Case 14571

Eurorad

Anomalous splenic vein, extending to the pelvis

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Section: Abdominal imaging
Area of Interest: Veins / Vena cava
Procedure: Education
Imaging Technique: CT
Imaging Technique: CAD
Special Focus: Arteriovenous malformations Case Type:
Anatomy and Functional Imaging
Authors: Schiaffino S., Zaottini F., Massone E., Piccazzo R., Melani E., Rollandi G.A.
Patient: 48 years, male

Clinical History:

A 48-year-old man presented to the radiology department for CT check because of clinical history of tuberculosis. He was dyspnoeic and had elevated inflammatory markers.

Imaging Findings:

The patient had active pulmonary tuberculosis. The CT examination, extended to the abdomen, revealed an anomalous splenic-portal confluence and anomalous splenic vein anatomy. Arising from the splenic hilum, the vein passed anterior to the anterior edge of the spleen, to its lower pole, and continued its intra-peritoneal course along the abdominal wall in the left paracolic recess, entered in the pelvis and ended up at the level of the bladder base. Then it turned up behind the posterior surface of the left rectus abdominis muscle to reach the greater gastric curve, ran medially toward the gallbladder fundus, turned medially and reached the superior mesenteric vein, superiorly to the pancreatic head.
No venous vessel was present in the normal splenic vein course. The pancreatic venous vessels were more apparent in the parenchyma, due to drainage compensation.
The gastroepiploic vein was normally present, and communicated with the anomalous splenic vein at the level of the splenic hilum.

Discussion:

The splenic vein embryology starts from the two vitelline veins, the first of all the veins to be developed. The right vitelline vein forms the superior mesenteric vein. The proximal portion of the left vitelline vein disappears during development. The terminal parts of the two vitelline veins are joined by three transverse communications, the middle one lies in the dorsal aspect of the duodenum, where it is reached by the splenic and inferior mesenteric vein [1]. During this development, splenic vein abnormalities may occur, but they are rare. A search of Pubmed and Medline revealed only one case report describing an anatomic variant of splenic vein [2].
During development, the splenic vein runs in the dorsal mesogastrium (Fig. 1), an embryological structure that begins to form during the fourth week of gestation and will give origin to the splenic ligaments including the gastrolienal ligaments and continue as the lesser omentum and hepato-duodenal ligaments.
In our case the splenic vein was not included in these peritoneal structures. We know that the greater omentum derives from the dorsal mesogastrium folding upon itself, anterior to the transverse colon and small bowel [3]. We

think that the anomalous vein results from the persistence of a connecting vein running inside the greater omentum, probably one of omental vein tributary [4], instead of the lesser omental bursa, but it is arduous to find a definitive explanation.
Identifying anatomic variants of the portal system is important in the surgical planning of different interventional procedures [5]. The portal system abnormalities are crucial for hepatic surgery, but in the presented case almost every abdominal surgical intervention could be at risk of splenic vein damage, with potential risk of severe bleeding. Laparotomic access could pose the risk of bleeding, as the laparoscopic one, because of potential damage derived from trocar accesses. Percutaneous interventional procedures, such as paracentesis, could be dangerous too. Furthermore, the anomalous course could pose the risk of thrombosis for slowed blood flow.
This singular anatomic variant underlines the importance of deep knowledge of embryology for the comprehension of anatomic variants in the human body. This case suggests the relevance of pre-operative imaging assessment for a better surgical planning.
Differential Diagnosis List: Anomalous splenic vein, Anomalous splenic vein, Portosystemic shunt

Final Diagnosis: Anomalous splenic vein

References:

Sadler, T. W., and Jan Langman. (2010) Langman's Medical Embryology. Philadelphia: Lippincott William & Wilkins, 2010. Print
Stanley T. Lau et al. (2005) The anomalous splenic vein: a case report and review of the literature. J Pediatr Surg 2005 Sep;40(9):1492-4 (PMID: 16150357)
Meyers, Morton A., Chusilp Charnsangavej, and Michael Oliphant (2011) Meyers' Dynamic Radiology of the Abdomen: Normal and Pathologic Anatomy. New York: Springer, 2011. Print
Aaron B. Gerber, M.d., Maurice Lev, M.d and Samuel L.Goldberg, M.d (1951) The surgical anatomy of the splenic vein.
Lee WK, Chang SD, Duddalwar VA, Comin JM, Perera W, Lau WF, Bekhit EK, Hennessy OF. (2011) Imaging assessment of congenital and acquired abnormalities of the portal venous system. Radiographics 2011 Jul-Aug;31(4):905-26 (PMID: 21768231)

Figure 1

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Description: Splenic vein originating from splenic hilum. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy

Figure 2

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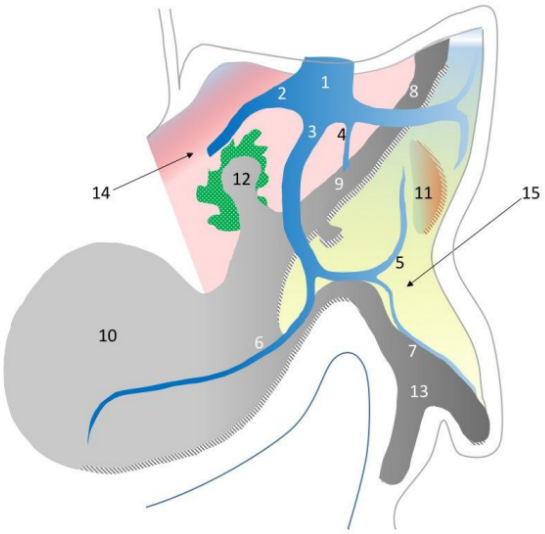

1- Sinus venosus
2- Right vitelline vein
3- Left vitelline vein
4- Left umbilical vein
5- Splenic vein
6- Superior mesenteric vein
7- Inferior mesenteric vein
8- Foregut
9- Stomach
10- Yolk sac
11- Spleen
12- Hepatic bud
13- Hind gut
14- Ventral mesentery
15- Dorsal mesentery

Description: Normal embryology of splenic vein. **Origin:** Zaottini F., Department of Radiology, University of Genoa

Figure 3

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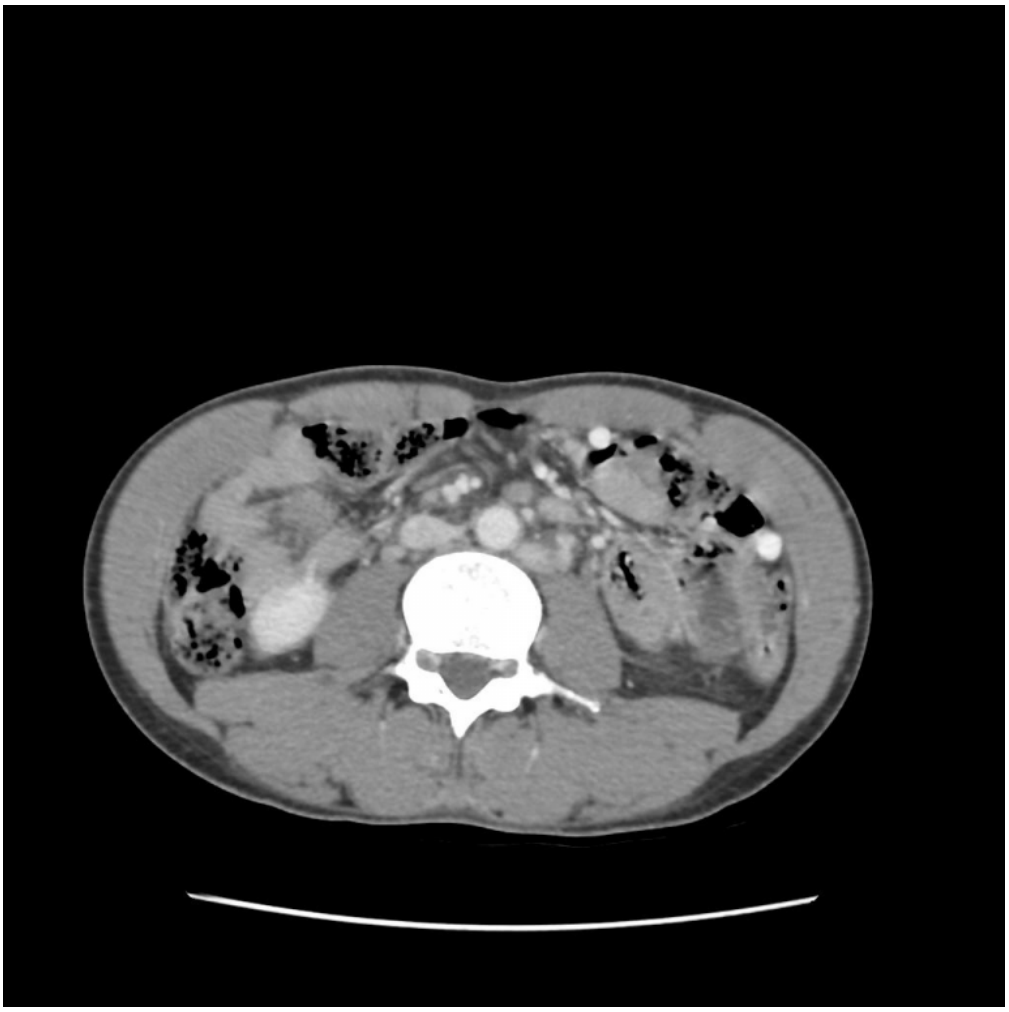

Description: Splenic vein course running intra-peritoneal along the abdominal wall. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy

Figure 4

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Description: Loop of the splenic vein in the pelvis, over the bladder fundus. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy

Figure 5

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Description: Splenic-mesenteric confluence, superior to the pancreatic head. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy

Figure 6

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Description: Volume Rendering of abdominal splenic-mesenteric-portal system of the patient. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy

Figure 7

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Description: VR of the abdominal venous system of the patient. **Origin:** Department of Radiology, Ospedale Galliera. Genova. Italy