Original Article

Indian Journal of Anatomy
Volume 9 Number 4, October – December 2020
DOI: http://dx.doi.org/10.21088/ija.2320.0022.9420.5

Differential Pattern in Course and Origin of Pancreatico Duodenal Arteries

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How to cite this article:
Suresh Babu K, Mithil Potuganti / Differential Pattern in Course and Origin of Pancreatico Duodenal Arteries. Indian J Anat. 2020;9(4):261–263.

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Abstract

Introduction: Pancreas is a mixed gland with exocrine and endocrine components. Arterial supply comprises of branches from coeliac trunk and from Superior Mesenteric Artery [SMA]. The frequency of complications can be reduced by refining the surgical techniques and detailed knowledge of the regional anatomy of pancreas, including collateral circulation which formed the basis for our study.

Materials and methods: After obtaining ethical committee approval, we observed the pattern of blood supply of pancreas in 40 cadavers, kept for undergraduate dissection in Ayaan Institute of Medical Sciences and Rohilkand Medical College and Hospital during 2018-2020.

Results: Of the 40 cadavers, we observed following variations in 2 different cadavers.

1. Inferior pancreatico-duodenal artery took origin from a common stem along with first jejunal artery from SMA.

2. Double inferior pancreatico-duodenal artery. One took origin from superior mesenteric artery [usual] and the other from second jejunal artery.

Keywords: Pancreas; Duodenum; Superior mesenteric artery.

Introduction

Pancreas is a mixed gland with exocrine and endocrine components. Arterial supply comprises of branches from coeliac trunk and from Superior Mesenteric Artery [SMA]. Arteries, after entering parenchyma, of specific parts of gland, forms anastomosis for a dense vascular network which is essential for pancreas function.[1]

Pancreas develops at the junction between foregut and midgut. The area derived from foregut is supplied by coeliac trunk and superior mesenteric artery supplies the midgut derivatives.[2]

The branch of Pancreatology has greatly evolved in the last few decades. Various novel surgical and interventional approaches were implemented for treating diseases like tumours, acute pancreatitis and others. In spite of many great evolutionary inventions regarding treatment of pancreatic disorders, vascularisation demands further attention. The frequency of complications can be reduced by refining the surgical techniques and detailed knowledge of the regional anatomy of pancreas, including collateral circulation which formed the basis for our study.[3]

Materials and Methods

After obtaining ethical committee approval, we observed the pattern of blood supply of pancreas

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in 40 cadavers which are kept for undergraduate dissection in Ayaan Institute of Medical Sciences and Rohilkand Medical College and Hospital during the time period of 2018-2020.

Cadavers of age group 25–50 were included in the study and cadavers with death due to past history of pancreatic diseases were excluded from study.

We observed the branching pattern of arteries supplying pancreas, with dissection done according to standard procedures.

Results

Of the 40 cadavers, we observed following variations in 2 different cadavers.

1. Inferior pancreatico-duodenal artery took origin from a common stem along with first jejunal artery from SMA (Fig. 1).

Fig. 1: Inferior pancreatico-duodenal artery took origin from a common stem along with first jejunal artery from SMA.

2. In another specimen, we observed double inferior pancreatico-duodenal artery. One took origin from superior mesenteric artery (usual) and the other from second jejunal artery (Fig. 2).

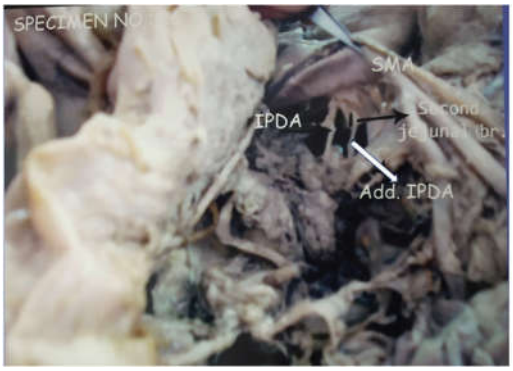

Fig. 2: Double inferior pancreatico-duodenal artery. One took origin from superior mesenteric artery [usual] and the other from second jejunal artery.

Discussion

Pancreas has a rich arterial supply via branches from coeliac trunk and superior mesenteric artery. Head and adjoining duodenum are supplied mainly by 4 arteries – 2 from coeliac trunk via Gastro Duodenal Artery (Anterior and Posterior Superior Pancreatico-Duodenal arteries SPDA) and 2 from Inferior Mesenteric Artery [IMA] (Anterior and Posterior Inferior Pancreatico Duodenal arteries IPDA). IPDA is present in most individuals. Usually arises either directly from SMA at the inferior border of pancreas. As a common branch with first jejunal artery (Pancreaticoduodenojejunal trunk) from posterior or left aspect of SMA (Horiguchi et al 2008, Bertelli etal 1996). When arising as Pancreaticoduodenojejunal trunk, the artery gives off a jejunal branch and then runs posterior to both SMA and vein before dividing into terminal branches. Occasionally IPDA is absent.[4]

Maneesh Joleya[5] (2016) reported Gastro duodenal artery (GDA) from coeliac trunk rather than common hepatic artery. In our study, we couldn't find this type of variation.

Chavan[2] (2015) reported in 2% of cases, anterior arterial arcade of pancreas is by dorsal pancreatic artery. In our study, in one case, double IPDA is found, where, one which took origin from SMA, completed anterior arterial arcade.

Covantev[3] (2019) observed in 24% of cases, majority of pancreas blood supply is by splenic artery. However, in our study, we didn't observe any such arterial dominant pattern.

Okahara[6] (2009), found in one case, a common trunk of coeliac trunk and superior mesenteric artery. However, we didn't observe such. They also reported IPDA arising as a common trunk with first jejunal artery in 14 cases. However, we found such a variant in only one case.

Ranjeeta[7] (2013), reported an anomalous dorsal pancreatic branch from coeliac trunk with absence of SPDA. However, in our study, we didn't find such variation.

Patil VR[8] (2017), observed an anomalous GDA from SMA, giving rise to SPDA and right gastro-epiploic artery. We didn't observe such variant.

Silva Jr (2014)[1], found and reported a variation in which IPDA and middle colic artery took origin from SMA as common trunk. In our study, IPDA and first jejunal artery took a common origin from a stem which originated from SMA.

Conclusion

Having Knowledge about variations in arterial supply to pancreas will be always an advantage during various abdominal surgeries involving pancreas or not.

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