

Peripancreatic Vascular Abnormalities Complicating Acute Pancreatitis

Dr. Pravinkumar Prabhakar Rao Wasadikar¹, Dr. Suresh Rangnathrao Harbade^{2*}, Dr. Anjali Pravinkumar Wasadikar³ Dr. Sarojini Pramod Jadhav⁴, Dr. Vinod Laxman Gundami⁵

^{1,2}Associate Professor, Department of Surgery, Government Medical College and Hospital, Aurangabad-431 001, Maharashtra, India

³Associate Professor, Department of Radiodiagnosis, Government Medical College and Hospital, Aurangabad-431 001, Maharashtra, India

⁴Professor and Head, Department of Surgery, Government Medical College and Hospital, Aurangabad-431 001, Maharashtra, India

⁵Junior Resident II, Department of Surgery, Government Medical College and Hospital, Aurangabad-431 001, Maharashtra, India

Original Research Article

*Corresponding author

Dr. Suresh Rangnathrao Harbade

Article History

Received: 12.10.2018

Accepted: 25.10.2018

Published: 30.10.2018

DOI:

10.36347/sjams.2018.v06i10.078



Abstract: Acute pancreatitis is a common illness with a relatively unpredictable severity course. However, in 30-40% of cases, it could be severe and associated with potentially life-threatening complications including peripancreatic vascular abnormalities. The present study was carried out in 120 cases of proven acute pancreatitis with estimation of serum amylase, serum lipase, abdominal ultrasound (US), and contrast enhanced computed tomography (CECT) abdomen. The peripancreatic abnormalities were observed in 18 patients on CECT. The causative factors, estimation of pancreatic enzymes in blood are discussed along with computed tomography severity index (CTSI) in acute pancreatitis.

Keywords: Acute pancreatitis, computed tomography, computed tomography severity index, splenic vein thrombosis (SVT), portal vein thrombosis (PVT), pseudoaneurysm.

INTRODUCTION

Acute pancreatitis is a disease with high morbidity and mortality with an unpredictable course. It has a broad spectrum that varies from mild to severe forms with significant local and systemic complications [1]. Major vascular complications of acute pancreatitis though rare (1-6%) carry high mortality (34-52%) [2]. The direct vascular involvement is the most feared complication, as it can cause rapid blood loss. CT is the gold standard noninvasive method of evaluating morphology of pancreas and peripancreatic region. In this article we will discuss possible etiologic factors, pathophysiologic mechanism in development of peripancreatic vascular abnormalities in acute pancreatitis.

MATERIALS AND METHODS

This retrospective observational study was carried out in 120 patients of proven cases of acute pancreatitis over a period of four years with permission of Institutional Ethical Committee at Government Medical College and Hospital, Aurangabad. All patients underwent abdominal and pelvic ultrasound at the time of the admission. The estimation of serum amylase and serum lipase was done in all patients within 24 hours of admission. The CECT abdomen was performed 3 to 7 days of admission on GE LIGHT SPEED VCT (VOLUME) CT SCANNER 64 – SLICE CT.

We scored the grade of pancreatitis using CTSI developed by Balthazar *et al* [3] (Table-1). The severity of pancreatitis was categorised as mild

(score:0-2 points), moderate (score:3-6 points), or severe (score:7-10). Subsequently, the presence of vascular abnormalities was determined. Arterial hemorrhage was defined as focal contrast extravasation within the pancreas or peripancreatic tissue. Venous thrombosis was present if an intraluminal hypoattenuating thrombus was presented (acute or subacute) or the vein was undetectable (chronic thrombosis) (Figure-1). In case of pseudoaneurysm the CT finding of contrast enhancement within or adjacent to a suspected pseudocyst/vessel (Figure-2). The enhancement may be similar to that of abdominal aorta. The finding of increased attenuation within a fluid collection on a non-enhanced scan may indicate recent hemorrhage.

Table-1: CT severity index

Prognostic indicators	Characteristics	Points
Pancreatic inflammation	Normal pancreas	0
	Focal or diffuse enlargement	1
	Intrinsic pancreatic abnormalities with peripancreatic inflammation	2
	Single, ill-defined fluid collection or mass	3
	Two or more poorly defined collection or presence of gas in or adjacent to pancreas	4
Pancreatic necrosis	No necrosis	0
	<-30%	2
	30% to 50%	4
	>- 50%	6

The upper gastrointestinal endoscopy was performed in 11 patients

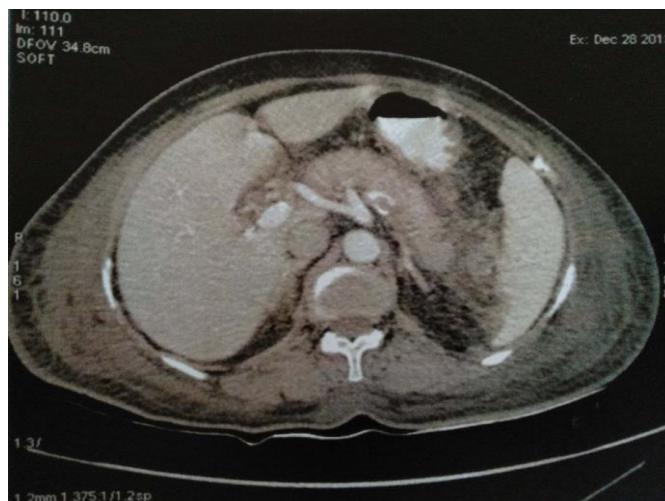


Fig-1: Splenic vein thrombosis following acute pancreatitis



Fig-2: Pseudoaneurysm of splenic artery following acute pancreatitis

RESULTS

The present study was carried out in 120 cases of proven acute pancreatitis. The sonographic features were suggestive of acute pancreatitis in 104 cases while no abnormality was detected in 16 cases. According to the CTSI, severity of pancreatitis was categorised as mild (n=18), moderate (n=92), and severe (n=10). Eighteen patients on CT revealed peripancreatic vascular abnormalities. Of these, 14 were males, (13 chronic

alcoholic and one with cholelithiasis), and four patients were females (three with cholelithiasis and one with history of trauma). Eight male and two female had hyperlipidemia. The median age of patients was 34 years (range 29-70). The serum amylase was significantly elevated in 12 patients, while serum lipase was significantly elevated in 16 patients. Table-2 shows correlation of prevalence of peripancreatic vascular complications and severity of pancreatitis. In mild

pancreatitis peripancreatic vascular complications were not observed.

Table-2: Correlation of prevalence of complications and severity of pancreatitis

	Moderate (3-6 points)	Severe (7-10 points)
SVT	10	4
PVT	4	2
Pseudoaneurysm	2	1

The upper gastrointestinal endoscopy was done in 11 patients. On four it revealed erosive gastritis, in two it was normal and in one it showed grade II lower esophageal varices. Out of 18 with peripancreatic vascular complications, four died because of multiorgan failure and two because of sudden shock.

DISCUSSION

Complications occurring in an episode of acute pancreatitis are responsible for 2-10% mortality and early detection of these complications by clinical, laboratory, or imaging studies is essential for the proper management of these patients. It has been established that most life-threatening complications develop almost exclusively in patients with pancreatic necrosis [4].

We observed peripancreatic vascular abnormalities in 18 patients (out of 120) of acute pancreatitis. The levels of serum amylase and lipase were significantly raised in only 12 and 16 patients respectively. This could be because in severe pancreatic necrosis levels may not be raised. Of 18 patients, 13 were chronic alcoholics and 10 with hyperlipidemia. These risk factors may play an important role in development of complications [5,6].

We observed SVT in 14 patients which may be due to secondary involvement of vein by surrounding edema, inflammation, cellular infiltration, or because of intimal injury [5]. The vein may be compressed by a pseudocyst or enlarged pseudoaneurysm. The splenic artery remains intact and enables high pressure in the spleen which forces an abnormal outlet through collaterals. Increased blood flow through the short gastric vein to the coronary vein or through the gastroepiploic vein to the pancreaticoduodenal vein creates a localized form of "left sided" portal hypertension with dilatation of submucosal veins within the stomach wall, producing gastric varices. A second pathway involves portosystemic channels, which develop around the lower end of esophagus, with direct connection to azygous system. The SVT may remain silent (eight of our cases) or present with gastrointestinal bleeding (two of our cases). Splenomegaly with hypersplenism may be associated and endoscopy is indicated even in asymptomatic patients with SVT.

SVT is usually an incidental finding and neither routine anticoagulation nor prophylactic splenectomy is indicated. If esophagogastric variceal

bleeding from left sided portal hypertension occurs, splenectomy is definitive treatment. Splenic artery embolisation is indicated in patients who are medically unfit for surgery [7]. SVT may frequently complicate pancreatic surgery because of extensive intraoperative blood loss from collateral circulation [6]. Mortelet *et al* [8] detected SVT thrombosis in 19% patients, SMVT in 14% and PVT in 13% patients and observed that major venous thrombosis is relatively common CT finding in patients of acute pancreatitis.

Pseudoaneurysms are less frequent than venous thrombosis (3.5–10%), but they can be life-threatening [6,7]. It is commonly due to release of pancreatic enzymes eroding the peripancreatic or even distant vessels. It may be due to vessel wall erosion by a pseudocyst. The intense inflammatory changes surrounding pseudoaneurysm makes surgical control extremely challenging associated with high mortality and morbidity [6]. The arteries commonly involved are splenic (two of our cases), pancreaticoduodenal (one of our case), gastroduodenal and rarely gastric, superior mesenteric jejunal, ileocecal and aorta may be involved [6]. Rupture is a disastrous complication and may occur into a pseudocyst, the gastrointestinal tract, peritoneal cavity or pancreatic parenchyma. The size of pseudoaneurysm is not a determinant of rupture [6]. The patient may present with sudden exacerbation of severe abdominal pain, distention and clinical signs of blood loss, but more rarely as hematemesis, melena or bleeding from the drains [6]. However the diagnosis of acute hemorrhage is not always easy to diagnosis particularly in patients with acute severe pancreatitis with multiple organ dysfunctions [8].

Angiography may fail to demonstrate bleeding, which could be due to venous bleeding, intermittent arterial bleeding or bleeding from a large surface area. A thrombus within the pseudoaneurysm may result in negative findings at colour Doppler ultrasound and there CECT should be preferred. Angiographic coil embolisation has become the first line therapy, but stent placement, can be used if the target artery cannot be sacrificed. Reported success rate varies from 67-100%: however in 20% of cases reintervention in the form of surgery or repeat angiography may be required [7]. Definitive surgical intervention should be considered after embolisation and emergency surgery indicated for control of bleeding in hemodynamically unstable patient or when angiographic embolisation has failed. Proximal and

distal ligation of bleeding vessels with limited pancreatic resection may be required [7]. However, because of limited facilities we observed 33.3% mortality.

CONCLUSION

The raised serum lipase levels, hyperlipidemia and chronic alcoholism may be important etiologic factors in peripancreatic vascular abnormalities. Major vessel thrombosis is a relatively common CT finding in association with acute pancreatitis. Arterial hemorrhage is infrequently detected and pseudoaneurysm formation is extremely rare. The CTSI may be accurate in predicting some of these major complications. These complications if diagnosed and managed early will result in considerable reduction of morbidity and mortality.

REFERENCES

1. Wasadikar AP, Wakode VD, Kaginalkar VJR, Wasadikar PP, Dahiphale AP, Makasare KR. Complications of pancreatitis-CT evaluation. J Evaluation Med Dent Sci. 2018; 7(14): 1796-1800.
2. Barge JV, Lopera JE. Vascular complications of pancreatitis: Role of interventional therapy. Korean J Radiol 2012; 13 (1): 545-555.
3. Balthazar EJ, Rabinson DL, Megibow AJ, Ranson JH. Acute pancreatitis: Value of CT in establishing prognosis, Radiology. 1990; 174:331-336.
4. Balthazar EJ. Complications of pancreatitis – Clinical and CT evaluation. Radiologic Clinics 2002; 40 (6): 1211-1227.
5. Yvonne D, Ullrich W, Ingo RR, Paul R, Wolf D, Wolfram W. Vascular complications in acute pancreatitis assessed by color Duplex ultrasonography. Pancreas. 2000; 21(2): 126-133.
6. Mallick IH, Winslet MC. Vascular complications of pancreatitis. J Pancreas. 2004; 5(5): 328-337.
7. Doannesm, Yeo CJ. Pseudocysts and other complications of pancreatitis. In Shackelford's Surgery of the Alimentary Tract. 8 Th Edition. Elsevier, Philadelphia. 2019; 1097-1112.
8. Mortelé KJ, Mergo PJ, Taylor HM, Wiesner W, Cantisani V, Ernst MD, Kalantari BN, Ros PR. Peripancreatic vascular abnormalities complicating acute pancreatitis: contrast-enhanced helical CT findings. European journal of radiology. 2004 Oct 1;52(1):67-72.