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## Neuroradiological and neurosurgical management of arteriovenous malformations of the foramen magnum

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**Introduction:** Vascular malformations within the foramen magnum and upper cervical canal are rare. Diagnosis is cumbersome and neurosurgical treatment is hazardous. We report on 6 cases.

**Methods:** Age ranged from 37 to 77 years, three male and two female patients. Diagnosis at the time of referral included normal pressure hydrocephalus (one case), subarachnoid haemorrhage (two cases) and spinal stenosis (two cases). Imaging techniques included magnetic resonance (MR) imaging, MR angiography and highly selective segmental cervical angiography with microcatheters. Surgery was performed with electroneurophysiological monitoring.

**Results:** Angiography revealed three arteriovenous shunts within the foramen magnum, a giant vertebral artery aneurysm within the foramen magnum and two patients with an intradural arteriovenous malformation at the C2 level. The shunts and the aneurysm were occluded using microclips. The edema of the cervical myelon of the patients with the shunts resolved with marked recovery of gait. The hydrocephalus of the patient with the giant vertebral aneurysm also resolved with good recovery. The arteriovenous malformations at the C2 level were coagulated. One of these patients subsequently needed a ventriculoperitoneal shunt. The other

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