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Case Report

Lumbar epidural vein thrombosis mimicking disc herniation: A report of 3 cases ☆

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ABSTRACT

Epidural vein thrombosis is a rare cause of lumbosciatica than can clinically and radiologically mimic other causes of nerve root compression such as disc herniation. We describe 3 unusual cases of spinal epidural plexus vein thrombosis illustrating the difficulty in preoperative diagnosis of this entity. Misinterpretation of imaging findings can lead to an erroneous diagnosis and inappropriate treatment. Knowledge of certain radiologic findings will increase the likelihood of recognizing epidural vein thrombosis.

Introduction

Lumbar epidural venous plexus thrombosis is a very uncommon cause of lower back pain and nerve root compression syndromes. The diagnosis of epidural venous thrombosis is a clinical and a radiological challenge, and most of them are diagnosed in the operating room [1,2]. Lumbar epidural varicous veins without thrombosis have also been associated with radicular symptoms. The differential diagnoses include herniated or sequestrated disc, perineural cyst, epidural abscess, epidural hematoma or neurogenic tumor [1,3].

We review 3 cases of spinal epidural plexus vein thrombosis presenting as an epidural fusiform space-occupying lesion intimately related with the vertebral venous plexus with a central contrast medium defect as major radiological findings.

Case presentation

Case 1

A 63-year-old woman with no relevant medical history presented to the emergency department for complaining of low back pain during 3 months after a day of hiking. The pain was irradiated to the left lower limb and was associated with

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paresthesia in the lateral aspect of the thigh. Neurological examination revealed no sensory or motor deficit. The patient underwent a lumbar spine MRI (Fig. 1) which revealed an extradural space occupying lesion with no discś dependance in the anterolateral left epidural space and the foramina at L2-L3 level, with mass effect on the L2 nerve root. Signal was hyperintense compared to muscle on fluid-sensitive sequences. Initially, no intravenous contrast was administered, and in view of these findings, the patient was then recalled. After contrast medium administration, the lession showed peripheral enhancement with a central filling defect (Figs. 1C and D). The presumptive diagnosis was sequestered disc with radicular compression. Surgery was performed with the final diagnosis of thrombosis of the epidural plexus without disc herniation. No biopsy was taken. Epidural corticosteroids were instilled as a locoregional treatment. Clinical evolution after surgery was favorable, with progressive disappearance of pain and paresthesias.

Case 2

A 48-year-old man with a previous personal history of pulmonary embolism, a family history of thromboembolic events and active oral anticoagulant therapy, with recent dosage reduction, consulted to the emergency department because a 2-day lower back pain after a weightlifting exercise session. The pain was irradiated to the left lower limb and associated with paresthesia in the lateral aspect of the thigh and leg. The physical exam depicted a left “foot drop”, with inability for foot dorsiflexion. There was no history of trauma. Nerve root compression was suspected, and the patient was admitted for evaluation and imaging.

A lumbar spine MRI (Fig. 2) revealed a soft tissue occupying lesion in the anterior left epidural space at the L4-L5 level, hyperintense compared to muscle on fluid-sensitive sequences, that caused stenosis of the ipsilateral subarticular recess and the foramen. Furthermore, the pelvic veins and the anterior spinal epidural venous plexus were engorged. On post-contrast T1-weighthed sequences, a filling defect with peripheral enhancement was noticed in the left anterior epidural space (Figs. 2C and D). These findings were highly suspicious for spinal epidural plexus varix and thrombosis, but a sequestrated disc could not be ruled out completely.

Due to the SARS-COV-2 pandemic and the lack of available operating rooms, it was decided to start anticoagulation treatment. Clinical follow-up was carried out with improvement of both sensitive and motor symptoms. Follow-up MRI obtained 7 months later (Fig. 3) showed complete resolution of the filling defect with slight epidural vein dilation persisting, confirming the diagnosis.

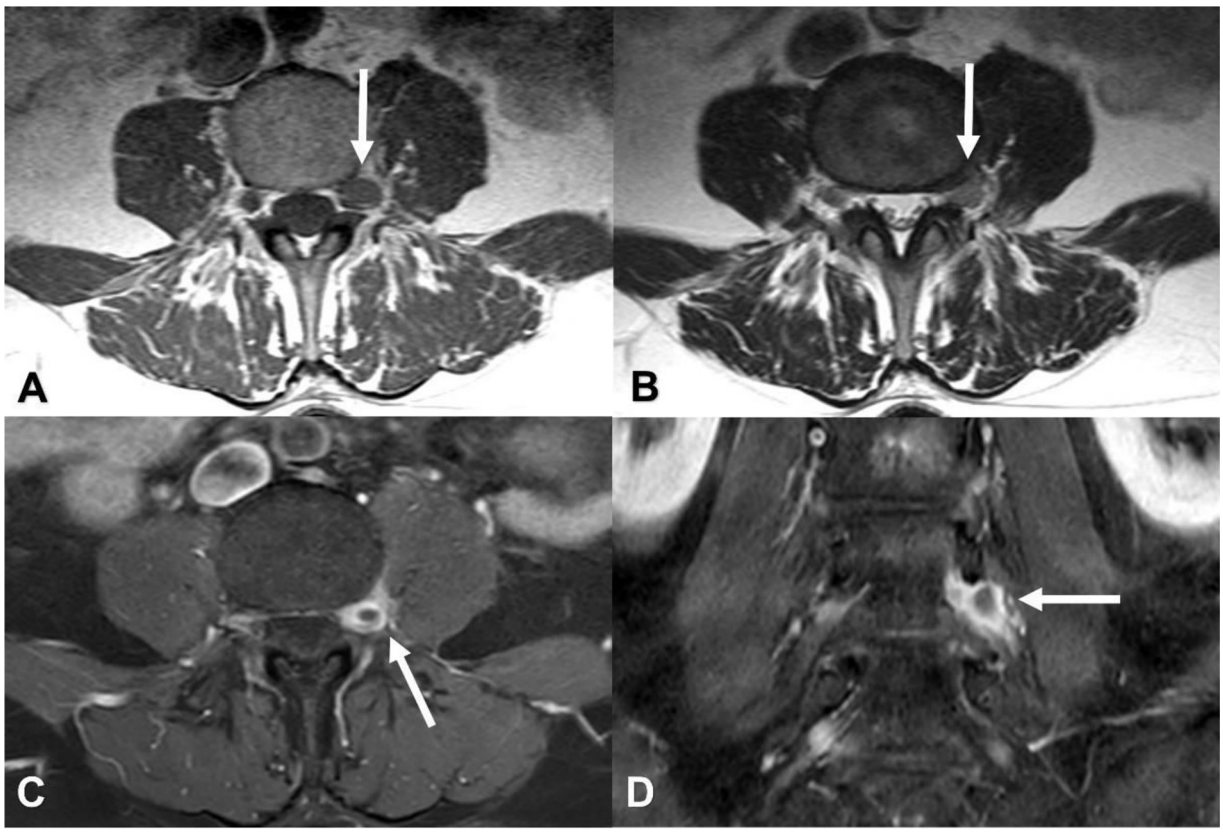

Fig. 1 – T1 (A) and T2 (B) weighted images show a space occupying elongated structure in the left anterolateral epidural and foraminal space at L2-L3 level (white arrow) without apparent intervertebral discś dependance. Axial (C) and coronal T1 fat suppressed images with intravenous contrast (D) show an engorged anterior epidural venous plexus varicose vein with a filling defect (white arrows, left intervertebral vein) with L2 root compression.

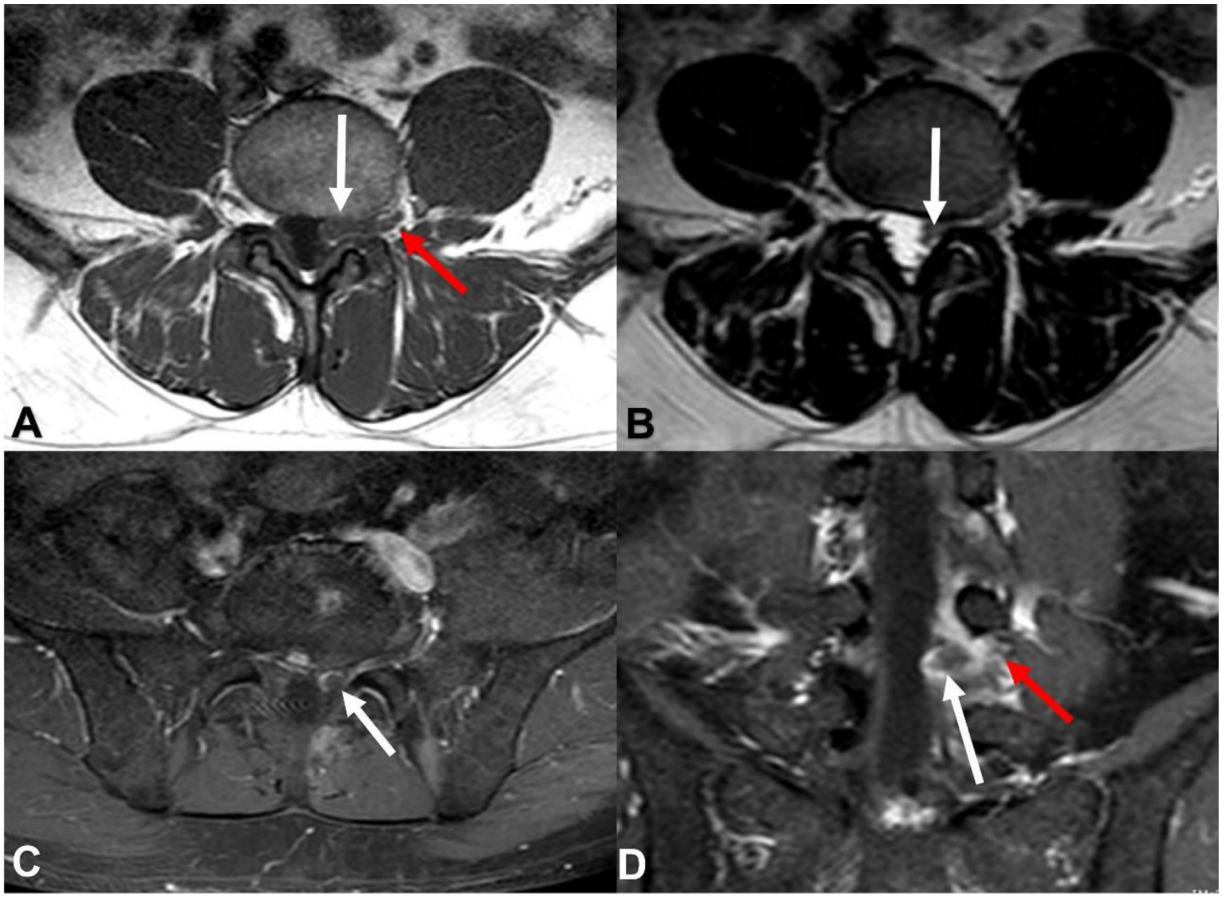

Fig. 2 – T1 (A) and T2 (B) weighted images show a space occupying elongated structure in the left anterolateral epidural space at L4-L5 level (white arrow), obliterating and partially stenosing the L4-L5 subarticular and foraminal space, displacing the L5 root (red arrow). It does not seem to depend on the intervertebral disc. Axial (C) and coronal T1 fat suppressed images with intravenous contrast (D) show an engorged anterior epidural venous plexus varicose vein with a filling defect (white arrows). The left L5 root is thickened and shows increased contrast uptake, as signs of radiculopathy because of the mass effect (red arrow in D). Also, engorged paravertebral veins can be seen in C and D.

Case 3

A 55-year-old woman with no relevant medical history presented to the emergency department for 6-month of low back pain that has progressively worsened over the last few weeks despite conservative treatment and rehabilitation. The pain was irradiated to both lower limbs. Neurological examination revealed no sensory or motor deficit. The patient underwent a lumbar spine MRI (Fig. 4) that revealed a left paravertebral space occupying lesion at L3-L4 that presented a moderately high signal on T2. A neurogenic tumor was the presumptive diagnosis, and a postcontrast study was obtained, demonstrating the continuity of the lesion with the external vertebral vein plexus with no discś dependance and intense ring-enhancement, suggesting the diagnosis of vein thrombosis (Figs. 4C and D).

Clinical evolution with conservative treatment was favorable, with progressive disappearance of pain. 3 months later, a control MRI was performed (Fig. 5) showing regression of the space-occupying lesion, supporting the presumptive diagnosis.

Discussion

Lumbar epidural venous plexus varices and thrombosis are an uncommon cause of lower back pain and sciatica [1,2]. Its diagnosis is a clinical and radiological challenge. In fact, most of them are diagnosed in the operating room because a herniated or sequestrated disc is initially suspected [2,4].

There are 2 internal vertebral epidural venous plexuses, anterior and posterior (Fig. 6) of which the anterior is more clinically relevant [1]. The intraosseous vertebral veins drain into the central basivertebral vein which drains into the anterior epidural plexus at the posterior surface of the vertebra [1,5]. On the other hand, the posterior internal vertebral venous plexus is located anterior to the laminae which com-

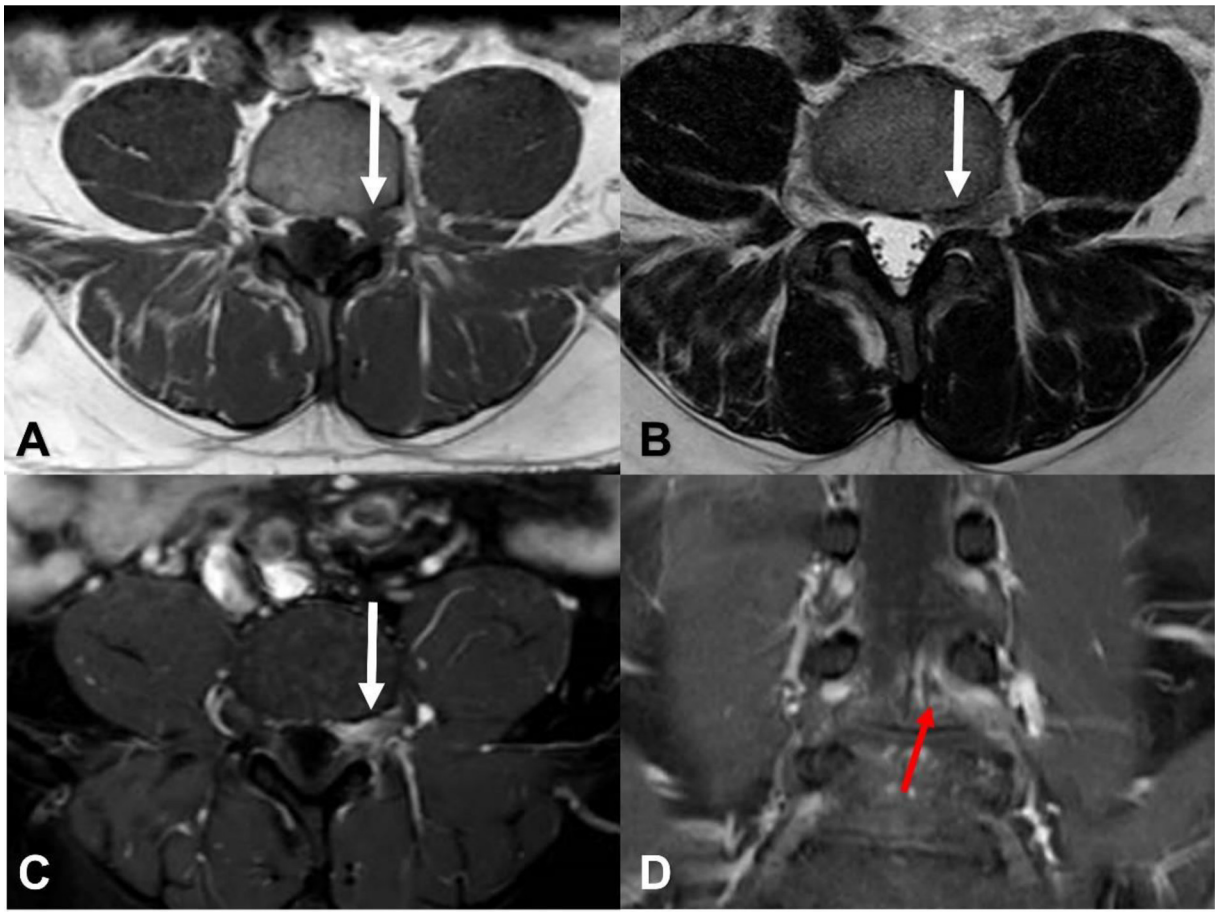

Fig. 3 – MRI images after a few months after symptomatic and anticoagulation treatment. T1 (A), T2 (B) and T2 fat suppressed (C) axial images show almost disappearance of the elongated structure in the left anterior epidural space (white arrows). Axial T1 fat suppressed image (D) after contrast administration demonstrates slight engorged epidural venous plexus with a very small residual filling defect (red arrow in D).

municates directly with the anterior internal plexus. Both anterior and posterior internal vertebral venous plexuses drain into the external vertebral venous plexus via intervertebral veins [5].

The epidural venous system is valveless and permits retrograde flow [2]. The pathophysiology of epidural vein varices and thrombosis is not totally clear, although it is believed to be caused by blood stasis which increases the intravenous pressure and leads to endothelial damage [1,2]. Causes of blood stasis may be a herniated disc, inferior vena obstruction, inferior vena cava agenesis or increased thoraco-abdominal pressure [1]. The dilated veins by themselves may compress and impinge surrounding nervous tissue, such as the thecal sac and nerve roots, generating lumbosciatica.

MRI is the gold standard for epidural vein varices and thrombosis diagnosis although in many cases diagnosis is missed [1,4]. Typical findings of epidural vein thrombosis are an occupying space lesion in the anterolateral epidural space, sometimes with extension to the foramina. The signal intensity of varicose veins can vary depending on whether they are thrombosed [2], but usually they are hyperintense compared to muscle on fluid-sensitive sequences showing a central filling defect with peripheral enhancement after intravenous contrast administration [1].

The most important distinctive feature between epidural venous thrombosis and its main differential diagnosis, herniated disc, is their topographical location in relation to the vertebral venous plexus [1,3]. Particularly when imaging shows a spindle-shaped space-occupying lesion in close proximity to vertebral venous plexus, with higher signal in liquid-sensitive sequences than the adjacent disc and with ring-enhancement, epidural venous thrombosis should be suspected [1]. However, sequestrated disc herniations tends to show rim enhancement after contrast administration due to peripherical granulation tissue, making differential diagnosis hard. On the other hand, sequestered disc fragments showing peripheral enhancement tend to regress spontaneously in up to 75% of cases [6,7]. Since vertebral plexus vein thrombosis can also regress spontaneously, venous thrombosis as a cause of lumbosciatica may not be as uncommon as expected, and may correspond, in some cases, to imaging-diagnosed herniations not visible intraoperatively [5,8].

Treatment of thrombosed epidural veins in symptomatic patients may be either conservative with medical drugs (an-

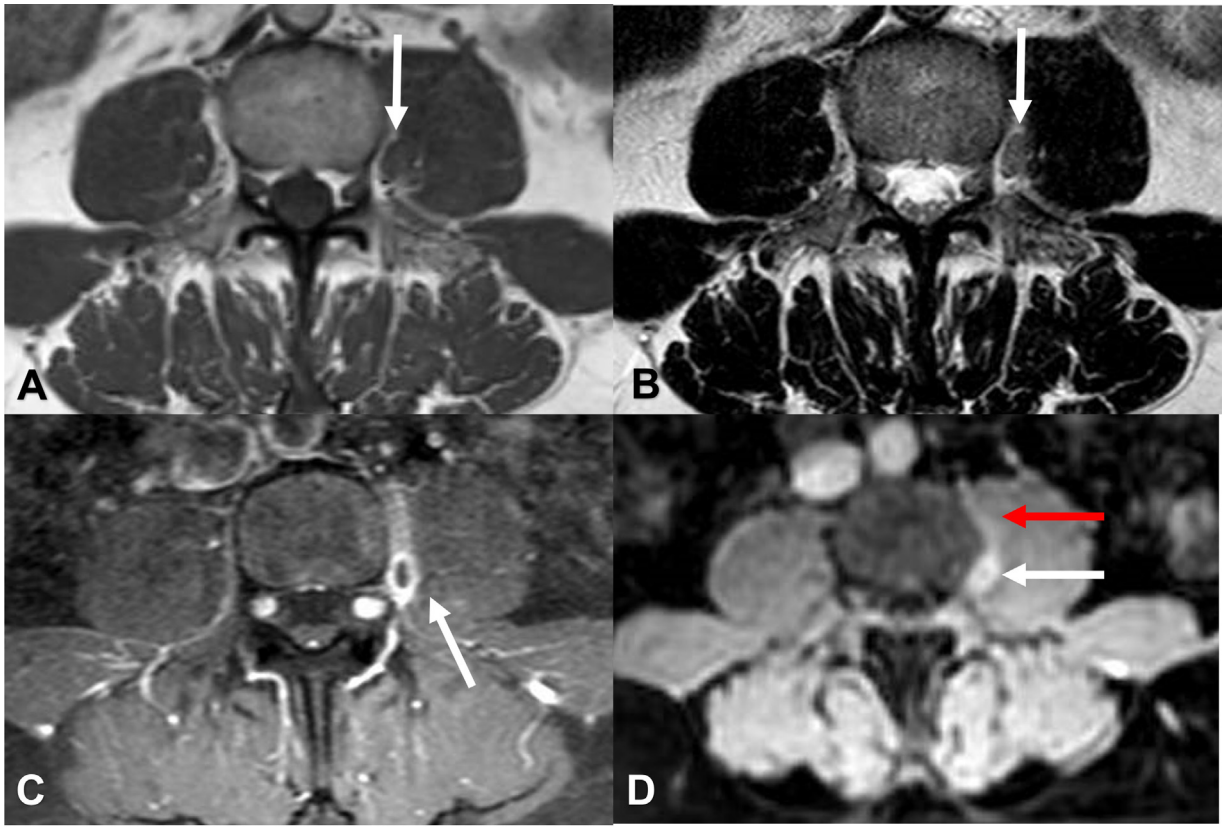

Fig. 4 – T1 (A) and T2 (B) weighted images show a space occupying elongated structure in the left paravertebral space at L3-L4 level (white arrow). Axial T1 fat suppressed image with intravenous contrast (C) show a central filling defect of the lesion. Dynamic study (D) shows the continuity of the lesion (white arrow) with the external vertebral venous plexus (red arrow).

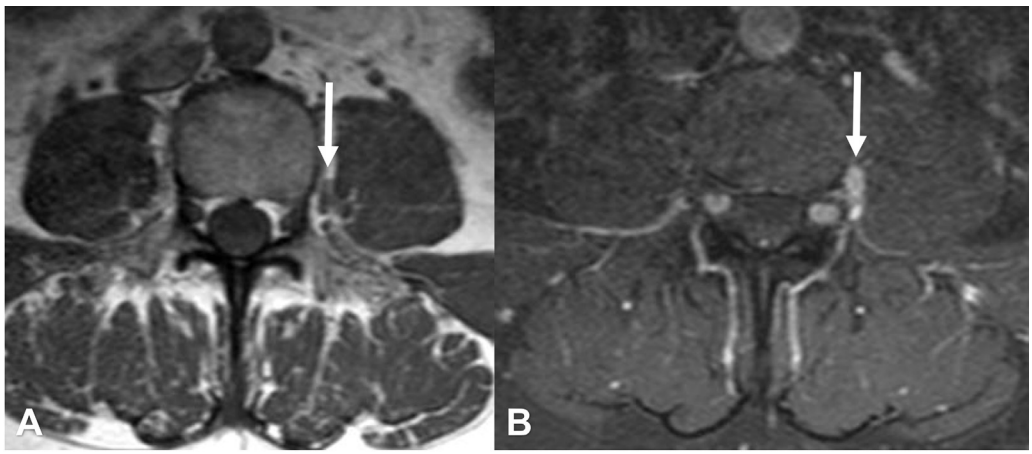

Fig. 5 – MRI images after 3 months of symptomatic treatment. T1 (A) axial image show decrease in size of the space-occupying paravertebral lesion (white arrow), with a minimal residual filling defect in axial T1 fat suppressed image (B) after contrast administration.

tithrombotics, NSAIDS, corticosteroids) or surgical such as venous thrombectomy or corticosteroid instillation [1,6,7]. We suggest conservative treatment with close follow-up in the initial course of epidural vein thrombosis without surgical indication even if a diagnosis of certainty is not reached, as both epidural venous thrombosis and sequestered disc herniation (especially if demonstrate peripheric enhancement), may show regression [4,7,8].

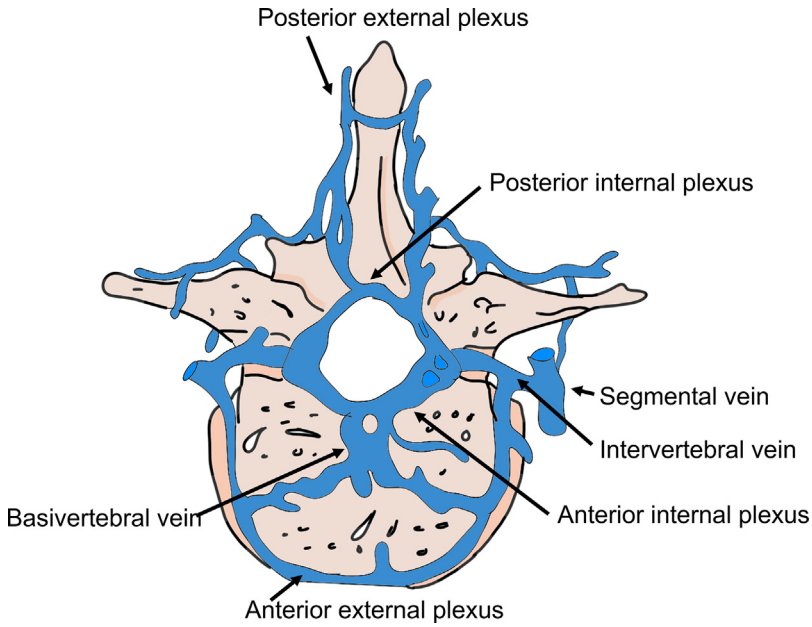

Fig. 6 – Graphic representation of the vertebral venous plexuses [1]. The anterior internal venous plexus stands out as the most frequent site of thrombosis.

Conclusion

These cases remind us that not all extradural masses are herniated discs. Epidural vein thrombosis must be included in the differential diagnosis of nerve impingement in patients presenting with back pain and neurologic deficits. It must be suspected when an epidural fusiform space-occupying lesion with a central contrast medium defect and intimately related with the vertebral venous plexus is detected on MRI.

Patient consent

I am writing to confirm that we have obtained informed consent from all 3 participants involved in the case report titled "Lumbar epidural vein thrombosis mimicking disc herniation: a report of 3 cases." We have diligently followed ethical guidelines and possess the necessary informed consent documents. These documents are securely stored and will be made available to the journal upon request.

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