Absence of Inferior Mesenteric Vein: a case report

YI-YANG LIN1,2  RHEUN-CHUAN LEE1,2  CHUI-MEI TII1,2,3  JEN-HUEY CHIANG1,2  CHENG-YEN CHANG1,2

Department of Radiology1, Taipei Veterans General Hospital, Taipei, Taiwan
School of Medicine2, National Yang Ming University, Taipei, Taiwan
Department of Radiology3, Lotung Poh-Ai Hospital, Ilan, Taiwan

ABSTRACT

We report a rare case of absence of inferior mesenteric vein (IMV) with collateral venous drainage via left and middle marginal veins of colon. The superior rectal vein, sigmoid colic vein and left colic vein drain into left and middle marginal veins of colon and then drain into portal venous system. Absence of IMV was demonstrated by contrast-enhanced computed tomography (CT) in a patient with rectal cancer.

Inferior mesenteric vein (IMV) drains venous blood from superior portion of the rectum, sigmoid colon and descending colon into portal vein. Congenital absence of IMV is a rare anatomical variation. The superior rectal, sigmoid colic and left colic veins are drained by marginal veins of colon instead. We report a case of absence of IMV and the drainage route of marginal veins of colon that were demonstrated on axial computed tomography (CT) scan and 3D venography. Identification of this rare variant can be helpful to avoid compromising the engorged left and middle marginal veins of colon and their upstream drainage colic segments. Some surgical complications like colic congestion and ischemia due to venous drainage compromise can be prevented.

CASE REPORT

A 76-year-old man was admitted to our hospital with a 3-month history of hematochezia. He also complained of tenesmus, the loss of body weight 10kg in recent one month. Hematological analysis showed mild anemia, with a hemoglobin level of 13.8 g/dL. Mild coagulopathy was found with prothrombin time 13.4 seconds, INR 1.28, and activated partial thromboplastin time 32.5 seconds. Stool occult blood test showed strongly positive. Colonoscopy showed an annular tumor with luminal obstruction at 12cm site from anal verge. The pathology of biopsy specimen was adenocarcinoma.

Multi-detector computed tomography (MDCT) virtual colonoscopy was performed with a 64–detector row CT scanner (Aquilion 64; Toshiba Medical Systems Corporation, Japan) due to incomplete study of colonoscopy. Supine and prone CT virtual colonoscopy were done with and without iodized contrast medium administration after colon preparation and gas inflation. CT showed a 4cm annular ulcerative mass at rectosigmoid junction with luminal obstruction. Infiltrative outer margin of the tumor at sigmoid mesocolon suggested T3 tumor. Several enlarged lymph nodes are noticed at mesosigmoid colon, which are pathologically proven as metastatic lymphadenopathies.

Interestingly, we did not find the IMV, which is usually at left anterior pararenal space, anterior to left psoas muscle and behind the duodeno-jejunal junction. Rectocolic venous drainage went via engorged marginal veins of left colic vein along the medial aspect of descending colon, and drained into superior mesenteric vein (SMV) on post-contrast CT scan (Fig. 1). The MIP and three-dimension volume rendering reformatted images also demonstrated the route of the marginal vein along the transverse and descending
colon straightforwardly (Fig. 2). Tracing back to his prior imaging studies, we also found absence of IMV with engorged collateral left colic marginal vein at abdominal CT scan performed three years ago for other reason.

The patient received lower anterior resection. The IMV was not seen during operation, while the inferior mesenteric artery was at its usual location. The specimen revealed adenocarcinoma. However, the noncancerous colic segment showed no polymorphonuclear leukocytes aggregating at mesocolon, no mucosal ulceration, congestion or diverticulitis. The patient is uneventfully recovered well one year after operation.

**DISCUSSION**

IMV had been well discussed on prior literature about its location and distal drainage variation on cross-sectional imaging modalities. IMV passes anterior to the left renal vein, posterior to the distal duodenum, and then anterior to the superior mesenteric artery before anastomosing with the portal venous system. IMV could drain into distal splenic vein, the SMV-splenic vein confluence, or the SMV. In contrast, the jejunal veins pass anterior to distal duodenum and superior mesenteric vein [1, 2]. In our case, the identified vessel went behind duodeno-jejunal junction, which was proved not a jejunal vein. The inferior mesenteric vein conveys blood to the portal system from the rectum (superior rectal vein), sigmoid (sigmoid vein) and descending colon (left colic vein). The former two veins usually unite to form a common ascending trunk before their junction with the left colic vein. The vein so formed passed upward and medially behind the body of the pancreas to terminate in the splenic or superior mesenteric vein. Douglass et al. described, in 3 cases of a series of 92 cadavers, that the IMV was represented by two trunks of almost equal

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**Figure 1.**

**a.** On axial contrast-enhanced CT scan obtained during portal venous phase, an ulcerative fungating mass is located at rectosigmoid junction (arrow). The superior rectal vessels were seen in mesorectum. **b.** On contrast-enhanced CT scan with prone position, the marginal vein of colon enhanced well with better demonstration of its drainage route into SMV (curve arrow). **c.** The left marginal vein of colon (open arrow) runs along left mesocolon and between the descending colon and jejunum.
caliber, which assumed to represent the superior rectal and left colic vein. In 1 case, three trunks joined at the splenic vein, which possibly represented superior rectal, left colic and sigmoid veins [3]. Popovici et al. described that in one body, of a series of 34 cadavers, IMV was not found. The author indicates that IMV was replaced by the marginal vein [4]. The congenital agenesis of IMV and supplanted by the marginal veins were reported in laparotomy exploration and angiography [4, 5]. Also, with helical CT venography, Graf et al. described that, since the inferior mesenteric vein has a relatively small diameter under normal conditions, the vein may not be identified at all [6]. The inferior mesenteric vein, left transverse colic vein, marginal vein of the transverse colon, and middle colic vein can serve as collateral venous drainage while proximal or distal splenic venous is occluded [4, 5, 7]. These venous structures had well-established collateral network. Once certain venous segment compromised, the venous flow changed direction and maintained antegrade venous drainage into portal venous system.

We present a case whose rectal and left colic venous drainage via engorged marginal veins of the transverse and descending colon into SMV, while the original IMV is absent on CT scan. To our knowledge, there are few reports of absence of IMV and its collateral drainage [4, 5, 8]. Tracing back to the patient’s past medical history, there is no associated lower abdominal symptoms suggesting diverticulitis or panniculitis. No abdominal symptoms and CT evidence that correlated with Crohn’s disease or other inflammatory bowel disease. We also exclude the possibility of hypercoagulability according to his past medical history, the blood test and pathological findings. Two CT scans did not reveal mesenteric fat stranding, mesenteric mass lesion except rectosigmoid cancer. We propose two possible causes of this observation. First, there is a congenital agenesis of IMV. Second and less likely, the original inferior mesenteric vein had thrombosed for a long time due to chronic inflammation or other unknown reason. Both conditions may have well-established collateral drainage veins, which are left and middle marginal veins of colon. In our case, the likelihood of congenital agenesis of IMV is higher than thrombosed IMV. Thrombosed IMV and fat stranding at left anterior pararenal space were not found at two CT separate scans. Pathological examinations of surgical specimens didn’t reveal thrombosed IMV, nor ischemic change in the sigmoid colon mucosa, which had been reported in

Figure 2

Figure 2. a. Oblique three-dimensional MIP demonstrates that the engorged left marginal vein of colon drains into the SMV (arrow). b. Volume rendering MDCT reveals the whole picture of the collateral left marginal vein of colon (arrowhead) from superior rectal vein and runs lateral to jejunum and posterior to distal duodenum.
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mesenteric venous thrombosis [9-11]. His clinical indolent presentation also favored congenital agenesis of IMV than chronic thrombosed IMV.

In conclusion, the clinical indolent presentation, no thrombosed IMV seen in two separate CT scan, and lack of colic wall edema, ulceration or congestion in histopathology examination suggest the congenital absence of IMV with well-established venous drainage via engorged left and middle marginal veins of colon.

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REFERENCE