



Rare case of a large pancreatic duct calculus causing pancreatitis

Authors

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Introduction

Chronic pancreatitis is commonly associated with debilitating abdominal pain that may be episodic or continuous. The pathogenesis of pain in chronic pancreatitis is usually multifactorial, pancreatic duct obstruction with resultant ductal hypertension is a relatively common cause. It is also commonly associated with exocrine and/or endocrine insufficiency called fibro-calculus pancreatic diabetes. Pancreatic duct calculi are commonly believed to be a sequela of chronic calcific pancreatitis. Primary pancreatic calculi are commonly seen in main pancreatic duct (wirsung) are usually less than 1cm in diameter, irregular and made of calcium salts. Endoscopic and surgical treatments focus on relief of the purported increased ductal pressure. However, endoscopic pancreatic duct stone removal is often difficult due to size or hardness of the stones.

Case Report

A 52 yr old female patient, known type II diabetic presented with acute abdominal pain radiating to the back for five days duration. The pain was aggravated on food intake. The patient also had non-bilious vomiting of three days duration. Upon further questioning she revealed history of similar episodes of abdominal pain in the past. She gave no history of alcohol intake. On examination her vitals were stable, she was not icteric. On

abdominal examination, she had epigastric tenderness with no palpable mass or organomegaly. Blood investigations revealed a moderately elevated amylase and lipase; normal total count; haemoglobin and liver function test. Ultrasonography of the abdomen revealed a grossly dilated main pancreatic duct (MPD) measuring 1.2cm with a large calculus within. In view of the dilated pancreatic duct, An MRCP was done which revealed a dilated main pancreatic duct of maximum diameter 3cm at the head and 1.1cm at the body, proximal part of the duct was grossly dilated with a intraductal calculi measuring 4.7 x 4 x 2.5 cm, the accessory pancreatic duct was also dilated with two calculi measuring 18 x 8mm and 8 x 7mm. Endoscopic retrograde cholangiopancreatogram (ERCP) was not attempted in view of the large size of the stone. Upper gastroduodenoscopy done was normal. In view of the above findings a surgical plan was formulated, which was discussed with the Patient and consent was obtained from the patient for the planned procedure. Anaesthetic fitness was obtained for the patient pre-operatively. The patient was taken up for a upper midline laparotomy, proximal pancreatic duct with the large calculus was identified intra-op by localizing the large dilated duct by aspirating with a syringe. The proximal part of the main duct was laid open and a large impacted calculus of size 5 x

4 x 3 cm was extracted with difficulty from the main duct. Two other smaller calculi from the accessory duct were also removed. This was followed by a lateral pancreatojejunostomy done at a length of 25 cm from the duodenojejunal flexure. This was followed by fashioning a roux-en-y loop for a jejun-jejunostomy. Patient was kept in the Intensive care unit post-op on epidural anaesthesia for 48hrs. she recovered well post-op. Her pain reduced considerably and she is doing well on her sixth month follow up with no further recurrent episodes.

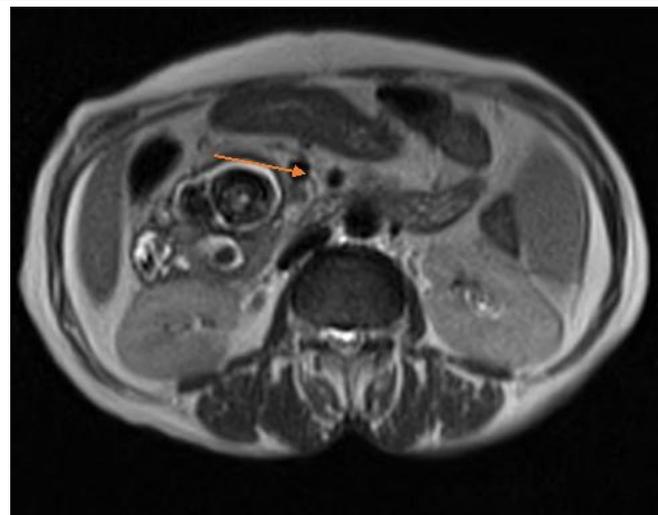


Fig 2 & Fig 3 MRCP picture showing dilated pancreatic duct with stone.

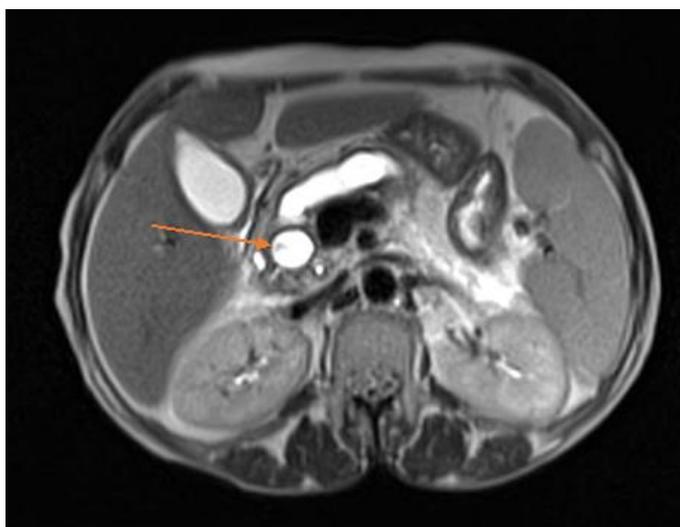


Fig 1 MRCP picture showing the dilated pancreatic duct.

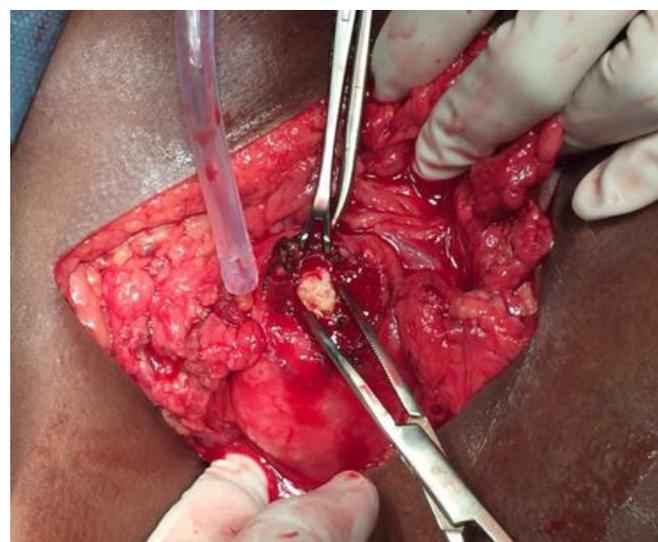


Fig 4 Intra-operative picture of the stone in the pancreatic duct

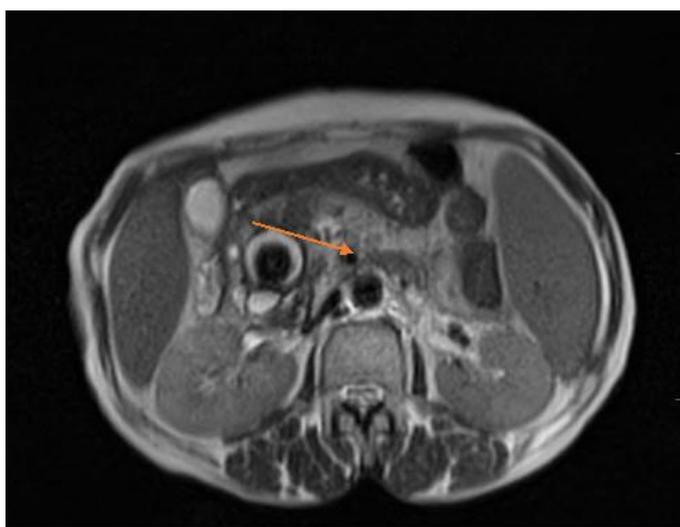


Fig 2 MRCP picture showing large pancreatic duct calculus

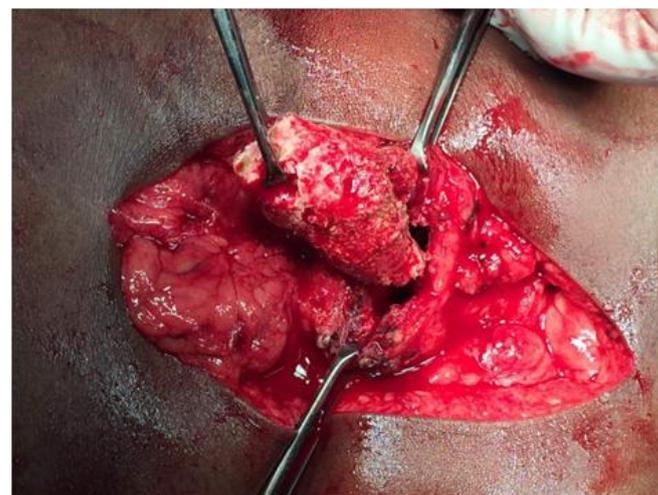


Fig 5 intra-op picture of the stone post extraction from the duct



Fig 6 Post-op picture of the pancreatic duct stone

PANCREATIC DUCT CALCULI *****	
APPEARANCE	
COLOUR	GREENISH WHITE
SHAPE & SIZE	1 BIG LARGE SIZE, 3 SMALL IRREGULAR SHAPE
TEXTURE	HARD NATURE
CHEMICAL ANALYSIS	
CALCIUM	PRESENT
CHOLESTEROL	PRESENT
PHOSPHORUS	ABSENT
BILIRUBIN	ABSENT

Fig 7 post-op pancreatic duct calculi analysis

Discussion

Pancreatic concretions have been a subject of investigation since the 17th century. Since they were described in 1667 by DeGraaf.^[1, 2] The first case of pancreatic calculi from India was reported by Kini in 1937^[9].

Large pancreatic duct calculi and pain are a feature of chronic calcific pancreatitis. Although the exact mechanism is not very clear, the characteristic pathologic changes are well known. Various factors including altered gene expression, cause reduction in the pancreatic stone protein (PSP). As a result of which the ducts become obstructed, due to super saturation of calcium carbonate in the pancreatic juice, that can eventually accumulate. This obstruction results in ductal ectasia and periductal fibrosis. The calculi

occur in ducts of all sizes and vary from microscopic to greater than 1 cm in diameter.

The radiographic appearance is generally that of numerous irregular small calcifications throughout the pancreas. The head of the pancreas is usually involved more prominently than the tail.

Previously, two primary patterns of calcification were believed to exist: an intraductal pattern, representing true stones and a parenchymal calcific pattern, representing "false stones" or calcifications^[1,3, 4]. The current consensus is that the only mode of calcification in the excretory portion of the pancreas is the formation of intraductal calculi^[5]. In the industrialized nations of the West, alcoholism stands out as the cause for chronic calcific pancreatic disease^[1]. Tropical pancreatitis is one of the most common causes of CP in the developing world^[6].

In the present case the patient presented with acute on chronic pancreatitis which was not previously evaluated, in whom MRCP revealed a grossly dilated main pancreatic duct with a large calculus at the proximal part of the main duct and two more calculi in the accessory duct. As the calculus was too large and do to the acute nature of presentation endoscopic retrograde cholangio-pancreatogram was not attempted.

Endoscopic extraction, with or without extracorporeal shock wave lithotripsy (ESWL), is the preferred method of extraction of MPD calculi^[7]. However, failing this, transduodenal exploration and calculus extraction from the MPD is a safe procedure.

In the present case due to the non-availability of ESWL and the stone being too large to be removed through a trans-duodenal approach, hence the proximal main pancreatic duct was laid open to extract the large calculi followed by pancreatojejunostomy. For patients with extensive calculi, multiple strictures, a suspected pancreatic carcinoma or those who have failed endotherapy, surgery is considered the better option.

Energy dispersive X-ray fluorescence studies and Electron microscopy have revealed an amorphous nidus which forms the centre of the pancreatic

duct stone. Calcium carbonate is then deposited in multiple layers as calcite over this nidus^[10]. In the present case also the pancreatic duct stone analysis revealed irregular stones mainly composed of calcium and cholesterol.

Conclusion

In conclusion chronic pancreatitis can result in pancreatic duct calculus as a natural sequel of an ongoing process, of which pain may be a dominant symptom. Smaller stones are predominantly dealt with by endoscopic intervention in the form of ERCP by basketing or balloon trawl. Large calculi if present should be subject to ESWL, if successful is followed by ERCP and extraction of the fragmented calculi. These procedures should be performed at experienced centers. Patients with extensive calculi, multiple strictures, suspicious mass lesions and those who have failed endotherapy are ideal candidates for surgery. Removal of existing by any of these above techniques however does not provide answers to many questions. These include recurrence, persistence of pain despite adequate clearance in some patients and the exocrine and endocrine dysfunction, that remain largely unaffected after stone clearance. Further research in these areas is essential in order to provide a final answer to the issues related to pancreatic calculi.

References

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