

VARIANT MIDDLE COLIC ARTERY ARISING FROM INFERIOR MESENTERIC ARTERY**Dr. Vijaykishan B.¹ and Dr. Yogesh Sontakke^{2*}**¹Assistant Professor, Department of Anatomy, Mahatma Gandhi Medical College, Pondicherry.²Associate Professor, Department of Anatomy, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Pondicherry.***Corresponding Author: Dr. Yogesh Sontakke**

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ABSTRACT

Background: Middle colic artery normally arises from the superior mesenteric artery, enters the transverse mesocolon, divides into right and left branches and supplies whole of transverse colon. There are some variations in its origin one which is found by us. **Case Description:** During the routine dissections among the undergraduate students, an abnormal origin of middle colic artery was found as it arised from the inferior mesenteric artery instead of the superior mesenteric artery. It arised as a common trunk that later divided into middle and left colic arteries. **Conclusion:** Knowledge about the variant origin of middle colic artery is important in the colonic surgeries.

KEYWORDS: Transverse colon, middle colic artery, instesine.**INTRODUCTION**

The abdominal aorta gives three ventral branches, namely coeliac trunk, superior mesenteric artery and inferior mesenteric artery. The coeliac trunk supplies derivatives of foregut, superior mesenteric artery supplies derivatives of midgut, whereas inferior mesenteric artery supplies derivatives of hindgut. Middle colic artery usually arises from the superior mesenteric artery just distal to the inferior pancreaticoduodenal artery. It then runs vertically upwards in the transverse mesocolon and divides into right and left branches. Right branch anastomose with ascending branch of the right colic artery and the left branch anastomose with ascending branch of left colic artery. It supplies the whole of the transverse colon and proximal part of descending colon.^[1]

Earlier, cadaveric and radiological studies have observed unusual origin or even absence of middle colic artery. Previously reported studies indicate that the middle colic artery was found to be arising from abdominal aorta^[2], splenic artery^[3] and gastroduodenal artery.^[4] The middle colic artery is absent in 3 to 5% of cases. The middle colic artery can be termed as a colonic artery when it arises from celiac trunk or can be termed as a middle mesenteric artery when it directly arises from aorta between superior and inferior mesenteric artery.^[5,6,7] It was also found to be arising from Coeliac trunk^[8], common hepatic artery.^[9] Knowledge of this variant origin is essential for diagnostic angiographic procedures and abdominal surgeries.

CASE REPORT

During routine educational dissection among undergraduate students at tertiary care hospital, an unusual origin of the middle colic artery was found in an adult female cadaver. The anterior abdominal wall was dissected out from above downwards. The stomach and greater omentum were then reflected upwards. Jejunal and ileal loops were retracted upwards to visualise superior and inferior mesenteric arteries. Mesentery was opened and the branches of superior mesenteric artery were traced. Parietal peritoneum of the posterior abdominal wall was reflected to find the branches of inferior mesenteric artery.

A common trunk arising from the inferior mesenteric artery was found to be divided into middle colic and left colic artery. The length of the common trunk of the inferior mesenteric artery was 3 cm. The length of the middle colic artery was 9 cm. Middle colic artery ran vertically upwards in the transverse mesocolon and bifurcated into right and left branches. Right branch anastomosed with ascending branch of the right colic artery and left branch with the ascending branch of the left colic artery.

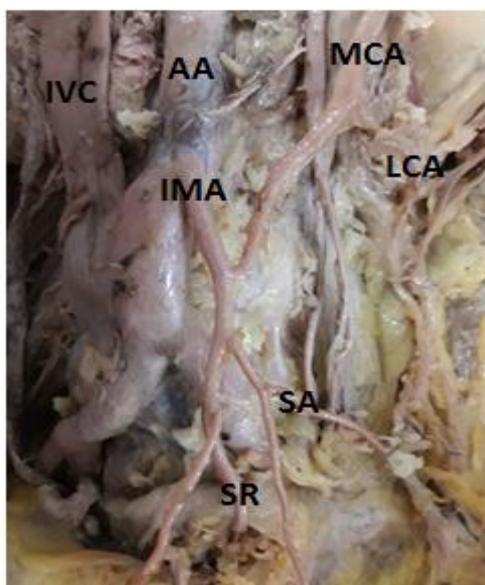


Figure 1: Branches of inferior mesenteric artery.

AA: Abdominal Aorta, IMA: Inferior mesenteric artery, IVC: Inferior vena cava, LCA: Left colic artery, MCA: Middle colic artery, SA: Sigmoidal artery, SR: Superior rectal artery.



Figure 2: Arterial supply of colon.

AA: Abdominal Aorta, IMA: Inferior mesenteric artery, IVC: Inferior vena cava, LCA: Left colic artery, MCA: Middle colic artery, RCA: Right colic artery, SA: Sigmoidal artery, SR: Superior rectal artery.

DISCUSSION

Usually middle colic artery originates from the right side of superior mesenteric artery just below the inferior

pancreaticoduodenal artery. It usually arises from a common trunk that divides into right and middle colic arteries. It supplies entire transverse colon and proximal part of descending colon through the marginal artery. When colonic ischaemia does occur, it is usually maximal in the region of the splenic flexure and proximal descending colon because this segment is furthest from the collateral arterial supplies.^[1] In the present case, it was seen that superior mesenteric artery did not give middle colic artery. On further dissection, it was found that inferior mesenteric artery gave a common trunk that later divided into the middle colic artery and left colic artery.

Earlier studies have cited various variations in the origin of the middle colic artery. Benton and Cotter (1963) found middle colic artery directly arising from the abdominal aorta. This artery was directed superiorly and gave branches to the superior part of descending colon and entire transverse colon.^[2] Middle colic artery originating from the proximal segment of splenic artery was also reported by Samanta PP et al (2013).^[3] Variant origin of the middle colic artery from gastroduodenal artery was reported by Indrajith et al. (2013).^[4] Enis Ulucam et al. (2009) reported middle colic artery originating directly from aorta as a middle mesenteric artery.^[5] Yosidha et al. reported a middle mesenteric artery arising from the aorta between superior mesenteric and inferior mesenteric artery on angiography.^[6] Pillet et al. reported a case in which the middle mesenteric artery arose from the abdominal aorta 1 cm below the superior mesenteric artery.^[7] The middle colic artery originating atypically from the bed of the coeliac trunk was reported by Makowski M et al.^[8] Wadhwa et al reported anomalous middle colic artery arising from the common hepatic artery.^[9] Shoumura et al reported middle colic artery arising from hepatic artery.^[10] Garcia-Ruiz et al^[11] and Chitra et al^[12] have reported the presence of double middle colic artery.

Knowledge of variations in the branching pattern of abdominal arteries is essential for the abdominal surgeries to prevent excessive bleeding caused by injuring one of these branches. Occlusion of the inferior mesenteric artery is often associated with abdominal aorta aneurysm when the descending colon remains viable because the marginal artery continues to receive adequate blood supply from a left branch of the middle colic artery and the sigmoid colon gains its supply from middle and inferior rectal arteries via superior rectal and sigmoidal arteries.^[1] The Griffiths point is the watershed anastomosis between the ascending left colic artery and the marginal artery of Drummond occurring in the region of the splenic flexure.^[13]

The basis of the present variation can be explained on the basis of the embryological views. There are the three sets of paired arterial branches arising from the paired dorsal aorta as follows: the dorsal intersegmental, the lateral segmental, and the ventral segmental vessels. The paired

ventral segmental arteries lie along the dorsal and lateral walls of the gut and yolk sac. Finally, as the dorsal aorta fuse, the ventral branches are also fused to form a series of unpaired segmental vessels.^[4] These ventral branches from dorsal and ventral anastomosis along the gut. Due to such extensive anastomosis, the need for numerous ventral splanchnic branches reduces and ultimately only three trunk persists namely the coeliac trunk, superior mesenteric artery and inferior mesenteric artery.^[5]

The gene responsible for the development of middle colic artery is *pitx2* dependent *cxcl12*.^[14]

CONCLUSION

Knowledge of variations in the middle colic artery is essential for the colonic surgeries and also for diagnostic angiographic procedures.

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