Angiographic demonstration of a spinal epidural arteriovenous malformation

Case report

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A 16-year-old boy presented with acute midline thoracic pain followed by rapidly progressive paraplegia. The initial neurological examination demonstrated a complete sensory and motor paraplegia, which significantly improved spontaneously over the following 2 days. Magnetic resonance imaging revealed a posterior epidural hematoma extending from the T-4 to T-6 vertebrae, and spinal angiography demonstrated an arteriovenous malformation (AVM) with a nidus of abnormal epidural vessels at the level of the T-5 vertebra, which was confirmed surgically. This case represents one of the first reports of a spinal epidural AVM confirmed by angiography.

Key words: • spinal arteriovenous malformation • spinal angiography • epidural hematoma

Spinal epidural hematomas are rare causes of acute myelopathy. Although spontaneous recovery has been reported, the necessity for urgent surgical intervention has prevented the routine use of diagnostic spinal angiography. This report outlines a case of acute paraparesis associated with rupture of an epidural spinal arteriovenous malformation (AVM) diagnosed by magnetic resonance (MR) imaging and angiography.

Case Report

This 16-year-old boy suddenly developed the onset of acute midline thoracic pain which radiated around the chest wall. Paraplegia developed rapidly, with complete motor and sensory paralysis at the level of the T-6 dermatome and preserved deep-tendon reflexes in the lower extremities. Initially the patient was examined at a local hospital, received steroid medication, and over the next several hours regained partial movement of his lower extremities. He was treated with an indwelling Foley catheter and transferred to our hospital approximately 60 hours after ictus.

Examination. Neurological examination demonstrated a sensory level to pinprick at the T-6 dermatome with intact position and vibratory sensation, and 4/5 strength in both lower extremities. Bilateral Babinski signs were present. An MR image revealed a posterior epidural hematoma extending from the T-4 through the T-6 vertebrae, with minimal cord compression (Fig. 1). Spinal angiography revealed a small epidural nidus of abnormal vessels at the T-5 level supplied by the fifth intercostal arteries (Fig. 2).

Fig. 1. Left: Sagittal T₁-weighted magnetic resonance (MR) image (TR 550 msec, TE 15 msec) demonstrating an iso-intense epidural mass (arrow). Right: Sagittal T₁-weighted MR image (TR 2200 msec, TE 90 msec) demonstrating an epidural mass of mixed signal (arrow).
Fig. 2. Left: Spinal angiogram with contrast injection into the left T-5 intercostal artery revealing the arteriovenous malformation (AVM) and draining vein (arrow). Right: Spinal angiogram with contrast injection into the right T-5 intercostal artery demonstrating the AVM (arrow) with the overlying intercostal artery.

Operation and Postoperative Course. A thoracic laminectomy revealed a small amount of gelatinous epidural clot and confirmed the angiographic findings. The dura was inspected and was not involved with the vascular malformation. Postoperative angiography revealed complete obliteration of the vascular lesion. At 6 months after surgery, the patient had made a complete recovery of strength and sensation of the lower extremities with normal urinary continence and sexual function.

Discussion

Acute nontraumatic spinal epidural hematomas are uncommon lesions which may be associated with pregnancy, pertussis, vertebral hemangiomas, and AVM's. In a review of 158 cases, Foo and Rossier reported only six such cases associated with AVM. Other, smaller series such as that of Müller, et al., had a higher incidence of AVM as the etiology of the epidural bleed. The clinical presentation in our case was typical and consisted of the acute onset of midline back pain with a radicular component, followed by a rapidly progressive paresis. Although spontaneous recovery can occur, urgent surgery is usually required for decompression.

In the past, myelography was used for diagnosis, although the anatomical extent of the hematoma was rarely demonstrated. As MR imaging can reveal the specific location and cause of the myelopathy, it has become the diagnostic procedure of choice. Epidural hematomas may be isodense on T1-weighted images and heterogeneous on T2-weighted images when performed in the acute phase. Later the hematoma becomes hyperintense and homogeneous on T2-weighted images.

Spinal AVM's have usually been categorized into four types: glomus, juvenile, intradural, and dural arteriovenous fistulae. The angiographic and operative findings are well documented. In this case, angiography revealed a lesion supplied by both the right and left intercostal vessels of T-5. The nidus was extradural and did not involve the meninges; in addition, the draining vein did not demonstrate the typical serpentine pattern seen in the more common dural arteriovenous fistulae. Although these findings must be confirmed with additional reports, epidural AVM's appear to have distinct angiographic characteristics. Whatever their cause, the presence of a spinal epidural hematoma usually requires emergency surgery as soon as it is discovered. The postoperative recovery is correlated with the rapidity of onset and severity of the preoperative neurological deficit. Our patient was transferred approximately 60 hours after his ictus and had exhibited significant neurological recovery during that time. We considered that angiography was indicated because 1) the patient was improving, so there was no need for emergency surgery; and 2) the angiogram could delineate an underlying vascular anomaly, making surgical planning much easier. Obviously, the AVM would have been discovered at surgery, but its complete obliteration may have been more difficult.

Conclusions

This report describes the case of a thoracic epidural hematoma in an adolescent male. Spontaneous recovery of severe paraparesis permitted diagnostic spinal angiography, which revealed an epidural AVM with a solitary draining vein. Surgery resulted in obliteration of the lesion. The patient had achieved an excellent recovery 6 months following surgery.

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References


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