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A VERY RARE VARIANT IN THE COLON SUPPLY – ARTERIA MESENTERICA MEDIA

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Aims: The arteria mesenterica media is a very rare variation of the mesenteric blood supply. It is a direct branch from the aorta abdominalis originating between the arteria mesenterica superior and inferior. This is not an aim.

Methods: One hundred forty-nine large intestines from cadavers fixed with formaldehyde were dissected.

Results: A case of the present arteria mesenterica media was discovered during the dissection of the large intestine blood supply. It originated from the anterior wall of the aorta abdominalis 2 cm above the arteria mesenterica inferior origin, having the diameter 0.9 mm. Then it ran horizontally to the left giving off branches to the colon descendens and flexura coli sinistra, in the extent of the normal arteria colica sinistra.

Discussion: Seventeen cases of true arteria mesenterica media have been reported since 1952.

Conclusion: The term arteria mesenterica media must be reserved for the vessel stemming from the aorta abdominalis in the extent between the arteria mesenterica superior and inferior.

INTRODUCTION

The arteria mesenterica media (AMM) belongs to a group of a very rare variations of the mesenteric blood supply. It is defined as a direct branch of the aorta abdominalis, branching from its anterior wall, below the origin of the arteria mesenterica superiorly and above the origin of the arteria mesenterica inferiorly. Its peripheral course and supplying area are various and can resemble that of the arteria colica media, the arteria ileocolica or the arteria colica sinistra. The segments of the intestine fed by it, comprise a variable portion of the colon differing from case to case. Embryologically, it results from the incomplete regression of the primitive paired segmental ventral branches of the aorta dorsalis. Usually only the 10th, 13th and 22nd ventral segmental arteries persist to form the truncus coeliacus, arteria mesenterica superior et inferior, respectively[1].

This arterial variant may cause difficulties in conjunction with an aortic aneurysm and its endovascular repair as reported by *Falkensammer*[2].

METHODS AND MATERIAL

One hundred forty-nine preparations of the large intestine were taken from anatomical cadaverous material and harvested from pathological sections (Czech population, age 40-91, 95 females, 54 males). The already fixed anatomical material samples were directly dissected. The material from the pathology department was firstly rinsed with water, a feeding vessel was visualized, cannuled and the blood vessel network was rinsed with lukewarm saline. It was then injected with the India ink solution (ratio 1 : 1), placed in 8 % formaldehyde solution for 10 days and then dissected.

RESULTS AND DISCUSSION

A case of the arteria mesenterica media was discovered during the dissection of the colon blood supply. This stemmed from the anterior wall of the aorta abdominalis 2 cm above the arteria mesenterica inferior origin and 5 cm below the arteria mesenterica superior origin, being 9 mm wide. Then it ran horizontally to the left giving off branches to the colon descendens and flexura coli sinistra, in the extent of the normal arteria colica sinistra. The first branch, reflecting the normal arteria colica sinistra, stemmed 35 mm from the origin of the arteria mesenterica media and 5 mm wide (see Fig. 1 and 2). The main trunk (6 mm wide) then continued to the aboral segment of the colon descendens, corresponding to ramus colicus arteriae colicae sinistrae (see Table 1). Its frequency varies from 33 % (ref.[3]) to 47 % (ref.[4]). For more details about rami colici arteriae colicae sinistrae, see[5].

Only seventeen cases of the true arteria mesenterica media have ever been reported. The first case was published in 1923 by *Delannoy*[6], who considered it to be a doubled superior mesenteric artery. The following cases

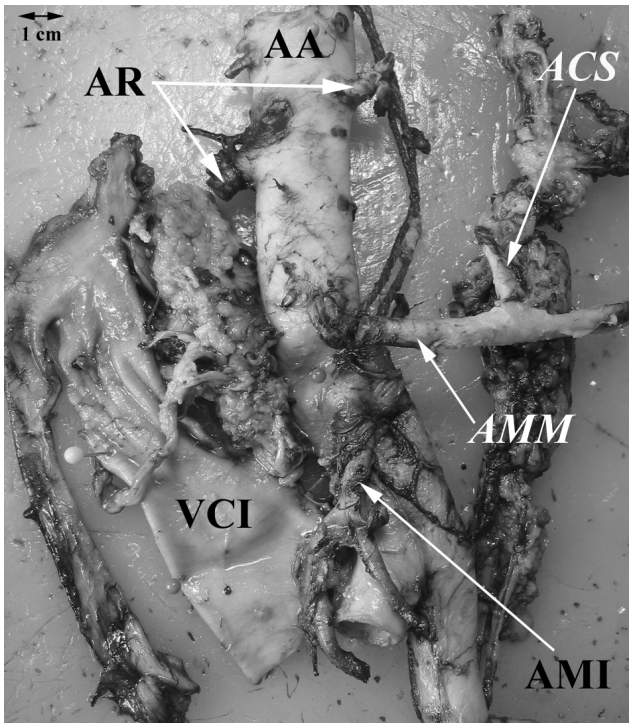

Fig. 1. A case of the arteria mesenterica media.
Legend: AA – aorta abdominalis, VCI – vena cava inferior, AMM – arteria mesenterica media, ACS – arteria colica sinistra, AMI – arteria mesenterica inferior

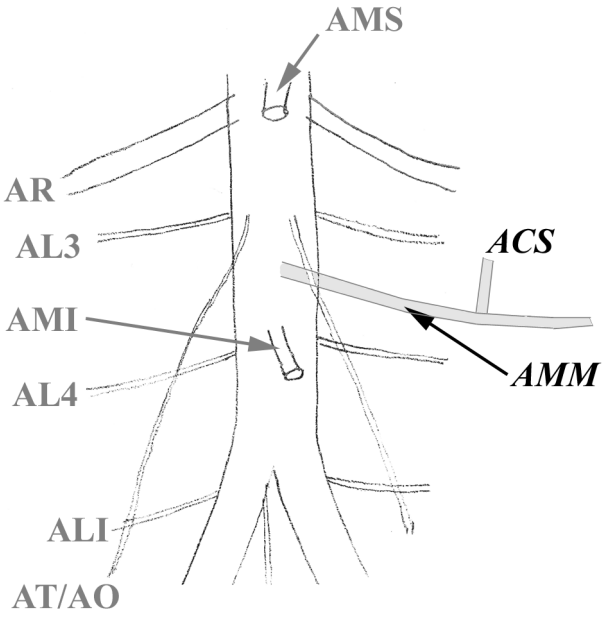

Fig. 2. Schema of the presented case.

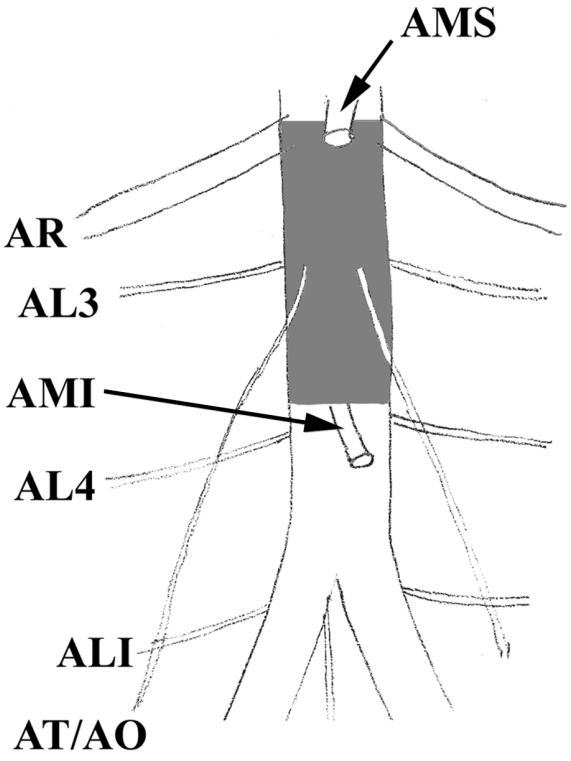

Fig. 3. Area of the possible origin of the "true" arteria mesenterica media.
Legend: AMS – arteria mesenterica superior, AMI – arteria mesenterica inferior, AMM – arteria mesenterica media, ACS – arteria colica sinistra, AR – arteria renalis, AL3 – arteria lumbalis tertia, AL4 – arteria lumbalis quarta, ALI – arteria lumbalis ima, AT/AO – arteria testicularis/ovarica

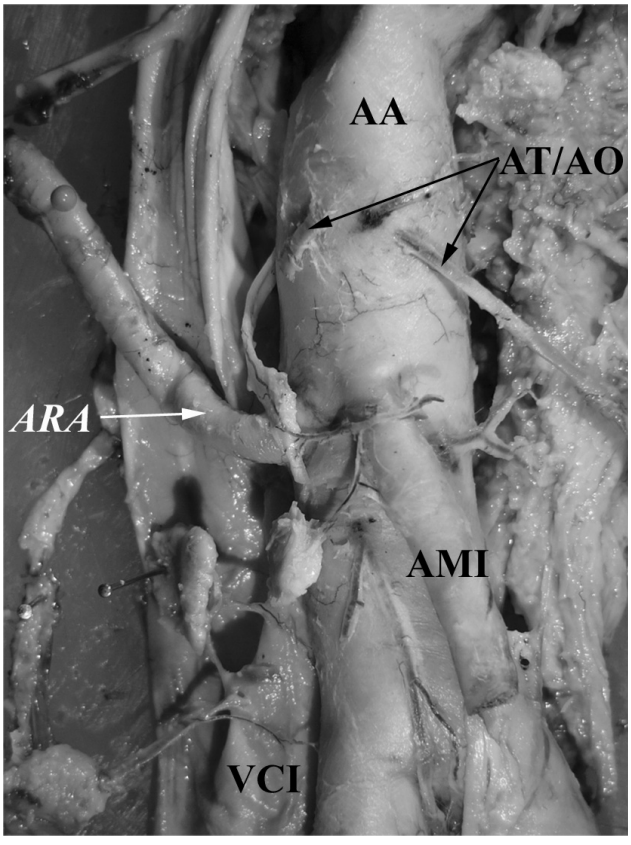

Fig. 4. An example of the arteria renalis accessoria for the inferior pole of the kidney.
Legend: AA – aorta abdominalis, VCI – vena cava inferior, AT/AO – arteria testicularis/ovarica, ARA – arteria renalis accessoria, AMI – arteria mesenterica inferior

Table 1. Propers terms and synonyms of arteries involved in the study.

Proper term	Synonyms
Ramus colicus arteriae colicae sinistrae	Arteria colica sinistra media; Middle left colic artery; Arteria sigmoidea prima; Arteria coli descendentis; Arteria colica media accessoria
Ramus colicus accessorius arteriae colicae sinistrae	Arteria colica sinistra inferior; Inferior left colic artery; La petit artère du côlon; Arteria colica tertia; Arteria coli descendentis; Real sigmoid artery; Penetrating artery; Artery of the pelvic colon
Arteria renalis accessoria inferior	Inferior accessory renal artery; Accessory renal artery for inferior pole; Lower polar artery; Inferior polar artery
Arteria colica aberrans (*with closer specification in every individual case*)	Arteria mesenterica media; Artère mésentérique moyenne; Middle mesenteric artery

described using the dissection technique, were issued by *Rigaud*[7], *Pillet* (first in 1961 and another in 1993)[8, 9], *Benton*[1, 10] and *Ulucam*[11], *Lawdahl*[12], *LeQuire*[13], *Stampfel*[14], *Yoshida*[15], *Koizumi*[16] reported detection of the AMM presence on angiography (feeding the colon transversum and flexura coli sinistra in two cases and in the other three cases the long segment of the intestine stretching from the terminal ileum as far as the flexura coli sinistra).

Kawai[17], *Higashi*[18], *Uchida*[19] reported three cases of AMM occurring in association with bowel non-rotation and *Woodfield*[20] and *Sato*[21] another two cases of AMM combined with bowel non-rotation and abdominal aortic aneurysm. The last published case by *Vandoni* was associated with abdominal aortic aneurysm only[22].

A case reported by *Soutoul*[23] or one by *Pillet*[8] should be reclassified and added to the group of accessory arteries of aberrant origin. Both authors marked them as a „minor type" of arteria mesenterica media, e.g. the arteria colica sinistra originating from the arteria hepatica communis[8]. The double arteria mesenterica superior reported by *Delannoy*[6] is another example of AMM, or rather aberrant colic artery. Duplication of the arteria mesenterica inferior was reported once by *Benton*[1, 10] but it has to be considered as an aberrant vessel as well, as arteria colica sinistra branching directly from the aorta abdominalis giving off the arteria colica media aberrans.

The area between the origins of both constant mesenteric arteries (arteria mesenterica superior and inferior – see Fig. 3) can feature another arterial variant. The arteria renalis accessoria inferior can originate from this area (see Fig. 4). The frequency of the accessory renal arteries ranges from 16 % to 32 % of cases[24, 25], being slightly higher on the right side as reported by *Raman* (16 % on the left side, 22 % on the right side)[26]. *Lippert* reported the arteria renalis accessoria inferior to be present in 7 % of cases in his overview of arterial variants[27], *Bergmann* in 4.7 % of cases (composite of 45 authors and 10,967 kidneys)[28].

The term "arteria mesenterica media" must be reserved for the vessel given off by the aorta abdominalis in the area between both constant mesenteric arteries origins corresponding to the embryological variants according to *Tandler's* scheme[29, 30]. This refers to the survival of some ventral roots which normally compose the mesenteric arteries. The supplied area differs depending on the level of the surviving root and is not crucial for the arteria mesenterica media term implication.

As for the nomenclature, none of these variants is part of the Terminologia Anatomica[31], but the most clinically relevant ones should be reflected in the anatomical nomenclature[32-34].

CONCLUSION

It is necessary to consider every arteria mesenterica media as an aberrant colic artery with an origin from the aorta abdominalis and we suggest using the term "aberrans" rather than the classical term "arteria mesenterica media" according to the supplied area. Following such definiton, our case of the arteira mesenterica media should be called the arteria colica sinistra aberrans.

This rare variant, being a major source of arterial blood supply to various length of the large intestine, has to be kept in mind, especially in para-aortal lympphadenectomy or abdominal aortic aneurysm surgery.

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