CASE REPORT

Celiomesenteric Trunk: An anatomical variation of gastrointestinal vasculature

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Abstract

Celiomesenteric trunk (CMT), a rare anatomical variant of the origin of the celiac trunk and the superior mesenteric artery (SMA) as a single trunk, has significant clinical implications. This case report describes an incidental observation of a CMT in a female cadaver of the Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka. The presence of this variation may influence surgical and interventional procedures in the gastrointestinal system. Therefore, it is essential to be aware of such variations for accurate diagnosis, management, and surgical planning.

Key words: anatomical variations; celiomesenteric trunk; gastrointestinal vasculature

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Introduction

The coeliac trunk usually arises from the anterior aspect of the abdominal aorta at the twelfth thoracic vertebral level, and the superior mesenteric artery (SMA) separately arises from the anterior aspect of the abdominal aorta at the first lumbar vertebral level, superior to the commencement of the left and right renal arteries. However, the arterial system of the gastrointestinal system is complex, and thus occasionally, anatomical variations in these vessels can occur. According to the literature, less than 1% of individuals in the general population have a single origin for the superior mesenteric and coeliac arteries (1,2). The variation, known as the Coelio-mesenteric Trunk (CMT), is characterized by the fusion of the coeliac trunk and the superior mesenteric artery, resulting in a single vessel supplying blood to both the foregut and midgut derivatives of the gastrointestinal system (1).

Though the exact cause for the occurrence of CMT formation is not well understood, it is thought to be a result of variant development in the embryonic vitelline arteries during early embryogenesis. Usually, the 10^{th} to 13^{th} vitelline arteries arises from the primitive abdominal aorta remain connected by a primitive ventral anastomotic artery during embryonic development. Later, these 10^{th} and 13^{th} arteries give rise to the coeliac trunk and the SMA, respectively, while the primitive ventral anastomotic artery, the 11^{th} and 12^{th} vitelline arteries undergo regression (Figures 1,2) (1,3). When a portion of the primitive ventral anastomotic artery fails to regress connecting the coeliac artery or its primary branches to the superior mesenteric artery (SMA), or if any abnormal regression of the 10^{th} and 13^{th} vitelline arteries occurs, CMT formation takes place (Figure 3) (1,4,5,6).

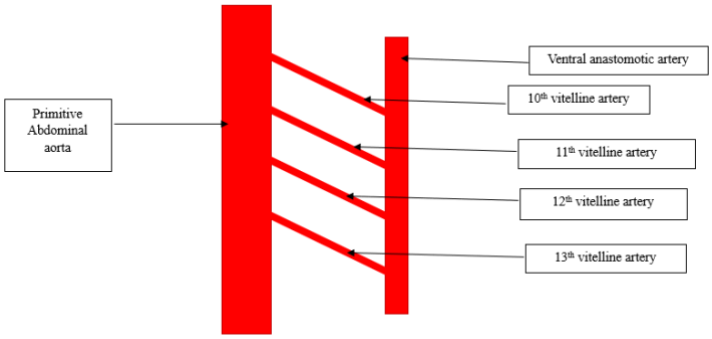


Figure 1: Primitive gastrointestinal vasculature

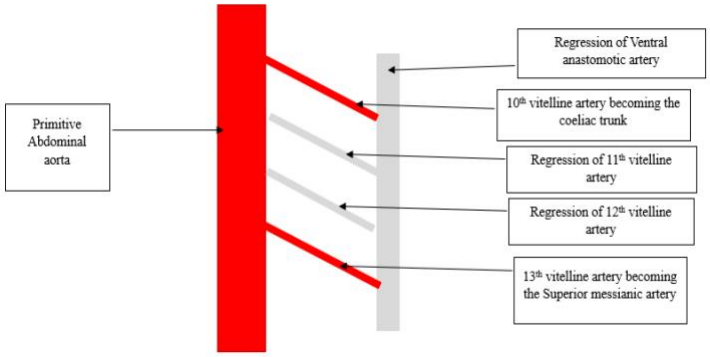


Figure 2: Normal development of coeliac trunk and superior mesenteric artery

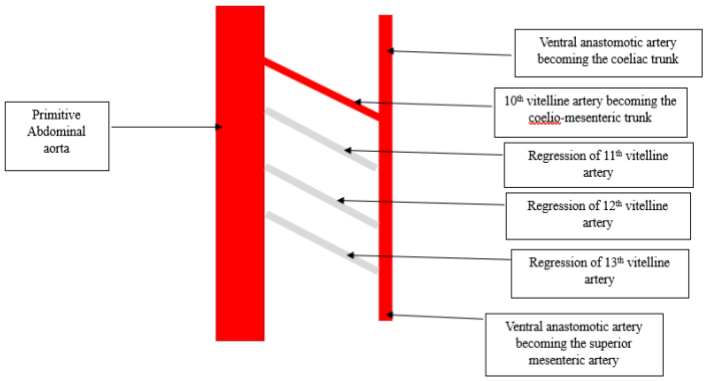


Figure 3: Development of coelio-mesenteric trunk due to abnormal regression of 13^{th} vitelline artery

Case presentation

During the routine dissection of a cadaver in the Department of Anatomy, Faculty of Medicine, Wayamba University of Sri Lanka, a variant arterial branching pattern was observed in the abdominal aorta. The cadaver belonged to an adult female of Sri Lankan origin. The findings revealed that the coeliac trunk and SMA were arising from a single vessel, referred to as the CMT. The CMT was found at the anterior aspect of the abdominal aorta, approximately 1 cm above the origin of the left and right renal arteries (Figures 4, 5). It was then divided into the coeliac trunk and the SMA. There was no artery arising from the area between the origin of CMT and the inferior mesenteric artery (IMA) (Figure 5). The IMA was originating from the anterior aspect of the abdominal aorta in the usual pattern (Figure 5).

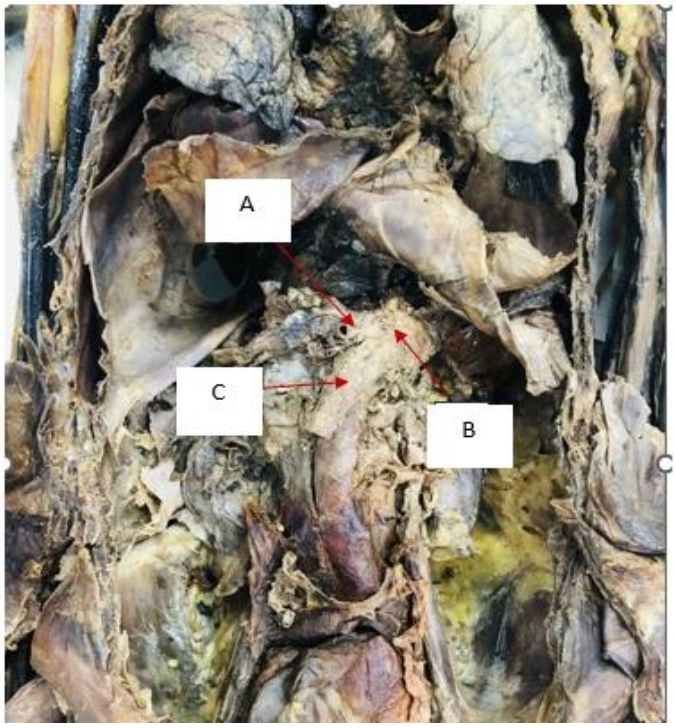
Discussion

The CMT is a rare vascular variant that can have significant clinical implications. Its presence can result in difficulty in the interpretation of radiological imaging and interventions and result in complications during surgical procedures involving the abdominal region. There are reported cases of real-life situations (6, 7, 8, 9,10) as well as cadaveric findings (11, 12) on CMT from different countries of the world, including Sri Lanka (13).

Some of the reported cases were initially presented as lower limb ischemia due to peripheral vascular disease, and further investigations revealed the presence of CMT (6 ,7). One particular case involved a 50-year-old man with CMT who underwent aorto-bifemoral bypass surgery without reimplantation of the inferior mesenteric artery (IMA) and unfortunately passed away due to mesenteric ischemia (7). These case reports highlight the important fact that although CMT typically remains asymptomatic, sometimes it can lead to serious complications when combined with atherosclerosis.

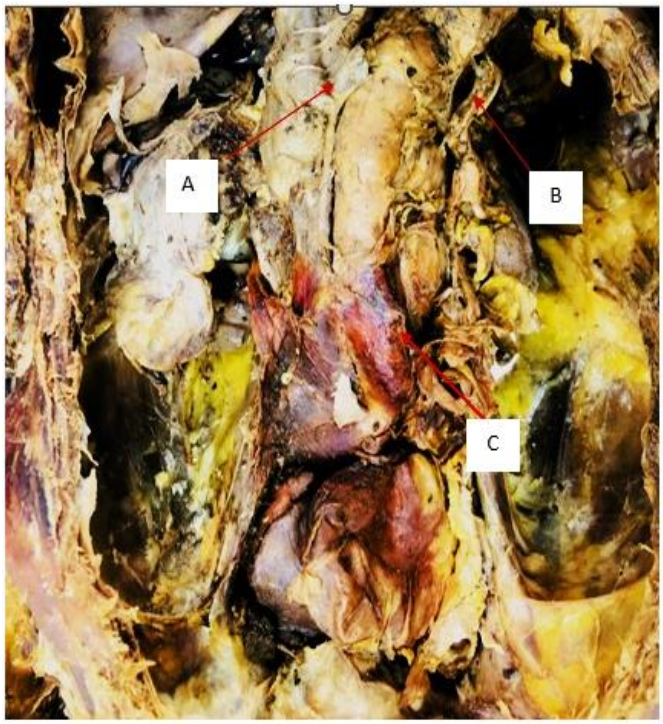
In addition, there has been an incidental ultrasound finding of an asymptomatic aneurysm with CMT in a 36-year-old young man (8), and a case of successful treatment of an aneurysm with CMT in an 82-year-old man has been reported (10). Furthermore, the reported case from Sri Lanka was an incidental abdominal contrast-enhanced computed tomography (CT) finding of a 71-year-old female who presented with non-specific abdominal pain (13).

Therefore, awareness of this variant is crucial for surgeons and interventional radiologists to prevent unexpected complications and potential iatrogenic damage to vital organs during procedures such as liver transplantation, pancreatic surgery, or catheter-based interventions in the abdominal vasculature. Further, the higher risk of undergoing ischemia of the abdominal viscera supplied by a CMT instead of a separate coeliac trunk and the SMA should be considered in patients with atherosclerosis (14).



A:Coeliac trunk, B:Coelio-mesenteric trunk, C:Superior mesenteric artery

Figure 4: Coelio-mesenteric trunk



A:Right renal artery, B:Left renal artery, C:Origin of the inferior mesenteric artery

Figure 5: Absence of a separate superior mesenteric artery origin

Conclusion

The reported case describes the rare observation of a CMT in the cadaver of a Sri Lankan female. Since the location of this CMT is closer to the normal anatomical origin of coeliac trunk this condition is more likely to be a result of abnormal regression of 13th vitelline artery with persistence of ventral anastomotic artery. Continued research to explore the prevalence of different types of CMT with other possible embryological mechanisms and exploring the clinical significance of this anatomical variation in the Sri Lankan population is crucial to expand the knowledge of CMT.

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Conflicts of interests

The authors have no conflicts of interests.

Author contributions

EAAMW involved in case identification, conceptualization, development illustrations on embryological basis and writing the original draft; KMWWP involved in proofreading and editing; DASSK involved in proofreading and formatting; KMC involved in supervision, review, and editing.

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