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CASE STUDY

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ANATOMICAL VARIATION OF THE SUPERIOR MESENTERIC ARTERY: CASE REPORT

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ABSTRACT

Anatomical variations in the abdominal cavity are critical for surgical planning and ensuring safe, effective procedures. Variants of the superior mesenteric artery are not uncommon and provide important insights into clinical conditions. In the dissection of a male cadaver, approximately 60 years old, a common trunk was observed arising from the superior mesenteric artery, giving rise to the right colic and ileocolic arteries. The anterior and posterior cecal branches were also identified. This finding is relevant for both anatomical studies and the refinement of clinical and surgical practice.

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INTRODUCTION

The abdomen is the region of the human body located between the thoracic and pelvic cavities. It contains vital organs involved in digestion, waste filtration, and food storage, which require an adequate supply of oxygen and nutrients. In this context, the abdominal aorta plays a key role by providing major branches such as the superior mesenteric artery (SMA), inferior mesenteric artery, and renal arteries, which ensure proper vascularization. This study focuses on a variation of the SMA, which supplies the small intestine, ascending colon, and part of the transverse colon (DRAKE, 2013). Anatomical variations of the SMA are common and frequently reported in scientific literature. They may occur unilaterally or bilaterally and can differ in number. According to Silva *et al.* (2020), such variations are not rare, and published reports highlight their clinical importance in the development of relevant conditions. Understanding these variations is therefore crucial for surgeons and specialists working in this field. By definition, an anatomical variation of the SMA occurs when its origin or course diverges from the standard descriptions found in the literature. Normally, the SMA arises from the abdominal aorta at the level of the first lumbar vertebra (L1), approximately 1 cm below the celiac trunk.

It continues between the mesenteric layers, giving rise to 15–18 jejunal and ileal branches, as well as the ileocolic and right colic arteries, which supply the ascending colon and hepatic flexure (MOORE, 2021). The present case report aims to describe an anatomical variation observed in a cadaver, in which the SMA gave rise to a common trunk for the right colic and ileocolic arteries, and to discuss its clinical and surgical relevance.

CASE REPORT

During the dissection of a male cadaver, approximately 60 years of age, from the Human Anatomy Laboratory of the School of Health Sciences at the State University of Amazonas, a variation in the branching pattern of the superior mesenteric artery was observed. After carefully removing the muscles and fascia covering the anterolateral abdominal wall, access to the abdominopelvic cavity was achieved (Figure 1). In the anatomical specimen analyzed (Figure 1), it was observed that, from the superior mesenteric artery (SMA), the emergence of a common trunk of approximately 31 mm, from which the right colic artery and the ileocolic artery originated, whose branches are the anterior and posterior cecal arteries.

DISCUSSION

The superior mesenteric artery (SMA), whose function is to irrigate structures derived from the midgut, despite presenting a classic pattern of formation of the middle colic, right colic, ileocolic, jejunal, ileal, and appendicular arteries, can also present anatomical variations (SILVA *et al.*, 2020). Among these anatomical variations, there is one described in the present study, in which, through a common trunk arising from the SMA, the right colic artery forms together with the ileocolic artery.



Legend: AMS = Superior Mesenteric Artery, Common Trunk, ACD = Right Colic Artery, AIC = Ileocolic Artery, ACA = Anterior Cecal Artery, ACP = Posterior Cecal Artery

Source: Human Anatomy Laboratory ESA/UEA (2025).

Figure 1. Superior Mesenteric Artery and its branches

In this anatomical variation, in which the SMA has a common trunk between the ileocolic and right colic arteries, Jain and Motwani (2013) detail that in a study conducted with 20 cadavers, 70% had a normal SMA branching pattern, while 25% presented this type of anatomical variation, in which the SMA, through a common trunk, gives rise to the right colic and ileocolic arteries. Gamo (2016) analyzed 50 cadavers and, based on these observations and previous reports of 560 computed tomography scans, proposed that the superior mesenteric artery can be classified into one of four described patterns: I, II, III, and IV. Pattern I is described as the independent emission of the three main branches. Pattern II is further divided into three subtypes: II.a - common trunk between the middle colic artery and the right colic artery (5.28%); II.b - common trunk between the right colic artery and the ileocolic artery (1.7%); II.c - is defined as the common trunk between the three main branches (FERRARI *et al.*, 2007). Pattern III - is the absence of the right colic artery, and pattern IV - was defined as the presence of any accessory artery (GAMO *et al.*, 2016). Figure 2. a Pattern I: Superior mesenteric artery: right colic artery, middle colic artery, and ileocolic artery arising independently; b Pattern II.a: Common trunk of the middle colic artery and right colic artery. The ileocolic artery arises independently; c Pattern II.b: The right colic artery and ileocolic artery arise from a common trunk, while the middle colic artery arises independently; d Pattern II.c: The three main branches of the superior mesenteric artery: middle colic

artery, right colic artery, and ileocolic artery arising from a common trunk; e Pattern III: Absence of the right colic artery; f Pattern IV: Presence of accessory right colic arteries. Furthermore, Gamo (2016) states that the ileocolic artery (ICA) and the right colic artery (RCA) arise from a single point of origin. The middle colic artery (MCA) arises independently. This configuration was observed in 32% of the dissected cadavers (16 cases, 9 males and 7 females) and in 15% of the CT samples (83 cases, 59 males and 24 females). This finding is important for understanding how anatomical variations in visceral arteries can occur and even confuse surgeons. Furthermore, according to Bruzzi *et al.* (2020), knowledge of the arteries that arise from the SMA is essential for performing right-sided colectomy procedures, since the large number of variations found in the right colon leads to a high morbidity rate.

CONCLUSION

The presence of anatomical variations in the superior mesenteric artery is common, and knowledge on this topic is essential for healthcare professionals to improve clinical and surgical management. This is because the presence of anatomical variations in this vessel interferes with the vascularization of the gastrointestinal tract, as in the case of the pancreas, part of the small intestine, the cecum, the ascending colon, and the proximal two-thirds of the transverse colon. Therefore, these anatomical variations are also important for surgeons to prevent damage to this vessel, which could lead to, for example, severe bleeding or even other complications. Therefore, knowledge of the anatomy and possible anatomical variations of the SMA favors the successful performance of surgical or other interventional procedures.

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