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ANATOMIC VARIATIONS

Variant termination of first and second jejunal veins into a "pancreatic portal vein"

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Abstract
Jejunal veins usually terminate into the superior mesenteric vein. Here, an unusual termination of first and second jejunal veins into a pancreatic portal vein has been presented. The common vein formed by the first and second jejunal veins could be named as pancreatic portal vein because it divided into two branches in front of the third part of the duodenum and these two branches entered the head of the pancreas and further divided into smaller branches before anastomosing with the tributaries of pancreatico-duodenal veins. The knowledge of this rare vein could be useful to radiologists and surgeons.

Keywords Jejunal vein · Superior mesenteric vein · Portal vein · Pancreatico-duodenal · Pancreatic surgery

Introduction

Jejunal veins usually drain into superior mesenteric veins (SMV). They usually cross the superior mesenteric artery (SMA) from left to right before opening into the SMV. However, in some cases they may cross the SMA from behind before opening into the SMV. Kim et al. [2] conducted a study on the common trunk of first jejunal vein According to their observation, first jejunal trunk crossed dorsal to the SMA in 64% and ventral to the SMA in 19% of cases. It crossed dorsal to the SMA and abruptly turned towards the right abdomen in 17% of cases. In any case, the jejunal veins drained into the SMV, There are very few reports on variations of jejunal tributaries of SMV. Hence, this unique vein is being reported here.

Case report

During dissection classes for medical undergraduates, a variation in the pattern of termination of the first and second jejunal veins was observed in an adult male cadaver aged 75 years, who had a natural death. The first and second jejunal veins joined to form a pancreatic portal vein at the junction between third and fourth parts of the duodenum (Figs. 1, 2). These first and second jejunal veins drained proximal 30 cm of jejunum. The pancreatic portal vein coursed to the right in front of the third part of the duodenum and behind the superior mesenteric vessels. After passing behind the superior mesenteric vessels, it divided into two branches which entered the head of the pancreas and divided further into smaller branches. These smaller veins anastomosed with the tributaries of the pancreatico-duodenal veins within the head of the pancreas (Fig. 3). The pancreas and duodenum were morphologically normal and were supplied by the branches of celiac trunk and superior mesenteric artery in a usual manner.

Discussion

Knowledge of variation of jejunal tributaries of the SMV could be important to radiologists and surgeons. The upper abdomen, in the vicinity of duodenum is the area of many surgical procedures to various medical disciplines like endocrinologists, nephrologists, gastroenterologists and hepatobiliary surgeons. The variant vessels in this region could result in iatrogenic bleeding during the procedures. The vein that is being referred to as "pancreatic portal vein" is a unique vein. To the best of my knowledge, such a vein has not been reported earlier. It is named here as a portal vein because of its resemblance to a portal vein in its temination.

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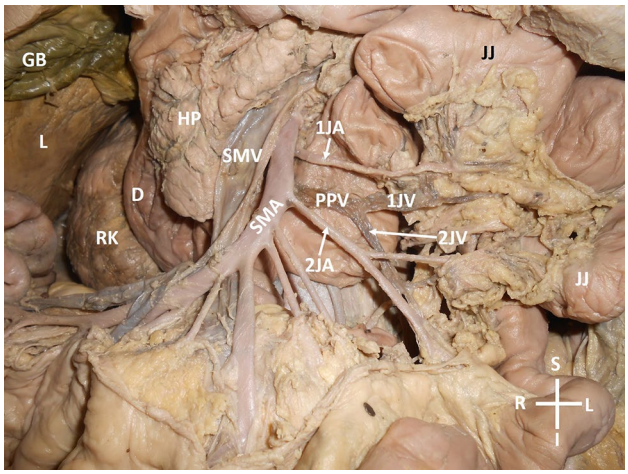

Fig. 1 Dissection of the upper abdomen showing the pancreatic portal vein passing behind the superior mesenteric vessels (*PPV* pancreatic portal vein, *1JV* first jejunal vein, *2JV* second jejunal vein, *1JA* first jejunal artery, *2JA* second jejunal artery, *SMA* superior mesenteric artery, *SMV* superior mesenteric vein, *JJ* jejunum, *L* liver, *GB* gallbladder, *RK* right kidney, *D* second part of duodenum, *HP* head of the pancreas, *S* superior, *I* inferior, *L* left, *R* right)

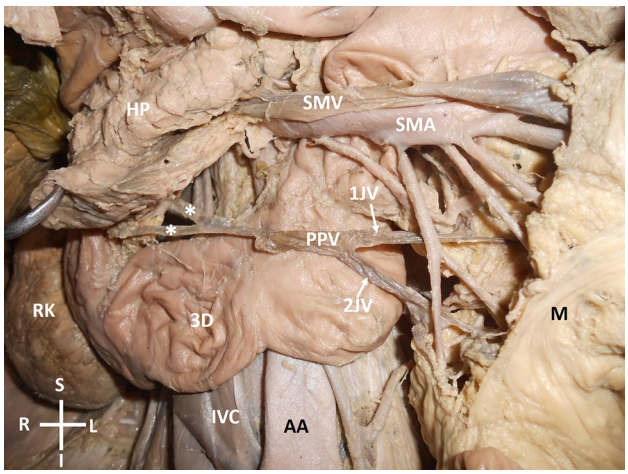

Fig. 2 Dissection of the upper abdomen showing the pancreatic portal vein dividing into two branches before entering the head of the pancreas. The superior mesenteric veins have been lifted to show the course of the first jejunal vein behind them (*PPV* pancreatic portal vein, *1JV* first jejunal vein, *2JV* 2nd jejunal vein, *SMA* superior mesenteric artery, *SMV* superior mesenteric vein, *JJ* jejunum, *RK* right kidney, *3D* third part of duodenum, *HP* head of the pancreas, *IVC* inferior vena cava, *AA* abdominal aorta, *M* mesentery; *two branches of the pancreatic portal vein; *S* superior, *I* inferior, *L* left, *R* right)

By definition, portal vein is a vein that begins in capillaries and ends in capillaries. In contrast, the systemic veins do not branch out before their termination. The first and second jejunal tributaries in the current case, united to form a common vein which divided into two branches before entering the head of the pancreas and further divided inside

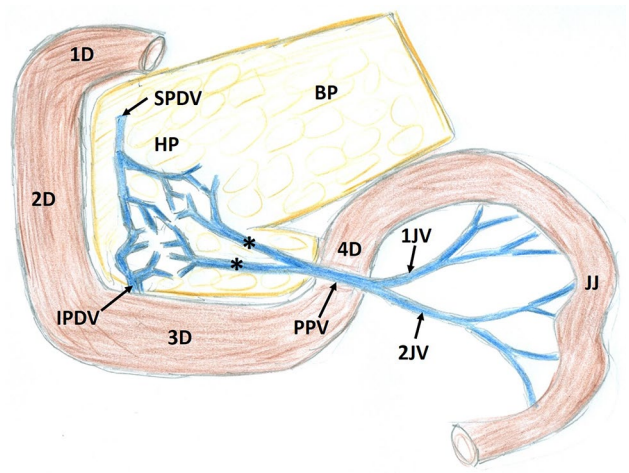

Fig. 3 A simplified schematic drawing to show the communications between the branches of pancreatic portal vein and pancreaticoduodenal veins within the head of the pancreas (*PPV* pancreatic portal vein, *1JV* first jejunal vein, *2JV* 2nd jejunal vein, *JJ* jejunum, *1D* first part of duodenum, *2D* second part of duodenum, *3D* third part of duodenum, *4D* 4th part of duodenum, *HP* head of the pancreas, *BP* body of pancreas, *SPDV* superior pancreaticoduodenal vein, *IPDV* inferior pancreaticoduodenal vein; *two branches of the pancreatic portal vein)

the head. This is the pattern seen only in the portal veins. Hepatic portal vein, renal portal vein and hypophyseal portal vein are the well documented portal venous systems in the body. The pancreatic portal vein may not have any functional importance since the blood flowing though this vein would reach the liver through the portal vein by the alternate route through the pancreas. However, the course of the vein behind the superior mesenteric vessels may make it vulnerable. Its compression between the mesenteric vessels and duodenum might result in a nutcracker syndrome similar to the one observed with the left renal vein [4]. This compression might result in necrosis of the jejunum. Pancreaticoduodenectomy is the standard procedure as a treatment for the cancer of the head of the pancreas. A thorough knowledge of the venous pattern around this area is required for the surgeon. The current vein that is being reported here might cause unexpected bleeding in the procedure. In a study conducted by Ishikawa et al. [1], only in 16% cases the first and second jejunal veins terminated into superior mesenteric vein independently. In rest of the cases they formed a common trunk. The common trunk passed in front of SMA in 21% case and behind SMA in 63% of cases before opening into SMV. In a study by Nayak et al. [3], there were two jejunal venous trunks namely superior and inferior. They made a venous collar around the SMA. Apart from these studies, reports on jejunal veins are scanty. Hence, it is worthwhile to document this rare variation in the literature.

Conclusion

The pancreatic portal vein being reported here is unique. Though it is just another alternative route for the blood to flow to the portal vein from jejunum, it might be significant surgically and radiologically. Its course behind the superior mesenteric vessels might subject it to compression and it might also cause inadvertent bleeding in pancreaticoduodenal surgeries.

Author contributions Protocol/project development: Nayak. Data collection or management: Nayak. Data analysis: Nayak. Manuscript writing/editing: Nayak.

Compliance with ethical standards

Conflict of interest Author declares that they have no conflict of interest.

References

1. Ishikawa Y, Ban D, Matsumura S, Mitsunori Y, Ochiai T, Kudo A, Tanaka S, Tanabe M (2017) Surgical pitfalls of jejunal vein anatomy in pancreaticoduodenectomy. J Hepatobiliary Pancreat Sci 24(7):394–400
2. Kim HJ, Ko YT, Lim JW, Lee DH (2006) Radiologic anatomy of the superior mesenteric vein and branching patterns of the first jejunal trunk: evaluation using multi-detector row CT venography. Surg Radiol Anat 29(1):67–75
3. Nayak SB, Mishra S, George BM (2017) A strange case of superior mesenteric venous collar around the superior mesenteric artery. Surg Radiol Anat 39:931–933
4. Park JH, Lee GH, Lee SM, Eisenhut M, Kronbichler A, Lee KH, Shin JI (2017) Posterior nutcracker syndrome—a systematic review. Vasa 22:1–7