

## Recurrent Chronic Pancreatitis due to Pancreas Divisum: Diagnosis by Multislice CT

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**Abstract:** The gold standard for diagnosis of pancreas divisum has been the invasive ERCP (Endoscopic Retrograde Cholangiopancreatography). More recently, it has been recognized that the pancreatic ductal anatomy may be defined non-invasively by MRCP (Magnetic Resonance Cholangiopancreatography). The sensitivity of CT scan has been considered to be too low for general clinical use for confirming the diagnosis of pancreas divisum. However, Multislice spiral CT with its increased spatial and temporal resolution, ability to do Multiplanar reconstructions in any plane with isotropic resolution may allow confident diagnosis of pancreas divisum obviating the need for diagnostic ERCP or MRCP.

**Key words:** Pancreas divisum, chronic pancreatitis, Multislice CT

### INTRODUCTION

Pancreas divisum, the most common anatomic variant of the pancreas, results from failure of fusion of the dorsal and ventral pancreatic ducts and is reported to be present in up to 11% of autopsy series and 5.8% of ERCP series<sup>1</sup>. The larger, dominant dorsal pancreatic duct, which drains the pancreatic tail, body, and superior head, courses anterior to the common bile duct and drains into the minor papilla separately from the common bile duct, superior to the major papilla. The smaller ventral duct, which drains the inferior pancreatic head and uncinate process, accompanies the common bile duct into the major papilla. Pancreas divisum is an important cause of recurrent pancreatitis in childhood and should be sought aggressively in children with more than one episode of pancreatitis or pancreatitis with a history of chronic recurrent abdominal pain<sup>2</sup>.

### CASE REPORT

A twelve years old child presented to the surgical emergency with severe acute upper abdominal pain radiating to back with the history of several similar episodes of upper abdominal pain in past two and half years. Ultrasound of the abdomen suggested the diagnosis of pancreatitis. CT scan of the abdomen was requested for.

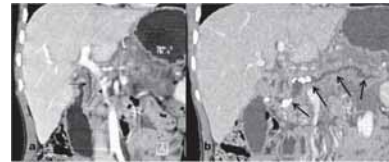
Contrast enhanced dynamic helical CT study was performed through upper abdomen using Somatom Plus 4 volume zoom (M/s Siemens Ltd.) Multislice CT scanner with collimation of 3mm reconstructed at 1.5mm intervals following intravenous administration of 100 ml of non-ionic contrast (300 mg I/ml at 3 ml/sec., scan delay 45 seconds). Oral water was used as a negative contrast agent to distend the stomach and duodenum. On axial images dilated accessory duct with multiple large intraluminal calculi was seen coursing through head of the pancreas anterior to the common bile duct. Another smaller duct was seen draining the ventral part of the head and uncinate process into duodenum through papilla of Vater after joining with common bile duct (fig. 1). Oblique coronal multiplanar (fig. 2a) and curved multiplanar reconstruction (fig. 2b) clearly demonstrated the two separate ductal systems, confirming the diagnosis of pancreas divisum.

### DISCUSSION

Most cases of pancreas divisum are asymptomatic, though this anomaly may contribute to recurrent episodes of idiopathic pancreatitis in younger patients with no risk factors. Most common age of presentation is between ages of 30 and 50 years. Several cases of pancreatitis associated with pancreas divisum in children have been reported. ERCP is essentially the only effective modality for confirming the diagnosis of pancreas divisum<sup>3</sup>. More recently, it has been recognized that the pancreatic ductal anatomy may be defined non-invasively by MRCP using two-dimensional heavily T2-weighted single shot fast spin-echo sequence<sup>4</sup>. Zeman et al<sup>1</sup> reported that CT might not enable specific diagnosis of pancreas divisum in the majority of patients. Identification of focal pancreatic head enlargement, two distinct pancreatic moieties separated by a fat cleft and focal atrophy in the distribution of the dorsal pancreas may suggest the diagnosis of pancreas divisum in few patients. Two separate ductal systems could be visualized in only 5 out of 12 (42%) patients. Lindstrom and Ihse<sup>5</sup> did CT scan in 29 Patients with pancreas divisum verified by ERCP to evaluate contour, volume, antero-posterior dimension and attenuation value of the gland in comparison with a normal reference series. They concluded that the CT findings in pancreas divisum are non-specific and an increase in craniocaudal length was suggestive of pancreas divisum but might as well represent another more serious pathology in the gland. They also concluded that ERCP still remains the method of choice when pancreas divisum is suspected and for firm diagnosis both papilla need to be cannulated.



**Fig. 1:** Axial section shows large calcification in accessory pancreatic duct (large arrowhead) coursing anterior to the common bile duct. Common bile duct (small arrowhead) and ventral pancreatic duct (arrow) are seen separately just prior to their opening at major duodenal papilla. Fluid is seen in lesser sac and anterior pararenal space.



**Fig. 2:** (a) Coronal curved multiplanar reconstruction showing the dilated accessory pancreatic duct running through the dorsal part of pancreatic head, body and tail and opening at minor papilla in second part of duodenum. Large intra-ductal calculi are present associated with changes of pancreatitis and peripancreatic fluid. (b) Oblique Coronal curved multiplanar reconstruction showing the common bile duct (arrow) and ventral pancreatic duct (arrowhead) running through the pancreatic head and opening at major duodenal papilla.

However, Multislice spiral CT permits acquisition of high quality volumetric data set using thin collimation in a single breath hold which can be retrospectively reconstructed in any desired plane with isotropic resolution. Serial axial images obtained at thin collimation permits identification of pancreatic duct, which can be followed right from the pancreatic tail to the major papilla or minor papilla in case of pancreas divisum, as in our case. Post processing of the data at workstation permits the visualisation of the entire duct in a single image using thick MPR, Curved MPR or Minimum Intensity projection<sup>6</sup>.

CT scan is the investigation of choice for evaluation of pancreatitis and if there is suspicion of pancreas divisum on CT scan patient is referred for invasive ERCP or more costly MRCP, adding to the morbidity and cost of patient care. However Multislice spiral CT permits diagnosis of pancreas divisum with a high degree of confidence through delineation of anatomy of ductal system and may obviate the need for diagnostic ERCP or MRCP in future, though larger studies are needed to establish the role of Multislice Spiral CT in the evaluation of pancreas divisum.

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