Misplacement of a vena cava filter into the spinal canal

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We report the case of a 70-year-old male with a complication of misplacement of a vena cava filter into the spinal canal. This likely happened as a result of penetration of the wire and filter sheath through the iliac vein or vena cava into the retroperitoneum, vertebral foramina, and spinal canal at the level of L2 and L3. Due to the patient’s condition, the filter was not removed and no neurologic symptoms have occurred. This represents the first reported case of a filter deployment into the spinal canal. Although placement of vena cava filters is a relatively safe procedure, complications are seen commonly due to the large number of procedures performed. Spinal complications, however, are rarely reported. This is the first reported case of the inadvertent placement of a vena cava filter into the spinal canal. (J Vasc Surg 2009;50: 1170-2.)

CASE REPORT

A 70-year-old man with a recent history of invasive poorly differentiated adenocarcinoma of the esophagus was seen at the hospital with progressive respiratory distress. His history is also notable for coronary artery disease, congestive heart failure, and an ejection fraction of 23%. Eventually, he required intubation with ventilatory support and hemodynamic support with intravenous dobutamine. Subsequent workup with a computed tomography (CT) scan of the chest revealed bilateral pulmonary embolisms. A duplex scan examination of the lower extremities did not show any deep vein thrombosis. There was no significant edema in the upper extremities. His baseline neurologic exam consisted of 3/5 motor strength in the bilateral quadriceps and biceps femoris and 2/5 strength upon dorsiflexion and plantar flexion. Gross sensory exam was normal.

The patient was initially anticoagulated on unfractionated heparin, but was discontinued a few days later when the hemoglobin level dropped from 11 to 8 g/dL. No source of bleeding was found, and the primary service requested placement of a vena cava filter.

Performed in the angiographic suite, the right femoral vein was accessed with a micropuncture needle and wire. This was exchanged for a 0.035-in guide wire. A Vena Tech vena cava filter (B. Braun Medical Inc, Bethlehem, Pa) was used. The filter sheath was advanced to the proximal femoral vein, the wire was removed, and contrast venography was performed, which showed a normal inferior vena cava with the renal veins located radiographically at the level of the L1 vertebral body (Fig 1, A). The wire was replaced and the sheath was advanced over the wire under fluoroscopic guidance to the level of the L2 vertebral body. The filter was advanced within the sheath and then completely unsheathed but did not expand.

Our vascular surgery service was consulted to evaluate the patient. The sheath had been pulled back to the femoral vein and a venogram showed extravasation of contrast along the right psoas muscle and the filter outside of the vena cava (Fig 1, B). The patient remained stable with a blood pressure of 140/80 mm Hg and heart rate of 70 beats per minute. Because the exact location of the filter was not apparent with fluoroscopic imaging, CT scans of the abdomen and of the lumbar spine were performed that showed the unexpanded filter in the right posterior aspect of the spinal canal at the level of L2 and L3 in an extradural location (Figs 2 and 3).

The neurosurgery service performed a neurologic examination and found no deficits from baseline. Their recommendation was for removal of the filter via a posterior laminectomy approach. Concerned over the patient’s medical condition, the family declined surgery.

DISCUSSION

Complications of vena cava filters are commonly described in the literature. The rate of complications range from 0% to 69%. Filter misplacement usually occurs into renal and iliac veins. Complications involving the spinal column, however, are rarely reported and misplacement into the spinal canal has not been described. Three case studies describing spine complications have been reported. The scenarios describe complications arising from penetration of a filter limb or struts through the caval wall into adjacent vertebrae or intervertebral discs by the filter. One article reports the incidental finding of an embedded filter strut into the vertebral body of a patient with low back pain.
5 years after placement. The patient was managed conservatively with nonsteroidal anti-inflammatory medications, leaving the filter in place with good results and resolution of symptoms. A second article reports the penetration of the filter struts into the aorta and a vertebral body 3 months after a suprarenal filter placement. The filter strut eventually fractured into the vertebral body. This case was also successfully managed conservatively without filter removal. Finally, Herbiere et al reported two cases of staphylococcal spondylodiscitis after insertion of a Mobin-Uddin filter (Edwards Laboratories, Exeter, Calif). Direct inoculation of the intervertebral disc occurred from penetration of the struts of an infected filter across the vena cava wall into the spine. Removal of the infected filters in both patients led to control of the infection.

This is the first reported case of inadvertent deployment of a vena cava filter into the spinal canal. This complication likely occurred by perforation of the right iliac vein or the distal vena cava with the filter sheath, possibly, after the initial venogram from the femoral position, the wire was
advanced into a side branch of the iliac vein or into a distal lumbar vein off the vena cava with subsequent penetration into the retroperitoneum. After vessel perforation, the sheath was advanced along the psoas muscle and into a vertebral foramina at L3 without significant resistance. The filter was deployed using the bony landmarks of L2. Deployment occurred into the extradural space distal to the conus medullaris and did not result in neurologic symptoms. Although retrieval of the filter via posterior laminectomy was recommended to prevent neural complications, the family declined surgery.

To prevent this complication, we recommend that the intracaval location of the sheath be confirmed with contrast venography with the sheath in the position where the filter is to be deployed. Before contrast injection, aspiration of venous blood should be noted. Other helpful maneuvers include avoiding multiple wire exchanges, using a J-tip wire to minimize entry into side or lumbar branches, and advancing the sheath with its inner dilator to prevent injury to the vessel wall.

Although this patient has been managed conservatively by the family’s request, leaving the filter in the spinal canal is not advised and should be removed if the patient’s condition allows.

REFERENCES


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