

Computed tomography myelography for degenerative cervical myelopathy

Despite its invasiveness, [computed tomography myelography](#) (CTM) is still considered an important supplement to conventional [magnetic resonance imaging](#) (MRI) for preoperative evaluation of multilevel [cervical spondylotic myelopathy](#) (CSM). Schöller et al., analyzed if [diffusion tensor imaging](#) (DTI) could be a less invasive alternative for this purpose.

In 20 patients with CSM and an [indication](#) for [decompression](#) of at least one level, CTM was performed preoperatively to determine the extent of spinal canal/cerebrospinal fluid (CSF) space and cord compression (Naganawa score) for a decision on the number of levels to be decompressed. [Fractional anisotropy](#) (FA) and [apparent diffusion coefficient](#) (ADC) were correlated with these parameters and with MRI-based increased [signal intensity](#) (ISI). [Receiver operating characteristic](#) analysis was performed to determine the sensitivity to discriminate levels requiring decompression surgery. [European Myelopathy Score](#) (EMS) and neck/radicular [visual analog scale](#) (VAS-N/R) were used for clinical evaluation.

According to preoperative CTM, 20 levels of maximum and 16 levels of relevant additional stenosis were defined and decompressed. Preoperative FA and particularly ADC showed a significant correlation with the CTM Naganawa score but also with the ISI grade. Furthermore, both FA and ADC facilitated a good discrimination between stenotic and nonstenotic levels with cutoff values < 0.49 for FA and $> 1.15 \times 10^{-9}$ m²/s for ADC. FA and especially ADC revealed a considerably higher sensitivity (79% and 82%, respectively) in discriminating levels requiring decompression surgery compared with ISI (55%). EMS and VAS-N/R were significantly improved at 14 months compared with preoperative values.

[DTI](#) parameters are highly sensitive at distinguishing surgical from nonsurgical levels in CSM patients and might therefore represent a less invasive alternative to CTM for surgical planning ¹.

In unclear cases of [cervical spinal degeneration](#), particularly multilevel stenosis, myelography and [CT myelogram](#) add relevant information for therapeutic decisions in more than a quarter of the patients in comparison with [MRI](#) as the sole diagnostic modality, and changes therapeutic strategies. However, a significant part of the information drawn out of [myelography](#) and CTM can be obtained by a completion of noninvasive examinations (native CT and radiographs) ².

A [CT myelogram](#) is most useful for patients who cannot undergo [MRI](#) (e.g., those with pacemakers or cochlear implants), or for those in whom MRI provides limited information (e.g., those with extensive metal in the spine).

The process usually involves lying face down on a table, with the lower extremities secured tightly with straps to the table. After the skin area has been numbed, the dye is injected into the spinal sac, then the table is slowly rotated in a circular motion, first down at the head end for approximately 4 to 6 minutes, then rotated up at the head end for the same duration. Several more minutes lying flat and the process is complete. This movement insures the contrast has sufficiently worked its way through the spinal cord, followed by X-rays, CT, or MRI scans.

If the fluid introduced in the spinal tap was oil based, the physician conducting the procedure will

remove the fluid after the procedure is complete. When water-based fluid is used, it is typically not removed, as the fluid will eventually be absorbed into the body.

Post-procedure care centers around ensuring that infection does not set in and that the “plug” at the site of the spinal tap does not become dislodged. Patients are usually instructed to avoid strenuous activity and heavy lifting, for example. Some patients are given instructions to keep their heads elevated at least 30 degrees for a specified number of hours. Complications from the surgery can cause a loss of cerebrospinal fluid (CSF), which could cause severe headaches. This can be corrected by returning to the medical facility and having them perform a blood patch. In this procedure a small amount of blood is taken from the arm and injected into the exact spinal tap location to stop the leaking of CSF.

1)

Schöller K, Siller S, Brem C, Lutz J, Zausinger S. Diffusion Tensor Imaging for Surgical Planning in Patients with Cervical Spondylotic Myelopathy. *J Neurol Surg A Cent Eur Neurosurg*. 2019 Jun 10. doi: 10.1055/s-0039-1691822. [Epub ahead of print] PubMed PMID: 31181580.

2)

Westermaier T, Doerr C, Stetter C, Linsenmann T, Koehler S, Eriskat J, Solymosi L, Ernestus RI. Influence of Myelography and Postmyelographic CT on Therapeutic Decisions in Degenerative Diseases of the Cervical Spine. *J Spinal Disord Tech*. 2015 Nov 12. [Epub ahead of print] PubMed PMID: 26566254.

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