Spinal dural arteriovenous fistula diagnosis

While digital subtraction spinal angiography remains the gold standard, recent advances in noninvasive vascular imaging have improved the diagnosis of SDAVF [1)]

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.

On T2-weighted sequences, the cord edema is depicted as a centromedullary not well-delineated hyperintensity over multiple segments that is often accompanied by a hypointense rim, most likely representing deoxygenated blood within the dilated capillary vessels surrounding the congestive edema [2)]

A study aimed to evaluate the usefulness of time-resolved MR angiography (TR-MRA) in SDAVF diagnosis. Wójtowicz et al. performed a systematic review of the PubMed and EMBASE databases followed by a meta-analysis. TR-MRA was an index test, and spinal DSA was a reference. Of the initial 324 records, they included 4 studies describing 71 patients with SDAVFs. In 42 cases, TR-MRA was true positive, and in 21 cases, it was true negative. They found 7 false-positive cases and 1 false negative. TR-MRA allowed for shunt level identification in 39 cases. Of these, the predicted level was correct in 23 cases (59%), to within 1 level in 38 cases (97.4%) and to within 2 levels in 39 cases (100%). The diagnostic odds ratio was 72.73 (95% CI [10.30; 513.35]), z = 4.30, p value < 0.0001. The pooled sensitivity was 0.98 (95% CI [0.64; 1.00]), and the pooled specificity was 0.79 (95% CI [0.10; 0.99]). The AUC of the SROC curve was 0.9. TR-MRA may serve as a preliminary study to detect

SDAVFs and localize the shunt level with sensitivity and specificity as high as 98% and 79%, respectively. Unless the TR-MRA result is unequivocal, it should be followed by a limited spinal DSA [3].

1)
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2)
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3)
Wójtowicz K, Przepiorka L, Maj E, Kujawski S, Marchel A, Kunert P. Usefulness of time-resolved MR angiography in spinal dural arteriovenous fistula (SDAVF)-a systematic review and meta-analysis. Neurosurg Rev. 2023 Dec 11;47(1):9. doi: 10.1007/s10143-023-02242-7. PMID: 38072856.