Congenitally absent superior mesenteric artery in an asymptomatic adult

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ABSTRACT

Congenitally absent superior mesenteric artery is an extremely rare anatomic anomaly with only one other case reported in an adult. We have described an elderly patient who presented with complete absence of the superior mesenteric artery found incidentally on computed tomography imaging. The patient had no abdominal pain, nausea, or other gastrointestinal symptoms. An abnormally enlarged inferior mesenteric artery provided collateral circulation to the midgut. No intervention was performed at the time given the patient’s adequate circulation and lack of symptoms. The present case highlights consideration of anatomic mesenteric vascular anomalies before procedures involving inferior mesenteric artery ligation or coverage. (J Vasc Surg Cases Innov Tech 2021;7:443-6)

Keywords: Atresia; Collateral circulation; Congenital; Mesenteric artery; Superior

Congenital absence of the superior mesenteric artery (SMA) is considered to be the result of a fetal vascular accident that usually results in fetal demise or significant intestinal atresia. Newborns with a congenitally absent SMA have a high mortality or require significant surgical interventions to treat the resulting intestinal atresia, with survival to adulthood rare. We report the case of a congenitally absent SMA in an asymptomatic adult. The patient provided written informed consent to report the details of his case and associated images.

CASE REPORT

An 82-year-old man was referred to our hospital for evaluation of an incidentally noted 1.4-cm splenic artery aneurysm on a contrast-enhanced computed tomography scan performed to evaluate transient abdominal discomfort that was ultimately attributed to gastritis. At the time of evaluation, he had no complaints of abdominal pain, nausea, vomiting, or weight loss. Furthermore, he was healthy and had no history of previous surgery or significant comorbidities, such as atherosclerotic disease or atrial fibrillation. Computed tomography angiography was performed demonstrating an absent SMA (Figs 1 and 2) with an abnormally enlarged inferior mesenteric artery (IMA) and arc of Riolan (Fig 2). The origins of the celiac trunk and IMA were widely patent (Fig 3). Because the patient did not have symptoms consistent with visceral ischemia and the splenic aneurysm was small, no vascular intervention was recommended. The patient remained asymptomatic at the 3-month follow-up examination, with plans for annual surveillance imaging of the splenic artery aneurysm.

DISCUSSION

Most reported SMA anomalies are associated with unusual origins from the celiac artery or aberrant branches such as a replaced right hepatic artery. Congenital absence of the SMA is very rare. The SMA is formed during the fifth week of gestation after fusion of the paired vitelline arteries. The absence of the SMA has been attributed to a vascular accident that might include failure of normal resorption of the fetal blood vessels, compression or twisting of the mesenteric vessels, or release of emboli through placental vascular connections. Most of the reported data on the congenital absence of the SMA is associated with fetal intestinal atresia. To date, only one case has been reported of a congenitally absent SMA diagnosed in an adult. Similar to the present case, Wu et al noted an absent SMA with an enlarged collateral branch of the IMA. From their case and a review of the literature, they proposed a classification system for superior and inferior mesenteric arterial variations. In their classification system, superior and inferior mesenteric arterial variations are divided into four types (Fig 4). In type 1, the SMA and IMA originate separately from the abdominal aorta, which is referred to as the “classic type.” In type 2, only the SMA is defective. In type 3, only the IMA is defective. In type 4, an aberrant middle mesenteric artery is present. Using this system, our patient’s anatomic variations were Type 2. Preoperative consideration of such anatomic variations is key, as ligation, coverage, or embolization of the IMA during vascular or oncologic operations could lead to catastrophic bowel ischemia. In modern practice, most
Fig 1. Absent superior mesenteric artery (SMA) with compensatory enlargement of the inferior mesenteric artery (IMA).

Fig 2. Three-dimensional reconstruction showing an enlarged inferior mesenteric artery (a) and a large arc of Riolan (b) providing collateral blood supply to the midgut.

Fig 3. Sagittal cut from a computed tomography scan revealing an absent superior mesenteric artery (SMA) with a patent and tortuous celiac origin (a) and patent inferior mesenteric artery (IMA) origin (b).
Fig 4. Schematic revealing variations of the superior and inferior mesenteric arteries. AO, Aorta; CA, celiac artery; CT, common trunk; GA, gastric artery; HA, hepatic artery; IMA, inferior mesenteric artery; MMA, middle mesenteric artery; RIMA, remnant of inferior mesenteric artery; RSMA, remnant of superior mesenteric artery; SA, splenic artery; SMA, superior mesenteric artery. Diagram based on data from Wu et al.4
patients will undergo preoperative imaging studies, which will afford the opportunity to detect this anomaly.

Given the patient’s absence of symptoms and the relatively small size of the aneurysm, no intervention was recommended. To the best of our knowledge, the present case is only the second case reported of a congenitally absent SMA identified in an adult.

More common anomalies involving the SMA include aberrant origins of branch arteries, which occurs in ≥18% of patients. The most common of these is the replaced right hepatic artery, occurring in 8.5% of patients. Other rare anatomic variations in the SMA that can be encountered include the celiomesenteric trunk. The celiac trunk and SMA share a common trunk in this anomaly, which is encountered in <2% of individuals. Additionally, in rare instances, the splenic artery and/or the common hepatic artery can originate directly from the abdominal aorta.

REFERENCES
1. Farghadani M, Momeni M, Hekmatnia A, Momeni F, Baradaran Mahdavi MM. Anatomical variation of celiac axis, superior mesenteric artery, and hepatic artery: evaluation with multidetector computed tomography angiography. J Res Med Sci 2016;21:129.
2. Torres A, Andrade EO, Christoph CL, Weinberger M. Congenital absence of the superior mesenteric artery. J Pediatr Surg 1999;34:1858-60.
3. Da Silva NCO, Barbosa ABM, Silva NA, Nevesaraugo D, Assis TO. Anatomical variation of the superior mesenteric artery and its clinical and surgical implications in humans. ABCD Arq Bras Cir Dig 2020;33:e1508.
4. Wu Y, Peng W, Wu H, Chen G, Zhu J, Xing C. Absence of the superior mesenteric artery in an adult and a new classification method for superior-inferior mesenteric arterial variations. Surg Radiol Anat 2014;36:511-5.
5. Chanpen N, Arjhansiri K. Aberrant branches of the superior mesenteric artery detected by MDCT angiography of abdominal aorta. Asian Biomed 2012;6:219-26.
6. Hazirolan T, Metin Y, Karaosmanoglu A, Canyigit M, Turkbey B, Oguz B, et al. Mesenteric arterial variations detected at MDCT angiography of abdominal aorta. AJR Am J Roentgenol 2009;192:1097-102.

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