Intraspinal Iliac Venous Stent Migration with Lumbar Nerve Root Compression

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Key words
- Ectopic intra-spinal stent
- Endovascular stent
- Stent migration

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BACKGROUND: **Venous stenting is a common treatment for chronic peripheral venous disease. The most frequent complications caused by this technique are stent misplacement and intracardiac or intravascular stent migration. In this publication, we will describe the first case of an intraspinal stent misplacement leading to lumbar nerve root compression.**

CASE DESCRIPTION: **Our patient was a 20-year-old woman with a bilateral pulmonary embolism caused by a right common iliac vein thrombosis and a severe compression of the left common iliac vein by the right common iliac artery (May—Thurner or Cockett syndrome). She underwent an endovascular stenting of the left iliac vein. A few days later, she reported some pain in the right L5 radicular and showed signs of hypoesthesia of the left leg and of paresis of the left extensor hallucis longus muscle. A lumbar computed tomography scan showed a stent misplacement into the spinal canal through the left L5 foramen with nerve root compression. She underwent a surgical removal of the stent through a unilateral L5—S1 laminarthrectomy. The postoperative follow-up showed a complete clinical recovery and a control lumbar computed tomography scan confirmed the L5 nerve root decompression.**

CONCLUSIONS: **The intraspinal misplacement of a venous stent is a rare complication that may cause nerve root injury. It requires a prompt treatment. Surgically removing the stent by a posterior approach seems to be a simple and safe therapeutic option.**

INTRODUCTION

Common iliac vein stenting is a frequent procedure to treat post-thrombotic syndrome or other chronic venous diseases.[1-6] One of the complications caused by this technique is the migration of the stent into the heart or into a large vessel.[7-10] However, intraspinal deployment of a stent through a lumbar vein is a very rare complication, which was never described before. It can lead to severe nerve root compression. We report the first case of a symptomatic patient and describe the surgical technique used to remove the stent through a posterior approach.

CASE DESCRIPTION

A 20-year-old woman with a history of multiple sclerosis was admitted to our hospital for a bilateral pulmonary embolism. Radiologic investigations showed a right common iliac vein thrombosis and a severe compression of the left common iliac vein by the right common iliac artery (May—Thurner or Cockett syndrome). Hematologic tests also revealed thrombophilia related to a factor V of Leyden mutation. After 6 months of anticoagulation, the right iliac vein was permeable again.

The patient then underwent an endovascular stenting procedure (size 18 mm × 60 mm, WALLSTENT; Boston Scientific, Natick, Massachusetts, USA) of the left iliac vein to remove the arterial compression. The procedure was technically difficult. After the stent was deployed, a satisfying venous opacification could not be obtained despite several attempts. The procedure was therefore interrupted, as the stent seemed well placed and projected along the common iliac vein on frontal radiographs (Figure 1). However, no lateral radiographs were performed.

A few days later, the patient started to feel some pain in the right L5 radicular and showed signs of hypoesthesia of the left leg and of paresis of the left extensor hallucis longus muscle. A lumbar computed tomography scan was made and showed that the stent had entered a lumbar vein and had been deployed into the spinal canal through the left L5 foramen in which the nerve root was severely compressed. The stent had crossed the spinal canal beforehand and ended up under the right L5 root emergence (Figure 2A—C). An electromyography confirmed a severe L5 radiculopathy on the left side.

Despite the risk of venous rupture, intraspinal bleeding, or root injury, an attempt was made to perform an endovascular extraction of the stent. However, the iliac phlebography did not show any opacification of the lumbar vein, suggesting its occlusion. We decided therefore to surgically remove the stent through a left unilateral L5—S1 laminarthrectomy. The intraspinal and foraminal part of the stent was easily exposed. The vein wall was very thin and the vessel was no longer permeable. There was no hematoma in the spinal canal or foramen. The stent was cut with scissors at the lateral part of the

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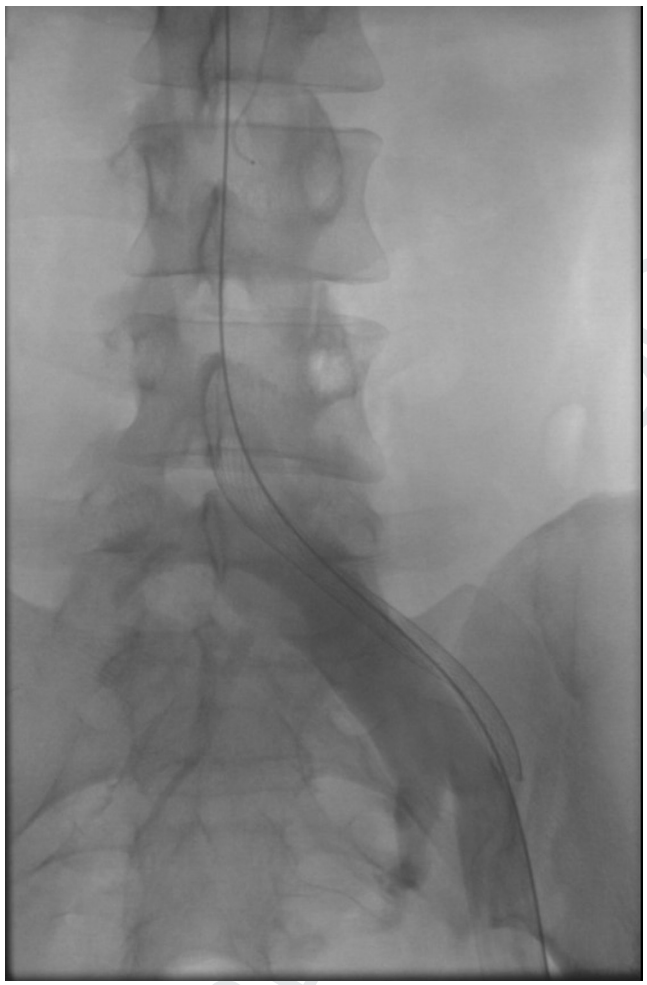

Figure 1. Intraoperative frontal radiograph showing the projection of the stent along the left iliac vein trajectory

spinal canal and was then progressively removed wire by wire (Figure 3A). The left L5 root was completely released (Figure 3B). There was no cerebrospinal fluid leak and no bleeding from the lumbar vein.

In the postoperative course, radicular pain disappeared and sensibility of the left leg improved. A control lumbar computed

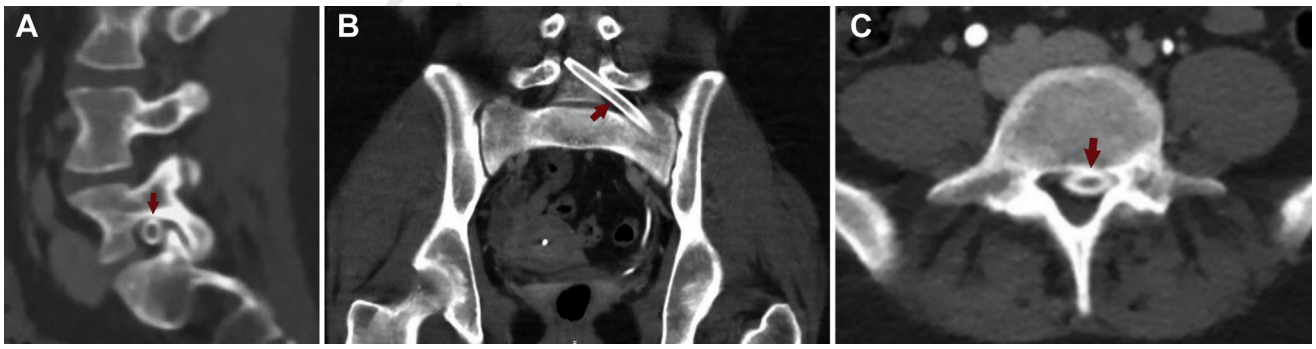

Figure 2. Preoperative computed tomography scan (sagittal, coronal, and axial views) showing stent (*red arrows*) deployment into the spinal canal through the left L5 foramen. (**A**) Sagittal view, (**B**) coronal view, and (**C**) axial view.

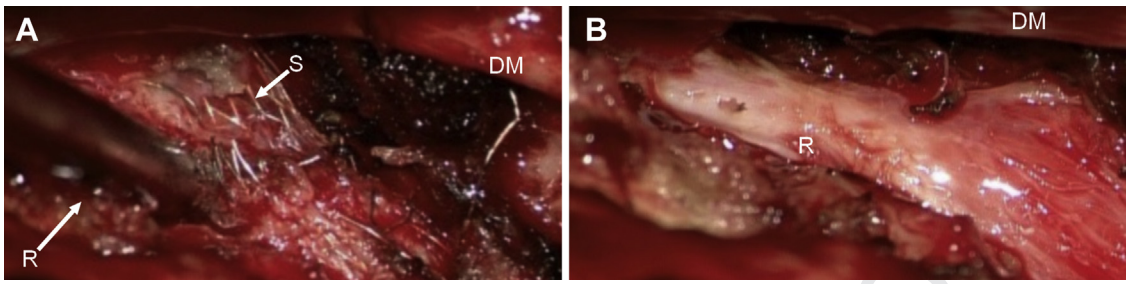

Figure 3. Intraoperative microscope images of the stent cut with scissors at the lateral part of the spinal canal and the left L5 root completely released. (**A**) Exposition of the foraminal part of the stent. (**B**) The L5 root completely released, DM, dura mater; R, L5 root S, stent.

tomography scan confirmed the L5 nerve root decompression (Figure 4A) and showed only a few small metallic particles remaining in the spinal canal (Figure 4B). At the last follow-up, 1 year after the surgery, clinical recovery was complete.

DISCUSSION

Peripheral venous stenting is an increasingly used procedure to treat chronic venous diseases. It has obtained good results, as reported in the literature.[1-5] Stent migration or misplacement is a potentially dramatic complication of this technique and can sometimes be fatal.[8] However, only a few cases have been described in the literature.[7-10] In most reported cases, the stent migrated into the inferior vena cava, the heart, or the pulmonary artery.[7-10] An intraspinal deployment or migration of a venous stent was, however, never described.

In our case, the guiding catheter probably penetrated into a lumbar vein that followed the same trajectory as the iliac vein. The hypothesis that the stent was initially deployed in the iliac vein and migrated secondarily into a lumbar vein is very unlikely because of the difference in caliber of the 2 vessels. The inaccurate deployment of the stent into this small vessel likely prevented its opacification and the fact that stent had been misplaced was therefore not detected at the end of the procedure. The absence of lateral radiographs during the procedure was crucial and may explain this pitfall. This case demonstrates that the placement of a venous stent should be continuously monitored by doing a frontal but also lateral fluoroscopy with different obliquities.

Stent migration into the spinal canal can result in a severe nerve root lamination, due to high radial forces exerted by the self-expanding WALLSTENT (1.5 to 2 N/mm). Because of the severity of the radicular symptoms, the stent should be retrieved as soon as possible. Unlike cases in which the stent migrates into the heart or large veins, the percutaneous endovascular extraction of the stent was impossible in our patient. Removing it surgically was therefore the only option. In the case of a braided stent, a small unilateral

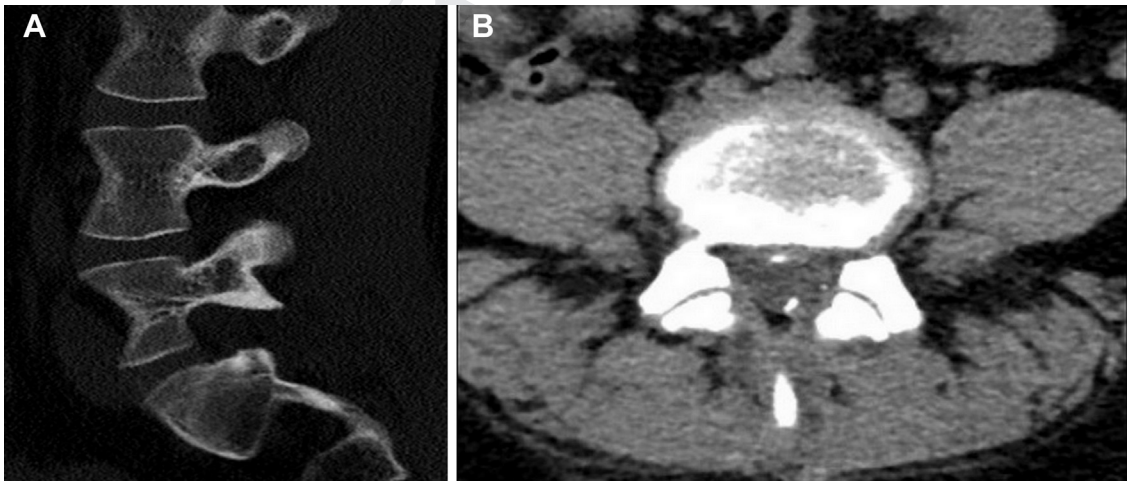

Figure 4. Postoperative computed tomography scan showing complete decompression of the L5 left foramen (**A**) and a few metallic fragments remaining in the spinal canal (**B**). (**A**) Sagittal view. (**B**) Axial view.

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posterior approach in which the stent is cut in its middle seems easy and safe. For a stent composed of welded struts, however, the exposure would be much larger, and the procedure could be more difficult. Due to the risk of proximal venous rupture during the stent removal, a radiologist or a vascular surgeon should be ready to intervene by an endovascular or open surgical route.

CONCLUSIONS

The intraspinal misplacement of a venous stent causing nerve root injury is a rare complication. However, it might be more frequent in the future because of the increasing use of this technique. Vascular surgeons and neurosurgeons should be aware of this complication, which requires a prompt treatment. Surgically removing the stent through a small laminarthrectomy is feasible, safe, and effective.

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Conflict of interest statement: The authors declare that the article content was composed in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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