

## Middle Colic Artery Originating Directly from Aorta as a Middle Mesenteric Artery

*A. Mesenterica Media Olarak Doğrudan Aortadan Köken Alan A. Colica Media*

Enis ULUÇAM, Ali YILMAZ, Bülent Sabri CİGALI, Cüneyt BOZER, Levent ELEVİLİ

*Department of Anatomy, Medical Faculty of Trakya University, Edirne*

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During abdominal dissection of a 32-year-old Caucasian female cadaver, an anomalous artery originating from the anterior aspect of the abdominal aorta was found. This artery had its origin between the superior mesenteric and inferior mesenteric arteries. It was 2.2 mm in diameter and formed an arch ascending to the left of the midline supplying the transverse colon. It was divided into right and left branches; the former anastomosing with the right colic artery, the latter with the left. During the diagnostic imaging of the abdominal vasculature and the practice of colonic surgery, the possibility of the existence of an anomalous artery must be kept in mind.

**Key words:** Middle mesenteric artery; abdominal aorta; middle colic artery; colon surgery.

Otuz iki yaşında beyaz, kadın bir kadavrada gerçekleştirilen karın bölgesi disseksiyonu sırasında aortanın ön yüzünden köken alan anormal bir arter bulundu. Bu arterin başlangıç noktası a. mesenterica superior ile a. mesenterica inferior arasındaydı. Çapı 2.2 mm idi ve orta hattan sola doğru bir kavis yaparak yukarı ilerlemekte, colon transversum'u beslemektedi. Sağ ve sol olmak üzere iki dala ayrılmış sağ dalı ile a. colica dextra, sol dalı ile de a. colica sinistra ile birleşmekteydi. Karın damarlarının teşhis amaçlı görüntülenmesi ve kalın bağırsak cerrahisi sırasında anormal bir arter varlığının olasılığı akılda bulundurulmalıdır.

**Anahtar sözcükler:** A. mesenterica media; aorta abdominalis; a. colica media; kalın bağırsak cerrahisi.

Middle mesenteric artery (MMA) arises from the abdominal aorta between superior mesenteric artery (SMA) and inferior mesenteric artery (IMA).<sup>[1-5]</sup> There are two different MMA case definitions in literature: one of them is the MMA arising directly from aorta as a different artery. SMA and IMA branches are normal in this case.<sup>[2,3]</sup> The other one is the middle colic artery (MCA) arising from aorta instead of

SMA.<sup>[1,6]</sup> Although there are considerable variations of those vessels supplying the gut, the quite cases of MMA are rare. These cases are usually recognized during radiologic interventions. In our case, the MCA was an anomalous branch arising from the abdominal aorta as a MMA. This report emphasizes the developmental aspects and the clinical importance of this rare anomaly.

## CASE REPORT

During abdominal dissection of a 32-year-old Caucasian female cadaver, an anomalous branch of the abdominal aorta supplying the colon was found. This anomalous branch was arising from the anterior aspect of the abdominal aorta between the superior and inferior mesenteric arteries at the L2-L3 intervertebral disc level (Fig. 1). It formed an arc ascending to the left of the midline supplying the transverse colon. It was divided into right and left branches; the former anastomosing with the right colic artery, the latter with the left. The left branch formed the Riolan's arch with the left colic artery (Fig. 2). The distance between any two branches arising from the abdominal aorta and the diameter of the anomalous artery were measured. It was 2.2 mm in diameter. The distance between SMA and MMA was 5.25 mm and the distance between MMA and IMA was 4.25 mm. Except the absence of MCA, the other branches of the SMA and IMA were normal.

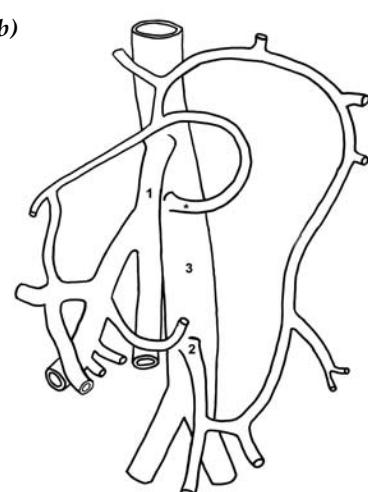
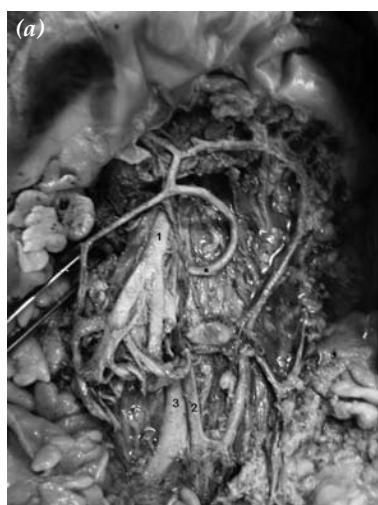
## DISCUSSION

Middle mesenteric artery which is a rare anomaly has mostly been observed during radiological interventions. Lawdahl and Keller<sup>[3]</sup> noted, on angiography, an artery arising from the anterior aspect of the aorta, slightly to the left of the midline, between the SMA and the IMA. The artery ran upwards towards the left and supplied the splenic flexure of the colon. Unlike our case, the middle colic branch of the SMA was present.



**Fig. 1.** Middle mesenteric artery, 1: Superior mesenteric artery, 2: Inferior mesenteric artery 3: Abdominal aorta.

Yoshida et al.<sup>[1]</sup> reported an MMA arising from the aorta between the SMA and IMA on angiography in a 49-year-old male with a left renal tumor. The anomalous vessel branched to supply the transverse colon, with a connection to the right colic artery from the SMA and to supply the left side of the transverse colon, the splenic flexure, and the proximal descending colon, with a connection to the left colic artery. Like our case, the MCA arising from the SMA was absent. Koizumi et al.<sup>[7]</sup> reported an MMA arising from the abdominal aorta between the SMA and the IMA on CT angiography in a 55-year-old woman. The MMA was branched into the ileocolic artery into the right, middle and accessory middle colic arteries.



**Fig. 2.** (a) 1: Superior mesenteric artery, 2: Inferior mesenteric artery, 3: Aorta, \*: Middle mesenteric artery. (b) Schematic drawing of the case.

This was supplying the caecum, the entire ascending and transverse colon, and the splenic flexure.

Pillet<sup>[2]</sup> reported a case in which the MMA arose from the abdominal aorta 1 cm below the superior mesenteric artery. While this anomalous branch had an anastomosis with the right superior colic branch of the SMA, it had no connections with the inferior mesenteric artery. Benton and Cotter<sup>[4]</sup> reported an anomalous mesenteric artery in a cadaver. This anomalous artery was directed superiorly and gave branches to the superior part of the descending colon and the entire transverse colon. The MCA was absent.

As stated previously, the recognition of variant colonic arterial supply has important diagnostic and therapeutic implications. Ignorance of these variations may result in either a false positive diagnosis such as branch occlusion or in a false negative diagnosis in the supplied segment of the colon.<sup>[3,7]</sup> The preservation of the continuity of the Riolan's arch and Drummond's artery after transverse colon resection is important for the prevention of the development of necrosis and gangrene. The disruption of this anastomosis as a consequence of the dissection of MMA may result in the development of a fistula. The radiologic technique utilized becomes a determinant of the choice of correct surgical technique.<sup>[8-10]</sup> If present, MMA must be preserved to confirm patency during device deployment in order to prevent bowel ischemia during interventional radiologic procedures such as endovascular aortic aneurysm repair.<sup>[5]</sup> LeQuire et al.<sup>[8]</sup> stated that an anteroposterior aortogram performed without a selective contrast material may cause the confusion of these important anastomoses for accessory or separate hepatic artery. In these situations, it is difficult to find hemorrhage focus and performing total colectomy instead of partial is a wrong decision.

Such anastomoses between the SMA and IMA, and their variations must not be overlooked. There may be misinterpretation of the signs of intestinal hemorrhage if care is not taken in the evaluation process. An extensive evaluation of the celiac trunk, SMA, IMA and their branches which supply the gut are of crucial importance before a colonic surgical intervention. Possible existence of an anomaly must be kept in mind if any of these branches cannot be observed.

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