

# Co-Existence of An Unusual Branching Pattern of Celiacomesenteric Trunk With Complete Common Mesentery in a 48-Year-Old Man: A Case Report

American Journal of Men's Health  
November-December 1–5  
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DOI: 10.1177/15579883221139369  
journals.sagepub.com/home/jmh  


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## Abstract

Celiacomesenteric trunk (CMT) refers to the common origin of celiac trunk and superior mesenteric artery which is a very rare anatomical variation. CMT is incidentally diagnosed during angiography or abdominal computed tomography scanning. The diagnosis of CMT may inform surgical practice and prevent damage during invasive radiologic procedures, lowering thus the rate of iatrogenic errors. Complete common mesentery is in its turn a rarer congenital anomaly that arises from an abnormal rotation of primitive small intestine during embryonic development. We report a case of a 48-year-old man, suffering from chronic abdominal pain, and postprandial discomfort. The patient underwent an abdominal contrast-enhanced computed tomography that detected a CMT associated with common complete mesentery. According to our review of bibliography, this is the first case report to simultaneously report both congenital anomalies (CMT and common complete mesentery). Furthermore, the CMT described here has not been described in previous classifications and represent a novel anatomical variation of CMT.

## Keywords

celiacomesenteric trunk, complete common mesentery, diagnostic imaging, celiac trunk, Variation

Received August 24, 2022; revised October 25, 2022; accepted October 31, 2022

## Introduction

Under normal anatomical conditions, the abdominal aorta generally gives rise to two main anterior branches—the celiac trunk and the superior mesenteric artery (SMA)—the two ensure the supply of almost all of the gastrointestinal tract (Bhatnagar et al., 2013). The celiac trunk arises at the level of T12-L1 and extends 1.5 to 2 cm before trifurcating into three main branches; the common hepatic (CHA), the left gastric, and splenic arteries—the so called “tripus Halleri”—as was initially described (Panagouli et al., 2013; Venieratos et al., 2013). Anatomical variations involving a common origin of celiac trunk and SMA has first been described by Adachi (1928) and was named the celiacomesenteric trunk (CMT) (Ataka et al., 2021). The prevalence of this variation has been reported to range between 1% and 2% of all anomalies involving the celiac axis (Deshpande et al., 2021; Tur Martínez et al., 2020).

Although, extremely rare, this variant is well defined and known (Bhatnagar et al., 2013). If undiagnosed, CMT may increase the risk of iatrogenic errors in hepatopancreatobiliary surgery, transplantology, and interventional radiology.

Common mesentery is also a very rare intestinal anomaly with a very low incidence rate ranging from 0.0001% to 0.19% in asymptomatic individuals (Fiorani et al.,

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**Figure 1.** The Arterial System Arising From the Celiacomesenteric Trunk

AS = splenic artery; AHG = left hepatic artery; AHD = right hepatic artery; AMS = mesenteric superior artery; PD1 + DP2, PD3 = pancreaticoduodenal arteries arising from different origins.

2014). Common mesentery results from the failure of normal embryological rotation and fixation of the primary intestinal loop during embryonic development (Ataka et al., 2021; Sangster et al., 2014). Unlike CMT, common mesentery is generally clinically insignificant and does not require surgical intervention. A thorough review of literature revealed that this is the first case of an association of CMT and common mesentery to be reported. Furthermore, to the best of our knowledge, this variation of the CMT has never been reported or included in classifications.

### Observation

A 60-year-old man, presented with reoccurring postprandial abdominal pain, described as postprandial fullness, associated with episodes of non-bilious bloodless, non-feculent vomiting without notable disorders in bowel habits. The patient also reported that he lost 15 kg as a result of food self-restriction. On general examination, vital signs were stable and normal. Physical examination revealed that the abdomen was soft and lax, and there was no tenderness or guarding. Blood tests revealed normal liver and kidney function. C-reactive protein, complete blood count, and tumor markers were within the normal range.

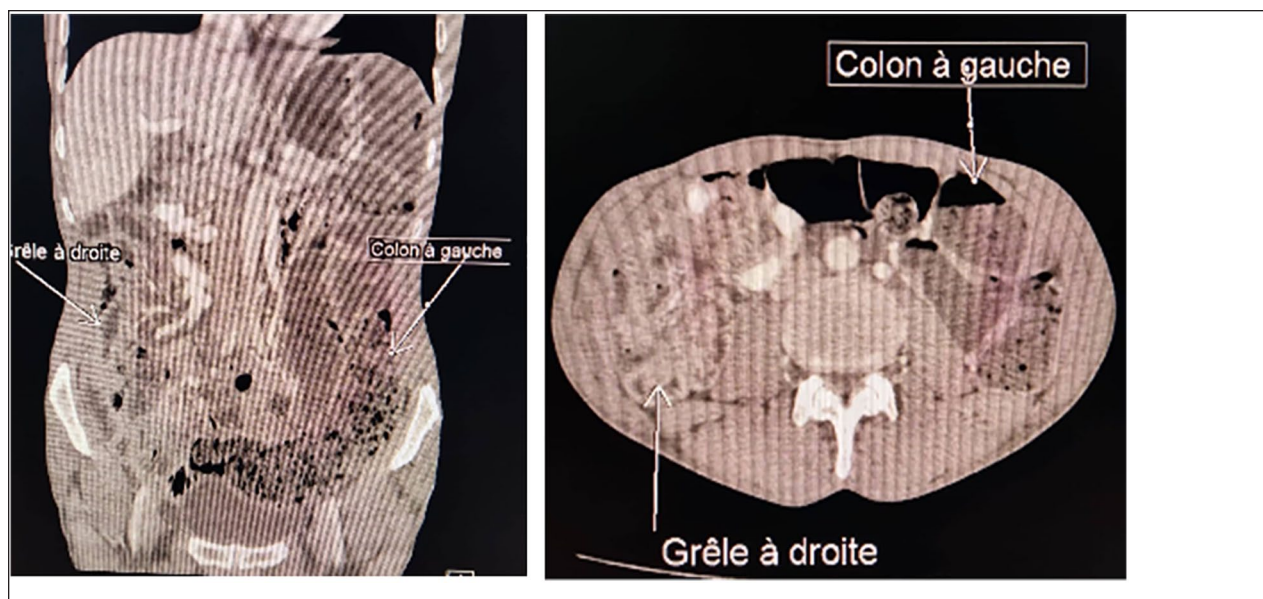
Abdomino-pelvic contrast-enhanced computed tomography revealed a CMT arising from the abdominal aorta (Figure 1). This CMT gave rise anteriorly

to an arterial branch—the pancreaticoduodenal artery (PD1)—destined to supply the duodenal-pancreatic block and the proximal jejunum, at the level of the posterior crossing of the pancreatic isthmus. The CMT then bifurcated into two other main arterial trunks:

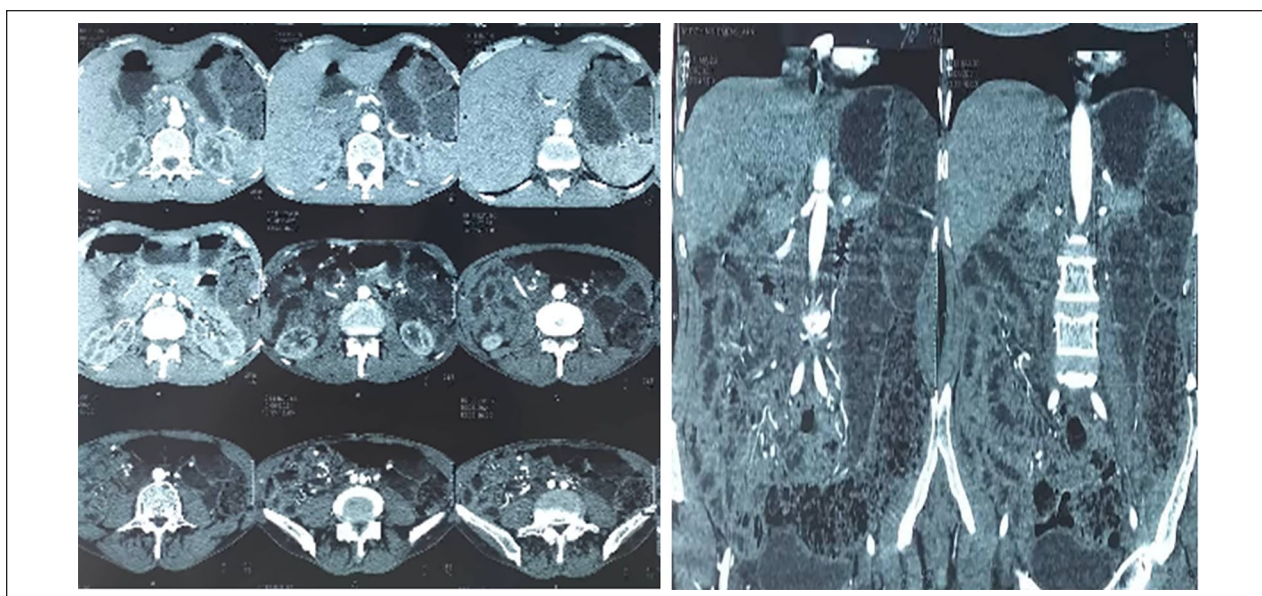
- A first trunk on the left giving rise to the splenic artery,
- A second, on the right, branching into the pancreaticoduodenal artery that supplies the duodenal-pancreatic block and the proximal small bowel. This artery followed an anterior course with regard to the pancreas ().
- The second branch was the SMA which created a large curve starting at the left side and ending on the right side of the abdomen. From SMA arose the left hepatic artery and another pancreaticoduodenal artery that extended behind the pancreas (PD3).

The same imaging modality (Figure 2 and 3) evidenced that the entire colon occupies the left side of the abdominal cavity and the small intestine occupies the right side, which push the liver forward on the contralateral side, suggesting intestinal malrotation and particularly a complete common mesentery.

The duodenum was located anteriorly with regard to the mesenteric vessels, while the cecum was located in



**Figure 2.** Abdominal Enhanced—Contrast Computed Tomography Showing Common Complete Mesentery



**Figure 3.** Abdominal Enhanced—Contrast Computed Tomography Showing Common Complete Mesentery. Colon on the Left, Small Bowel on the Right, and Duodenum was Located Anterior to the Mesenteric Vessels

the supra umbilical and para medial left. The superior mesenteric vein was located in front of its corresponding artery and a sign of a vascular whirlpool was evident. The main complaints of the patient were chronic abdominal pain and postprandial discomfort, but no intestinal disturbances or symptoms of acute volvulus were reported. The management was symptomatic medical treatment and regular follow-up at the outpatient clinic. The patient was

comforted and the abnormalities found on the computed tomography scan were explained to him.

### Discussion

CMT represents an uncommon vascular anomaly where the celiac trunk and SMA have a common origin from the abdominal aorta (Ndoye et al., 2008; Tur Martínez et al.,

2020). As mentioned earlier, the celiac trunk gives rise to three main arterial branches: the left gastric, CHA, and splenic arteries. In the current case, in addition to having a common origin with SMA, the celiac trunk presented an uncommon branching pattern that has not been previously described to the best of our knowledge. Besides giving rise to a left gastric and a splenic artery, a pancreaticoduodenal artery destined to supply the duodenal-pancreatic block and the proximal jejunum arose directly from the celiac trunk, a previously undescribed branching variant. In common anatomical conditions, pancreaticoduodenal arcade more commonly branches from the gastroduodenal artery, with the latter arising from the CHA. In our case, the CHA was absent and a pancreaticoduodenal trunk arose directly from the celiac trunk.

Current anatomy textbooks define and describe CHA as a segment of the hepatic artery arising from the celiac axis and following an horizontal course from the left to the right along the upper border of the pancreatic head to the pylorus or the proximal duodenum, precisely ending at the point of the gastroduodenal artery branching (Song et al., 2010). So frequent, however, deviations from this pattern that it is very difficult to define any normal pattern (Desai & Pande, 2019). In the current case, the celiac trunk gave rise to two main branches; anterior pancreaticoduodenal artery from which branched the right hepatic artery and SMA from which arose the left hepatic artery and another pancreaticoduodenal artery that followed a posterior course with regard to the pancreas. Furthermore, besides this uncommon branching pattern, this case evidenced the co-existence of a complete common mesentery, which to the best of our knowledge is the first case evidencing the co-occurrence of both. Complete common mesentery is an anomaly of intestinal rotation that results from the failure of normal embryological rotation and fixation of the primary intestinal loop during embryonic development (Ndikumana et al., 2021). Midgut malrotation in adults is uncommon with a reported occurrence of 0.0001% to 0.19% in adults (Ndikumana et al., 2021). The complete common mesentery represents an abnormal rotation of the primary intestinal loop at 90° (Oudou et al., 2019). Under such condition, all small bowel will be located on the right and the colon will entirely be located on the left (El Mortaji et al., 2019). The cecum takes an anterior and middle position, and the SMA will be on the right of the superior mesenteric vein (Ndikumana et al., 2021). This anomaly is usually asymptomatic and is subject to increasing incidental discovery thanks to the increasing use of imaging techniques. However, in our case, the accompanying vascular anomaly may affect the root of the mesentery which may be too short. Furthermore, the whole small intestine may be located on the SMA axis (Peltrini et al., 2021), which may lead to abdominal uncomfoting.

In our case, the diagnosis of both anomalies was based on the findings from the contrast-enhanced computed tomography (vascular anomaly and digestive anomaly, with whirlpool vascular). The procedure was surgical abstention with symptomatic care.

## Conclusion

CMT is a rare congenital variation of vascular anomaly and its discovery is not inconsequential because it may inform surgical practice, such as hepatic surgery (hepatic transplantation, hepatectomy), cephalic duodenopancreatectomy, and thus reducing the risk of iatrogenic errors. Its diagnosis is also of importance to interventional radiologists because it informs pre-procedural planning for hepatic chemoembolization. To the best of our knowledge, this is the first case to report a CMT associated with complete common mesentery.

## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## Ethical approval

N/A

## Informed consent

A written informed consent was obtained from this patient to publish this case.

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