

STUDY ON THE MORPHOLOGIC VARIATIONS IN COLIC BRANCHES OF SUPERIOR MESENTERIC ARTERY

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ABSTRACT

Superior mesenteric artery arises from the abdominal aorta and supplies the derivatives of Midgut. Knowledge of the normal and anomalous arterial supply is important in modern abdominal surgical techniques like liver transplants, laparoscopic surgery, splenectomies, intestine transfers, penetration injuries of abdomen, resections of the small and large intestines, in radiological diagnosis and radiological abdominal interventions. A total number of 50 superior mesenteric arteries were studied in the different age group and sex by Dissection, Angiogram pictures and Surgeries. The colic branches were studied for variations in origin, course and pattern of supply.

KEY WORDS: Superior mesenteric artery, midgut, anomalous, splenectomise, laparoscopic.

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INTRODUCTION

Superior mesenteric artery arises from the abdominal aorta at the level between 1st lumbar and 2nd lumbar vertebrae. It supplies the second part of the duodenum distal to the major duodenal papilla, the third and fourth part of the duodenum, a portion of the head and frequently an extreme area of the body of the pancreas, the jejunum, ileum and the large intestine up to the junction of right two third and left one third of transverse colon because it is the artery of midgut.

The colic branches arise from the concave right side of the artery as the middle colic, the right colic and the ileocolic branches. From the convex left side of the artery arise 12-15 jejunal and illeal branches.

Middle Colic Artery leaves the superior mesenteric artery just inferior to the pancreas descending in the transverse mesocolon and it divides into a right and left branch. The right branch anastomose with the right colic artery, and the left branch with a branch from the inferior mesenteric artery. Arches thus formed are 3 to 4 cm from the transverse colon, which they supply.

Right Colic Artery arises near the middle of the superior mesenteric artery and passes to the right behind the parietal peritoneum. Near the colon it divides into an ascending branch which anastomose with middle colic branch and a descending branch which anastomose with the ileocolic artery. These form arches, from which vessels are distrib-

distributed to the ascending colon, supplying its upper two-thirds and the right colic flexure.

Ileocolic artery, the last branch from the right side of the superior mesenteric artery descends to the right under the parietal peritoneum to the right iliac fossa, where it divides into a superior branch and inferior branch. Its superior branch anastomose with right colic artery, the inferior branch anastomose with the end of the superior mesenteric artery. Its inferior branch approaches the superior border of the ileocolic junction and divides in to branches as a) ascending branch b) anterior and posterior caecal c) an appendicular artery and d) an ileal branch [1,2].

Arterial vascularisation of the gastrointestinal system is provided by 3ventral branches at three different levels of the abdominal aorta (the celiac trunk and the superior and inferior mesenteric arteries).

Depending upon the embryological stage of development the variations in vascular structures will be present [3].

In oesophageal reconstruction surgeries, the colon can be used as an oesophageal substitute when the stomach is unusable or in total gastrectomy. The advantages of using colon are its length, rich blood supply and acid resistance [4].

The mesenteric collaterals between SMA and IMA especially marginal artery of Drummond and arc of Riolan can maintain adequate perfusion when major mesenteric branches are ligated [5].

MATERIALS AND METHODS

The study was done in 50 specimens which include gross anatomy specimens, angiographic pictures and in foetuses. The dissections were done according to Cunningham's manual and the variations were identified, photographed and documented.

RESULTS

In 50 specimens, the middle colic artery was present in 48 and absent in 2 specimens. Middle colic and Right colic artery arose as a common trunk from superior mesenteric artery in 6 specimens.

Double middle colic arteries were observed in 4 specimens.

Right colic artery was present in 47 and absent in 7 specimens. Out of the 43 right colic arteries, 34 showed normal site of origin. Double right colic artery was present in 6 specimens, common trunk with ileocolic artery in 1specimen and arising from ileocolic artery in 2 specimens.

Fig. 1: Absence of Middle colic artery.

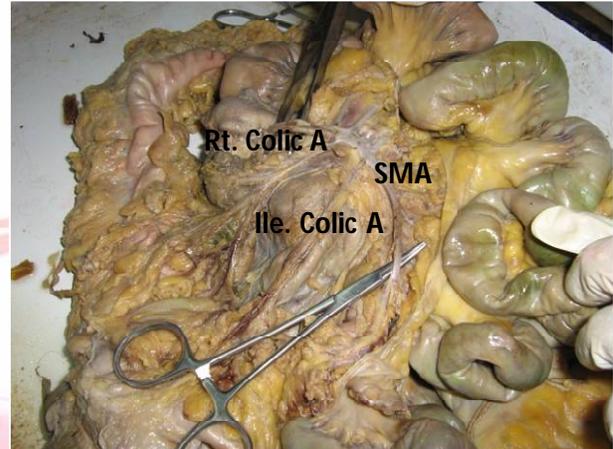
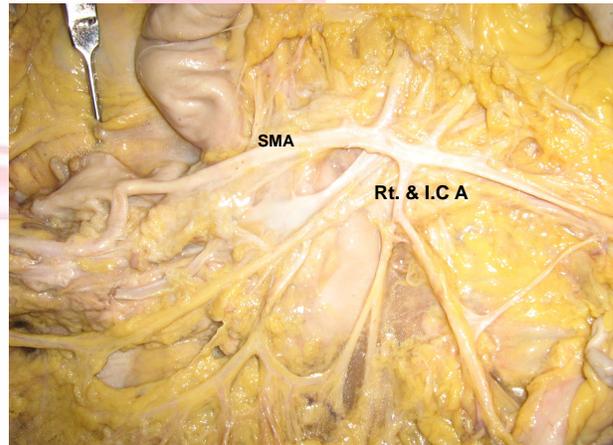


Fig. 2: Right colic and Ileocolic arteries as a common trunk.



DISCUSSION

In the present study the following findings were observed:

- Absent middle colic (4%) & right colic (14%) arteries
- Double middle colic (8%) & right colic (12%) arteries
- Common trunk for middle & right colic arteries (12%)
- Common trunk for right & ileocolic arteries (2%)
- Right colic artery arising from ileocolic artery (2%)
- Ileocolic artery from Right colic artery (12%).

The variations in the colic branches are not uncommon and types have been reported in earlier studies. Sonneland et al(1958) studied 600 specimens and demonstrated the classical pattern of the colic arteries in 23.8 %. They observed not only anomalies but described 24 patterns of colic arteries. They reported the absence of middle colic artery in 3.6 % (22 bodies in 600). Single middle colic artery was present in 7 %. Two middle colic arteries with two separate origin was found [6].

Common stem which shares middle colic and right colic arteries in 30% to 40% was reported earlier [2]. Presence of double middle colic artery was reported earlier [7].

The middle colic branch of the superior mesenteric artery is very variant. It is often absent and will be replaced by branches of the right colic or by a left colic reaching the hepatic flexure. It may arise from the celiac, common hepatic or a replaced right hepatic of the superior mesenteric origin. In some cases the Middle colic, the superior pancreaticoduodenal and the right gastroepiploic arose from superior mesenteric artery via a common trunk and middle colic artery was absent in 3 % of cases [5].

In a radiological study for oesophageal reconstruction, presence of double middle colic arteries and in another study accessory middle colic arteries were reported [8,9].

Reports say that there was absence of right colic artery in 18 % of cases. In 40 % it arises from superior mesenteric artery, in 30 % along with middle colic and in 12% along with ileocolic artery [5,7,10].

Sonneland et al (1958) reported absence of right colic artery in 12.6 % in a study of 600 bodies, in 78 % right colic artery arose as a single vessel, in 8.7 % showed two right colic arteries and in 0.7 % three right colic arteries arising from superior mesenteric arteries [6].

CONCLUSION

Detailed knowledge of the colic branches of superior mesenteric artery is essential for successful accomplishment of oncologic, surgical, radiological interventional procedures and also for anatomist to teach medical students.

Since damage to these variant branches may lead to severe haemorrhage and post-operative complications, the knowledge about them is very important.

Conflicts of Interests: None

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