CASE REPORT

Gastroduodenal Artery Pseudoaneurysm and Aberrant Right Hepatic Artery

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Abstract

We present a case of 36-year male patient who was referred to the Civil Hospital, Karachi with intermittent abdominal pain and vomiting for the last 2 years. The contrast enhanced CT examination revealed changes of acute pancreatitis, CTSI 4/10, pancreatic calcifications along with 22x17 mm partially thrombosed pseudoaneurysm of gastroduodenal artery. The aberrant right hepatic artery was incidentally seen, on the arterial phase acquisition, arising directly from abdominal aorta. Gastroduodenal artery pseudoaneurysm is a rare complication of acute pancreatitis. It can lead to hematemesis, and it can bleed massively into peritoneal cavity. The aberrant origin of right hepatic artery from the aorta is extremely rare. To the best of authors' knowledge, less than five cases have been reported previously in literature.

Key Words: *Acute pancreatitis. Gastroduodenal artery. Pseudoaneurysm. CT.*

INTRODUCTION

Pseudoaneurysms of the gastroduodenal artery are rare. They are usually postoperative, due to post-procedure complications or secondary to pancreatitis. Abdominal pain and gastrointestinal bleeding are the most common symptoms.[1] False aneurysms of the gastroduodenal artery can arise from impairment in the integrity of the arterial wall due to enzymatic digestion as a result of pancreatitis, direct injury via biopsy, surgery, or trauma.[2] If no soft tissues surround the site of injury, hemorrhage into the peritoneal cavity can occur. Its diagnosis and treatment is essential, because it can lead to complications. Making the diagnosis can be complex and often requires the use of CT and angiography.[3] Anatomical variations of the hepatic arteries and coeliac trunk are of considerable importance in liver transplants, laparoscopic surgery, radiological abdominal interventions, and penetrating injuries to the abdomen. MDCT angiography permits a correct and detailed evaluation of hepatic vascular anatomy.[4,5]

We present a rare case of partially thrombosed gastroduodenal artery pseudoaneurysm as a sequelae of pancreatitis, along with concurrent anomalous origin of right hepatic artery from abdominal aorta.

CASE REPORT

A 36-year male patient presented to the Civil Hospital, Karachi with intermittent severe abdominal pain and vomiting for the last 2 years. There was no history of hematemesis, jaundice, intervention or trauma. Patient had no drug or addiction history. On physical examination, extreme tenderness and rigidity was noted in the epigastrium. On investigation, total leukocyte count (TLC) was found high (12,000 cells/cc) and raised amylase levels and ESR levels seen measuring 1000IU/L and 50 mm/hr, respectively. The patient was referred to the Radiology Department for CT for further evaluation.

CT of the abdomen was performed with 16 Slice Toshiba Activion Scanner. Dual phase pancreatic protocol was done, i.e. the arterial (40 seconds) and the portal venous phase (70 seconds) acquisition after administration of 100 ml Ultravist at flow rate of 4 ml/sec. The scanning parameters were 120 KV, 150 mA, 1mm collimation, 1mm slice thickness for arterial and 5mm slice thickness for portal venous phase.

There was enlargement of the pancreas with heterogeneous density and enhancement, predominantly involving the head, along with retroperitoneal fat stranding, peri-pancreatic fluid collections, thickening of left Gerota's fascia and few peri-pancreatic lymph nodes (17x20 mm). Few calcific foci were seen in head and uncinate process. There was thrombosis of the portal vein at the porto-splenic confluence and varices were seen along the lienorenal ligament. Minimal free fluid was seen in the pelvis. However, no evidence of bleeding was seen in peritoneal cavity. The single breath-hold arterial phase acquisition (Figure 1) demonstrated 22x17 mm saccular, eccentric, pseudoaneurysm arising from postero-medial aspect of the gastroduodenal artery in the region of head of pancreas with partial lumen obliteration by hyper dense thrombus (HU = 55HU) with peripheral clot retraction. It was compressing the pancreatic head focally causing pancreatic ductal dilatation (diameter=4 mm). The aberrant right hepatic

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artery (Figure 2 A,B,C) was also seen on the arterial phase, arising directly from abdominal aorta and the common hepatic artery after giving off gastroduodenal artery, continuing into left hepatic artery. The patient was referred to the Surgical Department. He was kept on intravenous antibiotic ceftriaxone. Input/output charting was maintained along with appropriate pain management. Meanwhile, the vascular surgery opinion was taken for embolization of aneurysm. As the major portion of the aneurysmal lumen was thrombosed, chances of aneurysmal rupture were low and he was advised for conservative management. The patient was discharged uneventfully, with resolution of symptoms. He was followed later for the duration of 6 months. He remained symptom-free in that interval with no recurrent bouts of pancreatitis. Further, annual follow-ups with sonography for assessment in change in size of pseudoaneurysm was recommended.

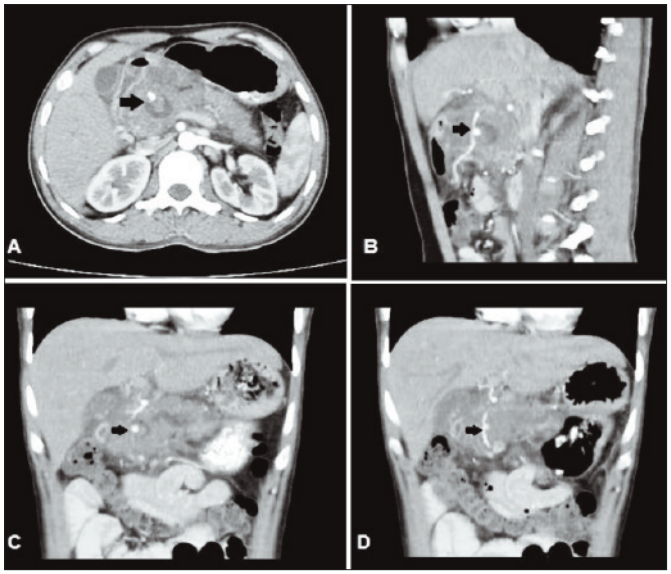

Figure 1: AXIAL-section **(A)** at the level of L1 vertebra, SAGITTAL-reformatted **(B)** and contagious CORONAL-reformatted images **(C &D)** of the contrast enhanced CT abdomen (Arterial Phase) shows edematous pancreas, with ductal dilatation and partially thrombosed pseudoaneurysm of gastroduodenal artery (black arrows).

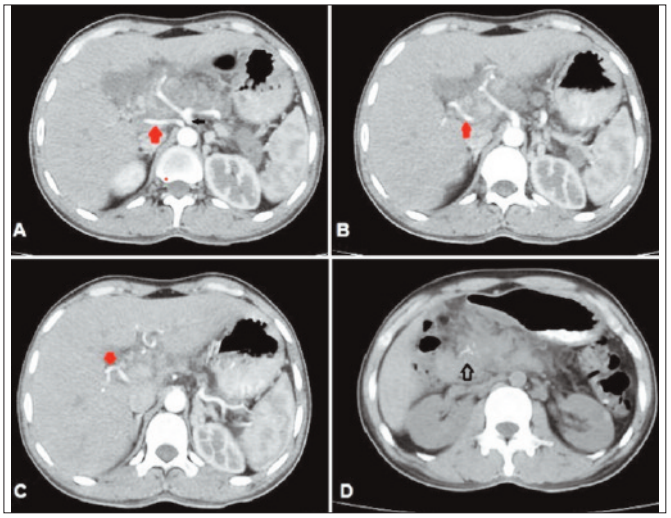

Figure 2: Contagious AXIAL sections of Arterial phase contrast enhanced CT abdomen **(A,B,C)** shows right hepatic artery arising directly from abdominal aorta (red arrows in **A,B,C**) and origin of coeliac trunk (black arrows in **A**). **(D)** Plain CT abdomen shows pancreatic head calcifications (black arrows).

DISCUSSION

The present case describes partially thrombosed gastroduodenal artery pseudoaneurysm causing pancreatic ductal dilatation, developed as a sequelae of acute-on-chronic pancreatitis, along with concurrent anomalous origin of right hepatic artery from abdominal aorta on dual phase pancreatic protocol CT in a 36-year male patient. The initial differential raised in this patient was pancreatic pseudocyst. But the direct contiguity of the enhancing lesion with adjacent vessel and peripheral hyperdense non-enhancing thrombus strongly suggested the presence of pseudoaneurysm with thrombus.[5] Foci of calcification are the hallmark of chronic pancreatitis.[6]

Pseudoaneurysm is a known, but uncommon complication of pancreatitis with incidence of 10%.[1] Release of pancreatic enzymes results in auto digestion of the vessel wall. This defect can lead to the formation of an open communication between the lumen of the artery and its surroundings. If no soft tissues surround the site of injury, hemorrhage into the peritoneal cavity can occur, associated with a mortality rate of around 50% necessitating either surgical or endovascular therapy. Diagnosis of visceral pseudo aneurysms can be made with Doppler sonography, contrast-enhanced CT and angiography.

Splenic artery is the most common artery to be involved; and in half of the cases, it is involved by pseudoaneurysm. Next in frequency are the gastroduodenal (10 to 15%) and pancreaticoduodenal arteries, followed by left gastric, hepatic and small intra-pancreatic arteries.[7] Parikh *et al*.[8] in 2011 reported ruptured giant splenic artery pseudoaneurysm as a rare complication of chronic pancreatitis in a 62-year man with alcoholic cirrhosis leading to acute hemodynamic collapse and mortality.

Pseudoaneurysms have been reported to undergo spontaneous thrombosis, but this is a rare event occurring under certain conditions. Only few reports on spontaneous thrombosis of small visceral pseudo-aneurysms have been found in the literature. Vanlangenhove *et al*. in 1988,[6] reported spontaneous thrombosis of dorsal pancreatic artery pseudoaneurysm complicating pancreatitis on CT in a 62-year patient-comparable to our case. In 2003, Patel SB and his colleagues[5] reported changes of chronic pancreatitis in the form of specks of calcification on CT along with presence of well-defined hypo-dense lesion medial to duodenum. Contrast enhanced at the level of head of pancreas showed early contrast filling of the lesion with

surrounding hypo-density. The diagnosis of pseudo aneurysm arising from the gastroduodenal artery with partial thrombosis was made, which is compatible to our case.

MDCT permits a correct and detailed evaluation of hepatic vascular anatomy. Michels's classification of the hepatic arterial system described 10 variant subtypes. In 2010, Ugurel *et al*.[4] further studied anatomical variations of hepatic arteries and found that only 3 of the 100 patients had unclassified hepatic artery, variations. One of these was a right hepatic artery that originated from the middle colic artery; one was a left hepatic artery originating from the common hepatic artery; and the third was a right hepatic artery that originated directly from the aorta. Löschner *et al*.[9] retrospectively evaluated hepatic arterial supply in 1,297 CT-angiographies, according to Michels's classification between 2010 and 2012. The unclassified variants were discovered in 26 patients. Out of these, only 1 patient was found to have a right hepatic artery arising from the abdominal aorta-compatible to our patient.

The pseudoaneurysm of the partially thrombosed gastroduodenal artery, secondary to acute on chronic calcific pancreatitis, was unique to our case along with extremely rare variant of right hepatic artery. To the best of authors' knowledge, less than five cases have been reported previously in literature. The vascular surgery opinion was taken for embolization of aneurysm. As the major portion of the aneurysmal lumen was thrombosed, chances of aneurysmal rupture were low and he was advised for conservative management. The patient was discharged uneventfully, with resolution of symptoms.

Pseudoaneurysm of the gastroduodenal artery is a rare grave complication of acute pancreatitis. The origin of right hepatic artery directly from the abdominal aorta is extremely rare. Anatomical variations of the hepatic arteries are of considerable importance in liver transplants and laparoscopic surgery. CT is the modality of choice for the diagnosis of pseudoaneurysm as well as variations of the splanchnic circulation as a non-invasive technique.

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