

# Duplicated Inferior Vena Cava Co-existing with Pancreatic Divisum and Duplicated Right Renal Collecting System

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**Abstract Background:** Duplication of the inferior vena cava (IVC) is a rare anomaly reported to occur in 0.2-3% of the population. To the best of our knowledge, there is no report of on the coexistence of duplicated IVC with pancreatic divisum in the literature. We report an incidental finding of duplicated IVC co-existing with pancreatic divisum and duplicated collecting system of the right kidney in a 25 year old man. **Case Description:** A 25 year-old man with history of chronic abdominal pain since childhood presented with a non-radiating epigastric abdominal pain, beginning a few hours prior to presentation. Physical examination was notable for tenderness and guarding in the epigastrium without rebound tenderness. Abdominal ultrasound revealed a normal appearing liver and spleen, but it showed a duplicated right renal collecting system. Abdominal CT revealed a duplicated IVC, a duplicated collecting system of the right kidney, and a prominent dorsal pancreatic duct consistent with pancreatic divisum. The patient was scheduled for out-patient Endoscopic Retrograde Cholangiopancreatography (ERCP), but he was lost to follow-up. **Conclusion:** This case describes a previously unreported co-existence of duplicated IVC with pancreatic divisum and duplicated right renal collecting system. The patient was planned for ERCP, but was lost to follow-up.

**Keywords:** *Inferior vena cava, divisum, duplicated, pancreas, renal*

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## 1. Introduction

Duplication of the inferior vena cava (IVC), a rare anomaly reported to occur in 0.2-3% of the population [1] is known to be associated with various urogenital tract anomalies such as horseshoe kidneys, crossed fused ectopia and circum-aortic renal collar [2,3]. To the best of our knowledge, there is no report of co-existence of duplicated IVC with duplicated collecting system of the kidney in the literature. Furthermore, no report has been written on the coexistence of duplicated IVC with pancreatic divisum.

## 2. Objective

To report an incidental finding of duplicated IVC co-existing with pancreatic divisum and duplicated collecting system of the right kidney.

## 3. Case Description

A 25 year-old man with history of chronic abdominal pain since childhood presented with the worst abdominal

pain of his life, located in the epigastric region, beginning a few hours prior to presentation. His chronic abdominal pain is not associated with diarrhea, steatorrhea or weight loss and family history was non-contributory. He had 3 episodes of vomiting following morphine administration for his pain. Physical examination was notable for tenderness and guarding in the epigastrium, but no rebound tenderness. His labs were notable for elevated aminotransferases (AST 283 units/L, ALT 71 units/L), but normal alkaline phosphatase, amylase and lipase levels and negative viral hepatitis serology.

Abdominal ultrasound revealed a normal appearing liver and spleen, but it showed a duplicated right renal collecting system. Computed Tomography (CT) of the abdomen was done to further investigate the etiology of the patient's abdominal pain. Abdominal CT revealed a duplicated IVC, with the left IVC draining into the left renal vein, a duplicated collecting system of the right kidney, with an extrarenal pelvis and a laterally rotated lower pole, and a prominent dorsal pancreatic duct consistent with pancreatic divisum (Figure 1 and Figure 2).

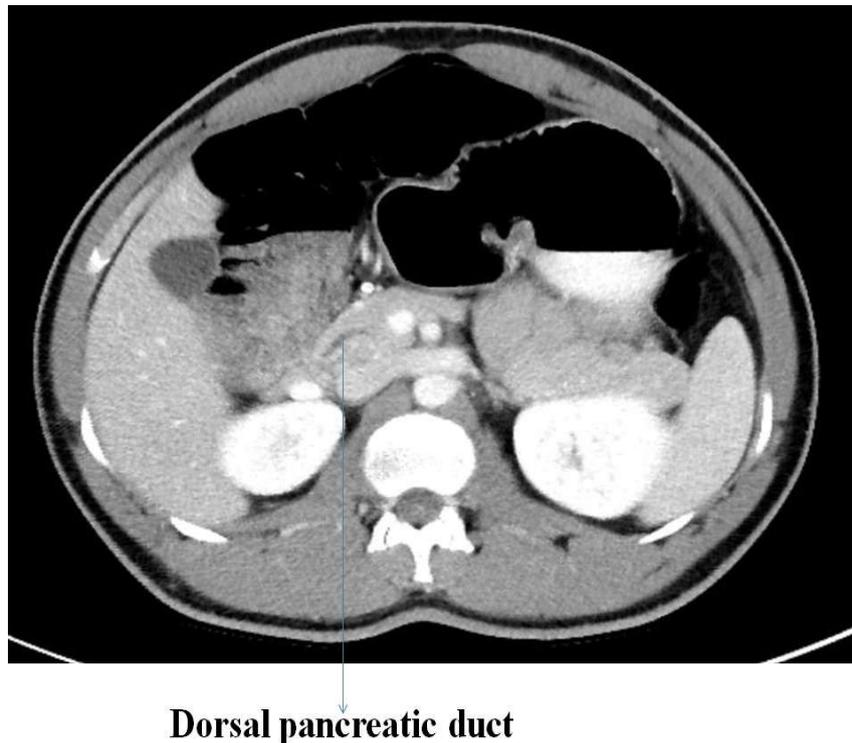
He had an esophagogastroduodenoscopy which revealed a small Mallory-Weiss tear in the esophagus and non-erosive gastritis. The patient was treated with esomeprazole and sucralfate and was scheduled for out-

patient Endoscopic Retrograde Cholangiopancreatography (ERCP). He was given a gastroenterology clinic

appointment on discharge, but he was lost to follow-up.



**Figure 1.** Coronal and Axial Computed Tomography images showing duplicated IVC and an extra-renal pelvis in the lower pole of the right kidney



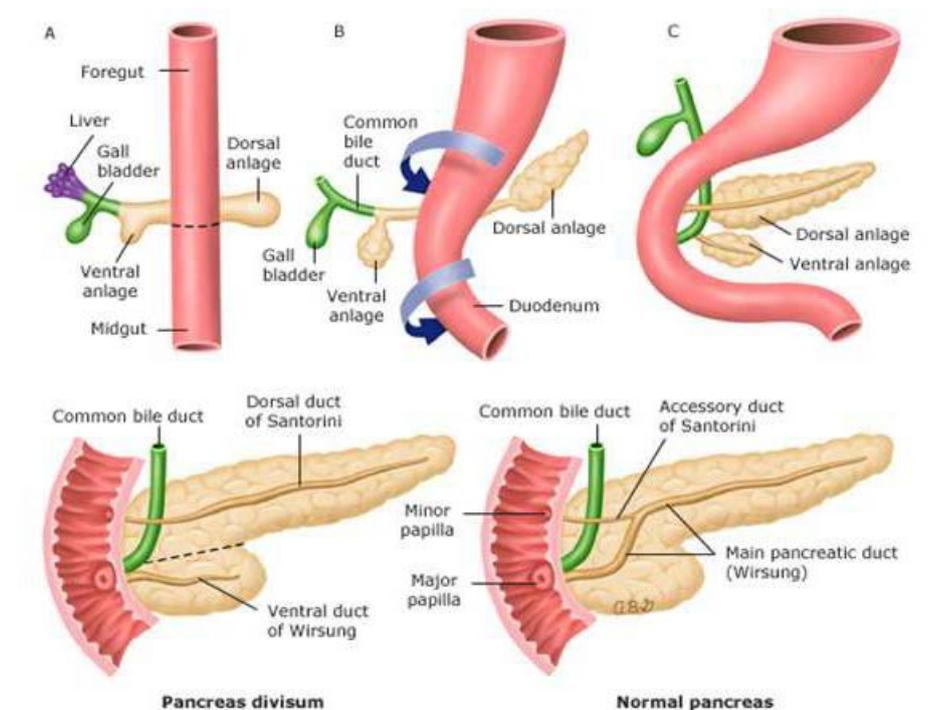
**Figure 2.** Axial CT image showing a prominent dorsal (accessory) pancreatic duct, consistent with pancreatic divisum

#### 4. Discussion

The IVC develops from three sets of paired venous channels that appear between the sixth and tenth weeks of gestation. A duplicate IVC results from the failure of regression of the left supracardinal vein [4,5]. Duplicate

IVC is asymptomatic and only becomes significant in the setting of IVC filter placement [6] and urologic surgeries.

Pancreatic divisum occurs in 1-14% of the population and is caused by failure of the ducts of the dorsal and ventral buds to fuse during embryologic development, at approximately the eighth intrauterine week of life [7] (Figure 3).



The pancreas develops from two parts whose ducts are in continuity with the common bile duct. One part is ventral and the other dorsal to the intestinal tract before rotation. The rotation brings the two parts together with separate ducts. The duct of the dorsal (larger) part later becomes continuous, enters that of the ventral part which enters the duodenum with the common bile duct. However, in a congenital malformation (pancreas divisum) the other two parts of the pancreas remain distinct, each with its own duct.

**Figure 3.** Anatomy and embryology of pancreatic divisum [8]

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In pancreatic divisum, majority of pancreatic juice drains through the dorsal (accessory) duct of Santorini into the duodenum at orifice of minor papilla while the minority (about 10%) drains through the (ventral) duct of Wirsung into the duodenum at the major papilla [9]. Symptoms of pancreatic divisum are probably due to high intrapancreatic dorsal ductal pressure caused by resistance to pancreatic secretion by a small minor papilla orifice.

Patients with chronic abdominal pain can have a pain syndrome consistent with pancreatitis without an identifiable etiological cause for pain (amylase, lipase, and imaging findings are normal), as was seen in our patient, who has had chronic abdominal pain since childhood. The patient was planned for ERCP, which is useful for confirming the diagnosis of pancreatic divisum and in addition, provides therapeutic options. Therapeutic interventions such as minor papillotomy or stent placement in the dorsal pancreatic duct, done at ERCP can benefit the patients with symptomatic pancreatic divisum, by reducing the pressure in the main pancreatic duct [10].

## 5. Conclusion

This case describes a previously unreported co-existence of duplicated IVC with pancreatic divisum and duplicated right renal collecting system. The patient was planned for ERCP, but he was lost to follow-up.

## Reference

- [1] Mayo J, Gray R, St Louis E et-al. Anomalies of the inferior vena cava. *AJR Am J Roentgenol.* 1983; 140 (2): 339-45.
- [2] Royal SA, Callen PW. CT evaluation of anomalies of the inferior vena cava and left renal vein. *AJR Am J Roentgenol.* 1979; 132 (5): 759-63.
- [3] Smith TR, Frost A. Anomalous inferior vena cava associated with horseshoe kidneys. *lin Imaging.* 20 (4): 276-8.
- [4] Freidland GW, De Vries PA, Nino-Murcia M *et al.* Congenital anomalies of the inferior vena cava: Embryogenesis and MR features. *Urol Radiol* 1992; 13: 237.
- [5] Chung VP, Mena E and Hoskins PA. Congenital anomalies of the inferior vena cava: Review of embryogenesis and presentation of a simplified classification. *Br J Radiol* 1974; 47: 206.
- [6] Siddiqui R, Hans S. Double inferior vena cava filter implantation in a patient with a duplicate inferior vena cava. *The Journal of Invasive Cardiology* 2008; 20 (2): 91-2.
- [7] Mulholland MW, Moosa AR, Liddle RA. Pancreas: anatomy and structural anomalies. n: Yamada T, ed. *Textbook of Gastroenterology.* Philadelphia, PA: JB Lippincott; 1995.
- [8] Fogel E, Sherman S. "Anatomy and clinical significance of pancreas divisum," *Uptodate*; July 2014 [Online]. Available: <http://www.uptodate.com/contents/anatomy-and-clinical-significance-of-pancreas-divisum>. [Accessed Aug. 17, 2014]
- [9] Kozu T, Suda K, Toki F. Pancreatic development and anatomical variation. *Gastrointest ndosc Clin N Am.* 1995; 5: 1-30.
- [10] Gerke H, Byrne MF, Stiiller HL, Obando JV, Mitchell RM, Jowell PS, anch MS, illie 1. Outcome of endoscopic minor papillotomy in patients with symptomatic pancreas divisum. *JOP.* 2004; 5: 122-131.