

## Absence of inferior pancreaticoduodenal artery compensated by dorsal pancreatic artery: A case report

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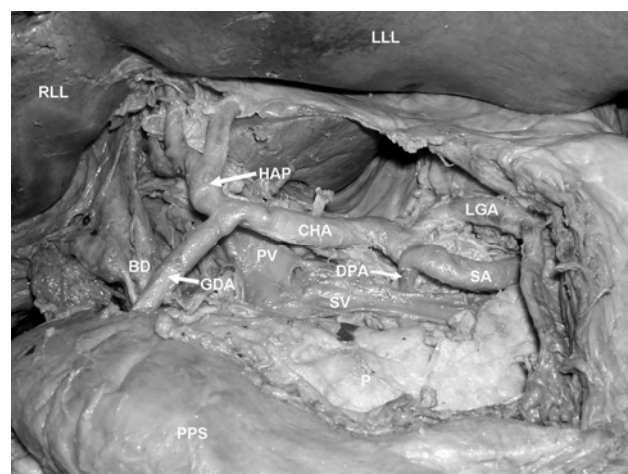
### Abstract

Consideration of new aspects of vascular anatomy of the pancreaticoduodenal region is required for further improvement of surgical procedures. Awareness of variations in arteries supplying the duodenum and pancreas can help in minimizing the blood loss during surgery. We report the absence of inferior pancreaticoduodenal artery, which was compensated by a large dorsal pancreatic artery arising from proximal part of the splenic artery. This artery replaced inferior pancreaticoduodenal artery and formed a large loop of anastomosis with the gastroduodenal artery.

**Key words:** Variation, Splenic artery, Dorsal pancreatic artery, Inferior pancreaticoduodenal artery, Pancreas.

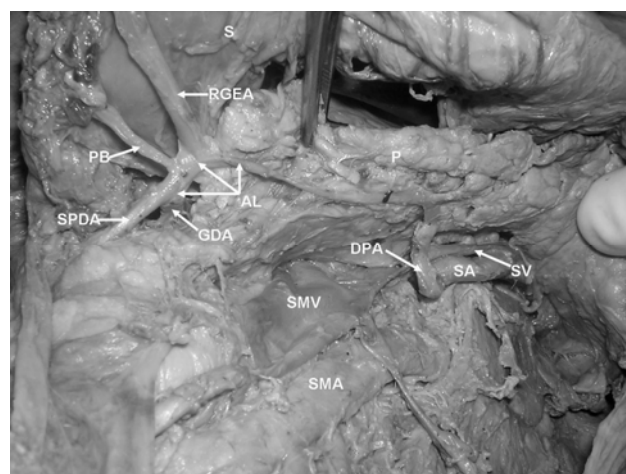
During the gross anatomy dissection of the abdomen of an approximately 60 year old male cadaver, the inferior pancreaticoduodenal artery was absent. We observed an abnormally large dorsal pancreatic artery (Fig. 1 and 2). The artery arose from the proximal part of the splenic artery and coursed down behind the body of the pancreas and splenic vein. Behind the body of the pancreas, the artery divided into a right and a left branch. The right branch coursed to the right, behind the body and the head of the pancreas and terminated by making a

loop of anastomosis with the gastroduodenal artery just behind the right margin of the head of the pancreas. The superior pancreaticoduodenal artery, right gastroepiploic artery and a branch to pyloric part of the stomach arose from this anastomosing loop. The superior pancreaticoduodenal artery was large and had a normal course. The left branch of the dorsal pancreatic artery had a short course on the dorsal surface of the pancreas before piercing its substance



**Fig 1:** Dissection of the upper abdomen showing the branches of celiac trunk

RLL – right lobe of liver, LLL – left lobe of liver, CHA – common hepatic artery, HAP – hepatic artery proper, SA – splenic artery, LGA – left gastric artery, DPA – dorsal pancreatic artery, PV – portal vein, SV – splenic vein, GDA – gastroduodenal artery, BD – bile duct, P – pancreas, PPS – pyloric part of stomach



**Fig 2:** Dissection of the upper abdomen showing the course and branches of dorsal pancreatic artery (stomach and pancreas have been retracted)

S – stomach, RGEA – right gastroepiploic artery, PB – pyloric branch, GDA – gastroduodenal artery, SPDA – superior pancreaticoduodenal artery, P – pancreas, AL – anastomosing loop, DPA – dorsal pancreatic artery, SV – splenic vein, SA – splenic artery, SMV – superior mesenteric vein, SMA – superior mesenteric artery.

## Discussion

The inferior pancreaticoduodenal artery is the first branch of the superior mesenteric artery. It supplies the distal part of the duodenum, the head and uncinate process of the pancreas. The dorsal pancreatic artery is a branch of splenic artery. It descends posterior to pancreas and divides into right and left branches. The right branch usually forms a prepancreatic arterial arch with a branch of anterior superior pancreaticoduodenal artery and the left branch anastomoses with the arteria pancreatica magna and arteria caudae pancreatis. In the present case, the dorsal pancreatic artery was quite large due to the absence of the inferior pancreaticoduodenal artery, probably to compensate the blood supply to the duodenum and pancreatic head. The superior pancreaticoduodenal artery was also enlarged (Fig. 2.). There was a characteristic loop formed behind the head of the pancreas by the anastomosis of the gastroduodenal and right branch of dorsal pancreatic artery (Fig. 2).

The origin of superior pancreaticoduodenal, gastroduodenal and pyloric branches from this type of a loop has not been reported in the literature hitherto. Bergman et al (1988) have reported some of the variations of the dorsal pancreatic artery in the past. In these reports, the dorsal pancreatic artery arose from the splenic in 37% of cases, the celiac in 33%, the superior mesenteric in 21%, and the common hepatic artery in 8% of cases<sup>1</sup>. Witte et al. (2001) have reported a case where one of the branches of the dorsal pancreatic artery joined with the superior mesenteric artery to form a longitudinal anastomosis. The inferior pancreaticoduodenal artery, a branch of the superior mesenteric artery, was missing<sup>2</sup>.

Knowledge of variations of the upper abdominal arteries is very useful for the surgeons dealing with gastric and duodenal ulcers, biliary tract surgeries and mobilization of the head of pancreas. Bleeding is one of the complications of these surgeries. Pancreaticoduodenal arteries must be ligated during the mobilization of the head of the pancreas. According to Murakami et al. (1999), special

attention should be paid to the ligation of inferior arteries because of the high incidence of the common trunk formation of the upper jejunal and inferior pancreaticoduodenal arteries<sup>3</sup>. Ohigashi et al (2004) have suggested early ligation of the inferior pancreaticoduodenal artery while performing a pancreaticoduodenectomy<sup>4</sup>.

In a case where there is absence of inferior pancreaticoduodenal artery, the surgeon must expect an abnormal arterial loop which has been reported here to avoid considerable bleeding. The variations which we are reporting may be important in the cases of celiac axis stenosis. Usually there will be enlargement of inferior pancreaticoduodenal artery as a compensatory measure in the celiac artery stenosis. If the inferior pancreaticoduodenal artery is absent and there is stenosis of celiac trunk, the pancreas and duodenum will receive a diminished blood supply. The surgeons who perform procedures with the pancreas, duodenum or the bile duct must be aware of this kind of variation, to minimize the bleeding during the surgery.

## References

1. Bergman RA, Thompson SA, Afifi AK, Saadeh FA. (1988) - Compendium of human anatomic variations. Urban & Schwarzenberg, Baltimore-Munich. 79p.
2. Witte B, Frober R, Linss W. (2001) - Unusual blood supply to the pancreas by a dorsal pancreatic artery. *Surg Radiol Anat.* 23(3):197 – 200p.
3. Murakami G, Hirata K, Takamuro T, Mukaiya M, Hata F, Kitagawa S. (1999) - Vascular anatomy of the pancreaticoduodenal region: A review. *J Hepatobiliary Pancreat Surg.* 6 (1): 55 – 68p.
4. Ohigashi H, Ishikawa O, Eguchi H, Yamada T, Sasaki Y, Noura S, Takachi K, Miyashiro I, Murata K, Doki Y, Imaoka S. (2004) - Early ligation of the inferior pancreaticoduodenal artery to reduce blood loss during pancreaticoduodenectomy. *Hepatogastroenterology.* 51(55):4 – 5p.

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