Case Reports

Symptomatic Celiomesenteric Trunk:

Variable Presentations and Outcomes in 2 Patients

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Mesenteric ischemia can be difficult to diagnose without a high degree of suspicion because it presents in a variety of ways. Visceral vascular collaterals between the fore- and midgut often provide protection against ischemia; however, the presence of anatomic variations, such as celiomesenteric trunk, can undermine the expected redundancy. Misdiagnosis can result in prolonged suffering or death, as evidenced in 2 of our patients with celiomesenteric trunk. The first patient with chronic mesenteric ischemia was diagnosed in the clinic and underwent successful surgical correction; the other had overwhelming, acute mesenteric ischemia, which resulted in death. Our cases show that successful diagnosis and management of mesenteric ischemia require astute interpretation of radiologic images. ***(Tex Heart Inst J 2018;45(1):35-8)***

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Mesenteric ischemia can have a variety of presentations, ranging from classic and predictable to unusual and occult. For instance, a visceral vascular obstruction from a cardioembolic source tends to be acute and spares the proximal splanchnic vasculature. In contrast, when atherosclerotic disease develops at the origins of the aortic branches, it is typically preceded by chronic symptoms.[1,2] Usually, the redundancy of the vascular collaterals between the fore- and midgut, which involves structures such as the pancreaticoduodenal arcade and the arc of Buhler, provides protection against ischemia. However, patients with anatomic variations—such as a celiomesenteric trunk (CMT), in which the superior mesenteric artery (SMA) originates from the celiac axis (CA) (Fig. 1)—lack this protection. In these patients, successful diagnosis and management depends on astute interpretation of radiologic images (usually computed tomographic angiograms [CTAs]).[3,4] Misdiagnosis can lead to prolonged suffering or death.

We present the cases of 2 patients with symptoms of mesenteric ischemia in whom we diagnosed CMT. Their cases illustrate the different courses of disease and outcomes in this population.

Case Reports

Patient 1

Chronic Mesenteric Ischemia. A 57-year-old woman presented with a 5-year history of severe, postprandial abdominal pain that had led to a fear of eating and a 40-lb weight loss. Over the years before admission, she had undergone endoscopic and ultrasonographic evaluations with unremarkable results. Additionally, she had undergone prolonged empiric treatment for peptic ulcer disease, which was unsuccessful in controlling her symptoms. She had been referred to our clinic after an outpatient CTA revealed no ventral branch in the anticipated location on the SMA, occlusion of the proximal CA, and a CMT (Fig. 2A). The inferior mesenteric artery (IMA) was enlarged (6 mm), as was a tortuous marginal arcade (up to 7.5 mm) (Fig. 2B). Elective surgical exploration confirmed the presence of CMT and revealed compression of the origin of the celiac trunk by the median arcuate ligament (MAL). There were also chronic fibrotic changes in the CMT. Even after lysis of the crural fibers, the CMT remained occluded, and Doppler ultrasound testing of the structure produced poor signals. Therefore, we performed an aortomesenteric bypass with a 6-mm Dacron graft to the confluence of branches originating from the CMT. Exploration of the remainder of the abdomen confirmed a markedly hypertrophic marginal arcade and its

meandering course through the mesentery of the large bowel. On the second postoperative day, the patient ate a regular meal without pain for the first time in several years. At her 6-month follow-up, she remained pain-free and was regaining weight.

Patient 2

Acute Mesenteric Ischemia. A 41-year-old woman presented at our emergency department with unrelenting epigastric and back pain of 3 weeks' duration. She had been seen at other hospitals during this time, but despite having undergone multiple computed tomographic (CT) scans and an upper endoscopy, she had not been given a definitive diagnosis. She was on empiric treatment for peptic ulcer disease and uterine fibroid tumors. On current presentation, a CT suggested appendicitis, so the patient underwent an uneventful laparoscopic appendectomy. Her pathologic results confirmed appendicitis.

Three days postoperatively, the patient developed severe hypertension and became lethargic. A CT revealed intestinal pneumatosis with small-bowel distention; the radiologist could visualize neither the CA nor the SMA (Fig. 3A). Notably, there was no evidence of vascular calcification. The patient rapidly decompensated with acidosis and coagulopathy and was taken to the operating

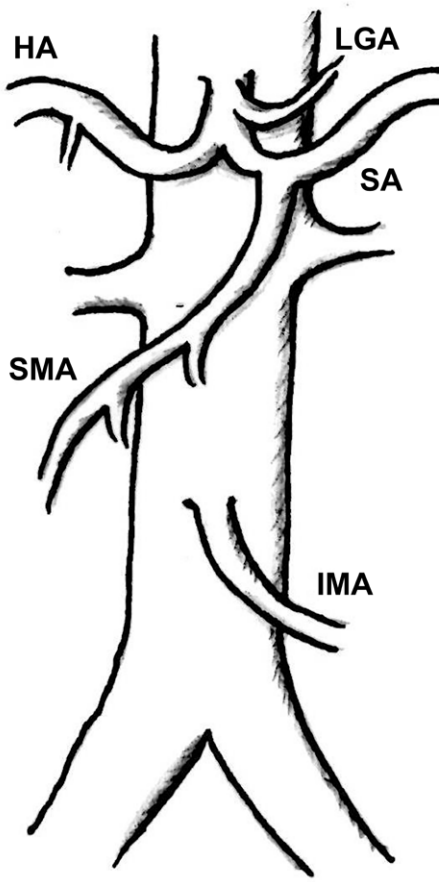

Fig. 1 *Drawing of a typical celiomesenteric trunk shows only 2 main ventral aortic branches: the celiac axis and the inferior mesenteric artery (IMA).*

HA = hepatic artery; LGA = left gastric artery; SA = splenic artery; SMA = superior mesenteric artery

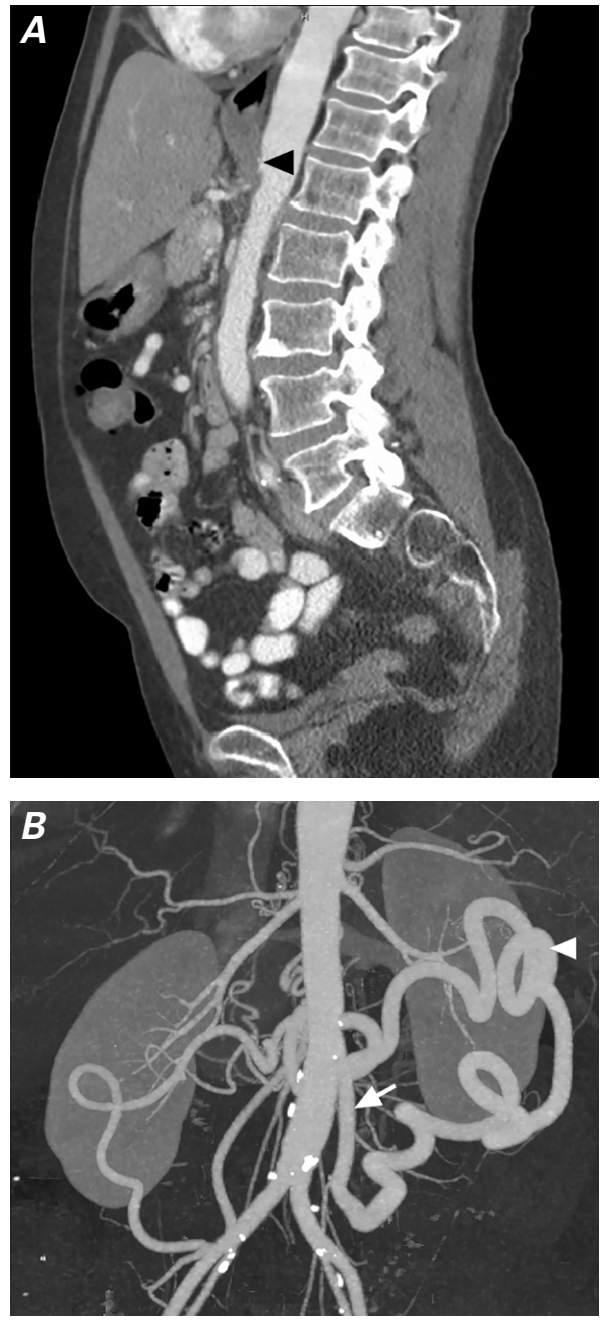

Fig. 2 *Patient 1. Computed tomographic angiograms show **A**) the occluded celiomesenteric trunk (arrowhead) in the sagittal view, and **B**) the hypertrophic inferior mesenteric artery (arrow) and mesenteric marginal arcade (arrowhead) in the coronal view (maximal-intensity projection).*

room on an emergency basis. On surgical exploration, the SMA was pulseless, and a retrograde thrombectomy failed to restore pulsatile inflow. Tracing the course of the common hepatic artery to its origin revealed a CMT compressed by the MAL. Lysis of the fibrous ligament and thromboendarterectomy of the CMT restored pulsatile flow within the celiac and SMA distributions, but only 40 cm of viable small bowel remained (Fig. 3B). Repeat surgical exploration after 24 hours confirmed a length of small bowel incompatible with life, and the patient died 4 days later.

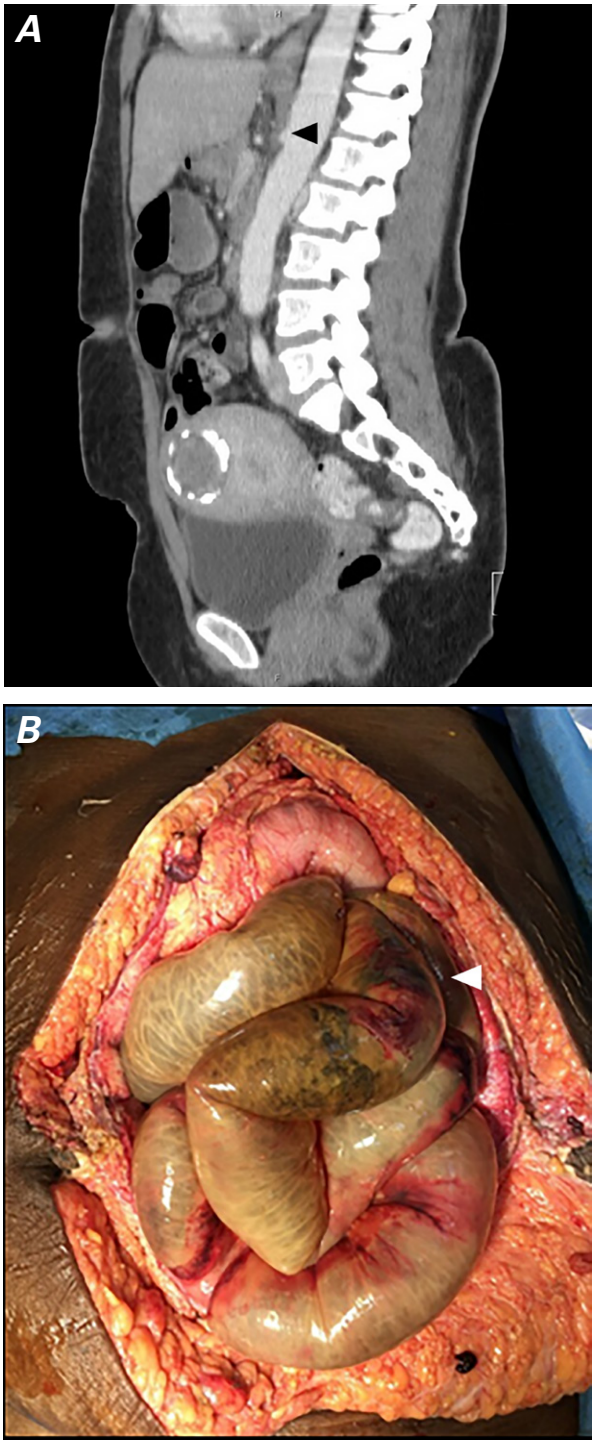

Fig. 3 *Patient 2.* ***A****) Computed tomographic angiogram (sagittal view) shows the occluded celiomesenteric trunk (arrowhead).* ***B****) Intraoperative photograph shows the infarcted small bowel (arrowhead).*

Discussion

Among patients with anatomic variation of abdominal visceral perfusion, 1.1% have a common CMT.[3] As seen in Patient 1, collateralization through the IMA can partially compensate for chronic stenosis or occlusion of a CMT. However, when the normally diminutive IMA is left as the sole conduit from the aorta, both it and the mesenteric arcade can undergo marked hypertrophy. Although this pathway is able to maintain intestinal viability when the patient is at rest, it generally does not prevent symptomatic chronic mesenteric ischemia.

In patients with CMT and occlusion from atherosclerosis, MAL syndrome, or both, symptoms of mesenteric ischemia can be severe and warrant surgical intervention. Incidental radiologic evidence of MAL syndrome can be found in more than 10% of CT scans performed in the United States.[5] Treatment of symptomatic patients focuses on releasing the restrictive bands of tissue and restoring laminar flow. Persistent occlusion despite release of the MAL warrants angioplasty or bypass. When existing collateral vessels are preserved and when all sources of obstruction are dealt with, the patient's outcome and quality of life can greatly improve. On the other hand, when CMT is discovered during an acute episode of mesenteric ischemia, the outcome can be devastating.

Sagittal CTA views are the best means of visualizing whether prominent ventral aortic branches are present. The CTAs from our patients had notable differences. Although Patient 1, who had chronic ischemia, had no ventral branch in the anticipated location on the SMA, she did have a present, but occluded, celiac trunk and a widely patent IMA (Fig. 2A). In contrast, the CT from Patient 2, who had acute mesenteric ischemia, showed no vascular calcifications or evidence of ventral aortic branches, including the IMA (Fig. 3A). The fatal outcome occurred because the diagnosis was delayed; the radiologist and surgeon did not suspect CMT and, thus, misinterpreted the images.

In most individuals, the embryologic divisions of the abdominal viscera are partially defined by the distributions of the ventral aortic branches: the foregut is perfused by the CA, the midgut by the SMA, and the hindgut by the IMA. Collateral pathways among the visceral branches provide protective redundancy and enable the patient to remain asymptomatic if blood flow within a branch vessel is compromised.[2,6] In individu-

als with CMT or other anatomic variations in which the celiac artery and the SMA share a common trunk, redundancy is reduced; thus, these patients are more likely to show symptoms and to be at higher risk of death if they are not treated in a timely manner.[4]

On the basis of our experiences and those reported in the literature,[4,5] we provide 3 teaching points for clinicians. 1) In the complete absence of identifiable ventral aortic branches, a vascular anomaly should be suspected. 2) Celiomesenteric trunk is a rare anatomic variant that limits mesenteric collateral pathways. 3) In the presence of CMT, the degree of mesenteric ischemia can be profound because of a lack of collateral circulation. Awareness of these points may lead to more timely diagnoses and more favorable outcomes in patients with CMT and mesenteric ischemia.

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