

## Case Report

# Epidural venous plexus engorgement due to inferior vena cava thrombosis resulting in cauda equina syndrome: Case report and literature review

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## Abstract

**Background:** Epidural venous plexus congestion at L5-S1 due to inferior vena cava (IVC) thrombosis led to an acute cauda equina syndrome (CES). Laminectomy to rule out an epidural abscess, allowing for resection of the dilated veins, led to immediate symptom resolution.

**Case Description:** A 47-year-old male presented with acute urinary retention and left greater than right lower extremity paresis of 2 weeks duration. Magnetic resonance imaging (MRI) revealed a contrast-enhancing space-occupying anterior epidural L5-S1 level lesion resulting in cauda equina compression. As the patient was septic, he underwent an emergency laminectomy for a presumed epidural abscess. Intraoperative findings, however, documented a markedly dilated epidural venous plexus secondary to a newly diagnosed IVC thrombus. One day postoperatively, the patient was symptom-free and neurologically intact.

**Conclusions:** Here we report a patient who uniquely presented with a CES characterized by acute paraparesis. This was attributed to a massively engorged anterior lumbar epidural venous plexus attributed to newly diagnosed IVC thrombus.

**Key Words:** Cauda equina syndrome, epidural venous plexus engorgement, inferior vena cava thrombosis

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## INTRODUCTION

Well-established causes of cauda equina syndrome (CES) include spinal tumors, infection/inflammation, critical stenosis, arteriovenous malformations, and hemorrhages.<sup>[1]</sup> Here, we describe a CES attributed to massive engorgement of the lumbar L5-S1 epidural venous plexus (EVPE) attributed to inferior vena cava (IVC) thrombosis. Following a decompressive laminectomy, the patients were asymptomatic and, again, neurologically intact.

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## CASE REPORT

A 47-year-old male presented with 2 weeks of a progressive left lower extremity paraparesis and 5 days of urinary dysfunction. On admission, he demonstrated a leukocytosis of  $21.6 \times 10^3$  cells/ $\mu\text{L}$ , along with *Streptococcus viridans* septicemia. Also noted was acute

venous thrombosis extending from the left popliteal vein to the IVC (e.g., at the confluence of left and right common iliac vein) [Figure 1]. He was immediately placed on both intravenous antibiotics and full-dose anticoagulation. When the lumbar magnetic resonance imaging (MRI) with and without contrast revealed a mass in the L5-S1 anterior epidural space, emergent

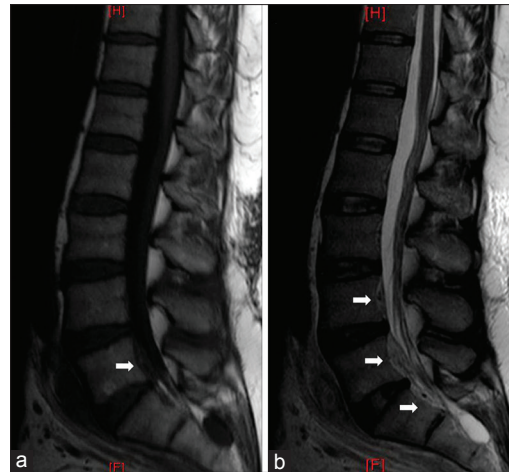
**Table 1: Literature review of case reports of symptomatic epidural venous plexus engorgement secondary to IVC thrombosis**

	# of cases	Clinical BP	Presentation		Treatment	Description/Comments
			Radic	CES		
De Kruijk <i>et al.</i> (1999)	1			X	Anticoagulation	58M with acute cauda equina syndrome (BLE weakness, sensory disturbances, urinary retention). MRI showed IVC thrombosis extending from just inferior to renal veins to iliac veins. Treated with IV heparin and acenocoumarol, symptoms improved within few days. 1 <sup>st</sup> report of acute CES due to IVC thrombosis
Paksoy and Gormus (2004)	13	X	X		Anticoagulation, thrombectomy, or delivery	Examined 9640 patients with back pain/sciatica over 2 years, 13 found to have epidural venous plexus enlargement as cause of symptoms. Secondary to IVC thrombosis or external compression/obstruction. All but one (due to inoperable malignancy) treated via delivery or thrombectomy/ anticoagulation
Mohit <i>et al.</i> (2006)	1	X	X	X	Thrombectomy	16F with acute DVT in IVC, iliac, and femoral veins with progressive low back pain, buttock paresthesia, BLE pain and weakness. Treated with thrombectomy, symptoms resolved after 1 week. OCP use as cause of thrombus. 2 <sup>nd</sup> report of cauda equina from IVC thrombosis. Ischemia secondary to venous congestion vs mechanical nerve root compression?
Bozkurt <i>et al.</i> (2006)	1	X	X		Endovascular stenting	27F with Budd-Chiari with severe stenosis of hepatic IVC resulting in symptomatic lumbar epidural venous engorgement (low back pain, radicular pain). Treated with IVC dilation and stenting with immediate resolution of symptom. First report of stenting to treat this.
Dudeck <i>et al.</i> (2007)	1	X	X		Anticoagulation	26M with low back pain and radiculopathy to left thigh found to have congenital agenesis of infrarenal IVC and associated BLE DVT. Treated with compression and anticoagulation, symptoms partially improved after 2 months.
Go <i>et al.</i> (2009)	1			X	Systemic tPA	36F morbidly obese with history with DVT, PE, IVCF presented with 3-day severe low back pain, urinary retention, and fecal incontinence for 1 day. Imaging confirmed ilio caval thrombosis but symptoms were refractory to therapeutic anticoagulation, so systemic tPA started for 48 h with improvement. Symptom free at 6 month follow-up. (2 <sup>nd</sup> case questionable for CES)
Kamerath and Morgan (2010)	1	X	X		Anticoagulation	34M with exercise-induced numbness of BLE found to have agenesis of infrarenal IVC. No associated thrombosis at the time, no interventions done. Later developed DVT and found to have Factor V Leiden mutation.
Yugueros <i>et al.</i> (2013)	2	X	X		Anticoagulation	Case report x2 of infrarenal IVC agenesis and DVT with nerve root compression secondary to hypertrophic epidural venous plexus. Treated with anticoagulation without recurrence.
Lee <i>et al.</i> (2015)	1			X	Endovascular stenting	60M with 1 year history of BLE weakness and voiding difficulty. Found to have IVC thrombosis and Budd-Chiari Type I with venous plexus dilation at T11-L3 causing thecal sac compression and concurrent syringomyelia at T11-12. Treated with IVC recanalization and stenting. 1 month follow up shows decreased epidural venous engorgement, but syringomyelia still present. 3 month and 1 year follow up had resolution of symptoms.
Carvalho <i>et al.</i> (2015)	1	X		X	Steroids, IVC dilation and stenting	20M with acute onset urinary retention and BLE weakness and perineum paresthesia consistent with conus medullaris syndrome. MRI showed intrahepatic IVC occlusion with venous plexus engorgement without signs of compression of the spinal cord or nerve roots → congestive myelopathy secondary to IVC occlusion (venous hypertension, decreased perfusion pressure gradient to spinal cord)

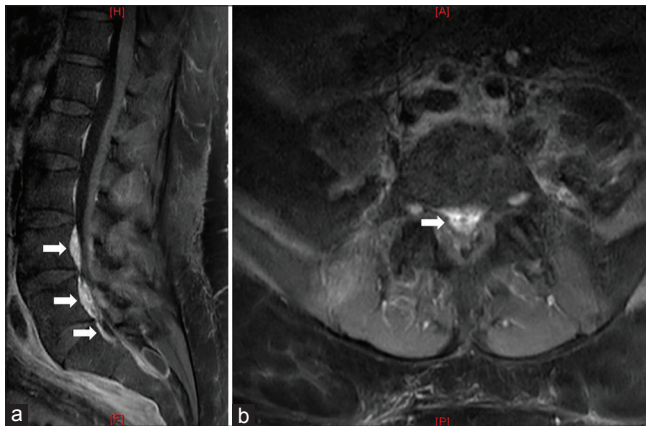
BP: Back pain, Radic: Radiculopathy, CES: Cauda equina syndrome, IVC: Inferior vena cava, DVT: Deep vein thrombosis, PE: Pulmonary embolism, IVCF: inferior vena cava filter, OCP: Oral contraceptive, tPA: Tissue plasminogen activator, BLE: Bilateral lower extremity



**Figure 1:** A venacavagram performed during IVC filter placement demonstrating filling defect near the confluence of the common iliac veins (a) with delayed reconstitution of contrast flow into the right, but not left, common iliac vein (b). Findings are consistent with an occlusive thrombus in the left common iliac vein with extension into the proximal IVC which is near-occlusive in nature



**Figure 2:** (a) Sagittal T1-weighted MR sequence revealing a lesion in the L5-S1 anterior epidural space that is heterogeneously hypointense (arrow). (b) Sagittal T2-weighted MR sequence with anterior spinal epidural lesion that is mixed iso- and hyperintense centrally with a rim of hypointensity peripherally (arrows), most prominently seen at L4-S1 but also present at T12-L3 levels. There is evidence of mass effect with compression of the thecal sac



**Figure 3:** Sagittal (a) and axial (b) images of gadolinium-enhanced T1 MR sequence. Arrows depict heterogeneous contrast-enhancing lesions in the anterior epidural space that have serpiginous fill void centrally

decompressive laminectomy was performed to rule out an abscess/phlegmon [Figures 2 and 3]. However, ventral L5-S1 exploration revealed a significantly engorged EVPE compressing on the thecal sac without evidence of infection; the plexus was cauterized/coagulated and resected. The patient's symptoms/signs resolved within just one postoperative day, and he remained symptoms/sign free at 8 postoperative months.

## DISCUSSION

EVPE engorgement causing low back pain, radiculopathy, and CES is rare, and the diagnosis is often missed. It was first described in the 1940s by Cohen<sup>[3]</sup> and Epstein<sup>[6]</sup> where epidural varices mimicked nucleus pulposus herniations/lumbar discs.

There are only 20 previously reported cases of myelopathy associated with EVPE secondary to IVC thrombosis, only five of which exhibited symptoms of CES [Table 1].<sup>[1,2,4,5,7-10,12,13]</sup> Anticoagulation, pharmacomechanical thrombectomy, and IVC stenting were the treatment of choice in many of these cases. Here, following a decompressive laminectomy to rule out an epidural abscess and resect the anteriorly massive dilated L5-S1 venous plexus, the patient's symptoms resolved.

## CONCLUSION

Symptomatic massive engorgement of the L5-S1 anterior EVPE resulted in a CES due to iliocaval thrombosis. Following a laminectomy to rule out an epidural abscess, coagulation/resection of the dilated venous plexus resulted in full symptom resolving.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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