years and maximum was 80 years. Mean age of the study sample studied was 45 years. Most number of study population belonged to the 40-49 yr age group, accounting for 32.8% of the study population. The study sample had majority of male patients with only 16.4 % female subjects. The male constituted 83.6% of the study population i.e. 56 out of the 67 total subjects. Male to female ratio of study population with acute pancreatitis was approximately 5:1. In the study, 49.3% were diagnosed to have acute interstitial oedematous pancreatitis. 50.7% had acute necrotising pancreatitis. No fluid collections were seen in 17.9% of the study population. APFC were noted in 17 cases (25.4%) and pseudocysts in 7.4%. WON was noted in 23.8% of the study population. The distribution of type of pancreatitis and various fluid collections in the study population is summarized below. (Fig 2) 59.7 % of study population showed no evidence of pancreatic parenchymal necrosis. Out of the 40.3% who showed necrosis, most of them had necrosis involving less than 30 % of pancreatic parenchyma. (Fig 6)

Peripancreatic necrosis was noted in 24 cases accounting for 35.8% of the study population. In 5 cases (7.5%), the possibility of peripancreatic necrosis could not be ruled out definitely. 38 out of the total 67 cases had no evidence of peripancreatic necrosis. Out of the total 67 cases in the study population, 82.1% (55 cases) had fluid collections either within the pancreatic parenchyma or in peripancreatic region. 12 cases out of the total 67 cases studied had no fluid collections, which accounted for 17.9% of study population. Out of the total 55 cases which had fluid collections, majority (65.5%) had extrapancreatic fluid collections only. 32.7 % had fluid collections in both intrapancreatic and extrapancreatic location. Only 1 case had isolated intrapancreatic fluid collection. Most cases when assessed for specific location of the fluid collections had multiple sites. Among the 19 cases which had intrapancreatic fluid collections, pancreatic head was the most common site for isolated involvement with 26.3% (5) of these cases. Similarly, among the 54 cases with extrapancreatic collections, immediate peripancreatic /anterior pararenal space was the most common site for isolated involvement (29.6% i.e.16 cases).(Table )Among the 55 cases with fluid collections in the study population, 41.8 % i.e. 23 cases had well demarcated wall in post contrast CT images. Rest of the 32 cases showed no well demarcated wall. Of the 55 cases which showed collection in CT evaluation, 5 cases, accounting for 9.1 % showed evidence of extra luminal gas.

#### Figures and Tables



**Fig 1:** Imaging based morphologic classification of acute pancreatitis and fluid collections as per Revised Atlanta Classification.



**Fig 2:** Chart depicting the distribution of type of pancreatitis and various fluid collections in the study population

#### IV. Discussion

Most number of study subjects was in the 30 – 50 yrs age group (39%). Only 7.5 % had age less than 30 years. Also the occurrence of acute pancreatitis was less in the above 70yrs category accounting for only 4 cases (6% of study population). This was consistent with a study by Dhiraj et al <sup>6</sup>, in which the incidence was found to be less towards the extremes of age. Also literature gives mean age of acute pancreatitis to be approximately 40 yrs <sup>7</sup>, which in our case came to 45 yrs. In our study 83% of the study population was males. Previous data also indicate increased incidence of acute pancreatitis in males especially those with alcoholic pancreatitis <sup>8</sup>.

55 cases (82.1 %) of the study populations had fluid collection on imaging in contrast to 12 cases (17.9%) who had no fluid collections on imaging. 65.5% of these cases had fluid collections isolated to the extrapancreatic region when compared to only 1.8%(1 case) which had isolated intra pancreatic fluid collections. 32.7% cases had both intra and extra pancreatic fluid collections. The location of these collections also revealed multiple sites of involvement to be more common, with isolated collection within the pancreatic head being more common in intrapancreatic location. The same in extra pancreatic location was more common in the immediate peripancreatic/ anterior pararenal space. 58.2% of the study subjects with fluid collection had non homogenous fluid characteristics suggestive of debris. Also, among the total 55 cases with fluid collections 38.2% had well demarcated wall in CECT imaging suggestive of either pseudocyst or WON. 23.8 % ( 16 cases) of study population had walled off necrosis which was considerably higher when compared to the 7.4% ( 5 cases) who had pseudocyst. This is consistent with the recent study by Sanatan Behera et al which has suggested that walled off necrosis is more common than pseudocyst <sup>9</sup>. In our study, 25.4 % ( 17 cases) each with APFC and ANC were also detected. Also, 9.1% ( 5 cases) of cases with fluid collections showed evidence of infection with extra luminal air.

#### V. Conclusion

CECT has helped in classifying acute pancreatitis and characterisation of complications thus aiding in diagnosis. The conclusions drawn from the study include acute pancreatitis was seen to occur most commonly in the 30-50 year age group, more in males. The vast majority of patients with acute pancreatitis had fluid collections (82.1%), with fluid collections more likely to occur with necrotising pancreatitis. Walled off necrosis was found to occur more commonly than pseudocyst.

#### References

- [1]. Frossard JL, Steer ML, Pastor CM. Acute pancreatitis. *Lancet* 2008; 371(9607):143–52.
- [2]. Rakesh K Tandon. Management of Acute Pancreatitis-Indian Guidelines and Protocols. *Medicine Update*. 2013; 23(59):267-270.
- [3]. Sandler RS, Everhardt JE, Donowitz M, et al. The burden of selected digestive diseases in the United States. *Gastroenterology* 2002; 122:1500-11.
- [4]. Fagenholz PJ, Fernandez-del Castillo C, Harris NS, et al. Direct medical costs of acute pancreatitis hospitalizations in the United States. *Pancreas* 2007; 35:302-7.
- [5]. Revision of the Atlanta classification of acute pancreatitis, April 9, 2008; Available from: <http://pancreasclub.com/wpcontent/uploads/2011/11/AtlantaClassification.pdf>.

- [6]. Dhiraj Yadav<sup>1</sup> and Albert B. Lowenfels. The Epidemiology of Pancreatitis and Pancreatic Cancer, *Gastroenterology*. June, 2013;144(6): 1252–1261.
- [7]. Scott Tenner and William M. Steinberg. Acute Pancreatitis. *Sleisenger and Fordtran's Gastrointestinal and Liver Disease*, 10thEdition, Elsevier, 2015.
- [8]. DeFrances CJ, Hall MJ, Podgornik MN. 2003 National Hospital Discharge Survey: Advance data from vital and health statistics. Hyattsville, Md: National Center for Health Statistics. 2005.
- [9]. Sanatan Behera, Ajmal Hasan, S. Shalimar, Pramod K. Garg. Extent and Infection of Pancreatic Necrosis Determine the Outcome of Acute Fluid Collections in Acute Pancreatitis: Results of a Prospective Validation Study of Revised Atlanta Classification. May 2013; 144(5)1:S-278.