

## **Surgery For The AVF At The Cranio-Cervical Junction And High Cervical Spine**

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Dural AVFs have been recognized as the most common type of vascular malformations at the cervical region. However, recent studies reveal more frequent coexistence of dural and pial AVFs than generally thought, which would require more accurate diagnosis for reliable surgery. In this study, we studied the effectiveness of intra-arterial injection (IA) fluorescence videoangiography, which can be repeated within a short time with bright and high-contrast image, to detect detailed angioarchitecture of this complex lesion during surgery.

This study included 9 cases (craniocervical junction (CCJ) 7, C5/6 1, C6 1) that underwent IA-fluorescence videoangiography among 18 cervical AVFs during 17 years. Preoperative diagnosis was dural AVF and pial AVF in 7 and 2 cases, respectively, and the concurrence of both AVFs was suspected in 2 cases. We analyzed the intraoperative finding of IA-fluorescence videoangiography, and investigated its effectiveness on the final diagnosis.

IA-fluorescence videoangiography depicted early reflux of fluorescence into draining veins in all dural AVF cases, and confirmed all vascular structures in all pial AVF cases. In 2 cases, the lesions were located at the ventral side of the spinal cord, which required endoscopic fluorescence videoangiography to observe the shunts. In the concurrence cases, IA-fluorescence videoangiography, especially frame-by-frame playback, could distinguish each vascular component. Namely, feeders of pial AVFs were depicted earlier than drainers of dural AVFs. From these findings, 3 of 7 cases diagnosed as dural AVF before operation were turned out to be the concurrence cases during surgery, and were treated based on the findings. Shunts were completely disappeared in all the cases, and outcomes were excellent in all but one with severe SAH.

IA-fluorescence videoangiography provides detailed information of blood flow in cervical AVFs, and allow us to distinguish dural, pial and concurrent AVFs. This novel modality would improve the durability of surgery.