Case Report / *Olgu Sunumu*

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Accessory inferior pancreatic artery and aberrant left colic artery: a case report

Arteria pancreatica inferior accessoria ve atipik arteria colica sinistra: bir vaka raporu

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ABSTRACT

The left colic artery generally emerges from the inferior mesenteric artery and then divides into ascending and descending branches. Arterial supply of the pancreas is provided by the superior mesenteric artery and the celiac trunk. During a routine cadaver dissection in a male body donor, two anatomical variations in the arterial pattern of the pancreas and colon were observed. An anomalous common trunk, originating from the superior mesenteric artery, gave rise to two branches: an accessory inferior pancreatic artery to the head of the pancreas, and the aberrant left colic artery. A comprehensive knowledge of vascular variations of this region is valuable in visceral surgery and interventional radiology. Hence, this case report may provide further anatomical knowledge for vessel management in the pancreas and colon surgical procedures.

Keywords: Anatomy, cadaver, left colic artery, pancreas, superior mesenteric artery.

ÖZ

Arteria colica sinistra genellikle arteria mesenterica inferior'dan çıkar ve ardından çıkan ve inen dallara ayrılır. Pankreasın arteriyel beslenmesi arteria mesenterica superior ve truncus coeliacus tarafından sağlanır. Bir erkek kadavrada rutin bir diseksiyon sırasında pankreas ve kolonun arteriyel paterninde iki anatomik varyasyon gözlemlendi. Arteria mesenterica superior'dan köken alan anormal bir ortak kütük iki dal verdi: caput pancreatis'e giden bir arteria pancreatica inferior accessoria ve atipik arteria colica sinistra. Bu bölgenin vasküler varyasyonlarının kapsamlı bilgisi visseral cerrahide ve girişimsel radyolojide değerlidir. Bu nedenle bu vaka raporu, pankreas ve kolon cerrahi prosedürlerinde damar yönetimi için daha ileri anatomik bilgi sağlayabilir.

Anahtar Sözcükler: *Anatomi, kadavra, arteria colica sinistra, pankreas, arteria mesenterica superior.*

INTRODUCTION

The anterior and posterior superior pancreaticoduodenal arteries from the gastroduodenal artery and the anterior and posterior inferior pancreaticoduodenal arteries from the superior mesenteric artery (SMA) supply to the head of the pancreas, according to classical anatomical descriptions (1). The left colic (LCA), sigmoid (SA), and superior rectal arteries are the three principal branches of the inferior mesenteric artery (IMA), which originates from the abdominal aorta. The LCA, which is the first branch of the IMA, typically consists of two branches: the ascending branch (AB) and the descending branch (DB). The AB provides the arterial blood supply to the distal third of the transverse colon and proximal descending colon, whereas the DB provides the arterial blood supply to the distal descending colon (2).

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Variations in vascular anatomy not only lead to a considerable risk factor for major bleeding during surgery and postoperative complications including ischemia or anastomotic insufficiency, but may also have an impact on symptoms associated with vascular occlusion (3). The present case report identifies the accessory inferior pancreatic artery (AIPA) and aberrant LCA (abLCA) arise from an anomalous common trunk (CT).

CASE PRESENTATION

We report two noteworthy variations in the arterial supply of the pancreas and colon observed during routine abdominal dissection. The two variations were detected in a 50 to 55-year-old male cadaver, which was received from the cadaver collection of Ege University School of Medicine, Izmir, Türkiye. Ethical approval was obtained from the Medical Research Ethics Committee at Ege University, Türkiye (approval number 23-9T/5, date September 07, 2023). The cadaver was fixed with 10% formalin before a routine dissection of the abdominal cavity was performed. The cause of death, family history, and clinical records were not available. There was no indication of past surgical interventions or pathologies affecting the abdominal region. The origin, course, and termination of the branches of the SMA were thoroughly examined. An anomalous branch originating from the SMA and serving as a CT was recognized (Figure-1a). The metric measurement was used to evaluate the diameter of CT. We measured the diameter as 4.1 mm.

The CT continues for a short distance and gives off AIPA, which courses directly behind to the head of the pancreas. Then, the CT terminates to form the abLCA. The abLCA travels inferiorly behind the inferior mesenteric vein (IMV). It curves under the IMV and passes in front of it. After that, the abLCA divides into AB and DB. The AB, which courses to the superior, anastomosis with the middle colic artery (MCA), and supplies the distal third of the transverse colon. The DB, which travels to the lateral and inferior, supplies the descending colon. The jejunal and ileal branches arise from the SMA as expected, and no abnormalities are observed in their course (Figure-1b).

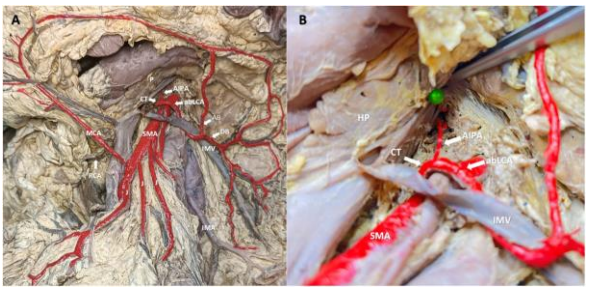

Figure-1. (a) The branching pattern of the superior mesenteric artery (SMA). Middle colic artery (MCA), right colic artery (RCA), inferior mesenteric vein (IMV), aberrant left colic artery (abLCA), ascending branch (AB), descending branch (DB), inferior mesenteric artery (IMA), jejunal branches of the superior mesenteric artery (J), anterior inferior pancreatic artery (AIPA) and pancreas (P) **(b)** Two branches of the anomalous common trunk (CT). Accessory inferior pancreatic artery (AIPA) and aberrant left colic artery (abLCA), head of the pancreas (HP), superior mesenteric artery (SMA), inferior mesenteric vein (IMV).

DISCUSSION

Planning vascular clamping during surgical operations is essential to prevent vascular damage and necrosis since the mesenteric arteries have several collateral routes. It is therefore important for surgeons to be aware of the abnormal branching pattern of the mesenteric arteries before executing surgical procedures including laparoscopic colectomies and organ resection (4).

Previous anatomical studies reported abLCAs arising directly from the MCA, SMA, common hepatic artery, or a common trunk with the SA (3–6). Besides, Nelson et al. examined the LCA in 50 cadavers, and they recorded that LCA was completely absent in one cadaver (5). In a case report, Memar et al. described the accessory posterior pancreaticoduodenal artery, dorsal pancreatic artery, and abLCA arising from an atypical CT, which emerged from the common hepatic artery (7). Likewise, Lichtenberg et al. observed an anomalous CT, which gave rise to the abLCA, MCA, and an accessory right colic artery (4). Ke et al. conducted a retrospective observational study employing abdominal and pelvic contrast-enhanced CT scans of 188 patients. Thus, they classified bifurcating patterns of IMA: 47.3% of LCAs emerged directly from IMA, %27.1 of LCAs arose at the root of SA, %20.7 of LCAs emerged from a CT from IMA,

and 4.8% of LCAs were absent (8). Contrary to all these scenarios, in our case, we observed an AIPA and an abLCA branching from abnormal CT arising from SMA.

Silva Júnior et al. demonstrated a variant pattern of the vascular supply of the pancreas and the transverse colon, i.e. an inferior pancreatic artery and an MCA originating from an anomalous CT arising from the SMA. In their case, they also found that the inferior pancreatic artery divided into anterior and posterior branches that course toward the neck of the pancreas (9). They also recorded the diameter of CT as 6 mm. In our case, we found the diameter as 4.1 mm. In the study conducted by Singh et al. on a cadaver, they observed an anomalous branch that arose from the SMA, and they introduced the term "accessory inferior pancreatic artery". Additionally, they noted that the artery is divided into anterior and posterior branches and both vessels enter the body of the pancreas (10). Throughout this paper, the term AIPA is used to refer to a variant artery to behind the head of the pancreas. It has been reported that variations in the vascular supply of the pancreas and colon are not uncommon; however, to the best of our knowledge, the coexistence of two arterial variants documented in this article does not exist in the literature. Furthermore, this area can be considered vulnerable during abdominal procedures since the presence of an AIPA and an abLCA close to the inferior mesenteric vein is not normally expected by surgeons. Considering the close positions of the abLCA and IMV in our case, inferior mesenteric portal hypertension may compress on the abLCA.

CONCLUSION

In this case report, we describe an anomalous CT, branching from the SMA, and providing the following two branches: the AIPA and the abLCA. We suggest that this knowledge of the atypical arterial pattern of the pancreas and colon is remarkable for clinicians to determine the feasibility of surgical procedures. Moreover, the variations reported in this article highlight how significant it is to acquire precise vascular imaging performed prior to abdominal surgery.

Conflict of interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1. Rela M, Reddy MS. Pancreas. In: Standring S (ed). Gray's anatomy: the anatomical basis of clinical practice. 41st ed. Philadelphia: Elsevier; 2016: 1179-87.
2. Skinner D, Wehrle CJ, Fossen K Van: Anatomy, abdomen and pelvis: inferior mesenteric artery. StatPearls. (2023).
3. Petzold S, Storsberg SD, Fischer K, Schumann S. Variant arterial supply of the descending colon by the coeliac trunk: a case report. Medicina. 2021;57(5):487.
4. Lichtenberg A, Kim SJ, Rogers L, et al. Aberrant left colic artery and accessory right colic artery: a case report and surgical implications. Cureus. 2023;15(6):e40594.
5. Nelson TM, Pollak R, Jonasson O, Abcarian H. Anatomic variants of the celiac, superior mesenteric, and inferior mesenteric arteries and their clinical relevance. Clin Anat. 1988;1: 75-91.
6. Nayak SB, Shetty SD, Sirasanagandla SR, et al. Anomalous origin and vulnerable course of left colic artery in relation to the pancreas—a case report. Forensic Med Anat Res. 2013;1(4):83–6.
7. Memar SA, Taylor AM, Ahuja S, Daly DT, Tan Y: Rare left colic artery variation of the gut arterial system. Folia Morphol (Warsz). 2023;82:(1)198–204.
8. Ke J, Cai J, Wen X, et al. Anatomic variations of inferior mesenteric artery and left colic artery evaluated by 3-dimensional CT angiography. Insights into rectal cancer surgery - a retrospective observational study. Int J Surg. 2017;41:106-11.
9. Silva Júnior LM, Alexandre M, Gonçalves L, Silva FS, Caetano AG. Variations in the vascular supply of pancreas and transverse colon: a case report. Int J Morphol. 2014;32(1):190–3.
10. Singh S, Kaur J, Arora J, Jeph R, Mehta V. Unusual pancreatico-mesenteric vasculature: a clinical insight. Arch Anat Physiol 2016;1(1): 001-3.