C2-C3 AVF: A Case Report. Maintaining Stability & Preserving Neurologic Function Applying Intraoperative Evaluation with Endovascular Techniques

Jose Alcibiades Fernandez Abinader MD; Rafael Esteban Baella MS-I; Ricardo Jose Fernandez-de Thomas MD; Miguel G Echevarria; Juan Manuel Ramos-Acevedo MD; Fanor Manuel Saavedra Pozo MD; Caleb E. Feliciano MD, FAANS

Neurosurgery and Neuroendovascular Section, Department of Surgery, University of Puertro Rico School of Medicine

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Purpose

Spinal vascular malformations can result in spinal cord dysfunction and disability. A high index of clinical suspicion after correlating the patient's history, physical exam, and imaging is necessary to establish diagnosis and further therapeutic options. Early recognition and treatment can halt progression of the disease and minimize permanent and possibly irreversible spinal cord injury. A variety of treatment modalities exist, including endovascular embolization or open surgery. Our surgical approach used in this case represents a recently described therapeutic modality, which could be implemented in similar cases.

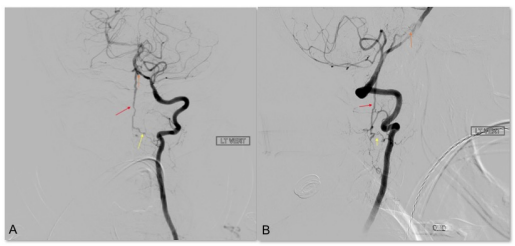
Case Descrtiption/Clinical Approach

75-years-old female who presented to the Emergency Department with sudden, severe headaches and nuchal rigidity. Patient denied any history of trauma. Posterior fossa cerebral SAH was diagnosed on non-contrast head computed tomography. Subsequent cervical spinal DSA demonstrated a C2/3 left perimedullary arteriovenous fistula in the anterolateral left cervical cord.

Clinical Findings

The AVF was supplied by left C2/C3 radiculomedullary branches, with an associated arterialized venous varix. Drainage was via the anterior median spinal vein cranially. The patient underwent delayed treatment after optimization, with laminectomies at C1 to C3, posterior transpedicular approach involving the C2 pedicle and C3 lateral mass with subsequent sectioning of the feeders and coagulation/occlusion of the perimedullary draining venous varix. Successful recovery with no neurologic sequelae was observed.

Figure 1



Preoperative DSA. Selective catheterization of the left vertebral artery shows a small vessel filling from a radiculomedullary branch of the left vertebral artery at the level of C2 (yellow arrow), which courses medially into a prominent anterior spinal vein (red arrow) which drains cranially into the left petrosal vein (orange arrow). A) oblique view, B) lateral view.

Conclusions

We present this rare entity and describe the diagnostic and surgical techniques utilized. Further discussion and review, the most appropriate time for management, possible approaches, and different classification systems are emphasized in our discussion.

Figure 2

Postoperative DSA. A) Townes view. Selective catheterization of the left vertebral artery shows normal vertebrobasilar junction with good filling of the posterior inferior, anterior-inferior, superior cerebellar and posterior cerebellar arteries without dural AVF intraspinal vascular malformation or early venous drainage. B) Lateral view. Selective catheterization of the left vertebral artery shows normal vertebrobasilar junction without dural AVF intraspinal vascular malformation or early venous drainage.

Learning Objectives

Understand the current classification of spinal AVFs and discuss different therapeutic modalities.

References

- Kim, L. J., & Spetzler, R. F. (2006). Classification and surgical management of spinal arteriovenous lesions: arteriovenous fistulae and arteriovenous malformations. Neurosurgery, 59(5), S3-195.

Figure 3

A) Large cervical SAH centered at C2 (blue) resulting in moderate compression upon the underlying SC (yellow). IVH in the 3rd ventricle (red). B) Small vessel filling from a radiculomedullary branch of the L vertebral artery at the level of the transverse foramen of C2 (yellow), which courses medially into a prominent anterior spinal vein (ASV) (red). C) Small vessel arising from the L vertebral artery at the level of the L transverse foramen of C2 (yellow), which courses medially into the ASV (red). There is a pial vessel (blue) arising from the ASV that draining finally into the L superior petrous sinus (SPS) (blue and orange). D) Small vessel filling from the L vertebral artery at the level of the transverse foramen of C2 (yellow), which courses medially into the ASV (red). There is a pial vessel (blue) arising from the ASV that drains into the L SPS (orange).