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Spinal arteriovenous malformation unmasked during intravenous urography

Spinal myoclonus may be provoked by intravenous contrast media in patients with spinal arteriovenous malformations (AVM). We report a patient who developed a transient paraparesis without myoclonus following contrast injection during an intravenous urogram (IVU) who was subsequently shown to have a spinal AVM. Awareness of this unusual clinical association may alert physicians to the possibility of underlying vascular malformations in patients who present with weakness following contrast studies.

A 68 year old retired headmaster who was previously healthy developed urinary urgency and hesitancy in November 1987. These symptoms were attributed to prostatism and he attended his local hospital for an intravenous urogram. Several minutes after the intravenous injection of contrast (50 mls of Urografin 310) while lying supine on the X-ray table, his legs felt prickly and shortly after became numb below the knees. He had no involuntary movements. As he got up from the table 45 minutes later his legs collapsed beneath him and he experienced some mild low thoracic back pain. During the next 30 minutes the numbness gradually resolved and his legs became sufficiently strong to allow him to get up off the floor, reach his car and be driven home. His legs never fully returned to normal. Most mornings on rising his legs would feel weak and unsteady and he would have to sit on a stool to wash and shave. After walking 400 yards his legs would weaken, his knees would buckle and he would have to rest before continuing further. He became unable to play more than two holes of golf. His urinary hesitancy and urgency worsened and in addition he became constipated and impotent.

On examination the cranial nerves and upper limbs were normal. Only the left upper abdominal reflex was present. In the legs there was no muscle wasting and tone was normal. There was mild weakness (MRC grade 4+) of hip flexion and ankle dorsiflexion, more marked on the right. The knee jerks were brisk, the ankle jerk brisk on the left and depressed on the right. The plantar responses were flexor. Sensory examination was normal apart from impaired vibration sense in both feet. After walking up and down

Figure 1a (Left) Sagittal MRI scan of lumbosacral spine (T2 weighted image, spinech) showing the remnant pseudomeningocele cavity with an air-fluid level in it (arrowed).
Figure 1b (Right) Lateral view of lumbar myelogram showing the Hartshill rectangle and the pseudomeningocele filling with contrast. The arrow points to the small filling defect in the upper part of the pseudomeningocele.
costal and first lumbar arteries. The AVM drained through a large ascending vein which passed to the posterior aspect of the perimedullary venous plexus (figure). At operation this vein was ligated and divided. Postoperatively he improved considerably and was able to play a full 18 holes of golf without symptoms. The physical signs at rest were unaltered and no longer changed following vigorous exercise.

Administration of intravenous contrast media is associated with a variety of neurological sequelae. The most common of these are seizures, usually occurring in patients with pre-existing structural brain lesions whereas focal neurological deficits without seizures are uncommon. Two reports of spinal myoclonus in patients with AVMs, in one case followed by weakness have been described. In the present case weakness occurred without involuntary movements which therefore appears to be unusual. The mechanism by which the weakness occurred in this case is speculative. Several pathophysiological studies have demonstrated toxic effects of contrast media due to osmotic oedema, alterations in the blood-brain barrier and alterations in regional blood flow either as a result of local or systemic factors. In this patient, the possibility that prolonged supine posture on an X-ray table contributed to an alteration in spinal perfusion, particularly the venous drainage of the AVM, needs to be considered since postural factors are a well recognised precipitant of symptoms in spinal AVMs. However, the usual precipitating posture is forward bending, sitting or standing rather than lying, which leads us to believe that this is an unlikely explanation in this case. Irrespective of the mechanism, the temporal relationship between the procedure and the symptoms was very striking and should raise the diagnostic suspicion of an AVM in future cases of focal neurological deficits following intravenous contrast studies.

Figure (Left) Right subcostal angiogram. (Right) Digital subtraction image of the same frame of the angiogram. There is an angiomatous malformation (arrow) on the dura in the right D12-L1 intervertebral foramen. It is supplied by the radiculo-meningeal branch and it drains through an ascending intradural venous plexus. It is an unusual. The National Hospital for Nervous Diseases, London D THRUSH Derriford Hospital, Plymouth

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