

# Symptomatic Spinal Epidural Varices Presenting With Nerve Impingement

## Report of Two Cases and Review of the Literature

Chin-Ho Wong, MBBS,\* Paul L. K. Thng, MBBS, FRCS (Edin), FRCS (Glas),\*  
Fei-Ling Thoo, MBBS, FRCR,† and Cheng-Ooi Low, MBBS, FRCS (Glas)\*

**Study Design.** Two cases of symptomatic epidural varices are presented and the literature was reviewed on this entity.

**Objective.** To raise awareness of this rare condition in the interpretation of preoperative magnetic resonance imaging scans and to assess the results of surgical treatment.

**Background.** Symptomatic epidural varices presenting with radiculopathy are extremely rare, and the diagnosis is often missed in the preoperative evaluation. This condition commonly masquerades as a herniated nucleus pulposus. Diagnosis is often only made intraoperatively.

**Materials and Methods.** Case 1 is a 40-year-old man presenting with acute exacerbation of lower back pain associated with radiculopathy down his right lower limb. Magnetic resonance imaging showed a paracentral disc prolapse. At operation, a congested epidural vein impinging on the L5 nerve root was noted with no intervertebral foramen stenosis. Excision of the vein was performed. The second case, a 50-year-old man with previous spinal instrumentation, was admitted for acute onset of radiculopathy down his left lower limb. At operation, an epidural varix compressing on the L4 nerve root was noted. Retrospectively, features of epidural varices were noted in the preoperative magnetic resonance imaging scans. Both patients reported resolution of symptoms after surgery.

**Results.** Excision was done for the first patient, and coagulative ablation was done in the second patient. Both patients had symptomatic relief and neurologic recovery on follow-up.

**Conclusion.** Our experience and the literature demonstrated that a favorable outcome with resolution of neurologic symptoms can often be achieved after excision or ablation of the epidural varices. [Key words: symptomatic epidural varices, radiculopathy, diagnostic magnetic resonance imaging, surgical excision, coagulative ablation, resolution of symptoms] *Spine* 2003;28:E347–E350

Impingement of nervous tissue by spinal epidural varices is rarely described in the literature.<sup>1–4</sup> Symptomatic epidural varices presenting with radiculopathy is extremely rare and was first reported by Cohen<sup>2</sup> and Epstein<sup>3</sup> in the 1940s. The diagnosis is often missed in the preoperative evaluation with computed tomography (CT) scans and even magnetic resonance imaging (MRI) scans. This condition commonly masquerades as a herniated nucleus pulposus, and the diagnosis is usually made only at op-

eration. This report describes our recent observation of such venous varices in two of our patients and our review of the literature on this entity. The diagnosis, pathophysiology, and treatment of this condition are discussed.

### Materials and Methods

**Case 1.** A 40-year-old man with a history of lower back pain for the past 3 months was admitted for acute exacerbation of his lower back pain associated with a new onset of radiculopathy down his right lower limb in the L5 dermatome. He had classic root tension signs (straight leg raise and bow string tests) and had slight weakness of his extensor hallucis longus (EHL) on his right. He was severely incapacitated and bed bound. Magnetic resonance imaging showed a small paracentral prolapsed disc at L4–L5 just abutting on the L5 nerve root and thecal sac. On the sagittal T1-weighted image, prominent veins posterior to the L4 and L5 vertebral bodies in the epidural space were noted (Figure 1A). As his symptoms were classic of nerve root impingement, he was offered surgery.

At operation, we noted a congested and dilated epidural vein after laminectomy (Figure 1B). This was compressing the L5 nerve root on the right. The L5 intervertebral foramen itself was not stenosed. There was only a small paracentral L4–L5 disc prolapse noted beneath the epidural vein. This was felt not to significantly contact the exiting nerve root. Nevertheless, as it was thought that the paracentral disc protrusion might be a contributory factor to the genesis of the epidural varices, L4–L5 discectomy and excision of the epidural vein were performed. Histology demonstrated fibrosis and phlebothrombosis of the epidural vein. The patient reported improvement of his right lower limb radiculopathy the next day, and his symptoms resolved over the next 4 weeks. At 9 months follow-up, he had mild backache but no recurrent radicular symptoms and was able to return to active employment.

**Case 2.** A 50-year-old man, who worked as a mechanic, presented with signs and symptoms of spinal instability affecting his work and quality of life. An MRI of the lumbar spine was performed, and this demonstrated a large sequestered disc at L3–L4 and severe central canal as well as bilateral lateral recess stenosis at L3–L4 and L4–L5. An L4 laminectomy, L3–L4 discectomy, and L3–L5 posterolateral fusion were done for the patient. His lower back pain and L5 dermatomal numbness gradually improved after the operation.

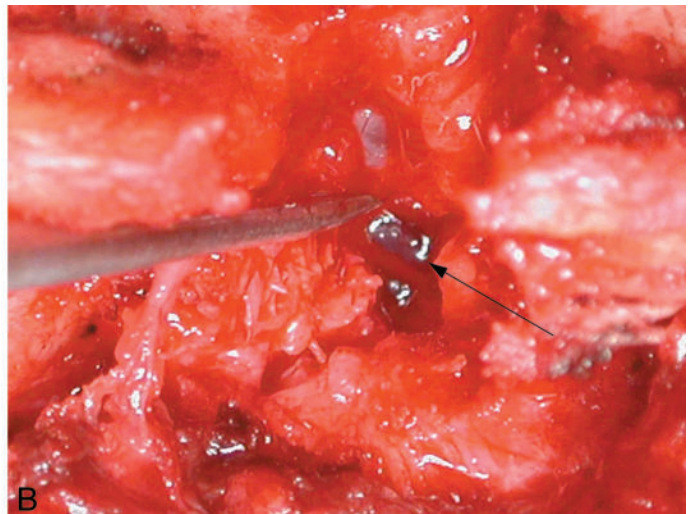
Seven months later, he was admitted for sudden onset of acute lower back pain associated with right-sided sciatica in the L4 dermatome and weakness of his right lower limb. On neurologic examination, nerve root tension signs were positive on his right lower limb. A repeat MRI reported a posterior disc protrusion at L3–L4 with caudal extension (Figures 2A and 2B). The disc indented the thecal sac on the right and partially compressed the L4 nerve root. He was offered surgery with a presumptive diagnosis of a herniated nucleus pulposus.

From the Departments of \*Orthopedic Surgery and Radiology, Changi General Hospital, Singapore.

Acknowledgment date: February 3, 2003. First revision date: April 11, 2003. Acceptance date: April 28, 2003.

Address correspondence to Chin-Ho Wong, MBBS, Department of Orthopedic Surgery, Changi General Hospital, 2 Simei Street 3, Singapore 529889; E-mail: wchinho@hotmail.com

Figure 1. **A**, Sagittal T1-weighted image of the lumbar spine, showing prominent veins posterior to the L4 and L5 vertebral bodies in the epidural space (arrows). This is, however, not an uncommon finding in spinal stenosis and prolapsed intervertebral discs. **B**, Intraoperative pictures of Case 1. After laminectomy, a dilated epidural vein was noted (at tip of the sucker and arrow) impinging on the spinal nerve root (concealed by bleeding in picture). After excision of the epidural vein, there was only minimal prolapsed intervertebral disc noted, and the nerve root foramen was only minimally stenosed.



At surgery, a dilated epidural vein was found in the epidural space causing ventral compression of the dural sac and the right nerve root of L4. Minimal central disc prolapse was noted at L3–L4 beneath the dilated epidural vein. The L4 nerve intervertebral foramina itself was only slightly stenosed. Despite decompression of the L4 foramen and L3–L4 discectomy, the epidural vein remained dilated, abutting onto the L4 nerve root on the right. The vein was traced superiorly to L2–L3 disc. A moderate prolapsed nucleus pulposus was noted at this level. Cephalad to the L2–L3 disc, the vein was normal in size (approximately one-third the size of the dilated vein). An L2–L3 discectomy was therefore performed. Postdiscectomy, the epidural vein was noted to decompress significantly. Coagulative ablation of the dilated epidural vein was performed.

After the operation, he reported immediate improvement of his radicular symptoms, which gradually resolved over a period of 6 weeks. At follow-up 1-and-a-half years later, he had mild lower back pain but no recurrence of the radicular symptoms and had returned to active employment.

## Discussion

Spinal epidural varix causing neurologic compromise is a rare entity. Gumbel *et al* reported an incidence of 0.5%

of isolated nerve root compression caused by varices among 1091 cases of sciatica.<sup>4</sup> The pathophysiology of this entity is distinct from nerve compression due to arteriovenous malformations (primary intradural and telangiectatic) described in the literature.<sup>5,6</sup> The vertebral venous system is a valveless network that communicates with the inferior vena cava, the azygous system, and the pelvic veins. Foraminal veins (known as supra- and infraradicular veins) connect the retrovertebral venous plexus and external venous network and traverse the intervertebral foramen.<sup>7</sup> Blood normally flows away from the spinal cord, but because of the valveless nature of this venous network, retrograde flow is possible when thoracoabdominal pressure is increased (*e.g.*, Valsalva maneuver) or when there is venous hypertension.<sup>8</sup>

Epidural varices have been reported to cause radiculopathy,<sup>7</sup> urinary retention,<sup>9</sup> myelopathy,<sup>10</sup> and lower back pain.<sup>11</sup> There appears to be two subgroups of patients with this condition, one with isolated symptomatic varices and another with varices associated with underlying spinal canal abnormalities. Although isolated symptomatic varices have been reported,<sup>4</sup> the latter sub-



Figure 2. **A**, Axial T2-weighted image at L4 showing a large epidural lesion (arrow) of intermediate signal intensity, seen indenting into the anterior thecal sac causing moderate central canal stenosis. **B**, Axial T2-weighted image at the level of L4 showing a serpiginous vein in the left epidural space (arrow) coursing towards an epidural mass on the right. The right anterior thecal sac and nerve root are indented by the epidural lesion. Transpedicular screws from previous lumbar surgery are present. This epidural lesion is found intraoperatively to be a dilated epidural varix. **C**, Axial T1 postgadolinium contrast fat suppressed image at the level of L4–L5. There is a prominent enhancing lumbar segmental vein (arrow) seen adjacent to the right exit spinal foramen with intraforaminal extension.

group (varices found in association with other spinal pathology) is much more common. Some associated conditions reported included herniated nucleus pulposus,<sup>12</sup> spondylolisthesis,<sup>13</sup> spondylolysis,<sup>1</sup> and spinal stenosis.

The pathophysiological basis of this condition has not been clearly defined. In the case of our two patients, we postulated that a combination of mechanical and chemical factors were probably responsible for the epidural vein formation. The narrowing of the spinal canal by the prolapsed disc and spinal stenosis caused occlusion of the epidural veins and impedance of venous blood flow. This in combination with the inflammatory process triggered by the prolapsed nucleus pulposus caused focal epidural vein phlebothrombosis. The resulting endothelial injury can precipitate scarring and fibrosis of the epidural vein. Conceivably, this can impinge on the surrounding nervous tissue. Acute deterioration sometimes seen in these patients can be caused by acute or chronic thrombosis of the epidural vein.<sup>14</sup>

Although MRI has been reported to be of value in demonstrating the dilated epidural vein,<sup>7,12</sup> the diagnosis is often missed in the preoperative evaluation because of the lack of awareness.<sup>7</sup> The lesion is commonly noted only retrospectively on the MRI.<sup>7</sup> This is particularly so if the patients have concomitant spinal pathology. The commonest misdiagnosis is a sequestered prolapsed nucleus pulposus. The MRI characteristics of the epidural varices were described as serpiginous flow void in the epidural space. However, its imaging characteristics depended on the degree of thrombosis within the vein. Thrombosed varices are hyperintense on T1-weighted and T2-weighted images. Flowing blood is hypointense, and a partially patent vein has a variable hypo- and hyperintensity on T2-weighted MRI sequence.

In our own experience, both patients had a preoperative diagnosis of herniated nucleus pulposus with nerve root impingement. Retrospectively, for Case 2, on the axial T2-weighted image at the level of L4, a large epidural lesion of intermediate signal intensity was noted to indent into the anterior thecal sac (Figure 2A). On a lower cut, at the level of L4, a serpiginous vein in the left epidural space coursing towards the epidural mass on the right was noted (Figure 2B). The right anterior thecal sac and nerve root were indented by the epidural lesion. On the axial T1 postgadolinium contrast fat suppressed image at the level of L4–L5, there was a prominent enhancing lumbar segmental vein seen adjacent to the right exit spinal foramina with intraforaminal extension (Figure 2C). This epidural lesion was found intraoperatively to be dilated epidural varices. Although the diagnosis is often difficult even when the MRI films were reviewed retrospectively, attention should be drawn to the combination of an intermediate signal intensity epidural mass with an accompanying serpiginous dilated vein and prominent lumbar segmental veins with intraforaminal extension. This triad should alert the clinician of the possibility of this rare entity.

For Case 1, the MRI showed a paracentral disc prolapse just abutting the L5 nerve root. Although we do not recommend surgical exploration without conclusive evidence of spinal pathology on imaging studies, we operated on him, as his symptoms were classic of nerve impingement. Furthermore, the loading of the spine when the patient assumes an erect position may produce significantly more disc protrusion and nerve impingement than demonstrated in the MRI taken in a supine position. Prominent epidural veins posterior to L4 and L5 lumbar vertebrae were the only diagnostic clue in this patient (Figure 1A). This, however, is not an uncommon finding in cases of prolapsed disc or spinal stenosis, and in most of these patients, the symptoms were usually not attributed to these prominent veins. As mentioned earlier, the valveless nature of the epidural venous network permits retrograde flow, and this can cause asymptomatic dilatation of the epidural veins. Conditions such as congestive heart failure, hepatic failure, obesity, pregnancy, patient positioning with abdominal compression, and arteriovenous malformation can produce asymptomatic dilatation of the epidural veins.<sup>15,16</sup> The interpretation of MRI scans should therefore be tempered with caution in order not to overdiagnose this condition in asymptomatic patients.

The diagnosis of this condition is usually made intraoperatively.<sup>7</sup> Results of surgical treatment for this condition reported in the literature are encouraging for both isolated varices and those associated with underlying spinal pathologies.<sup>7,10,11,15</sup> In their series, Hanley *et al* reported resolution of symptoms with coagulative ablation or excision of the epidural vein in all five patients they operated on.<sup>7</sup> These findings were supported by our own experience of good response after coagulative ablation or excision of these dilated veins.

In the example of Case 2, the epidural vein remained dilated and impinged on the L4 nerve root despite decompression of L4 foramina and L3–L4 discectomy. When traced superiorly, the sudden change in the dimensions of the epidural vein at the L2–L3 disc level suggested that the epidural vein inflammation and fibrosis were initiated at this point and should therefore be addressed. An L2–L3 discectomy and excision of the entire length of the epidural varix were therefore performed. As mentioned, the genesis of these epidural veins is probably attributable to the mechanical irritation by the diseased structures in the spinal canal. Therefore, a thorough search for associated pathology, such as a prolapsed disc, should be performed intraoperatively and if present, should be addressed. This presumably will reduce the chances of a recurrence.

## ■ Conclusion

Symptomatic spinal epidural varix is a rare entity not commonly encountered. Magnetic resonance imaging is a valuable preoperative imaging modality. Awareness of

this entity is important, as a serpiginous flow void in the epidural space hints towards the diagnosis. However, its imaging appearance can be deceiving and is variable depending on the degree of thrombosis within the vein. An important diagnostic clue is the triad of an intermediate signal intensity epidural mass in the company of serpiginous epidural veins and prominent lumbar segmental veins with intraforaminal extension. Diagnosis is often made intraoperatively, and coagulative ablation and excision produces good long-term results.

### ■ Key Points

- Symptomatic epidural varices are a rare entity.
- They are often missed in the preoperative evaluation, and the diagnosis is often made intraoperatively.
- MRI is a valuable diagnostic tool. Not all extradural masses are disc materials. The triad of intermediate signal intensity epidural mass accompanied by serpiginous dilated vein and prominent lumbar segmental veins should raise the suspicion of this condition.
- Underlying spinal pathology is often the inciting agent in majority of epidural varices.
- Excision or coagulative ablation produces good symptomatic response. Intraoperatively, the primary cause of the dilated epidural vein should be searched for and addressed to reduce the chances of a recurrence.

### References

1. Pekindil G, Yalniz E. Symptomatic lumbar foramina epidural varix. Case report and review of the literature. *Br J Neurosurg* 1997;11:159–60.
2. Cohen I. Extradural varix simulating herniated nucleus proposes. *J Mt Sinai Hosp* 1941;8:136–8.
3. Epstein BS. Low back pain associated with varices of the epidural vein simulating herniation of the nucleus proposes. *Am J Res* 1947;57:736–40.
4. Gumbel U, Pia HW, Vogelsang H. Lumbosacrale Gefassanomalien als Ursache von Ischialgien. *Acta Neurochir* 1969;20:131–51.
5. Cahan LD, Higashida RT, Halbach VV, et al. Variants of radiculomeningeal vascular malformation of the spine. *J Neurosurg* 1987;66:333.
6. Gennuso R, Zappala RA, Strenger SW. A localized lumbar spine root AVM presenting with radicular signs and symptoms. *Spine* 1989;14:543.
7. Hanley EN Jr, Howard BH, Brigham CD, et al. Lumbar epidural varix as a cause of radiculopathy. *Spine* 1994;19:2122–6.
8. Koroshetz AM, Taveras JM. Anatomy of the vertebrae and spinal cord. In: Taveras JM, Ferrucci JT, eds. *Radiology: Diagnosis, Imaging, Interventions*. 1st ed. Philadelphia, PA: Lippincott; 1990:101–5.
9. Ivanovici F. Urine retention: an isolated sign of some spinal cord disorder. *J Urol* 1970;104:284–6.
10. Dickman CA, Zabramski JM, Sonntag VK, et al. Myelopathy due to epidural varicose veins of the cervicothoracic junction: case report. *J Neurosurg* 1988;69:940–1.
11. Asamoto S, Sugiyama H, Doi H, et al. Spinal epidural varices. *No Shinkei Geka* 1999;27:911–3.
12. Zimmerman GA, Weingarten K, Lavyne MH. Symptomatic lumbar epidural varices. Report of 2 cases. *J Neurosurg* 1994;80:914–8.
13. Bammatter S, Schnyder P, De preux J. CT in thrombosed dilated posterior epidural vein. *Eur J Radiol* 1987 May;7(2):116–8.
14. Yucesoy K, Acar F, Koyuncuoglu M. Acute foot drop caused by thrombosed epidural vein. *Acta Neurochir (Wein)* 2001;143:631–2.
15. Demaerel P, Petre C, Wilms G, et al. Sciatica caused by a dilated epidural vein: MR findings. *Eur Radiol* 1999;9:113–4.
16. Clarot F, Callonnec F, Douvrin F, et al. Giant cervical epidural vein after lumbar puncture in a case of intracranial hypotension. *Am J Neuroradiol* 2000;21:787–9.