

'Retro-uncinate Superior Mesenteric Vein' – first report of a rare congenital anomaly and possible embryological explanation

Prerak Patel

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Raghav Yelamanchi

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Shraddha Patkar

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Anant D Dhanwate

Government Medical College and Hospital, Akola

Manish S Bhandare

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Shailesh V Shrikhande

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Vikram A Chaudhari (✉ drvikramchaudhari@gmail.com)

Tata Memorial Hospital, Homi Bhabha National Institute (HBNI)

Case Report

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Abstract

We evaluated a 61-year-old female for a periampullary cancer. The preoperative contrast enhanced CT scan demonstrated an abnormal course of superior mesenteric vein (SMV). The vein was absent from its normal location in the groove behind neck of the pancreas and anterior to the superior mesenteric artery. It was found to be coursing anomalously, posterior to the uncinate process of pancreas and on the right of superior mesenteric artery. This is probably the first report of this anomaly. We had to coin the term 'retro-uncinate SMV' to describe this anatomical variation. Rest of the porta structures and pancreas were found to be anatomically normal in this patient. This is a rare anomaly, probably does not have a pathological consequence and remained unreported. Congenital variations in porta structures are relatively common. Careful and thorough preoperative assessment of radiology is essential to have a roadmap to avoid injuries to such anomalous structures during surgery. Preoperative identification of this anomaly resulted in a safe pancreaticoduodenectomy in this patient. Development of portal venous system and pancreas are closely related due to their anatomical proximity. Normally, the left part of ventral pancreatic anlage regresses and right part rotates posterior to the developing SMV. Malrotation of this right ventral pancreatic anlage anterior to the developing SMV or Regression of right ventral pancreatic anlage and persistence and development of left ventral pancreatic anlage anterior to the developing SMV is the only logical explanation for development of this anomaly.

Case Details

Sixty-one-year-old female was evaluated for obstructive jaundice. She was diagnosed to have a resectable periampullary cancer and was planned for a pancreaticoduodenectomy.

The preoperative contrast enhanced CT scan demonstrated an abnormal course of superior mesenteric vein (SMV). SMV usually lies in a tunnel between neck and uncinate process of pancreas and is anterior to the superior mesenteric artery. SMV was found to be coursing anomalously, posterior and right of the uncinate process of pancreas. Unusually high insertion of the splenic vein into the SMV was also noted which resulted in a short length of the main portal vein. This 'retro-uncinate SMV' then entered the groove between lower end of uncinate and duodenum to enter the mesentery normally. There was no other anomaly in the porta, pancreas, and mesenteric structures.

Careful and thorough preoperative assessment of radiology is essential to have a roadmap to avoid injuries to such anomalous structures during surgery [1–7]. Preoperative knowledge of this anomaly allowed safe dissection of the anomalous SMV off the uncinate process from behind early in the course of surgery. Patient had an uneventful recovery and was discharged on post operative day seven.

Discussion

Development of portal venous system and pancreas are closely related due to their anatomical proximity. Infrahepatic parts of the right and left vitelline veins lie on respective sides of the developing duodenum.

These two vitelline veins soon become interconnected by three transverse anastomoses. The caudal ventral intervittelline anastomosis involutes. Middle dorsal anastomosis and part of right vitelline vein between cranial ventral and middle dorsal anastomosis form the trunk of portal vein [8, 9].

SMV and the splenic vein develop as new splanchnopleuric venous channels in the mesentery and join the left end of the dorsal intermediate anastomosis i.e. developing portal vein [8, 9]. SMV develop *in situ* in the midgut mesentery secondary to regression of the left vitelline vein. The regressing left vitelline vein provides a long peritoneal fold in the midgut mesentery just above the SMA. A few tissue clefts appear along the SMA in the mesentery which are precursors of the SMV. Thus, the SMV does not develop from budding of or venous plexus of vitelline veins but develops *in situ* [10].

Congenital anomalies of the portal venous system and SMV are well described in the literature [2, 3]. However, there is no report of this anomaly in the literature [3–6]. Normally, ventral pancreatic anlage has right and left buds. Left ventral pancreatic anlage involutes. Persistence of left ventral pancreatic anlage is postulated to result in annular pancreas [7]. Right ventral pancreatic anlage rotates posterior to the developing SMV to join the dorsal pancreatic bud and pancreas is formed. With this rotation SMV lies in its normal anatomical position in the groove behind the pancreatic neck. Malrotation of right ventral pancreatic anlage anterior to the developing SMV or regression of right ventral pancreatic anlage and persistence and development of left ventral pancreatic anlage anterior to the developing SMV is the only logical explanation for development of this anomaly particularly in absence of any other anatomical abnormality in this region. We report first case of this anomaly and coin the term ‘retro uncinata SMV’ to describe it anatomically.

Declarations

Funding: No sources of funding for this study

Conflict of Interest: Authors declare that they have no conflict of interest.

Ethical approval: This study was performed in line with the principles of the Declaration of Helsinki 1975 revised in 2013.

Written informed consent was obtained from the patient

The authors affirm that human research participants provided informed consent for publication of the images in Figure(s) 1 and 2.

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Figures

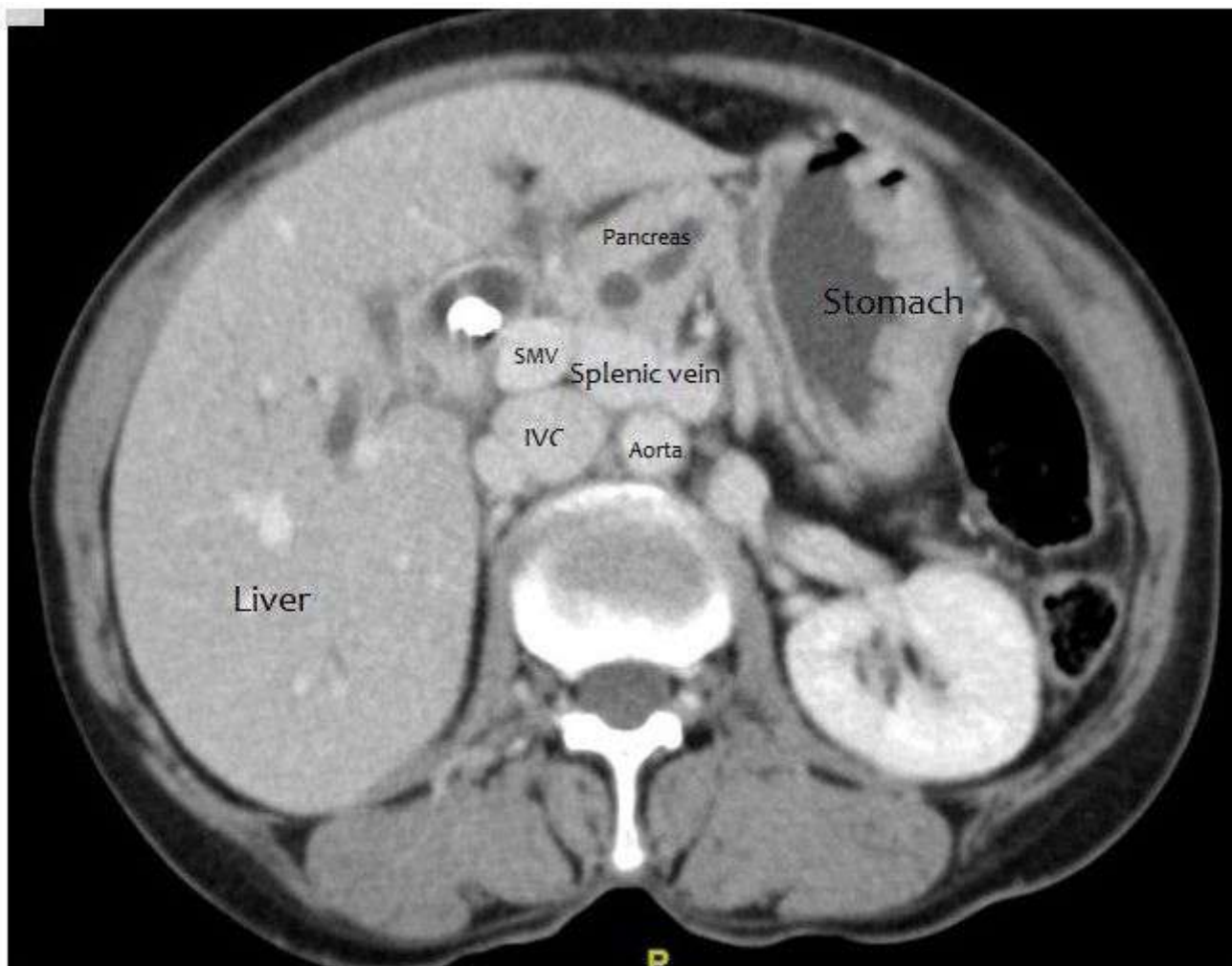


Figure 1

Axial image of the contrast enhanced computerized tomography of the abdomen showing the high confluence of the superior mesenteric vein (SMV) and splenic vein

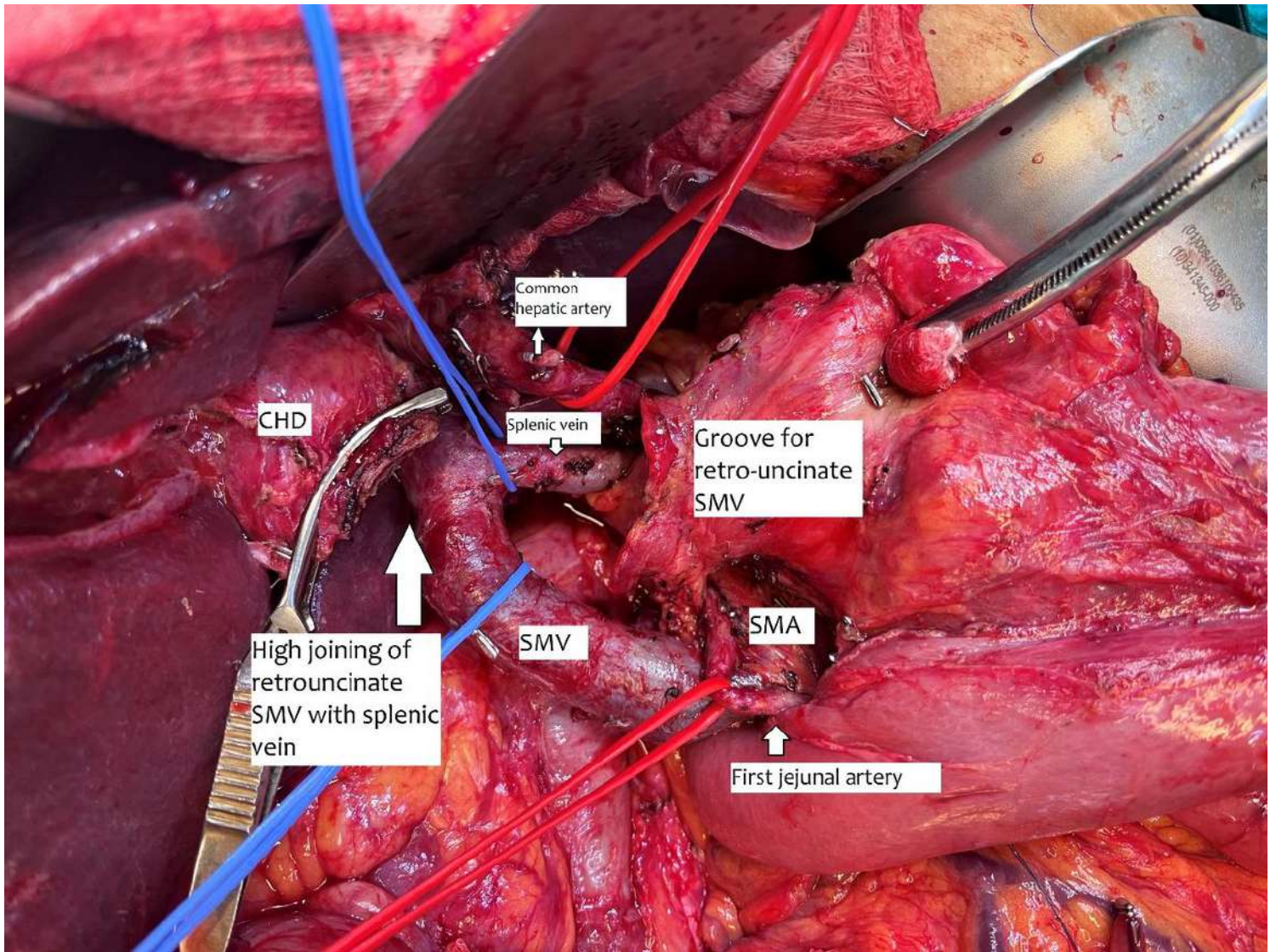


Figure 2

Intraoperative image of pancreaticoduodenectomy. Demonstrating common hepatic artery (CHA), splenic vein (SV), superior mesenteric vein (SMV), superior mesenteric artery (SMA), first jejunal artery and common hepatic duct (CHD). Note the groove for SMV over the posterior surface of uncinate process.