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Medically Challenging Case: Lumbosacral Radiculopathy Secondary to Occlusion of Right Iliac Vein Kissing Stent in the Context of Variant Course of Right Iliac Vein between Psoas Muscle and Spine and Factor V Leiden Mutation

Lei Lu, MD, PhD[1], and Meron Selassie, MD[2]

Background: The variant course of the right iliac vein between the right psoas muscle and spine and its significance has not been reported and lumbosacral radiculopathy is not a known complication after occlusion of the right iliac vein stent in such condition.

Case Report: The patient is a 38-year-old woman with Factor V Leiden mutation, multiple deep vein thrombosis, including in her bilateral iliac veins, and a variant course of the right iliac vein between the psoas muscle and spine, who presented with radicular pain and weakness after stenting of the bilateral iliac veins. She was found to have complete occlusion of the right common iliac through the femoral vein stent that was compressing her lumbosacral spinal roots and resulted in lumbosacral radiculopathy. Her pain and weakness significantly improved after an epidural steroid injection.

Conclusion: Lumbosacral radiculopathy is a rare complication after occlusion of the right iliac vein stenting in the setting of a variant course of the right common iliac vein between the psoas muscle and spine and Factor V Leiden mutation. The risks and benefits of implanting a kissing stent in a similar scenario should be weighed carefully for patients at high risk for stent occlusion. Additionally, patients should be assessed for variable anatomy as part of the presurgical workup to hopefully prevent this undesired outcome.

Key words: Lumbosacral radiculopathy, iliac vein stenting, Factor V Leiden, deep venous thrombosis, variant course

BACKGROUND

The incidence of variations of iliac vein anatomy is reported around 20% and there are different types (1). Some variation in the course has anatomical and surgical significance. For instance, May-Thurner syndrome is caused by compression of the left common iliac vein between the lumbar spine and the right common iliac artery (2). The compression and resultant stenosis lead to deep vein thrombosis, which predominantly happens in women of childbearing age due to increased pelvic pressure during pregnancy and hypercoagulability. In some variations, the right iliac vein can be affected

From: [1]Department of Neurology, Medical University of South Carolina, SC; [2]Department of Anesthesiology & Perioperative Medicine, Medical University of South Carolina, SC

Corresponding Author: Meron Selassie, MD, E-mail: selassi@musc.edu
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as well (2). However, the variant course of the right iliac vein between the psoas muscle and spine and its significance has not been reported though it shares a similar pathogenesis as May-Thurner syndrome.

Factor V Leiden mutation is a risk factor for deep vein thrombosis (DVT) and pulmonary embolism (PE) (3). Iliofemoral venous stenting is a safe and effective method for treating iliac venous thrombotic disease, which may be caused by May-Thurner syndrome, factor V Leiden mutation, or another hypercoagulable condition (4). Venous stenting displays a high patency rate in treating acute DVT (5). For chronic DVT, percutaneous recanalization and stenting also provide a good option for reconstruction as the secondary patency rate over the long term is high at 70-90% (6). Intraspinal migration of iliac venous stent has been reported to cause lumbar radiculopathy (7), but it's unknown if the stent occlusion leads to compressive pathology of adjacent structures other than just DVT, such as radiculopathy, lumbosacral plexopathy, or sciatic neuropathy.

Here we are presenting a challenging case of a patient with Factor V Leiden mutation and failure of multiple anticoagulants who developed lumbosacral radiculopathy from occlusion of a right iliac vein kissing stent in the setting of variant course of right iliac vein between the psoas muscle and spine. A transforaminal epidural steroid injection relieved the radicular pain and improved the weakness with better function.

CASE REPORT

The patient is a 38-year-old woman with factor V Leiden, multiple DVT including in bilateral iliac veins, who presented with back pain that radiates down to her right leg with weakness in the context of occlusion of her right iliac vein kissing stent and variant course of right iliac vein between the psoas muscle and spine.

The patient initially had DVT and PE during her most recent pregnancy and was found to have Factor V Leiden heterozygote mutation. She failed multiple blood thinners, including enoxaparin, rivaroxaban, apixaban, and developed chronic bilateral, multiple DVTs, and had an inferior vena cava filter placed. Due to progressive bilateral iliac DVT and severe leg edema, she had a thrombectomy of the right iliac vein and subsequently kissing venous stents of both iliac veins. Her right iliofemoral venous segment was noticed to be small and cordlike during the procedure. Shortly after her procedure, she developed right-sided severe low back pain radiating down to the posterior aspect of her right thigh, lower leg, and top of the foot. She reported paresthesia in the same area. She had to ambulate with a cane due to weakness. She denied bowel and bladder issues or saddle anesthesia.

The physical examination was notable for weakness of most muscle groups (innervated by L4, L5, and S1) of the right leg and decreased sensation to pinprick of dermatomes of L4, L5, and S1. A computed tomography of the abdomen and pelvis with and without contrast showed complete occlusion of the right common iliac through femoral vein stent and abnormal anatomy of the right iliac vein coursing behind her psoas muscle and against her spine. A lumbar MRI demonstrated that the right iliac kissing vein stent courses medial to the right psoas muscle and encroached on the extraforaminal space at the levels of L3-L4 and to a lesser extent L4-L5.

Given the history, physical examination, and imaging findings, the patient developed lumbosacral radiculopathy secondary to nerve root contact by the occluded kissing stent of the right iliac vein. Physical therapy and medications that included gabapentin, muscle relaxants, and opioids provided mild improvement. The stent was deemed inoperable per vascular surgery. The decision was made to perform transforaminal epidural steroid injections at the right L3-L4 and L4-L5 levels where the occluded kissing stent was contacting the spinal roots. She was taking dabigatran, which was held for 3 days before the procedure at the direction of her hematologist. Immediately after the procedure, she had > 70% pain relief and was able to ambulate out of the procedure room without using her cane. At the 2 week follow-up after injection, she had sustained > 50% pain relief and > 50% improved function.

DISCUSSION

This is a very unique and challenging case in many ways. The patient has Factor V Leiden and developed DVT and PE while pregnant. Then she failed multiple anticoagulant treatments and developed occlusion of the kissing stent of her right iliac-femoral vein. Because of the variant course of the right iliac vein between her psoas muscle and spine, the occluded stent contacted the spinal nerve roots causing her to develop severe lumbosacral radiculopathy. Furthermore, treatment options were limited as she could not undergo surgery to revise the stent and correct the pathology. As a result, an epidural steroid injection was one of the few treatment options to treat her pain and improve her function. This decision was made in concert with the

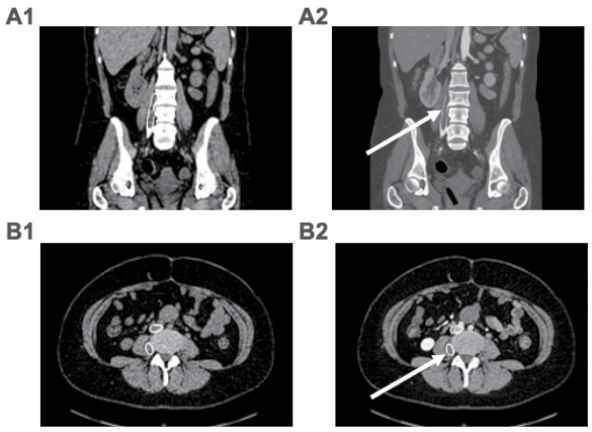

Fig. 1. Computed tomography of the abdomen and pelvis with and without contrast shows the variant course of right iliac vein between the psoas and spine and complete occlusion of the kissing stent (arrows).
A1/2: coronal section without and with contrast; B1/2: axial section without and with contrast.

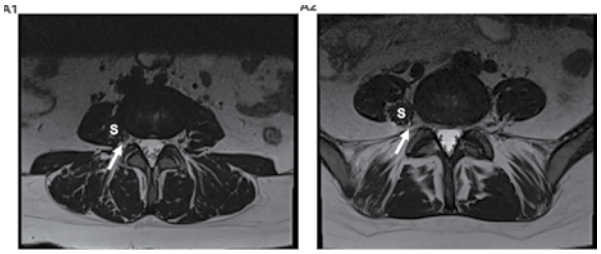

Fig. 2. Lumbar MRI demonstrates the occluded kissing stent encroaching spinal nerve roots at L3-L4 and L4-L5 levels (arrows) on the right side.
A1: L3-L4 level; A2: L4-L5 level. S: stent.

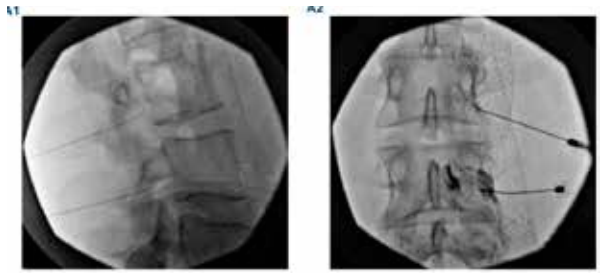

Fig. 3. Fluoroscopy illustrates epidural steroid injections at L3-L4 and L4-L5 levels.
A1: lateral view; A2: AP view with contrast.

patient and her treating hematologist, considering the risks of holding anticoagulation for the procedure. Ultimately, the decision was made that dabigatran could be held for 3 days. The American Society of Regional Anesthesia and Pain Medicine guidelines generally recommend 4 days, which corresponds to 5 half-lives of the medication (8). Nevertheless, this patient's underlying hypercoagulable condition made the risk of clotting high, and the decision was made to proceed with an abbreviated anticoagulation hold (9).

The abnormal course of the right iliac vein passing between her psoas muscle and spine was probably the fundamental reason for DVT in addition to the Factor V Leiden mutation. In the operative note when the kissing stent was implanted, her right iliac vein was noticed to be small and cordlike, likely a result of the physiological changes when passing through the narrow gap between strong structures of muscle and bone. The patient went on to form a thrombus within the kissing stent. The dilation of the vein and the rigidity of the kissing stent probably led to the compressive pathology of adjacent spinal roots causing her to develop radiculopathy.

Stenting is the first line treatment for DVT secondary to May-Thurner syndrome and Factor V Leiden mutation and the patency rate of implanted stents is generally high (4-6). The risks and benefits of implanting a kissing stent in a similar scenario should be weighed carefully for patients with a higher risk of stent occlusion. In addition, presurgical imaging should be obtained prior to the operation to ensure anatomical variations are discovered and the surgical plan revised to account for this. The patient had a favorable initial response to the epidural steroid injection. An additional long-term treatment plan would include spinal cord stimulation, if lumbosacral radiculopathy persists.

CONCLUSIONS

Lumbosacral radiculopathy is a rare complication after occlusion of the right iliac vein stenting in the setting of a variant course of the right common iliac vein between the psoas muscle and spine and Factor V Leiden mutation. The risks and benefits of implanting a kissing stent in a similar scenario should be weighed carefully for patients at high risk for stent occlusion. Additionally, patients should be assessed for variable anatomy as part of the presurgical workup to hopefully prevent this undesired outcome.

Disclosure

The IRB approval is not needed, as it's a case report. The informed consent has been obtained from the patient.

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