



Case Report

Multiple Accessory Middle Colic Arteries – A Rare Case Report

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ABSTRACT

The superior mesenteric artery takes origin from the abdominal aorta 1cm below the origin of celiac trunk at the level of L1 vertebra. It supplies the whole of small intestine except the superior part of duodenum, it also supplies the caecum, ascending colon and most of the transverse colon. During routine dissection of I MBBS students batch (2012-2013) in an elderly male cadaver aged 65 yrs at DR. PSIMS & RF Gannavaram; Krishna Dist; A.P (INDIA) multiple middle colic arteries as direct branches from superior mesenteric artery were found. The comprehensive knowledge of the colonic arterial pattern including variations remains as the key issue in determining the technical feasibility of surgical interventions like colonic interposition, colonic grafts as well as the post operative management.

KEYWORDS: Superior mesenteric artery, Colon, Middle colic artery.

INTRODUCTION

Large intestine is partly supplied by Superior mesenteric artery and partly by inferior mesenteric artery. Ascending colon is supplied by left colic branch and major part of transverse colon by middle colic branch of Superior mesenteric artery whereas small left portion of transverse colon, descending and Sigmoid colon receive blood supply from left colic, sigmoidal branches of inferior mesenteric artery. The middle colic artery normally arises from superior mesenteric, either while the vessel lies behind the pancreas or as it emerges at its lower border [1]. A single accessory middle colic artery was seen in 10% of cases, where it arises proximal to main middle colic artery and directed towards left in the mesocolon to anastomose with marginal artery near left colic flexure [2]. The mesenteric circulation has a rich system of collateral vessels that provide a

potential mechanism for maintaining adequate perfusion to the colon when major mesenteric branches are surgically ligated. These collaterals, which play an important role in colonic surgery, are those between the SMA and IMA, and primarily include the marginal artery of Drummond [3] and the arc of Riolan [4]

The surgical use of the colon as an esophageal substitute plays an important role in esophageal reconstruction, especially when the stomach is unavailable for use. Colonic interposition may be the only surgical option in various situations, such as when prior gastric surgery precludes use of the stomach; when total gastrectomy accompanies esophageal resection; or as a salvage procedure when previous gastroplasty fails. The advantages of using the colon include its length, acid resistance and typically rich blood supply. [5].

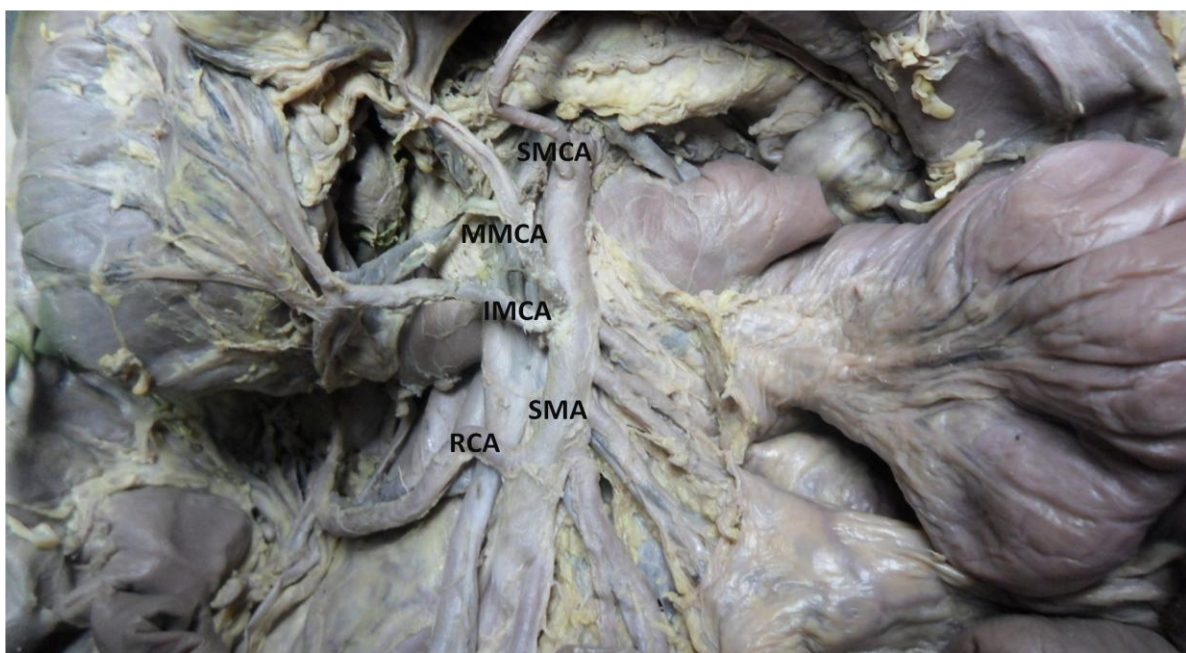
CASE REPORT

During routine dissection of I MBBS students (batch 2012-2013) in an elderly male cadaver aged 65 yrs at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences & Research Foundation Gannavaram; Krishna Dist; A.P (INDIA) it is observed that superior mesenteric artery gives rise to 3 separate middle colic arteries from its anterior aspect arranged one below the other as superior, middle & inferior middle colic arteries which entered into the transverse mesocolon sequentially lower one to the right

side & upper to the left side (fig:1). In addition, the transverse colon also received another branch from left colic artery (fig: 2). Thus total 4 arteries supplied transverse colon (fig: 2).

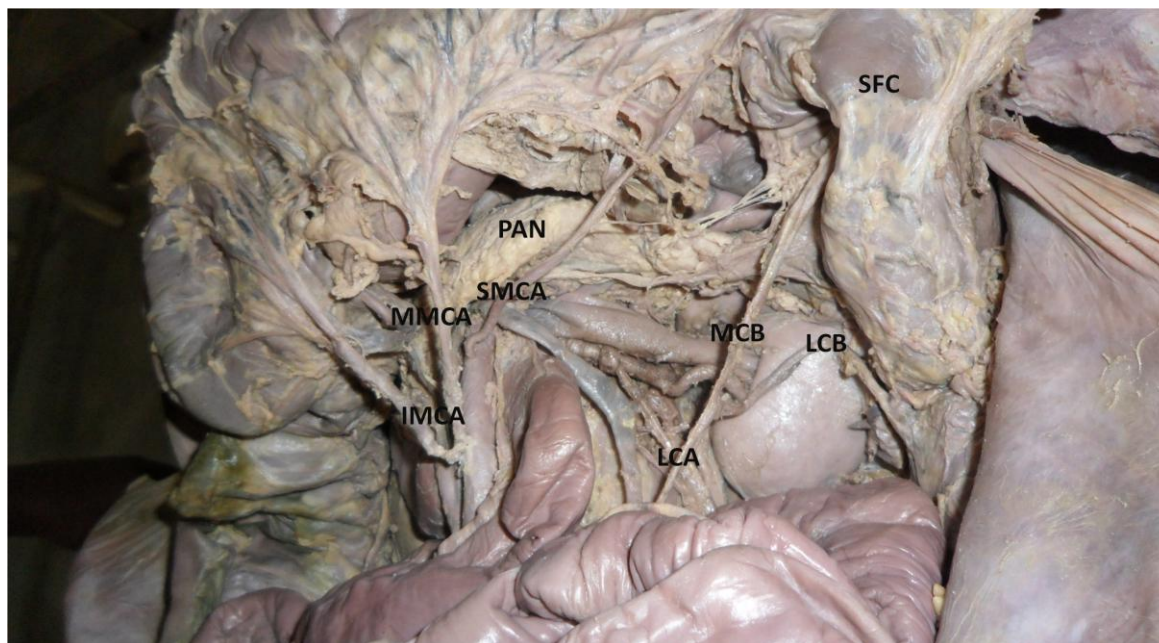
On careful dissection it was observed that transverse colon was folded in left hypochondriac region without any adhesions & after releasing the folds the length of transverse colon measured using a measuring tape was found to be 19 inches and this can be considered as the underlying cause for the increase in the number of feeding arteries.

Figure 1: Three middle colic arteries from Superior mesenteric artery



SMCA-Superior Middle Colic Artery, **MMCA**-Middle Middle Colic Artery, **IMCA**-Inferior Middle Colic Artery, **SMA**-Superior Mesenteric Artery, **RCA**-Right Colic Artery

Figure 2: Accessory middle colic branch from left colic artery along with triple middle colics from superior mesenteric artery



SMCA-Superior Middle colic Artery, MMCA-Middle Middle Colic Artery, IMCA-Inferior Middle Colic Artery, LCA-Left Colic Artery, MCB-Middle Colic Branch, LCB-Left Colic Branch, PAN-Pancreas, SFC-Splenic Flexure of Colon

DISCUSSION

In a radiological study conducted on 54 patients undergoing mesenteric angiography before esophageal reconstruction, on angiography 19/54 (35%) patients had vascular anatomy that was considered unsuitable for left colonic interposition surgery. 2 out of those 19 patients presented with double middle colic arteries.[6] According to Ronald et al the incidence of accessory middle colic arteries from superior mesenteric artery was around 9% of individuals.[7].

Angiographic patterns of the SMA anatomy have been divided into five categories based on the work of Sonneland et al. [8]. Type 1 consists of patients with the most common, classical arterial configuration, consisting of three dominant branches supplying the right colon: the middle colic, right colic, and ileocolic arteries. Patients with an absent right colic artery are classified as type 2, and patients with an absent middle colic artery as type 3.

Type 4 is characterized by multiple right colic arteries and type 5 patients show multiple middle

colic arteries. Incidence of double middle colic arteries was 3.7% in radiological study which was less compared to 10-12% in the previous studies [6].

Multiple variations in the middle colic artery have been described, including an aberrant origin, complete absence (in up to 25% of individuals), and presence of an accessory or double middle colic artery (~10%) [9]. Presence of double middle colics, common trunk with left or right colic arteries and complete absent middle colic artery are the commonly reported variations of middle colic artery but the present case report of multiple accessory middle colic arteries (n=4), 3 directly from superior mesenteric artery was never reported before. Increase in the number of middle colic arteries can be explained by the increase in length of transverse colon as it may need supplementary arteries for its blood supply. When there are marked variations in the total length of colon, these are usually due to unusual lengths of either transverse colon or sigmoid colon [1].

CONCLUSION :

Colonic interposition may be the only surgical option in some situations, in such a case detailed knowledge of vascular anatomy of colon is a prerequisite. Presence of multiple accessory colic arteries is one such condition considered unsuitable for colonic interposition. Preoperative angiography can be used to identify anomalous or aberrant arteries that supply the colon and thereby acts as a guide in the selection of reconstruction option to avoid unwanted complications..

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