Original Article

Comprehensive insights into lumbar epidural varicose veins: Three clinical cases and surgical strategies

ABSTRACT

Lumbar epidural varicose veins (LEVs) present a challenging clinical scenario with limited literature. This series addresses the scarcity of comprehensive understanding, emphasizing the need for nuanced exploration. Varied prevalence estimates and clinical oversights underscore the urgency for a standardized approach to surgical interventions. We present three diverse clinical cases: (1) segmental varicose veins causing radicular pain, (2) local varicosities leading to lower paraparesis, and (3) widespread varicose veins with prolonged symptoms. Surgical tactics involved targeted coagulation, crossing of veins, and preservation of collateral blood flow. Advanced imaging techniques guided interventions. Tailoring interventions based on varicose vein subtype, preserving collateral flow, and adopting a staged postoperative approach contribute to successful outcomes. This series provides valuable insights into LEV management, emphasizing the significance of advanced imaging in diagnosis and surgical planning.

Keywords: Advanced imaging, collateral blood flow, lumbar epidural varicose veins, radiculopathy, surgical strategies

INTRODUCTION

Varicose veins within the epidural space of the lumbar spine pose a complex and often overlooked clinical challenge. Amid the intricate landscape of spinal disorders, lumbar epidural varicose veins have emerged as an enigmatic entity, not fully comprehended in both their pathology and clinical ramifications.[1-9] As we embark on this series, it is crucial to acknowledge the scarcity of comprehensive literature on this subject, highlighting the pressing need for deeper exploration. According to studies by Wong *et al.*[1] in 2003, lumbar epidural varicose veins are frequently associated with degenerative processes in the lumbar spine. Despite the potential significance of this pathology in the clinical realm, our current understanding remains fragmented, and numerous questions persist, as emphasized by Moonis *et al.*[2] in 2003. The limited knowledge surrounding varicose veins of the epidural veins is compounded by the intricate nature of diagnosis, often leading to accidental discovery during surgery, resulting in substantial bleeding and exacerbated neurological symptoms.[10-17] Estimates regarding the

Kayode Agboola, Bipin Chaurasia[1], Gianluca Scalia[2], Giuseppe Emmanuele Umana[3], Nicola Montemurro[4,5], Eugene Slinko[6]

Departments of Neurosurgery and [6]Spinal Pathologies, Romodanov Institute of Neurosurgery, National Academy of Medical Sciences of Ukraine, Kyiv, Ukraine, [1]Department of Neurosurgery, Neurosurgery Clinic, Birgunj, Nepal, [2]Department of Head and Neck Surgery, Neurosurgery Unit, Garibaldi Hospital, [3]Department of Neurosurgery, Trauma and Gamma Knife Center, Cannizzaro Hospital, Catania, [4]Department of Neurosurgery, Azienda Ospedaliera Universitaria Pisana (AOUP), [5]Department of Translational Research and New Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

Address for correspondence: Dr. Kayode Agboola, Romodanov Institute of Neurosurgery, National Academy of Medical Sciences of Ukraine, Kyiv, Ukraine.
E-mail: mikay.agboola@icloud.com

Submitted: 16-Jan-24 **Accepted:** 10-Mar-24
Published: 24-May-24

How to cite this article: Agboola K, Chaurasia B, Scalia G, Umana GE, Montemurro N, Slinko E. Comprehensive insights into lumbar epidural varicose veins: Three clinical cases and surgical strategies. J Craniovert Jun Spine 2024;15:205-9.

Access this article online	
Website: www.jcvjs.com	Quick Response Code
DOI: 10.4103/jcvjs.jcvjs_9_24	

frequency of varicose veins vary among different authors, ranging from 0.1% to 4.5% in patients undergoing surgery for degenerative lumbar spine conditions.[13,14] Despite its relatively common occurrence in spinal surgery, the clinical implications of epidural vein expansion are not always recognized by surgeons, underscoring the need for a deeper exploration of this phenomenon. The urgency surrounding the surgical treatment of lumbar epidural varicose veins is underscored by the complexities in diagnosis, a scarcity of observations, and a lack of publications addressing the long-term outcomes of interventions. Crucially, a standardized approach for surgical treatment is yet to be established, leaving clinicians without clear guidelines based on the location and prevalence of varicose veins. This series aims to shed light on lumbar epidural varicose veins, exploring three diverse clinical cases and categorizing them into segmental, local, and widespread varicose veins. The choice of surgical tactics is intricately linked to the specific subtype and its clinical manifestations, with the overarching goal of decompressing nervous structures.[18-23] As we embark on this exploration, it becomes imperative to delve into the pathogenesis and pathophysiology of lumbar epidural varicose veins, necessitating a comprehensive understanding of the topographic and anatomical features of the venous system in this intricate spinal region. Through this series, we aim to contribute to the evolving knowledge base, fostering a more informed and nuanced approach to the diagnosis and treatment of this intriguing medical condition.

CASE PRESENTATION

Clinical case 1

A 51-year-old man presented with severe, constant burning pain in the right leg, and to a lesser extent, in the lower back. The pain worsened at rest, in the evening, and at night, necessitating continuous use of analgesics. He had been experiencing symptoms for 2 years, with a relapsing course of the disease. The most recent exacerbation lasted over 2 months, with constant day and night pain. On examination, pain in the L4–L5 somatoma on the right was noted (0 points), and Lasègue's sign on the right was weakly positive. No paresis or changes in muscle tone were detected, but hypoesthesia was noted in the L4 dermatome on the right (3 points). Knee reflexes were D < S. The patient exhibited a disturbance in static dynamics, experiencing pain in the right leg while walking and requiring a cane. Magnetic resonance imaging (MRI) scans [Figure 1] revealed signs of protrusion of the L4–L5 intervertebral disc, congestion of epidural veins at the level of the L4–L5 vertebrae, and hypertrophy of the L4–L5 ligamentum flavum. Venospondylography revealed segmental varicose veins [Figure 2]. The patient underwent microsurgical interlaminectomy L4–L5 on the right, excision of the thick yellow ligament, and coagulation of varicose epidural veins under the L5 root. Postintervention, there was a notable regression of radicular pain syndrome, sensory disorders, and complete restoration of static-dynamic functions. A follow-up examination after 5 months confirmed the stability of the

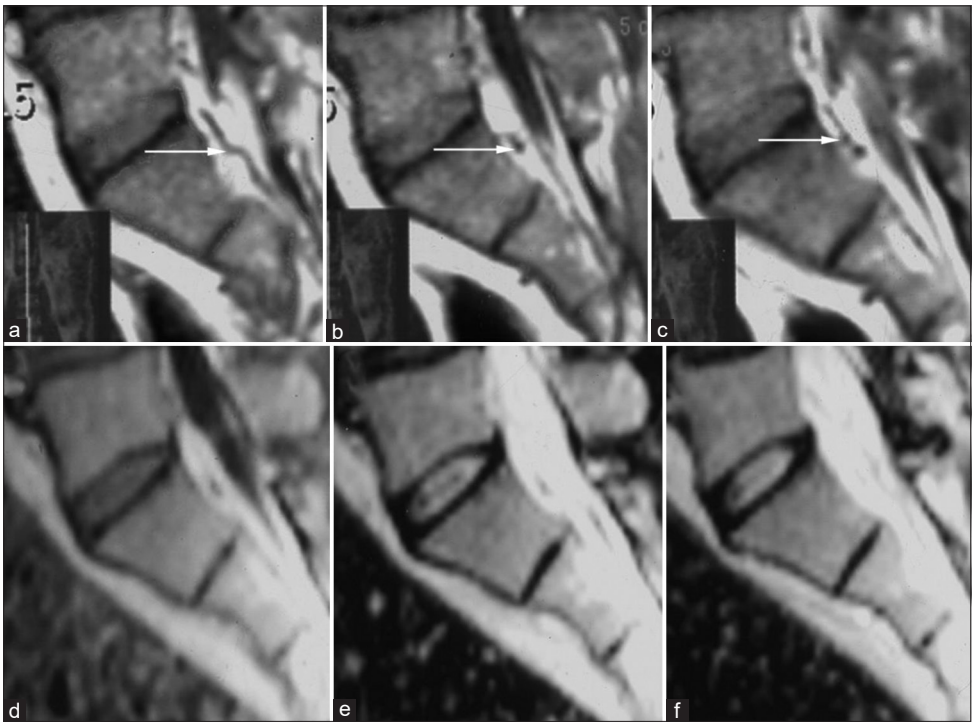

Figure 1: Condition after surgery. For comparison, (a-c) the state before surgery, (d-f) the state after surgery arrow indicating epidural varicose vein

treatment results, with no signs of epidural varicose veins on MRI.

Clinical case 2

A 16-year-old man was admitted with complaints of weakness and numbness in the lower extremities, along with decreased control over pelvic organ functions. The disease manifested suddenly, 2 weeks prior, with morning pain, leg weakness, and an inability to walk. On examination, lower paraparesis was observed, predominantly affecting proximal muscle groups (2 points). Hypotonia of the quadriceps muscles of the thighs and hypoesthesia in the dermatomes L1–L4 on both sides were noted (1 point). Knee reflexes were not evoked, Achilles reflexes were depressed, and Lasègue's sign was positive on both sides from 15° to 30°, with pain in L1, L2, and L3 somatomas (1 point). Severe disturbances in static dynamics were evident, and the patient required crutches for short distances. MRI results indicated signs of arteriovenous malformation (AVM) of the spinal cord in the lumbar region, in the area of the conus spinal cord. However, spinal selective angiography did not confirm AVM, and varicose veins of the epidural veins were suspected [Figure 2]. Venospondylography revealed local varicose epidural veins at the conus of the spinal cord, along with dilatation of intervertebral veins and longitudinal venous trunks at the level of L1–L2–L3, more prominent on the left. The patient underwent microsurgical laminectomy L1–L4, excluding varicose epidural veins [Figures 3 and 4]. Postintervention, there was incomplete regression of neurological symptoms, and the patient could walk independently with crutches. During a dynamic examination after 6 months, lower paraparesis persisted, and the patient continued to walk independently.

Clinical case 3

A 42-year-old woman was admitted with complaints of pain in the lumbosacral region radiating to the right leg and left ankle, along with numbness along the inner surface of the right thigh. The disease had a gradual onset over 20 years, with periodic exacerbations of lower back pain radiating to the right leg. Three years ago, she underwent right phlebectomy. The latest exacerbation lasted 10 months, with increasing pain and sensory disturbances in the right leg. The pain was described as wave-like and intensified at night. On examination, pain in the L5–S1 somatomas on both sides was noted (2 points), more on the right. Lasègue's sign was positive on the right from 30° and on the left from 60°. Mild paresis and hypotonia of the dorsal flexors of the right foot (4 points) were observed, along with hypoesthesia in the dermatomes L4, L5, and S1 on the right (2 points). Knee and Achilles reflexes were of reduced alertness, with D < S. No pelvic disorders were identified, but static-dynamic disorders were noted, with pain in the right leg when walking, necessitating outside help. MRI revealed protrusions of the L4–L5 and L5–S1 intervertebral discs,

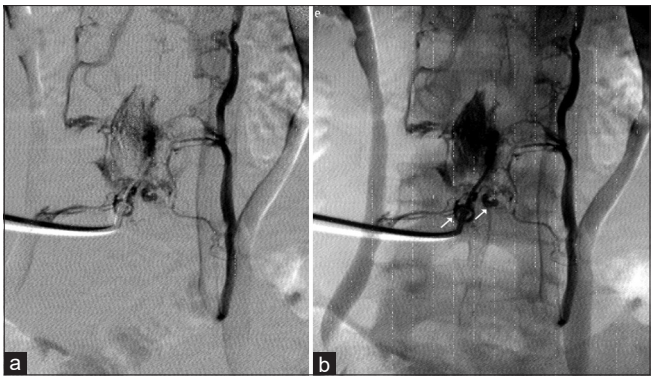

Figure 2: (a) Diffused epidural varicose veins. (b) Venospondylography with magnification. The arrows indicate the dorsal venous conglomerates, which drain into the intervertebral veins at the L4 level

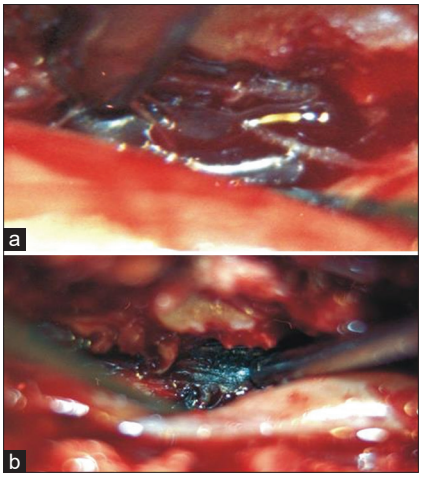

Figure 3: Intraoperative photo. (a) Dilated anterior longitudinal veins are located ventrally under the dural sac, (b) Varicose veins are coagulated

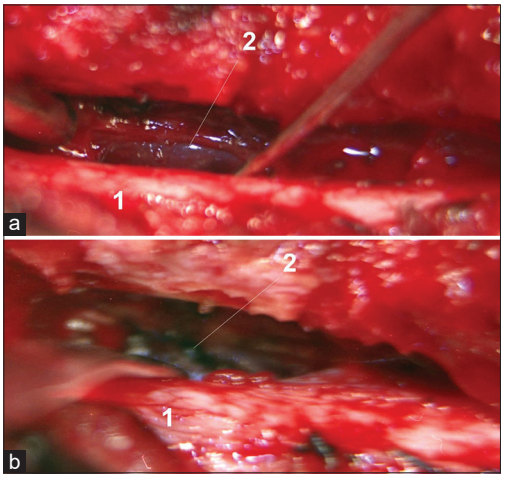

Figure 4: Diffused epidural varicose veins. Intraoperative photo. (a) Photo before the varicose veins are coagulated. 1 – dural sac, 2 – venous sac under the articular processes. (b) Photo after the varicose veins have been coagulated. 1 – dural sac, 2 – coagulated venous sac under the articular processes

and ventrolaterally on the right, an area of heterogeneous signal of irregular elongated shape, likely indicating epidural venous malformation at the level of L4, L5, and S1 [Figure 1]. Venospondylography confirmed widespread epidural varicose veins, including expansion of longitudinal venous trunks along the L3, L4, L5, and S1 vertebrae, retrocorporeal veins, and segmental veins L4–L5–S1, more prominent on the right. The patient underwent microsurgical interlaminectomy L4–L5 and L5–S1 on the right, with coagulation of epidural segmental varicose veins L4–L5–S1 on the right. Postoperation, there was complete regression of radicular pain syndrome and neurological symptoms. During a dynamic examination after 6 months, some neurological disorders persisted, and the patient walked with the help of a cane.

DISCUSSION

Diagnostic algorithms for patients with radiculopathy and lumbar pain traditionally involved myelography, computed tomography, computed tomography myelography, and MRI.[15,23-26] In cases where there was no clear evidence of disc herniation or spinal stenosis, venospondylography was employed.[25] However, with the advent of enhanced lumbar magnetic resonance and high-resolution MRI, a more careful examination of venography results has been undertaken, especially when evidence of lumbar epidural varicose veins (LEV) is suggested by MRI [Figure 3]. Takeshi *et al*.[27] recommended surgical removal and subsequent histology for confirmation in 2008. The pathogenesis and clinical manifestations of LEV necessitate an understanding of the topographic and anatomical features of the venous system in the lumbar spine. Blood drainage from the spinal cord involves radial intracerebral veins that feed into the pial venous network, comprising anterior and posterior spinal veins. An extensive anastomosis occurs between these veins thanks to the venous pial meshwork. Blood from the spinal cord veins eventually collects in the anterior and posterior radiculomedullary veins, merging into the common radiculomedullary vein. This vein further combines with the intervertebral veins, either directly connecting to the ascending lumbar vein or flowing into the inferior vena cava. The lumbar spine's venous system encompasses internal and external venous plexuses, communicating with each other. During interventions, efforts were made not to completely block blood flow in the epidural venous system, as it often served as the only collateral blood flow in cases like caval hypertension. The surgical tactics were based on the analysis of venospondylography data, MRI, and clinical symptoms. For cases where unilateral radiculopathy resulted from the expansion, compression, or irritation of intervertebral veins (segmental varicose veins), the focus was on coagulating and occluding the intervertebral veins at the level of the affected roots. Local varicose veins, causing irritation or compression of the dural outlet of the root, led to coagulation and crossing of the ventral longitudinal venous trunk. Preservation of ventral longitudinal venous trunks was prioritized whenever possible, as they serve as collateral blood flow trunks. In instances of bilateral radicular symptoms caused by segmental or local varicose veins, interventions aimed at bilateral coagulation and crossing of intervertebral veins were performed. Coagulation and crossing of ventral epidural venous trunks occurred only in cases of severe compression of the dural sac, and on one side. In cases where widespread epidural varicose veins resulted from increased vena cava pressure, a more conservative approach was adopted, focusing on coagulating and transecting varicose veins, primarily segmental ones, in the dural outlet zone of roots with neurological symptoms. Preservation of ventral longitudinal venous trunks was attempted to maintain collateral blood flow. Decompression of veins and nerve structures was achieved through decompressive bone resections. Postoperative treatment involved a staged approach. In the immediate aftermath and during the initial 3 days, vasotropic drugs, antibacterial therapy, analgesics, tranquilizers, and anticoagulants were administered. Decongestant measures included the use of Lasix and dexamethasone. Early activation of patients, breathing exercises, passive leg exercises, and elastic bandaging were employed to prevent thrombophlebitis. If neurological disorders persisted after the 3rd day, drugs improving blood rheological properties were prescribed.

Neurological rehabilitation treatment commenced between days 7 and 14 postsurgery, continuing with vasotropic drugs, anticoagulants, and B-group vitamins. Medications to enhance nerve cell metabolism and neuromuscular transmission were introduced. Physiotherapeutic methods, including electrophoresis, magnetic therapy, electrical stimulation, physical therapy, and massage, played a crucial role in this stage.

Clinical observation followed, with a repeat of the rehabilitation treatment course 8–12 weeks postsurgery. Nondrug interventions, such as physical therapy, muscle massage, physiotherapy, balneotherapy, underwater massage, and swimming, were emphasized. Specialized sanatorium treatment in cases of residual signs of radicular disorders was recommended. The selected diagnostic algorithm and indications for surgical treatment allowed for the reliable identification of the target for surgical intervention and rational planning of microsurgical exclusion of various types of epidural varicose veins. The careful consideration

of hemodynamic characteristics during microsurgical interventions helped prevent uncontrolled bleeding due to varicose vein rupture. Achieved regression of neurological disorders in the immediate postoperative period necessitated further staged drug and physiotherapeutic treatments.

CONCLUSIONS

Lumbar epidural varicose veins present complex challenges, and our analysis of three clinical cases underscores the significance of advanced imaging for accurate diagnosis and surgical planning. Tailoring interventions to the specific type of varicose veins, preserving collateral blood flow, and employing a staged postoperative approach contribute to successful outcomes in managing this condition.

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.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Wong CH, Thng PL, Thoo FL, Low CO. Symptomatic spinal epidural varices presenting with nerve impingement: Report of two cases and review of the literature. Spine (Phila Pa 1976) 2003;28:E347-50.
2. Moonis G, Hurst RW, Simon SL, Zager EL. Intradural venous varix: A rare cause of an intradural lumbar spine lesion. Spine (Phila Pa 1976) 2003;28:E430-2.
3. Celik H, Erdem Y, Karatay M, Yorubulut M, Gursoy T, Sertbas I, *et al.* Lumbar epidural varicose vein: Early neurological improvement and late radiological full recovery with surgery; the importance of magnetic resonance imaging in follow-up. Turk Neurosurg 2015;25:824-7.
4. Jeong HJ, Sim WS, Park HJ, Lee SH, Oh MS, Cho MK, *et al.* Severe lumbar radiculopathy with epidural venous plexus engorgement in a morbidly obese pediatric patient: A case report. Medicine (Baltimore) 2019;98:e16842.
5. Berthelot JM, Douane F, Ploteau S, Le Goff B, Darrieutort-Laffite C. Venous congestion as a central mechanism of radiculopathies. Joint Bone Spine 2022;89:105291.
6. Ju JH, Ha HG, Jung CK, Kim HW, Lee CY, Kim JH. Patterns of epidural venous varicosity in lumbar stenosis. Korean J Spine 2012;9:244-9.
7. LaBan MM, Wang AM, Shetty A, Sessa GR, Taylor RS. Varicosities of the paravertebral plexus of veins associated with nocturnal spinal pain as imaged by magnetic resonance venography: A brief report. Am J Phys Med Rehabil 1999;78:72-6.
8. Pekindil G, Yalniz E. Symptomatic lumbar foraminal epidural varix. Case report and review of the literature. Br J Neurosurg 1997;11:159-60.
9. Subbiah M, Yegumuthu K. Lumbar epidural varices: An unusual cause of lumbar claudication. Indian J Orthop 2016;50:440-3.
10. Kawai M, Udaka F, Nishioka K, Houshimaru M, Koyama T, Kameyama M. A case of idiopathic spinal epidural lipomatosis presented with radicular pain caused by compression with enlarged veins surrounding nerve roots. Acta Neurol Scand 2002;105:322-5.
11. LaBan MM, Wang AM. Engorgement of the cervical spinal epidural venous plexus simulating a spinal epidural mass. Am J Phys Med Rehabil 2014;93:634-5.
12. Hammer A, Knight I, Agarwal A. Localized venous plexi in the spine simulating prolapse of an intervertebral disc: A report of six cases. Spine (Phila Pa 1976) 2003;28:E5-12.
13. Zimmerman GA, Weingarten K, Lavyne MH. Symptomatic lumbar epidural varices. Report of two cases. J Neurosurg 1994;80:914-8.
14. Paksoy Y, Gormus N. Epidural venous plexus enlargements presenting with radiculopathy and back pain in patients with inferior vena cava obstruction or occlusion. Spine (Phila Pa 1976) 2004;29:2419-24.
15. Demaerel P, Petré C, Wilms G, Plets C. Sciatica caused by a dilated epidural vein: MR findings. Eur Radiol 1999;9:113-4.
16. Kataoka H, Miyamoto S, Nagata I, Ueba T, Hashimoto N. Venous congestion is a major cause of neurological deterioration in spinal arteriovenous malformations. Neurosurgery 2001;48:1224-9.
17. Kim HJ, Kim WH, Lim HW, Kim JA, Kim DK, Shin BS, *et al.* Obesity is independently associated with spinal anesthesia outcomes: A prospective observational study. PLoS One 2015;10:e0124264.
18. Campbell DN, Liechty RD, Rutherford RB. Traumatic thrombosis of the inferior vena cava. J Trauma 1987;21:413-5.
19. Dudeck O, Zeile M, Poellinger A, Kluhs L, Ludwig WD, Hamm B. Epidural venous enlargements presenting with intractable lower back pain and sciatica in a patient with absence of the infrarenal inferior vena cava and bilateral deep venous thrombosis. Spine (Phila Pa 1976) 2007;32:E688-91.
20. Akutsu H, Sugita K, Sonobe M, Matsumura A. A case of nontraumatic spinal epidural hematoma caused by extradural varix: Consideration of etiology. Spine J 2003;3:534-8.
21. Raut VK, Khan AH, Ahmad M. Spinal epidural varicosity resembling prolapsed intervertebral disc on MRI: A diagnostic dilemma for lumbar canal stenosis. J Neurol Stroke 2021;11:23-5.
22. Genevay S, Palazzo E, Huten D, Fossati P, Meyer O. Lumboradiculopathy due to epidural varices: Two case reports and a review of the literature. Joint Bone Spine 2002;69:214-7.
23. Hanley EN Jr., Howard BH, Brigham CD, Chapman TM, Guilford WB, Coumas JM. Lumbar epidural varix as a cause of radiculopathy. Spine (Phila Pa 1976) 1994;19:2122-6.
24. Endres S. Epidural varicosis as a possible cause of radicular pain: A case report. J Med Case Rep 2011;5:537.
25. Slin'ko EI, Al-Qashqish II. Surgical treatment of lumbar epidural varices. J Neurosurg Spine 2006;5:414-23.
26. Zozulya YA, Pedachenko EG, Slynko EI. Khirurgicheskoye lecheniye neyrokompressionnykh poyasnichno-kresttsovykh bolevykh sindromov [Surgical treatment for pain due to lumbosacral nerve root compression]. Kiev: UIPK EksOb. 2006.
27. Aoyama T, Hida K, Akino M, Yano S, Saito H, Iwasaki Y. Radiculopathy caused by lumbar epidural venous varix: case report. Neurol Med Chir (Tokyo). 2008;48:367-71. doi: 10.2176/nmc.48.367.