A very rare cause of low-back pain and sciatica: deep vein thrombosis due to absence of the inferior vena cava mimicking the clinical and radiological signs of lumbar disc herniation

Case report

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The authors report a very rare cause of low-back pain and sciatica in a patient with iliac vein thrombosis attributed to absence of the infrarenal segment of the inferior vena cava (IVC) with massively dilated venous collaterals draining via a paraspinal plexus into the azygous system. This 21-year-old man presented with acute low-back pain radiating to the left ventral thigh. The initial CT scan revealed an intraspinal lesion that mimicked lumbar disc herniation. Further clarification revealed an iliac vein thrombosis, which was triggered by the absence of the infrarenal segment of the IVC, a very rare vascular anomaly. Collateral venous return was developed and led to lumbar varicosities and epidural vein engorgements. Laboratory examinations revealed factor V mutation as a predisposing factor for thrombosis. The patient’s symptoms were relieved with anticoagulation and antiinflammatory therapy.

Absence of the infrarenal IVC associated with iliac vein thrombosis should be regarded as a very rare cause of radicular and low-back pain, and this condition can mimic the clinical and radiological signs of lumbar disc herniation. Sciatica might be the first clinical manifestation of this rare venous anomaly. (DOI: 10.3171/2011.4.SPINE10636)

Key Words • absence of inferior vena cava • deep vein thrombosis • epidural varices • low-back pain • lumbar disc herniation • vascular disorders

Abbreviations used in this paper: CRP = C-reactive protein; IVC = inferior vena cava.

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Radicular and low-back pain are very common in neurosurgical practice. Lumbar disc disease, facet joint and muscular pathology, tumors, infections, and trauma account for the symptoms in most cases. Absence of the infrarenal segment of the IVC is a rare vascular anomaly, and its etiology is controversial. The cause is unlikely to be a single embryologic event. Several authors suggest the absence of the infrarenal IVC to be a result of intrauterine or perinatal thrombosis. In this setting, venous blood is drained via lumbar, paravertebral, and epidural collaterals into the azygous system. This condition is not necessarily symptomatic. Clinical manifestations mainly involve deep vein thrombosis, since the anomaly constitutes a highly thrombogenic factor. Here we present the case of a 21-year-old man who presented with acute low-back pain and sciatica due to lumbar varices and intraspinal epidural venous engorgements primarily caused by absence of the infrarenal IVC associated with iliofemoral vein thrombosis. Epidural varicose veins causing low-back pain and radiculopathy have been described; they develop either primarily or secondarily due to IVC obstruction or thrombosis. However, formation of epidural varices with concomitant iliofemoral vein thrombosis caused by absence of the infrarenal segment of the IVC as a primary cause of low-back pain and sciatica represents a very rare clinical entity.
Absence of inferior vena cava mimicking lumbar disc herniation

**Case Report**

This 21-year-old man was admitted to our university neurosurgical clinic for surgical treatment of a lumbar disc herniation diagnosed at a peripheral hospital. The patient presented to the peripheral hospital with acute low-back pain radiating to the left ventral thigh. Physical examination revealed no neurological deficits. Laboratory examination revealed leukocytosis (11,800/μl) and a high CRP value (341 mg/L, reference range < 5 mg/L). An initial CT scan of the lumbar spine was obtained with contrast enhancement, due to the elevated white blood cell count and CRP level, to exclude a spondylodiscitis. The CT scan showed an intraspinal space-occupying lesion that resembled a herniated lumbar disc at the L5–S1 level (Fig. 1). An L5–S1 disc herniation was diagnosed and the patient was transported to our university clinic for an urgent operation, due to severe pain that could not be controlled with analgesic medication. The pain was also accompanied by an atypical radiation to the left lower abdomen. We performed further diagnostic evaluation with abdominal ultrasonography, which revealed dilated veins in the left pelvis. Multidetector CT and MR imaging of the abdomen showed a major iliofemoral thrombosis with associated thrombophlebitis and massively dilated iliac vessels (Fig. 2). Venous collaterals drained the blood via engorged lumbar veins and a dilated epidural plexus (Fig. 3) into the dilated azygous/hemiazygous system (Fig. 4). Collateralization of venous drainage was attributed to the absence of the infrarenal segment of the IVC as identified on MR imaging (Fig. 5). The suprarenal segment of the IVC was persistent, but showed narrowing and drained only small amounts of blood from the renal veins. Massively dilated renolumbar collaterals drained renal blood to the azygous system (Fig. 5). Further laboratory investigations revealed a heterozygous factor V mutation as a predisposing factor to thrombosis. Sigmoidoscopy was performed to exclude other conditions associated with abdominal pain but revealed no abnormality. The patient’s white blood cell count and CRP level declined rapidly.

We examined the patient 3 and 5 months after the episode. He had continued a regimen of prophylactic anticoagulation therapy and had no pain or any other symptom. An ultrasonographic examination showed no thrombosis.

**Discussion**

Stasis in the lumbar venous system as well as epidural vascular engorgements have been described in numerous publications as a rare cause of radicular and low-back pain. Several underlying pathologies, such as thrombosis or occlusion of the IVC, IVC compression due to pregnancy, and portal hypertension, account for epidural venous engorgements associated with low-back pain and sciatica.

Nevertheless, epidural varices primarily attributable to an IVC anomaly, such as congenital stenosis or absence of the IVC, represent an extremely rare clinical condition. Moreover, in our patient, sciatica was the first clinical manifestation and led to the identification of this vascular anomaly.

The etiology of this anomaly is the subject of controversy. Several authors suggest the absence of the infrarenal segment of the IVC to be a result of an intrauterine or perinatal thrombosis rather than a single embryological event. Several clues in our case support this the-
sis: looking back to the history of the patient, the parents recalled a hospitalization due to cyanosis of the infant’s legs. We assume that this postnatal event corresponds to an IVC thrombosis involving the renal veins. Compensatory blood drainage was established by postthrombotic formation of iliolumbar and renolumbar collaterals to the azygous system and partial recanalization of the infrarenal segment of the IVC and the renal veins. Furthermore, bilateral adrenal calcifications observed on the multidetector CT images provided evidence that a postnatal adrenal hemorrhage has taken place. The latter has been correlated to renal vein thrombosis with concomitant IVC thrombosis. We believe that the patient suffered a postnatal IVC thrombosis and that the IVC could be recanalized only partially in the suprarenal segment. The established venous anomaly together with the factor V mutation resulted in a major iliofemoral vein thrombosis.

Surgical treatment of epidural venous engorgements has been proposed. Decompressive laminectomy, foraminotomy, coagulation, and excision of the engorged veins have been suggested as appropriate surgical treatments. Nevertheless IVC thrombosis due to primary or secondary thrombophilia (for example pregnancy, contraceptives, or factor V mutation) can be treated with anticoagulation.

We have considered both surgical and medical treatment strategies in our case. Cava stenting for IVC stenosis associated with Budd-Chiari syndrome and low-back pain has been reported. In this case, endovascular treatment was possible due to the partial stenosis of the IVC at its hepatic portion. To the contrary, in our case the infrarenal IVC was absent. Consequently, endovascular or open surgical treatments to eliminate the primary cause were regarded as not feasible. The patient’s symptoms were relieved by subcutaneous anticoagulation therapy with fondaparinux (selective factor Xa inhibitor).

**Conclusions**

The absence of the infrarenal IVC should be regarded as a very rare cause of low-back pain and sciatica in patients with lumbar varicose veins and epidural vein engorgements. Moreover, the initial CT scan may be misleading as it may show a lesion that resembles a herniated lumbar disc. Finally, low-back pain or sciatica might be the very first symptom in these patients and may lead to the diagnosis of this venous anomaly.

**Disclosure**

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

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References

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