Spinal dural arteriovenous fistula

Spinal arteriovenous fistula (SDAF) within the dura.

see also Dural arteriovenous fistula.

It is a connection between a radicular artery and a radicular vein, (there is no intervening nidus between a meningeal segmental artery and a radiculomedullary vein) resulting in venous hypertension and obstruction of the venous flow. Consequently, edema forms beneath the fistula and congestive ischaemia of the myelum develops.

Epidemiology

They are the most common type of spinal arteriovenous malformation, especially in middle-aged men.

The annual incidence are 5-10 cases per million. The data on efficacy, recurrence rates and complications of endovascular treatment versus surgical treatment is limited.

Pathophysiology

The pathophysiology results in perimedullary venous congestion and in turn spinal cord congestion.

The craniocaudal extent of enlarged intrathecal veins draining SDAVF correlates with patient functional status, providing further insight into the pathophysiology of venous hypertensive myelopathy 1).

Diagnosis

While digital subtraction spinal angiography remains the gold standard, recent advances in noninvasive vascular imaging have improved the diagnosis of SDAVF.

It is a time consuming and potentially dangerous investigation as dissection of a vessel can potentially lead to cord ischaemia.

The site of maximal MRI abnormality is not a reliable indicator of the location of the fistula, which can be many levels away. As such a complete spinal angiogram consists of selective catheterisation of the bilateral:

- intercostal arteries
- lumbar arteries
- median and lateral sacral arteries
- vertebral arteries
- ascending cervical arteries
- intracranial vessels may also need to assessed if no fistula is found including
- ascending pharyngeal artery
meningohypophyseal trunk

middle meningeal artery

occipital artery.

**Differential diagnosis**

SDAVFs are considered to be acquired and should be distinguished from congenital intradural perimedullary arteriovenous fistulas (PMAVFs).

**Treatment**

Spinal dural arteriovenous fistula treatment.

**Outcome**

see Spinal dural arteriovenous fistula outcome.

**Case series**

Spinal dural arteriovenous fistulas: clinical results and quality of life assessment with surgical treatment as a crucial therapy. The joint experience of two centers

Safaee et al. performed a retrospective review of a prospectively maintained database by the senior author to assess clinical outcomes in patients undergoing surgical treatment of spinal dAVFs. Preoperative and postoperative motor and Aminoff and Logue disability scale (ALS) scores were collected. RESULTS A total of 41 patients with 44 spinal dAVFs were identified, with a mean patient age of 64 years. The mean symptom duration was 14 months, with weakness (82%), urinary symptoms (47%), and sensory symptoms (29%) at presentation. The fistula locations were as follows: 30 thoracic, 9 lumbar, 3 sacral, and 2 cervical. Five patients had normal motor and ALS scores at presentation. Among the remaining 36 patients with motor deficits or abnormal gait and micturition at presentation, 78% experienced an improvement while the remaining 22% continued to be stable. There was a trend toward improved outcomes in patients with shorter symptom duration; mean symptom duration among patients with clinical improvement was 13 months compared with 22 months among those without improvement. Additionally, rates of improvement were higher for lower thoracic and lumbosacral dAVFs (85% and 83%) compared with those in the upper thoracic spine (57%). No patient developed recurrent fistulas or worsening neurological deficits. CONCLUSIONS Surgery is associated with excellent outcomes in the treatment of spinal dAVFs. Early diagnosis and treatment are critical, with a trend toward improved outcomes. No patient in this study had fistula recurrence or worsening of symptoms. Among patients with abnormal motor or ALS scores, 78% improved after surgery. Therapeutic embolization is an option for some lesions, but for cases with unfavorable anatomy where embolization is not feasible, surgery is a safe option associated with high success.

**Case reports**
Simal Julián et al. present the case of a 68-year-old man with an sDAVF fed by the right T7 segmentary artery. Indocyanine green videoangiography (IGV) was initially performed with the presumptive fistula feeder occluded for less than 1 minute, which provided both diagnostic and postexclusion control in one procedure. This technique therefore is reversible by not prolonging vascular exclusion times. Discussion IGV in negative is an extremely visual and intuitive procedure that represents an improvement over conventional IGV. Studies with larger sample sizes are necessary to determine whether IGV in negative can further reduce the need for postoperative digital subtraction angiography.

A 30-year-old woman presented with progressive worsening of weakness in both legs during several months. (A) Sagittal T2WI showed a vascular lesion at the T11 spinal cord. Note the diffuse spinal cord edema (venous congestive myelopathy, VCM) with dilated perimedullary veins surrounding the cord. (B) Spinal angiogram showed a spinal cord arteriovenous malformation supplied by a pial feeder of the right L2 lumbar artery. (C) The VCM improved three weeks after embolization of the two pial feeders, as did the patient’s symptoms.


