ORIGINAL ARTICLE

Vascular complications in cases of acute pancreatitis — CT scan based study

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Abstract

Objective: To record the incidence of vascular complications in cases of acute pancreatitis.

Methods: This retrospective, cross-sectional study was performed at the Liaquat National Hospital, Karachi, from October 31, 2012 to October 31, 2014, and comprised computerised records and computerised tomography scan images related to cases of pancreatitis.

Results: Of the 210 patients included, 97(46.19%) were men and 113(53.81%) were women. A total of 24(11.4%) patients had thrombosis of splanchnic vasculature, of which the most frequently thrombosed vessel was the splenic vein, in 17(70.8%) patients; followed by the portal vein, 11(45.8%); and the superior mesenteric vein,4(16.7%).

Conclusion: The incidence of vascular thrombosis was low, but not uncommon in patients of severe acute pancreatitis.

Keywords: Vascular, Complications, Pancreatitis, CT scan. (JPMA 66: 977; 2016)

Introduction

Pancreatitis is one of the most frequently-occurring causes for hospital admissions for an acute abdomen pain and the most common pancreatic disease in adults and children worldwide.[1] Simply defined, pancreatitis is the inflammation of the organ and can be broadly categorised into two distinct forms: acute (representing a rapid onset inflammatory process, and chronic (characterised by progressive, continuous, permanent inflammatory damage to the pancreas).[1] The pathogenesis is believed to be the premature activation of pancreatic enzymes leading to auto-digestion of the organ and the subsequent damage to peripancreatic tissues by extravasation of these enzymes.[2] It is this extravasation of activated enzymes that dissects across tissue planes and envelopes adjacent organs and vasculature, the repercussions of which are potentially catastrophic, rapidly deteriorating the patient's condition.[3] Thus, early detection and appropriate management is of utmost importance.[4,5]

Although physical examination and laboratory evaluation is the mainstay for detecting pancreatitis, imaging plays a pivotal role in determining the cause, assessing the severity and guiding therapeutic interventions,[1,2] Contrast-enhanced computerised tomography (CECT) remains the most commonly used and most comprehensive modality for initial assessment; the wide availability with faster scanning times makes CECT the most frequently applied imaging technique.[4,6-8]

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Vascular complications (VCs) are not uncommon in cases of pancreatitis. The current study was planned to record the incidence of VCs in cases of acute pancreatitis (AP), namely thrombosis of the splanchnic vein (SV) system and the formation of pseudoaneurysm.

Materials and Methods

The retrospective, cross-sectional study was performed at the Liaquat National Hospital (LNH), Karachi, from October 31, 2012, to October 31, 2014, and comprised computer records of pancreatitis patients. Approval from the institutional ethical review committee was obtained before data collection. No formal consent was required from the patients, nor was there any contact with them. Full confidentiality of patients was maintained by using computerised tomography (CT) numbers as the reference. Patients of clinically and biochemically suspected pancreatitis that underwent CT scanning for a definitive diagnosis were included. Patients with chronic pancreatitis, known malignancy, cirrhosis and established portal hypertension were excluded on the basis of recognised prothrombotic states and the possibility of pre-existing thrombosis of the surrounding SV. All examinations were performed on a multi-detector CT (MDCT) scanner (Toshiba Activion16-slice CT scanner). CECT scans (collimation, 4 x 2.5mm; reconstruction section thickness, 4mm; reconstruction intervals, 4mm) were obtained 50 seconds after intravenous administration of 100ml of ioparidol 370mg I/ml (Iopamiro), injected at a rate of 2.8 ml/sec using a mechanical power injector. Opacification of the digestive tract was achieved with oral administration of 1000ml of Urograffin suspension (370mg I/ml) administered four hours before the scan.

CT scans were retrospectively reviewed on picture archiving and communication systems (PACS) workstations and findings were recorded; including presence and extent of pancreatic necrosis, fluid collections, pseudocysts and the presence of extrapancreatic findings such as VCs (venous thrombosis and pseudoaneurysm), gall bladder, common bile duct (CBD) and colonic involvement. The grade of pancreatitis was determined using Modified CT Severity Index.[9]

Results

Of the 216 patients, 210(97.2%) were included. Of them 97(46.19%) were men and 113(53.81%) women. The overall median age was 43.25 years (Interquartile range: 23). Besides, 95(45.24%) patients had severe, 73(34.76%) had moderate and 39(18.57%) had mild pancreatitis.

A total of 24(11.43%) patients were found to have SV thrombosis. The most frequently thrombosed vessel was the splenic vein (SV), in 17(70.83%) cases; followed by the portal vein (PV),11(45.83%); and the superior mesenteric vein (SMV),4(16.66%). Isolated SV thrombosis was noticed in 10(41.66%) patients, isolated PV thrombosis in 4(16.66%) and isolated SMV thrombosis in 2(8.33%). A combination of SV and PV thrombosis was seen in 6(25%) while SMV+PV and SMV+SV were found in 1(4.1%) patient each (Table-1) (Figures-1,2).

None of the patients had pseudoaneurysms.

Table: Pattern of splanchnic vein thrombosis.

Vessel thrombosed	No. of patients
SV(all)	17
SV only	10
SV+PV	6
PV(all)	11
PV only	4
PV+SMV	1
SMV(all)	4
SMV only	2
SMV+SV	1

SV: splenic vein; PV: portal vein; SMV: superior mesenteric vein.

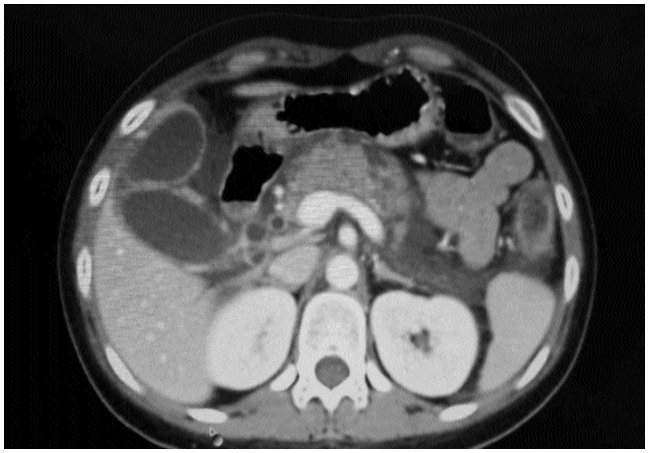

Figure-1: Computed tomography (CT) scan axial images of a 22-year-old male patient showing pancreatic necrosis (white arrow) and peripancreatic fluid collection (black arrow).

Figure-2: Computed tomography (CT) scan of a case of pancreatitis showing thrombus (arrow) in splenic vein (coronal section).

Discussion

Approximately one quarter of patients with pancreatitis develop VCs ranging from: SV thrombosis, formation and rupture or pseudoaneurysm, haemorrhage into pseudocyst, erosions of the upper gastrointestinal (GI) arteries and formation of varices.[5,7,8,10-13]

According to Ryan et al., the recorded incidence of vascular thrombosis (VT) has increased over time due to substantial developments in cross-sectional imaging modalities.[12] Hitherto, the correct assessment and prediction of the risk of haemorrhage due to pancreatitis-induced thrombosis of SV has been routinely confounded by failure to rule out pancreatic malignancies and extrapancreatic causes of the thrombosis.[12] In their study, based on a computerised index search from 1992-2003, 53 patients with a diagnosis of pancreatitis and presence of SV thrombosis were identified, out of which 13 patients had AP.[14]

In a more recent study by Hector et al., 20 patients out of 127 admissions over two years were noted to have SV thrombosis. Hector et al. postulated that venous thrombosis in patients of pancreatitis is a common observation and that colocalisation of peripancreatic collections and SV thrombosis strongly suggest the

mechanism to be compression and perivascular inflammation.[15]

In our study, 11.4% patients were found to have thrombosis of varying degrees related to pancreatitis, which cannot be ignored since haemorrhage is one of the most life-threatening complications of pancreatitis.[8,10,13] The most frequently-involved vessel was found to be SV, in accordance to the study by Hector et al. This may be due to anatomically close proximity to the inflamed pancreas.

Pseudoaneurysms are a rare but serious complication of pancreatitis with the potential for rupture and life-threatening haemorrhage[5,13] which, if undetected, results in high mortality.[5] Best initial management is endovascular embolisation (EE) and if that fails it should be followed by emergency surgery without delay.[5,13] However, in our study none of the patients were found to have pseudoaneurysms.

Although our study led to significant findings, it was not aimed at determining the best intervention and management of the condition, nor was there any follow-up with the patients to ascertain the sequelae of this affliction. Also, being a single institution experience, it is somewhat confined to a less-than-diverse group of patients. A multi-centre study would be even more thorough in determining the prevalence of VCs in patients of a developing country.

Conclusion

The incidence of VT was low, but not uncommon in patients of severe AP. It is one of the most frequently found VCs seen in patients of pancreatitis. Pancreatic necrosis and peripancreatic collections are almost always seen in concordance with VCs in such patients. Timely diagnosis and management will be useful to lower morbidity and mortality.

Acknowledgements

We are grateful to Dr. Bushra Rehan for support and advice, and to Dr. Fariha Tariq and Dr. Marriam Usman for data-collection and editorial assistance.

Disclosure: No.

Conflict of Interest: No.

Funding Sources: No.

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