

Surgically Important Uncommon Tetrafurcation of Coeliac Trunk

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Case Report

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Abstract

The vascular anatomy of the pancreas is very important for the surgeons to do ligation and to arrest profuse bleeding. So the knowledge about vascular anatomy and its variations for the surgeons is very important. In this case report there was an unusual rare tetrafurcation of coeliac trunk. The usual three branches left gastric, splenic and common hepatic were arising and one more branch dorsal pancreatic artery which arose directly from the coeliac trunk to supply most of the pancreas.

Keywords: Splenic artery; Pancreatic Artery; Coeliac Trunk; Pancreas; Variation

Abbreviations: CHA: Common Hepatic Artery; LGA: Left Gastric Artery; SA: Splenic Artery; DPA: Dorsal Pancreatic Artery.

Introduction

The blood supply of pancreas is derived from branches of coeliac trunk, which is the artery of foregut and superior mesenteric artery which is the artery of midgut. The superior pancreaticoduodenal artery which arises from gastroduodenal artery divides into anterior and posterior branches to anastomose with anterior and posterior branches of inferior pancreaticoduodenal artery which is the branch of superior mesenteric artery. These anastomotic arteries richly supply entire duodenum, head and uncinata process of the pancreas.

The body and tail of the pancreas is usually supplied by numerous pancreatic branches of splenic artery which directly run into the gland and supply. One of these pancreatic branches is larger and is called as arteria pancreatica magna and the larger branch supplying the tail is called as arteria pancreatica cauda. This knowledge about extensive vascular supply of the pancreas and its variations are important for the surgeon resecting in this region to acquire ligation and haemostasis [1,2].

Case Report

During routine Anatomy dissection class of abdominal region at ALL INDIA INSTITUTE OF MEDICAL SCIENCE, MANGALAGIRI, and an uncommon tetra-furcation of coeliac trunk was observed in a 60 year old cadaver.

Origin and course of all the four branches on the contrary to normal three were dissected and then photographed. Observed coeliac trunk was of normal length and bore size, it was traversing horizontally forward after originating from the abdominal aorta at the level of intervertebral disc between T12 and L1 vertebra. Branches of coeliac trunk as observed on further dissection were found to be four, instead of normal three. Observed branches were Common Hepatic Artery (CHA), Left gastric artery (LGA), Splenic Artery (SA) and Dorsal Pancreatic Artery (DPA).

Common hepatic artery passed downwards, forwards towards right and gives gastroduodenal artery further continued as proper hepatic artery. Gastroduodenal artery was running downwards and gave two branches: right gastro-epiploic artery and superior pancreaticoduodenal artery which were supplying greater curvature and head of pancreas respectively. Left gastric artery after coming out of coeliac trunk supplied lesser curvature by gastric branches and lower end of oesophagus by oesophageal branches, then anastomosed with right gastric artery, a branch of proper hepatic artery.



Figure 1: Coeliac trunk tetrafurcation (CHA-Common hepatic artery, LGA-left gastric artery, SA-splenic artery, DPA-Dorsal pancreatic artery)



Figure 2: Right and Left Branches of Dorsal Pancreatic Artery supplying entire pancreas.

Splenic artery after emergence had taken its usual course horizontally towards left and was supplying neck to tail of pancreas, fundus and greater curvature of stomach through its usual branches before entering into spleen. The **DORSAL PANCREATIC ARTERY** was running downwards after originating directly from coeliac trunk (Figure 1). The artery was tortuous during its course and enters into pancreas through its dorsal surface dividing into two branches immediately. The branches were going towards right and left (Figure 2). The right branch is small in length and going to right side on superior border of pancreas to supply head and neck of the pancreas and finally anastomosed with superior pancreaticoduodenal artery. The left branch which is longer in length, supplied body and tail of pancreas and finally anastomosed with splenic artery. The head of the pancreas was supplied by superior pancreaticoduodenal artery which is a branch of gastroduodenal artery and inferior pancreaticoduodenal artery which is the first branch of superior mesenteric artery.

Discussion

In this case report the main variation was in coeliac trunk where the DPA arose from inferior part of coeliac trunk. The DPA also can arise from some other arteries like superior mesenteric artery, common hepatic artery or abdominal aorta. The knowledge of this variation is may prevent the vascular damage during any surgeries involving stomach, duodenum, pancreas, and hepatobiliary region, for abdominal aortic aneurism, penetrating injuries of abdomen, in patient undergoing coeliac arteriography for gastrointestinal bleeding, for pancreas transplant and pancreatic tumour [3].

Bergman, et al. [4] had reported variations in the blood supply of pancreas that the dorsal pancreatic artery if present arose from splenic (37%), coeliac (33%), superior mesenteric (21%) and common hepatic artery (8%). Another study had reported a case that dorsal pancreatic artery arose from splenic artery but the inferior pancreaticoduodenal artery was absent [5]. In case of stenosis of coeliac trunk the inferior pancreaticoduodenal artery enlarges and compensate for the pancreatic and duodenal blood supply [6].

Michels' classification [7] divided the variations of coeliac trunk into 6 types:

Type 1: Normal

Type 2: Hepatosplenic trunk and left gastric artery from aorta - Bifurcation

Type 3: Hepatosplenomesentric trunk and left gastric from aorta - Bifurcation

Type 4: Hepatogastric trunk and splenic artery from superior mesenteric artery - Bifurcation

Type 5: Splenogastric type; splenic and left gastric from the coeliac trunk and common hepatic artery from superior mesenteric artery - Bifurcation

Type 6: Coeliacomesentric trunk; splenic, left gastric, common hepatic and superior mesenteric arteries arise from a common trunk - Tetrafurcation

In this classification the dorsal pancreatic artery variation was not included in any type as in this study it was directly arising from the coeliac trunk. Another study showed that the dorsal pancreatic artery arose from common hepatic artery in the pancreatic transplant specimens so the surgeons can be easily overlooked not familiar with this artery [8]. The dorsal pancreatic artery can arise from (a) Splenic artery (70%), (b) common hepatic artery (77%), (c) superior mesenteric artery (2%), (d) coeliac trunk (1%) [9]. Another rare variant of the dorsal pancreatic artery is the anatomotic branch with the middle colic artery which a branch from the superior mesenteric artery [10].

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