LEFT-SIDED DUPLICATION OF INFERIOR VENA CAVA: CLINICAL IMPLICATIONS IN A PATIENT WITH SIGMOID ADENOCARCINOMA

R. Dumitru¹, Andra Scarlat², M. Ionescu², T. Dumitrascu²
Fundeni Clinical Institute, Bucharest, Romania
1. Department of Radiology and Medical Imaging
2. Center of General Surgery and Liver Transplant

LEFT-SIDED DUPLICATION OF INFERIOR VENA CAVA: CLINICAL IMPLICATIONS IN A PATIENT WITH SIGMOID ADENOCARCINOMA (Abstract): Double inferior vena cava is a rare congenital anomaly, usually detected by computed tomography or magnetic resonance imaging. Although asymptomatic, it may have a clinical significance, as it may mimic a para-aortic lymphadenopaty. A case of left-sided duplication of the inferior vena cava in a patient with sigmoid colon cancer is presented. The diagnostic pitfalls and clinical implications are discussed. Accurate preoperative assessment of such an anatomical variant is of utmost importance, this way potentially life-threatening surgical complications, particularly when a minimally invasive approach is planned, are prevented. Key words: DOUBLE INFERIOR VENA CAVA, COLON CANCER, LYMPHADENOPATY, COMPLICATIONS.

Congenital anomalies of the inferior vena cava are uncommon findings (1) and usually are identified in asymptomatic patients (2). Although rare, double inferior vena cava may have a significant clinical impact, especially during retroperitoneal surgery (3, 4) or in the treatment of thromboembolic diseases (5). The left inferior vena cava can be misinterpreted as a retroperitoneal tumor or, more frequently, as a para-aortic lymphadenopaty (7, 8). We present the case of a patient with sigmoid colon adenocarcinoma and a double inferior vena cava, the left one mimicking a lymph node metastasis. The clinical implications of this association are also discussed. To the best of our knowledge this is the first case reported in the English literature on an association between colon cancer and double inferior vena cava.

CASE REPORT
A 48-year-old woman with no significant medical history was investigated for alternating constipation and diarrhea along with abdominal discomfort. Clinical examination was unremarkable, except mild skin pallor. Laboratory tests revealed mild anemia (Hb = 9 g/dl) without other abnormalities. Carcinoembryonic antigen and CA 19-9 serum levels were within normal limits. Colonoscopy emphasized an ulcerate tumor mass at the level of the sigmoid colon, partially obstructing the lumen. Abdominal ultrasonography revealed a para-aortic “tumor mass” suggestive of lymphadenopaty. Axial contrast enhanced computed tomography showed a double inferior vena cava (fig. 1 a), invalidating the presence of para-aortic lymphadenopaty; no distant metastases to the liver, lung or peritoneum.
were found. Coronal computed tomography reconstruction revealed a left accessory inferior vena cava lying along the left side of the aorta and draining into the left renal vein (fig. 1 b). The patient was referred to surgery and underwent a left open colectomy. The double inferior vena cava was confirmed intraoperatively (fig. 2). The postoperative outcome was uneventful and the pathological examination of the operative specimen diagnosed a moderately differentiated (G2) sigmoid adenocarcinoma invading through the muscularis propria into the pericolic tissue (pT3), with no regional lymph node metastases (pN0) – stage IIA, Dukes B.

**Fig. 1.** (a) Axial contrast enhanced abdominal computed tomography showing a pseudotumoral mass on the left side of the aorta (black arrow); (b) Coronal contrast enhanced reconstruction imaging revealed double infrarenal inferior vena cava; the left inferior vena cava (black arrow) continues the left common iliac vein and drains into the left renal vein (Ao, aorta; rIVC, right inferior vena cava; lrv, left renal vein; SMA, superior mesenteric artery)

**Fig. 2.** Intraoperative aspects of the left inferior vena cava (black arrow) after left colectomy with removal of the lymph nodes at the origin of the inferior mesenteric artery from the aorta (Ao); white arrow shows the stump of the inferior mesenteric artery
DISCUSSION

The prevalence of double inferior vena cava in the general population is no more than 3% (1), most of the cases being asymptomatic and diagnosed by radiology (2, 8). However, in a limited number of cases, this rare anatomical variant may have a surgical impact, especially in urology (7, 9) or vascular surgery (4).

The embryogenesis of the inferior vena cava is a complex process. Development of the inferior vena cava is due to appearance, regression, and fusion of three paired embryonic veins: posterior cardinal, subcardinal and supracardinal veins. Normally, the left supracardinal vein regresses, and the right supracardinal vein forms the infrarenal part of the inferior vena cava (1, 2). Persistence of the left supracardinal vein results in a double infrarenal vena cava; usually, the left infrarenal vena cava ends into the left renal vein (1, 2), as seen in the above presented case.

Data in the literature show that double inferior vena cava was misdiagnosed as para-aortic lymphadenopathy in patients with prostate (7), testicular (9), cervical (10) or rectal cancer (8). Thromboses of the double inferior vena cava (6) have been reported. CT scan without the administration of a contrast agent is the most common cause of misdiagnosis (6).

Lymph node metastases are widely recognized as one of the most important prognostic factors after colon cancer resection. Recently it was demonstrated that the presence of lymph node metastases at the origin of inferior mesenteric artery from the aorta strongly correlates with poor prognosis (11). Thus, the identification of a para-aortic lymphadenopathy in sigmoid colon cancer is of utmost diagnostic importance. This is particularly important when a minimally invasive surgery is planned because in these cases there is a poor depth perception, and tactile sensation is diminished (12). Misinterpreting a left inferior vena cava as a lymph node metastasis may lead to such life-threatening complications as severe intraoperative hemorrhages. Nevertheless, laparoscopic approach has been previously demonstrated as feasible and safe in left nephrectomy patients, even in the presence of a double inferior vena cava (3).

A double inferior vena cava was also associated with an increased risk for deep vein thrombosis, especially in young adults, due to inadequate venous return from the lower extremities (5).

The clinical implications of a double inferior vena cava in a patient with colon cancer are related to an increased risk for deep vein thrombosis and misdiagnosis of para-aortic lymphadenopathy. An accurate preoperative diagnosis can be made if computed tomography assessment of vascular structures is made by using intravenous contrast material; during the arterial phase, the veins exhibit little or no contrast (2). Prophylactic use of anticoagulants may theoretically reduce the risk for deep vein thrombosis and pulmonary embolism.

CONCLUSIONS

Double inferior vena cava is a rare congenital anatomical variant that may have significant surgical implications. Awareness of this anomaly is mandatory and the surgeon should be able to distinguish it from para-aortic lymphadenopathy. If a double inferior vena cava is not preoperatively recognized, it can be a source for severe surgical complications.
REFERENCES