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Role of Computed Tomography in Evaluation of Complications of Severe Acute Pancreatitis.

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ABSTRACT: The study was aimed to evaluate the Multidetector Computed Tomography (MDCT) findings of complications associated with severe acute pancreatitis.Severe acute pancreatitis is defined as pancreatitis with Modified CT severity index (CTSI) score of 8-10.Severe acute pancreatitis with its complications is one of the most common causes of mortality in hospitalized patients.Various complications are seen in severe acute pancreatitis which have classified into early, intermediate and late according to timing of their occurrence.MDCT serves as an excellent tool for early diagnosis and evaluation of complications of acute pancreatitis and can detect most of the complications of severe acute pancreatitis.

I. INTRODUCTION:

Acute pancreatitis is defined as an acute condition presenting with abdominal pain, a threefold or greater rise in the serum levels of the pancreatic enzymes (amylase or lipase) and/or characteristic findings of pancreatic inflammation on contrast-enhanced CT [1]. Patients may present with a mild, self-limiting disease without complications to severe disease which results in local or systemic complications with significant morbidity and mortality [2].

Contrast enhanced computed tomography (CECT) scan is the premier imaging test in the diagnosis & management of patients with acute pancreatitis .CECT scan should be performed after at least 72hours of onset of pain as parenchymal necrosis is well defined by this time [3].

The CT severity index (CTSI), developed by Balthazar & colleagues, focused on the presence and degree of pancreatic inflammation and necrosis to predict morbidity and mortality in patients with acute pancreatitis. In 2004, Mortele and coworkers modified CTSI (MCTSI) and incorporates extra pancreatic complications along with pancreatic inflammation and necrosis to overcome the potential limitations of CTSI [4].

Severe acute pancreatitis is defined as pancreatitis with Modified CT severity index (CTSI) score of 8-10.Severe acute pancreatitis with its complications is one of the most common causes of mortality in hospitalized patients.Various complications are seen in acute pancreatitis which have classified into early, intermediate and late according to timing of their occurrence.[5]

Early complications (2-3 days)	**Intermediate complications (2-5 weeks)**	**Late complications (Months to Years)**
Associated with multi organ failure.	Due to abdominal complications.	Between multiple episodes of acute pancreatitis & chronic pancreatitis.
Cardiovascular,pulmonary,renal and metabolic complications.	Retroperitoneal infections, infected necrosis, GI &billiary complications, solid organ involvement	Vascular & hemorrhagic complications , Pancreatic ascites

MDCT can detect most of the complications of severe acute pancreatitis and serves as an excellent tool for early diagnosis and evaluation of complications of acute pancreatitis .
Complications can be divided into vascular andnon vascular complications.[3,7,8]

A. Vascular complications :
1. Pseudoaneurysms
2. Arterial rupture and hemoperitomeum
3. Arterial thrombosis
4. Venous thrombosis

5. Perigastric and splenic hilar collateral venous channels
6. Portal hypertension.

B. Non-vascular complications :
1. Different types of fluid collections
2. Infected Necrotic Collection
3. Pancreatic Fistula
4. Disruption Of MPD Or Secondary Branches
5. Pancreatic Duct Strictures
6. Ascites
7. Pleural Effusion
8. Bowel Obstruction And Ileus
9. Bowel Ischemia And Necrosis
10. Cholecystitis
11. Cholangitis
12. Splenic infarct

II. MATERIALS & METHODS:

The prospective study was conducted in the department of Radiodiagnosis at HI-TECH Medical College & Hospital, Bhubaneswar, for a period of 12 months from 1st July 2023 to 30th June 2024.

Patients with clinically suspected and proven for severe acute pancreatitis were performed over computed tomography on GE REVOLUTION ACT 32 SLICE MACHINE. Those patients fulfilling inclusion & exclusion criteria were enrolled in the study.

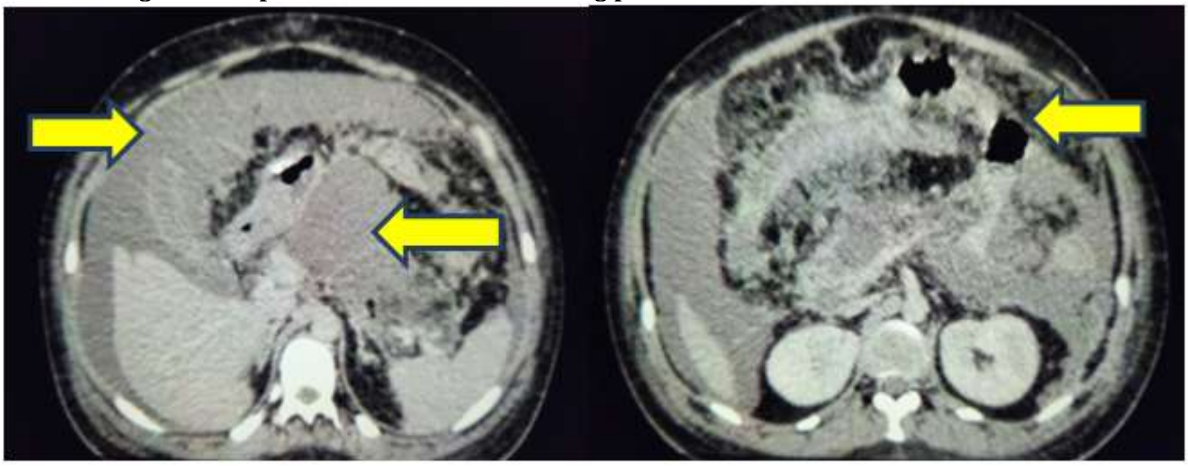
INCLUSION CRITERIA-
Patients with an episode of severe acute pancreatitis corresponding to Modified CT severity index score 8 to 10 were included in the study.

EXCLUSION CRITERIA-
- Patients with deranged renal function test.
- Patients with previous history of adverse contrast reactions and contrast allergy.
- Pregnant women and breast feeding mothers.
- Patients unwilling to give consent for the study.

40 patients were included in the study. Plain and post-contrast images of the abdomen and pelvis was taken in the axial sections and reformat in sagittal and coronal planes .All images was viewed in a range of soft tissue window settings and vascular and non vascular complications of severe acute pancreatitis was assessed.

III. OBSERVATIONS AND RESULTS:

REPRESENTATIVE IMAGES:
CASE 1:
Entire pancreas in non enhancing and replaced by necrotic collection, massive ascites and solid areas of necrosisthrough out the peritoneum- Acute necrotizing pancreatitis.



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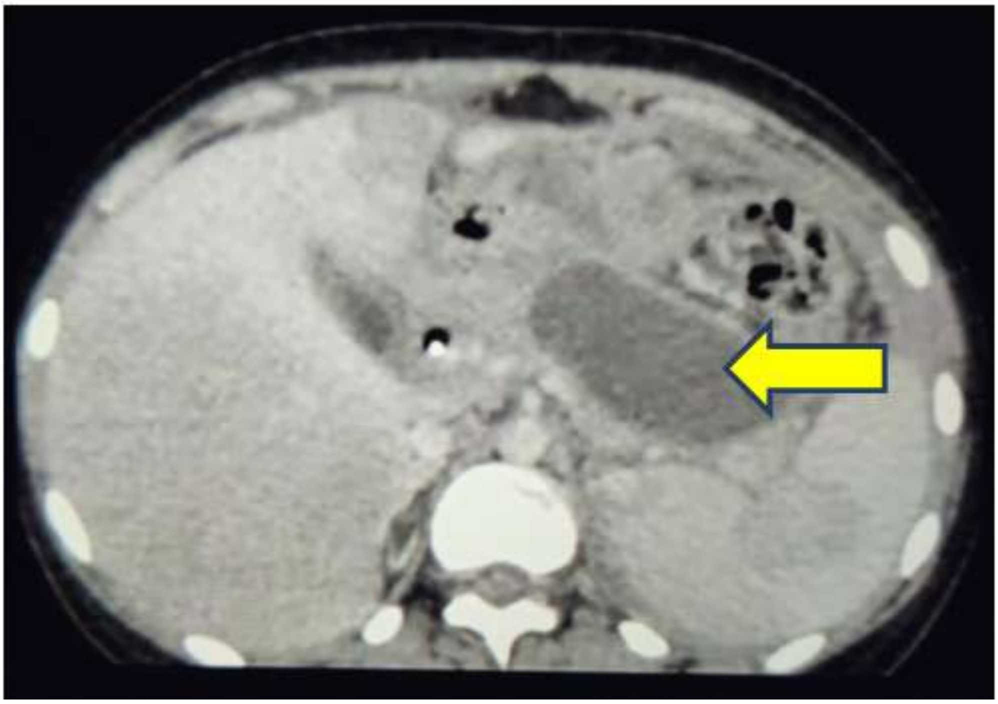
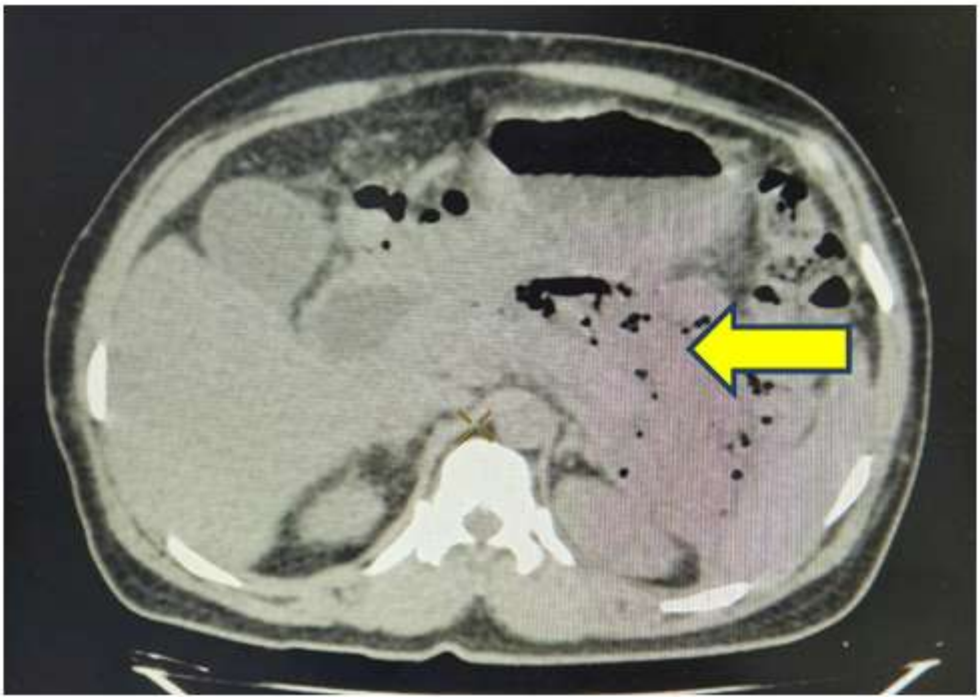
CASE 2:
Collection in pancreatic tail with partially formed wall around the collection- Walled off necrosis.



CASE 3:
Acute necrotizing pancreatitis with air bubbles within the pancreatic parenchyma in body and tail region- Infected pancreatic necrosis.



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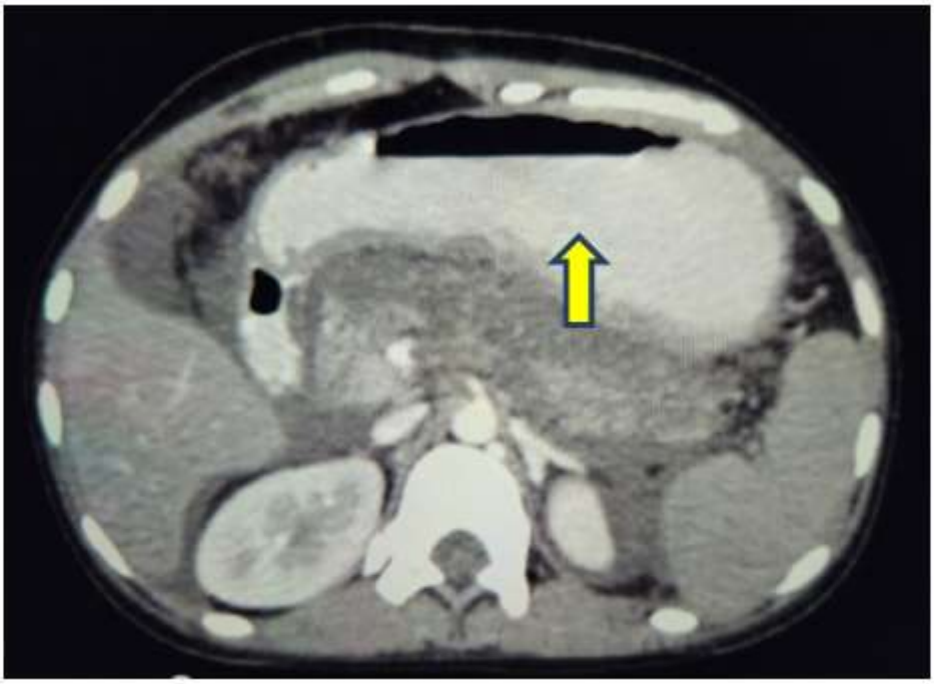
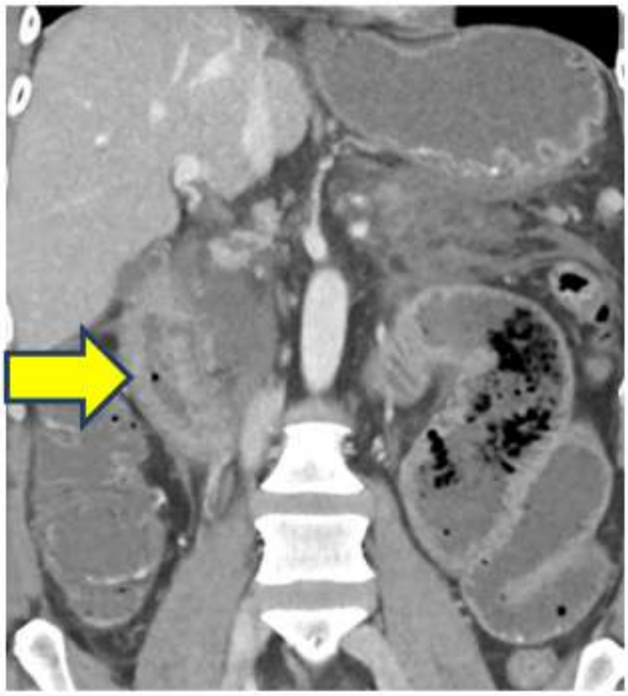
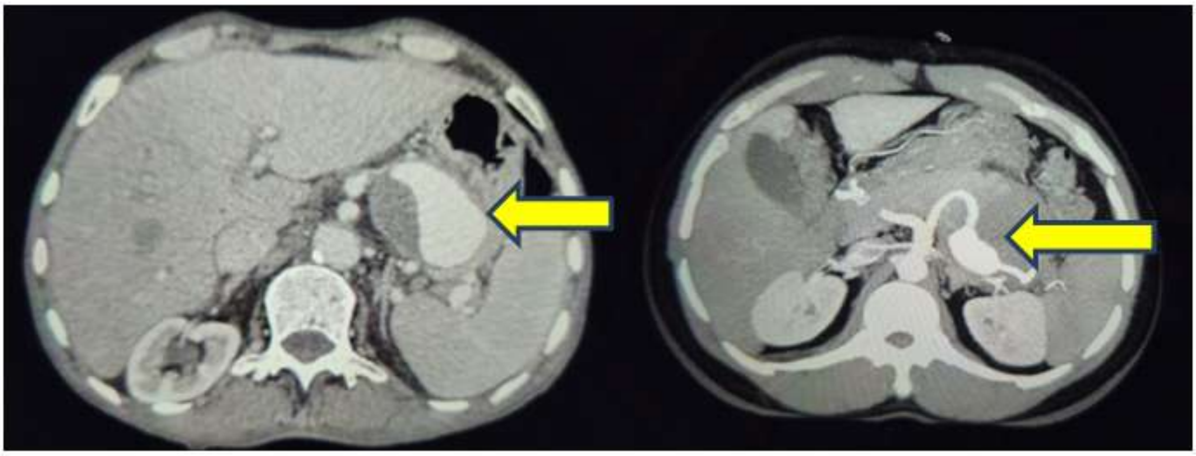
CASE 4:
Acute necrotizing pancreatitis with non opacification of retropancreatic splenic vein – Splenic vein thrombosis.



CASE 5:
Non enhancement of head of pancreas with Marked thickening of the 2nd part of the duodenum – Duodenitis.



CASE 6:
Acute necrotizing pancreatitis with a large aneurysm arise from splenic artery which is partially thrombosed in its external part- Splenic artery pseudoaneurysm.



CASE 7:
Dilated MPD with focal discontinuity in its inferior aspect leading to extravasation of fluid from pancreatic parenchyma outside into the peritoneum- Disconnected Pancreatic Duct Syndrome

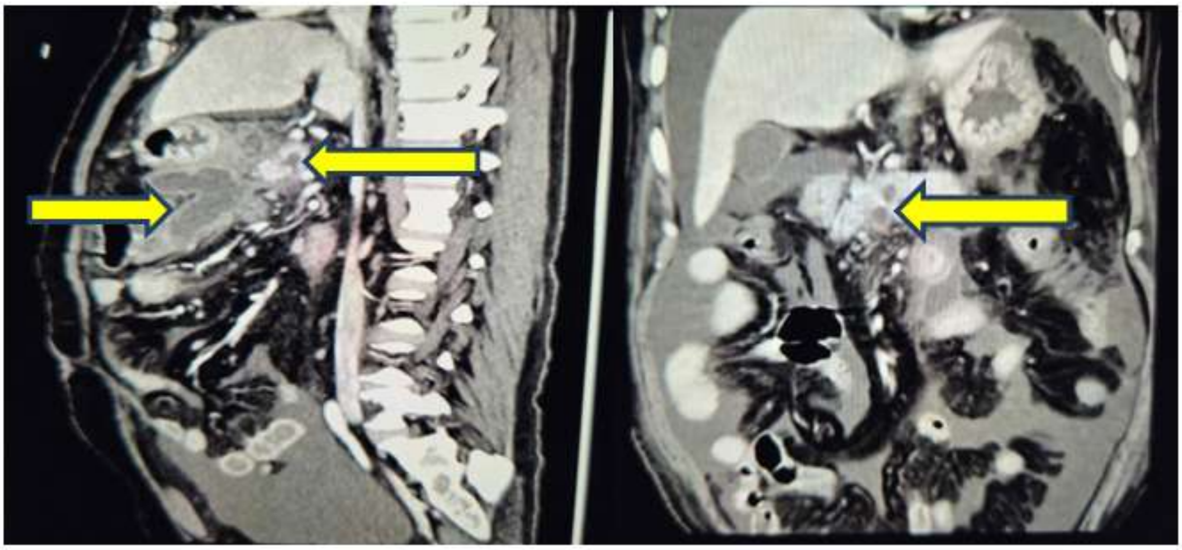


Table 1: SEX DISTRIBUTION

Gender	NO. OF PATIENTS	PERCENTAGE
Male	36	90 %
Female	4	10 %
Total	40	100 %

Table 2:AGE DISTRIBUTION

AGE IN YEARS	NO. OF PATIENTS	PERCENTAGE
< 20	2	5%
20-30	14	35%
30-40	10	25%
40-50	10	25%
>50	4	10%

Table 3:TYPES OF COMPLICATIONS

TYPE OF COMPLICATIONS	NO. OF PATIENTS	PERCENTAGE
1. Acute necrotic collection	36	90
2. Infected pancreatic necrosis	4	10
3. Walled off necrosis	4	10
4. Vascular complications	8	20
5.Gastrointestinal and biliary complications	20	50
6. Pleural effusion	34	85
7. Ascites	24	60

IV. DISCUSSION

- The study included 40 patients with complications of severe acute pancreatitis.
- The patients age were ranges from 16 to 70 years with maximum patients were in the age group of 20-30 years.
- The study group included 36 males (90%) and 4 females (10%).
- This study estimated that most common complication was acutenecrotic collection seen in 36 patients (90%) followed by pleural effusion seen in 34 patients (85%).
- Infected pancreatic necrosis with air bubbles was seen in 4 patients (10 %).
- Walled off necrotic collection was seen in 4 patients (10%).
- Vascular complications like portal & splenic vein thrombosis, pseudoaneurysm of splenic &gastroduodenal artery was seen in 8 patients (20%)
- Gastrointestinal and biliary complications like disruption of main pancreatic duct ,duodenal& colonic wall edema. bowel obstruction and ileus, bowel ischemia, cholecystitis was seen in 20 patients (50%),

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- Ascites was seen in 24 patients (60%).

V. CONCLUSION

MDCT is an excellent diagnostic modality for evaluation of complications arising from severe acute pancreatitis with a Modified CTSI score of 8-10. MDCT is the standard of choice for diagnosing and quantifying the progression of complications arising from severe acute pancreatitis.This imaging helps in planning several interventions for the complications such as percutaneous drainage and surgical or endoscopic necrosectomy.

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