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Stent Grafting Resolved Brachial Plexus Neuropathy due to Cervical Arteriovenous Fistula

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We report a rare case of an iatrogenic vertebrovenous fistula presenting with a brachial plexus neuropathy and a cervical bruit. This arteriovenous fistula (AVF) was successfully occluded by implanting a stent graft into the right vertebral artery. After the stenting, the cervical bruit ceased and the radiculopathy slowly improved. This case highlights the usefulness of such new devices as covered stent grafts, and the therapeutic options for effectively treating AVFs while maintaining patency of the vertebral artery.

Case Report

Spinal AVFs are characterized by the presenting symptoms of tinnitus, vertebrobasilar ischemia [1, 2], myelopathy or subarachnoid hemorrhage [3]. Only a few cases of cervical AVF associated with radiculopathy have been reported so far, because AVF rarely occurs at this site [4–7]. We describe a case of progressive brachial neuropathy that was caused by a vertebrovenous AVF. The patient was successfully treated by stent grafting of the vertebral artery.

A 63-year-old woman was admitted to our hospital with a 3-month history of progressive pain and fluctuating paresthesia of the right arm. The patient history revealed that right-sided breast carcinoma had been treated by surgery and local radiotherapy 4 years previously. Five months before onset of the brachial neuropathy, she had undergone a liver transplantation for fulminant hepatitis A and had received several central venous lines on the right side.

The neurological examination revealed hypesthesia and paresthesia of the right upper limb with predominant involvement of the dermatomes C_6–C_8. The muscle strength as well as the reflexes of both upper and lower limbs were normal. A loud, continuous bruit was detected during auscultation of the right lateral neck. Electromyography showed that the amplitude of the compound action potential of the right median nerve was reduced. Moreover, there were signs of chronic denervation of the right interosseus muscle. Motor and sensory electroneurography were normal. A recording of the somatosensory-evoked potentials after stimulation of the right median nerve revealed a loss of the peripheral responses (N13/14). Doppler ultrasound showed a pathological flow in the vertebral artery on the right side. MRI of the cervical spine demonstrated ectatic veins with flow voids in the neuroforamina on the right (fig. 1). Conventional angiography disclosed a direct vertebral artery fistula draining into the paravertebral venous plexus at the level of the root C_7 (fig. 2a).

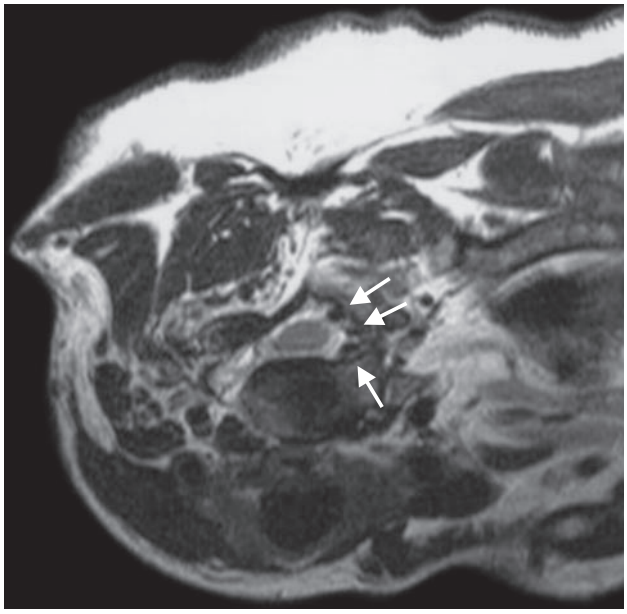

Fig. 1. T_2-weighted axial MRI at the level of C_6/C_7. Flow voids of dilated veins (arrows) around the nerve routes on the right side.

The AVF was occluded by implanting a Jomed stent graft (4 mm × 1.2 cm) into the right vertebral artery (by T.E.M.). The stent was dilated to 6 mm proximally with a Maverick balloon (fig. 2b). No neurological complications occurred during or after the endovascular treatment. The cervical bruit ceased, and the brachialgia and paresthesia of the right arm slowly improved after the stenting.

We had first thought that the right-sided brachial plexus syndrome was either caused by direct metastatic spread or was a delayed complication of the prior local radiation therapy [8, 9]. However, the cervical bruit pointed to an AVF that angiography confirmed. This case of AVF was most likely iatrogenic, having occurred after an unintentional puncture of the vertebral artery during insertion of a central venous line. Most cervical AVFs are caused by trauma, but they can also occur spontaneously or in association with other vascular dysplasias [5]. The brachial neuropathy of our patient was probably due to a direct compression of the cervical roots by dilated draining veins; this was documented by MRI and angiography (fig. 1, 2a).

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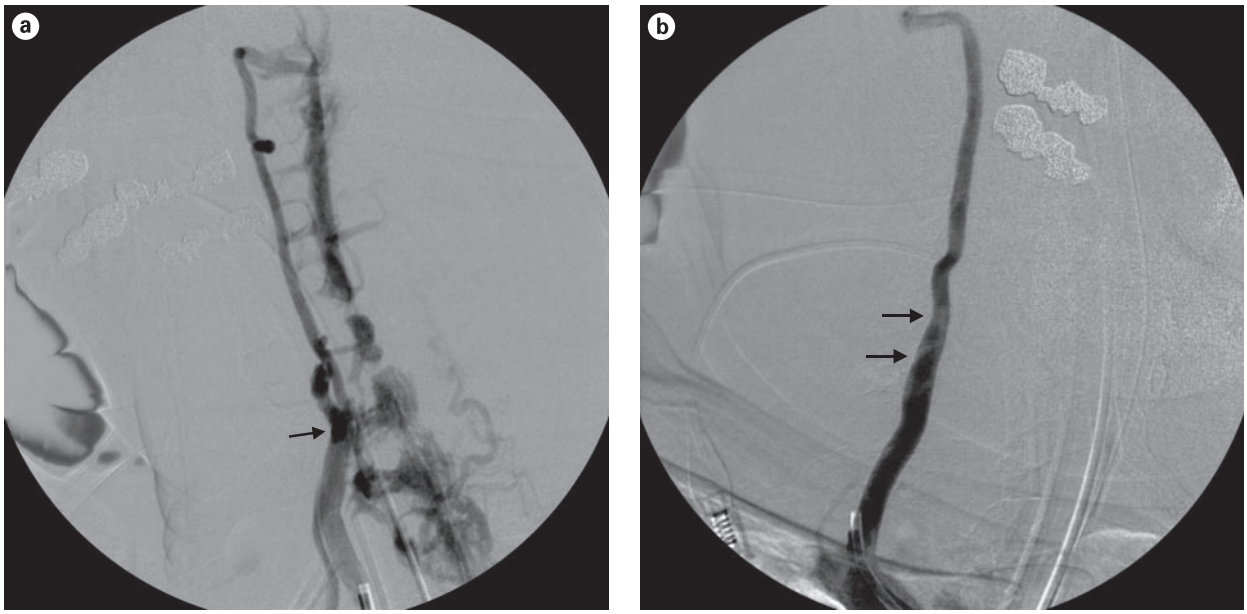

Fig. 2. a Angiography of the right vertebral artery. Ectatic proximal vertebral artery, pseudoaneurysm and direct fistula (arrow) with early filling of the paravertebral venous plexus. **b** Remodeling of the vertebral artery and occlusion of the AVF by the polytetrafluoroethylene-covered stent graft (arrows).

Whereas in the past the most common treatment of AVF consisted of embolization with microcoils or surgery, nowadays successful stent repair has been reported in a few cases [10–12]. In our patient, a coronary polytetrafluoroethylene-covered stent graft repair was sufficient. It also successfully maintained patency of the vertebral artery (fig. 2b). This procedure appears superior to surgery or embolization, since patency of the vertebral artery is maintained.

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