

Review began 09/30/2026
Review ended 10/14/2026
Published 10/21/2026

© Copyright 2026

Adachi et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.118328

Left Gastric Artery Arising From the Superior Mesenteric Artery via a Common Trunk With the Dorsal Pancreatic Artery: A Rare Anatomical Variant Identified Before Laparoscopic Gastrectomy

Saki Adachi ¹, Yusuke Nishimuta ¹, Daisuke Tsurumaru ¹, Koji Ando ², Kousei Ishigami ¹

1. Department of Clinical Radiology, Kyushu University, Graduate School of Medical Sciences, Fukuoka, JPN 2. Department of Surgery and Science, Kyushu University, Graduate School of Medical Sciences, Fukuoka, JPN

Corresponding author: Yusuke Nishimuta, nishimuta.yusuke.021@m.kyushu-u.ac.jp

Abstract

Preoperative vascular mapping is important for safe laparoscopic gastrectomy because perigastric arterial variants may influence surgical strategy. We report a rare arterial variant in a 45-year-old woman with early gastric cancer, in whom the left gastric artery (LGA) arose from the superior mesenteric artery (SMA) through a shared trunk with the dorsal pancreatic artery (DPA). No conventional LGA arising from the coeliac artery was identified, and an accessory LGA arising from the left hepatic artery was also present. Preoperative CT angiography using multiplanar reformatted, maximum-intensity projection, and volume-rendered images clearly demonstrated this branching pattern. These findings informed surgical planning and enabled selective division of the gastric branch distal to the LGA-DPA bifurcation while preserving the DPA and accessory LGA. Laparoscopic distal gastrectomy with D1+ lymphadenectomy was completed without vascular injury or conversion to open surgery. This case highlights the value of CT angiography for detailed recognition of clinically relevant perigastric arterial variants before minimally invasive gastric cancer surgery.

Categories: Radiology, Anatomy, Gastroenterology

Keywords: anatomical variation, ct-angiography, laparoscopic gastrectomy, left gastric artery, superior mesenteric artery (sma)

Introduction

The left gastric artery (LGA) usually arises from the coeliac artery and is commonly controlled during gastrectomy with lymphadenectomy. In oncologic gastrectomy, lymphadenectomy requires dissection along the perigastric and suprapancreatic vascular pedicles, making accurate recognition of arterial anatomy important for safe vascular control. However, the coeliac artery and its branches show considerable anatomical variation, and unexpected perigastric arterial variants may increase the risk of vascular injury during minimally invasive gastric surgery [1,2]. Preoperative CT angiography can provide detailed information on patient-specific vascular anatomy and may assist surgical planning [3-5].

An LGA arising from the superior mesenteric artery (SMA) is exceptionally rare and has been described mainly in isolated reports [6,7]. The dorsal pancreatic artery (DPA) contributes to the arterial supply of the pancreatic body and tail, and its origin and course are variable [8,9]. When an anomalous gastric artery shares a trunk with the DPA, indiscriminate division of that trunk could result in unnecessary sacrifice of a pancreatic arterial branch.

The present case is particularly unusual because the LGA arose from the SMA through a shared trunk with the DPA, no conventional coeliac-origin LGA was present, and an accessory LGA arose from the left hepatic artery. We report this rare arterial configuration in a patient who underwent laparoscopic distal gastrectomy for early gastric cancer and describe its CT angiographic and surgical relevance.

Case Presentation

A 45-year-old woman presented with intermittent epigastric pain lasting several weeks. The symptom was nonspecific and was not considered related to the arterial anomaly described below. She denied weight loss, vomiting, or gastrointestinal bleeding. Physical examination and laboratory findings were unremarkable.

Upper gastrointestinal endoscopy revealed a flat-depressed lesion, classified as type 0-IIc, measuring more than 5 cm in greatest dimension, without ulceration, on the posterior wall of the distal gastric body (Figure 1).

How to cite this article

Adachi S, Nishimuta Y, Tsurumaru D, et al. (October 21, 2026) Left Gastric Artery Arising From the Superior Mesenteric Artery via a Common Trunk With the Dorsal Pancreatic Artery: A Rare Anatomical Variant Identified Before Laparoscopic Gastrectomy. *Cureus* 18(10): e118328. DOI 10.7759/cureus.118328

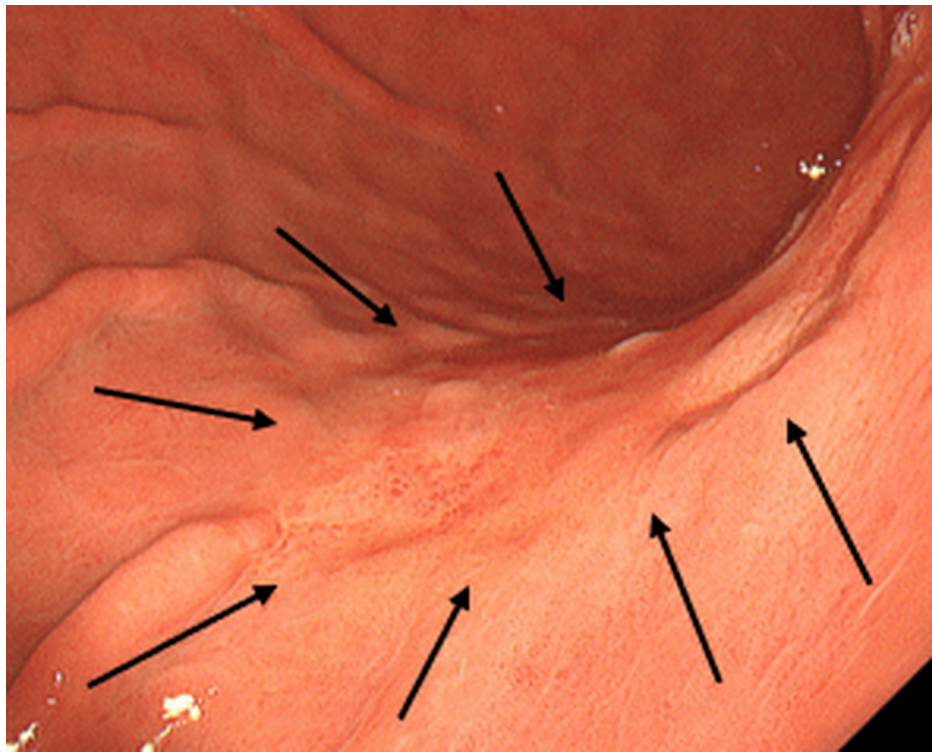


FIGURE 1: Endoscopic appearance of the gastric lesion

Upper gastrointestinal endoscopy shows a flat-depressed lesion (type 0-IIc, arrows), measuring more than 5 cm in greatest dimension, without ulceration on the posterior wall of the distal gastric body.

Histopathological examination of biopsy specimens showed group 5 poorly differentiated adenocarcinoma with signet-ring cells. The lesion was clinically assessed as cT1aN0M0. Although selected intramucosal undifferentiated gastric cancers without ulceration may be considered for endoscopic treatment, the present lesion was large and had undifferentiated histology. Therefore, laparoscopic distal gastrectomy was selected rather than endoscopic resection.

For preoperative staging and surgical planning, contrast-enhanced CT angiography was performed using a dual-layer spectral detector CT scanner (iQon Spectral CT; Philips Healthcare, Best, the Netherlands). After an overnight fast, the patient ingested 5.25 g of an effervescent agent (Baros Effervescent Granules-S; Horii Pharmaceutical Industries, Saitama, Japan) with a small amount of water immediately before scanning to achieve gastric distension. Nonionic iodinated contrast material (Iopamiron 370; Bayer HealthCare, Osaka, Japan) was administered intravenously at a dose of 2 mL/kg over 30 s using an automated power injector. Bolus tracking was performed with a region of interest placed in the descending aorta. Monitoring began 10 seconds after the start of contrast administration at 1-second intervals, and the trigger threshold was an increase of 100 HU. Arterial-phase scanning was initiated 15 seconds after triggering. Portal venous and delayed-phase images were acquired at 60 seconds and 240 seconds, respectively. Acquisition parameters were as follows: rotation time, 500 ms; collimation, 128 × 0.625 mm; tube voltage, 120 kV; automated tube current modulation; field of view, 32 cm; reconstruction thickness, 1 mm; and spiral pitch, 0.586. The arterial-phase dataset was used to generate multiplanar reformatted, maximum-intensity projection, and volume-rendered images.

On arterial-phase axial CT at the level of the pancreatic body, the aberrant LGA was identified coursing posterior to the splenic artery (Figure 2).

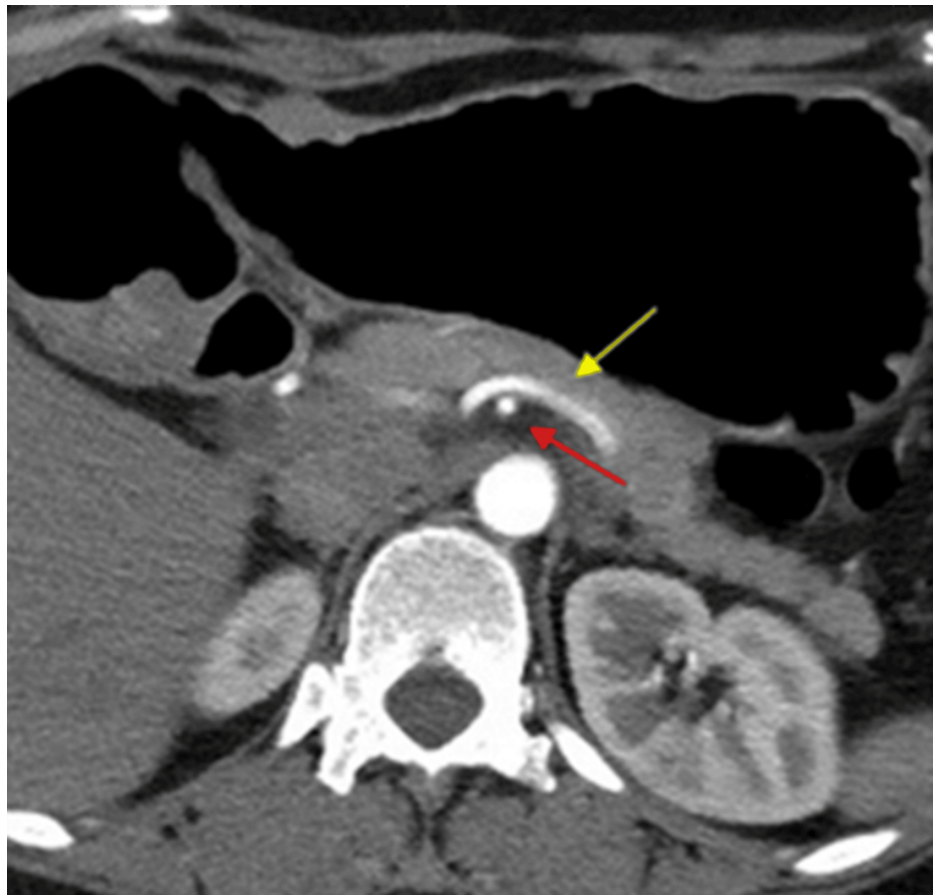


FIGURE 2: Axial CT image of the aberrant left gastric artery

Arterial-phase axial CT image at the level of the pancreatic body shows an aberrant left gastric artery (LGA, red arrow) coursing posterior to the splenic artery (yellow arrow).

Coronal multiplanar reformatted images with maximum-intensity projection demonstrated a shared trunk arising from the SMA and bifurcating into the ascending LGA and DPA (Figure 3).

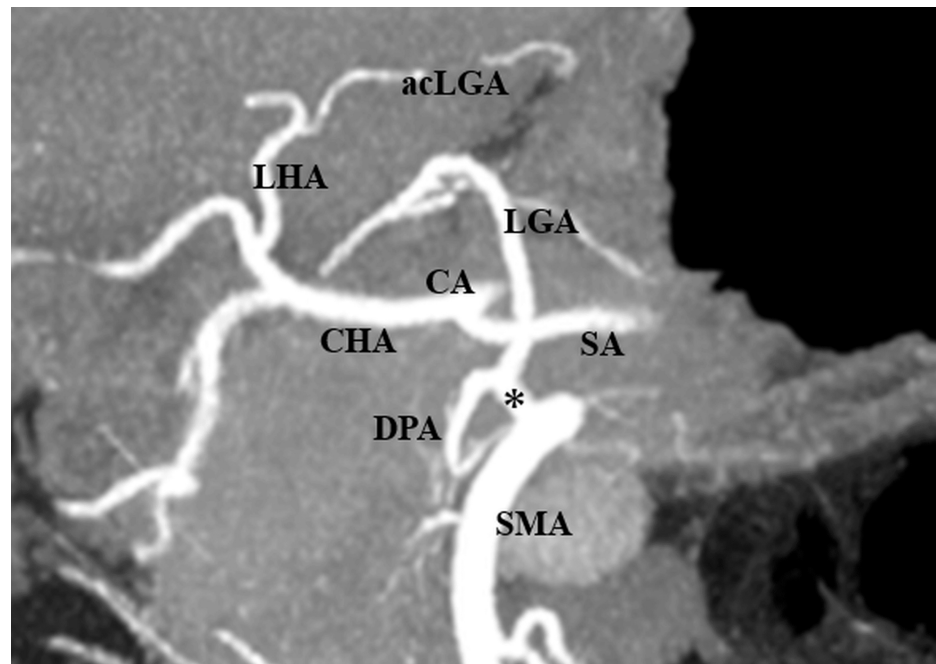


FIGURE 3: Coronal maximum-intensity projection image showing the shared LGA-DPA trunk

Coronal multiplanar reformatted image with maximum-intensity projection demonstrates the superior mesenteric artery (SMA) and the shared trunk arising from it, which bifurcates into the left gastric artery (LGA) and dorsal pancreatic artery (DPA). The asterisk indicates the LGA-DPA bifurcation. An accessory left gastric artery (acLGA) arising from the left hepatic artery (LHA) is also shown.

CA - coeliac artery; CHA - common hepatic artery; SA - splenic artery

No conventional LGA arising from the coeliac artery was identified. Volume-rendered CT angiography further clarified the three-dimensional branching pattern and demonstrated an accessory LGA arising from the left hepatic artery and supplying the proximal lesser curvature (Figure 4).

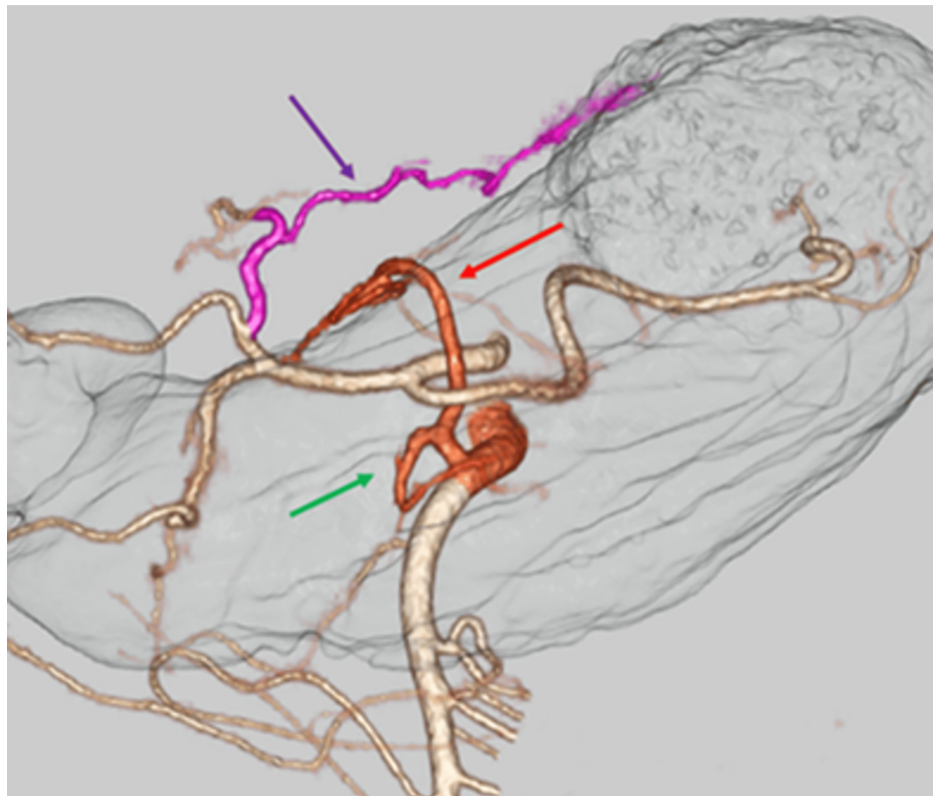


FIGURE 4: Volume-rendered CT angiography of the perigastric arterial anatomy

Volume-rendered CT angiography image shows the LGA (red arrow) arising from a common trunk derived from the SMA and ascending toward the lesser curvature. The DPA (green arrow) branches posteriorly toward the pancreas, and an accessory LGA (purple arrow) arises from the left hepatic artery and supplies the proximal lesser curvature.

The remaining major branches of the coeliac artery showed a conventional configuration.

The CT angiographic findings were reviewed preoperatively by the surgical and radiology teams. Because the LGA and DPA shared a trunk, the surgical plan was to avoid en bloc division of the shared trunk and instead selectively divide the LGA distal to the LGA-DPA bifurcation while preserving the DPA. The accessory LGA arising from the left hepatic artery was also planned to be preserved.

Laparoscopic distal gastrectomy with D1+ lymphadenectomy was performed. During suprapancreatic dissection, the aberrant LGA was directly identified (Figure 5).

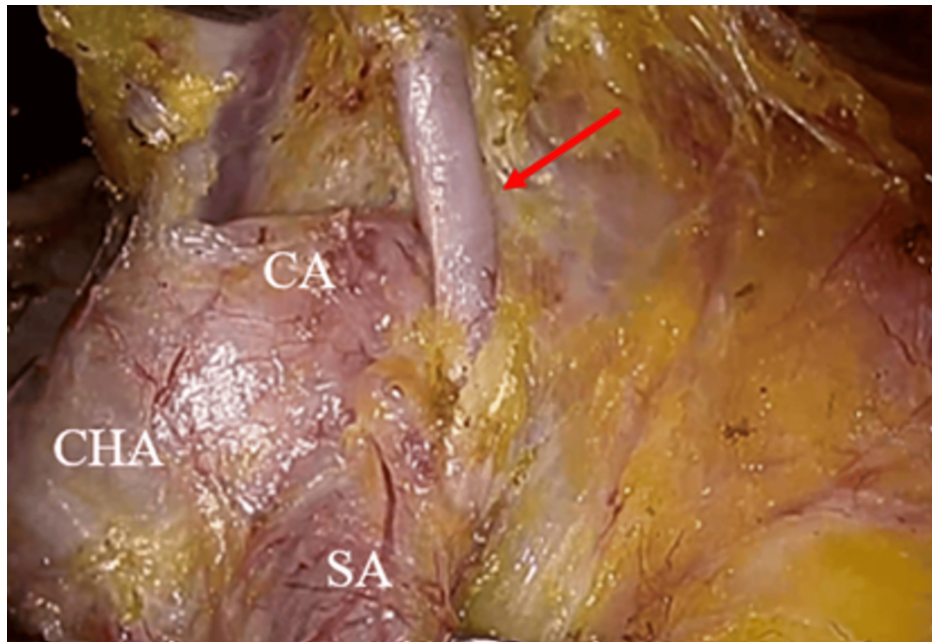


FIGURE 5: Intraoperative identification of the aberrant left gastric artery

Intraoperative photograph during suprapancreatic dissection shows the aberrant LGA (red arrow). The shared LGA-DPA trunk and DPA were delineated on preoperative CT angiography but are not fully visualized in this operative image.

CA - coeliac artery; CHA - common hepatic artery; SA - splenic artery

After identification of the LGA-DPA bifurcation, the LGA was selectively ligated and divided on the gastric branch side distal to the bifurcation. The DPA was preserved, as was the accessory LGA arising from the left hepatic artery. The complete SMA-shared trunk-LGA/DPA configuration was delineated preoperatively on CT angiography; however, the entire shared trunk and DPA bifurcation are not simultaneously visible in the available intraoperative photograph. The procedure was completed without vascular injury or conversion to open surgery.

Final histopathological examination showed a 55 × 46 mm intramucosal adenocarcinoma with signet-ring cell features, negative resection margins, and no lymph node metastasis, corresponding to pT1aN0M0. Higher-power hematoxylin and eosin staining demonstrated tumor cells with signet-ring cell features (Figure 6).

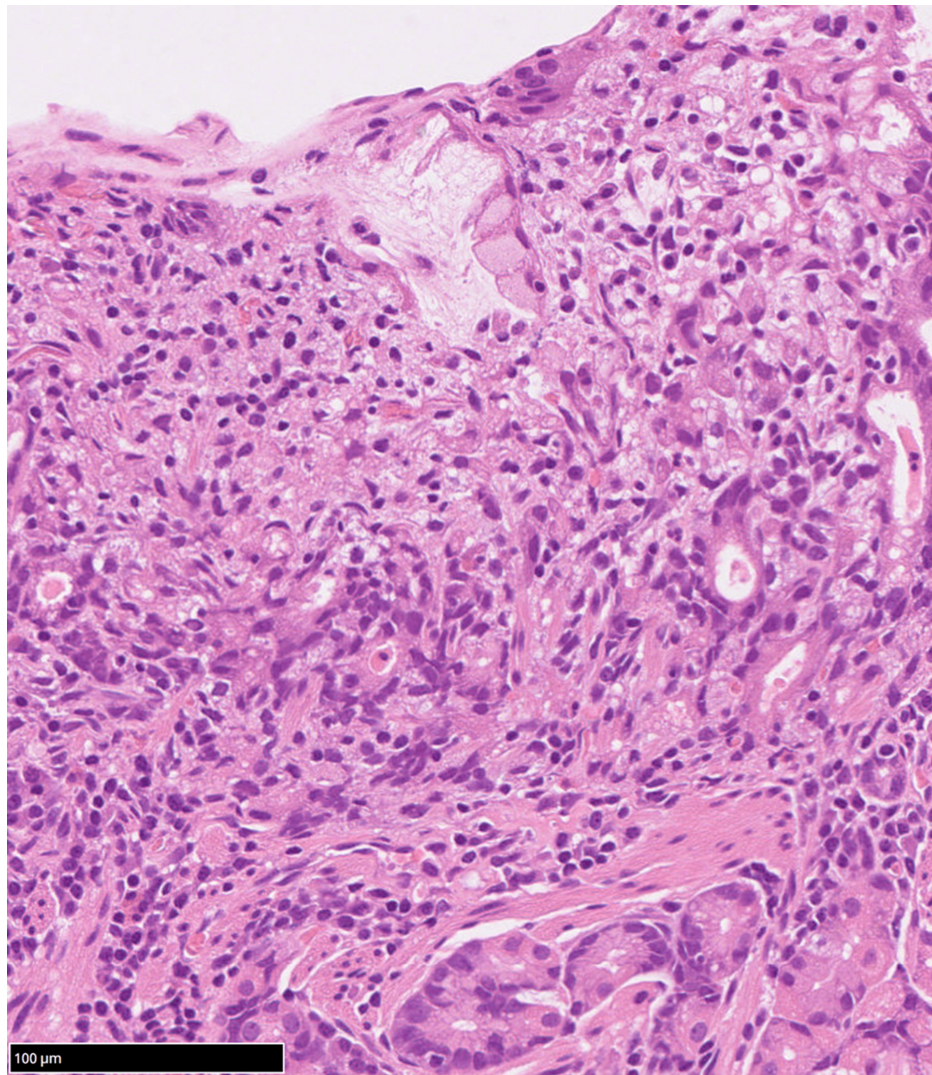


FIGURE 6: Histopathological findings of the resected gastric tumor

Higher-power hematoxylin and eosin-stained section demonstrates tumor cells with signet-ring cell features. Scale bar = 100 μ m.

A total of 52 lymph nodes were retrieved. The operative time was 208 min, estimated blood loss was 1 mL, and the postoperative hospital stay was 10 days. The postoperative course was uneventful. Follow-up with upper gastrointestinal endoscopy and CT at 12 months showed no evidence of recurrence.

Discussion

The coeliac artery and its branches show substantial anatomical variation. Numerous classification systems have been proposed, ranging from classical cadaveric and embryological classifications by Lipshutz, Adachi, and Morita to recent multidetector CT-based systems [1,2]. However, terminology and classification criteria remain heterogeneous, and no single system has been universally accepted. A recent systematic review and meta-analysis reported that the typical three-branch coeliac trunk was present in 83.39% of cases, whereas bifurcation, quadrifurcation, and absence of the coeliac trunk were observed in 10.53%, 1.80%, and 0.43%, respectively [1]. In gastric cancer surgery, such variants are clinically relevant because lymphadenectomy requires vascular dissection along the perigastric and suprapancreatic arterial pedicles.

An LGA arising from the SMA remains exceptionally rare and has been described mainly in isolated reports [6,7]. In the present case, no conventional coeliac-origin LGA was identified. Instead, the LGA arose from the SMA through a shared trunk with the DPA. In addition, an accessory LGA arose from the left hepatic artery. This combination created a more complex perigastric arterial configuration than an isolated SMA-originating LGA.

Embryologically, coeliac-mesenteric arterial variants have traditionally been explained by abnormal

persistence or regression of primitive ventral splanchnic arteries and their longitudinal anastomoses [2]. Persistence of a communicating channel between the gastric and pancreatic arterial territories may explain the shared LGA-DPA trunk arising from the SMA in the present case.

The DPA contributes to the arterial supply of the pancreatic body and tail, and its origin, pathway, and branching pattern are highly variable [8,9]. A meta-analysis showed that the DPA may arise from several parent arteries, including the splenic artery, common hepatic artery, coeliac artery, and SMA [8]. Yamane et al. emphasized that the pathway and branching pattern of the DPA, rather than its origin alone, are important for understanding surgical anatomy [9]. In the present case, the DPA shared a trunk with the LGA. Therefore, division of the shared trunk without recognition of the bifurcation could have resulted in unnecessary sacrifice of the pancreatic branch. Preoperative delineation of this relationship allowed the surgical team to plan selective division of the LGA distal to the bifurcation while preserving the DPA.

The accessory LGA arising from the left hepatic artery further illustrates the complexity of gastric arterial supply. Accessory hepatogastric arterial branches have been demonstrated on multidetector CT and angiography [10]. In the present case, the accessory LGA was identified preoperatively and preserved during surgery. Thus, the clinically relevant finding was not simply the anomalous origin of the LGA from the SMA, but the complete pattern of perigastric arterial supply, including the shared LGA-DPA trunk and accessory LGA.

Preoperative CT angiography directly informed surgical planning. Axial images demonstrated the unusual course of the LGA posterior to the splenic artery. Multiplanar reformatted and maximum-intensity projection images demonstrated continuity between the SMA, shared trunk, LGA, and DPA, while volume-rendered images provided an intuitive three-dimensional overview of the arterial configuration. Previous studies have shown that three-dimensional CT angiography can depict perigastric vessels and facilitate understanding of patient-specific vascular anatomy before laparoscopic gastrectomy [3,4]. Liu et al. also reported that preoperative three-dimensional CT angiography can help identify perigastric arteries and guide lymph node dissection [5].

An important distinction is that the complete branching pattern in this case was established primarily by preoperative CT angiography. The operative photograph directly documents the aberrant LGA during suprapancreatic dissection but does not simultaneously demonstrate the entire shared trunk, DPA, and bifurcation. Therefore, the imaging and operative findings should be interpreted as complementary rather than identical anatomical demonstrations.

This report has several limitations. First, it describes a single patient and therefore cannot establish the frequency or broader clinical impact of this arterial configuration. Second, although CT angiography clearly delineated the shared LGA-DPA trunk and informed operative planning, the complete branching anatomy was not documented in a single intraoperative image. Finally, this case demonstrates the usefulness of CT angiography for anatomical recognition and surgical planning but cannot establish that CT angiography prevents vascular injury or improves surgical outcomes.

Conclusions

This case demonstrates a rare arterial configuration in which the LGA arose from the SMA through a shared trunk with the DPA, with no conventional coeliac-origin LGA and an additional accessory LGA arising from the left hepatic artery. Preoperative CT angiography enabled detailed recognition of the anomalous branching pattern and informed selective vascular control during laparoscopic gastrectomy.

Although a single case cannot establish an effect on surgical outcomes, careful preoperative assessment of perigastric arterial anatomy may be particularly valuable when the LGA cannot be identified at its usual coeliac origin or when an anomalous gastric artery is closely related to pancreatic arterial branches.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Yusuke Nishimuta, Daisuke Tsurumaru, Saki Adachi, Kousei Ishigami, Koji Ando

Acquisition, analysis, or interpretation of data: Yusuke Nishimuta, Daisuke Tsurumaru, Saki Adachi, Kousei Ishigami, Koji Ando

Drafting of the manuscript: Yusuke Nishimuta, Daisuke Tsurumaru, Saki Adachi, Kousei Ishigami, Koji Ando

Critical review of the manuscript for important intellectual content: Yusuke Nishimuta, Daisuke Tsurumaru, Saki Adachi, Kousei Ishigami, Koji Ando

Supervision: Yusuke Nishimuta, Daisuke Tsurumaru, Kousei Ishigami, Koji Ando

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Triantafyllou G, Belimezakis N, Lyros O, et al.: Prevalence of coeliac trunk variants: a systematic review with meta-analysis. *Ann Anat.* 2025, 259:152385. [10.1016/j.aanat.2025.152385](https://doi.org/10.1016/j.aanat.2025.152385)
2. Campbell D, de Gail QL, Spence AD: Anatomical variations of the coeliac trunk: a scoping review of classification systems. *Ir J Med Sci.* 2026, [10.1007/s11845-026-04490-0](https://doi.org/10.1007/s11845-026-04490-0)
3. Matsuki M, Kani H, Tatsugami F, et al.: Preoperative assessment of vascular anatomy around the stomach by 3D imaging using MDCT before laparoscopy-assisted gastrectomy. *AJR Am J Roentgenol.* 2004, 183:145-51. [10.2214/ajr.183.1.1830145](https://doi.org/10.2214/ajr.183.1.1830145)
4. Iino I, Sakaguchi T, Kikuchi H, et al.: Usefulness of three-dimensional angiographic analysis of perigastric vessels before laparoscopic gastrectomy. *Gastric Cancer.* 2013, 16:355-61. [10.1007/s10120-012-0194-x](https://doi.org/10.1007/s10120-012-0194-x)
5. Liu P, Wei M, Sun D, et al.: Study on the application of preoperative three-dimensional CT angiography of perigastric arteries in laparoscopic radical gastrectomy. *Sci Rep.* 2022, 12:6026. [10.1038/s41598-022-09584-0](https://doi.org/10.1038/s41598-022-09584-0)
6. Ray CE Jr, Gupta AK, Shenoy SS: Left gastric artery arising from the superior mesenteric artery - case reports. *Angiology.* 1998, 49:1017-21. [10.1177/000331979804901208](https://doi.org/10.1177/000331979804901208)
7. Triantafyllou G, Arkoudis NA, Samolis A, Velonakis G, Piagkou M: A rare arterial variant combining hepatosplenic and gastromesenteric trunks with bilateral accessory renal arteries. *Cureus.* 2025, 17:e91801. [10.7759/cureus.91801](https://doi.org/10.7759/cureus.91801)
8. Rousek M, Whitley A, Kachlik D, et al.: The dorsal pancreatic artery: a meta-analysis with clinical correlations. *Pancreatol.* 2022, 22:325-32. [10.1016/j.pan.2022.02.002](https://doi.org/10.1016/j.pan.2022.02.002)
9. Yamane M, Ishikawa Y, Asano D, et al.: Surgical anatomy of the dorsal pancreatic artery: considering embryonic development. *Pancreatol.* 2023, 23:697-703. [10.1016/j.pan.2023.07.009](https://doi.org/10.1016/j.pan.2023.07.009)
10. Ishigami K, Yoshimitsu K, Irie H, Tajima T, Asayama Y, Hirakawa M, Honda H: Accessory left gastric artery from left hepatic artery shown on MDCT and conventional angiography: correlation with CT hepatic arteriography. *AJR Am J Roentgenol.* 2006, 187:1002-9. [10.2214/AJR.05.1114](https://doi.org/10.2214/AJR.05.1114)