Dural arteriovenous fistula at the lateral foramen magnum: A report of 2 microsurgical cases

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Dural arteriovenous fistulae (DAVFs) are acquired pathological shunts between dural arterial and venous system, and could be associated with venous hypertension from sinus outflow obstruction\(^1\). DAVFs at foramen magnum is an uncommon site for dural AVF.

Previous studies have shown that retrograde cortical venous drainage of DAVFs are prone to subarachnoid hemorrhage (SAH). We retrospectively present two cases of effective microsurgical disconnection for DAVFs at foramen magnum presenting with SAH in the past year (2019 – 2020) in this centre. Specific feeding arteries and draining veins were studied.

Both presented with sudden onset severe headache. Initial CT brain both showed SAH, especially anterior to medulla.
**Case 1 52/M**

**Main feeding artery**: ascending pharyngeal artery → neuromeningeal trunk → hypoglossal and jugular branch

**Venous pouch** at accessory nerve exit + pial venous plexus

**Main draining vein**: Via petrosal vein to pterygopalatine venous plexus

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**Right ECA injection**

**Lateral view**

Red star = venous pouch at exit of accessory nerve
Purple star = pial venous plexus with venous pouch

APA = ascending pharyngeal artery
NMT = neuromeningeal trunk
HB = hypoglossal branch of neuromeningeal trunk
JB = jugular branch of neuromeningeal trunk

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**Right ECA injection**

**AP view**

Red box = venous pouch at accessory nerve exit
Purple box = venous pouch of pial venous plexus
Case 2 42/M

Main feeding artery: ascending pharyngeal artery → neuromeningeal trunk → hypoglossal and jugular branch
Venous pouch of C1 radicular vein
Main draining vein: Anterior and posterior spinal vein

Left ECA injection
Lateral view

Red star = venous pouch of C1 radicular vein
APA = ascending pharyngeal artery
NMT = neuromeningeal trunk
HB = hypoglossal branch of neuromeningeal trunk
JB = jugular branch of neuromeningeal trunk
ASV = anterior spinal vein
PSV = posterior spinal vein
Complete occlusion of DAVF was achieved with coagulation of feeders and shrinkage of venous pouch using far-lateral microsurgical approach. Intra-operative indocyanine green injection confirmed no filling of venous pouch. Post-operative DSA demonstrated no angiographic evidence of residual DAVF or new hemorrhages.
DISCUSSION

DAVFs at lateral foramen magnum are associated with 4 important feeding arteries arising from ECA/vertebral artery:
1. Branches from ascending pharyngeal artery (most common)
2. Anterior meningeal artery
3. Posterior meningeal artery
4. Branches from occipital artery

Treatment options:
1. Microsurgery – effective and safe
2. Endovascular embolization e.g. Coil, Onyx – risk of damaging cranial nerve supplies via transarterial approach
3. Stereotactic radiosurgery – delayed effect

CONCLUSION

DAVFs at foramen magnum could present as SAH. A combination of CT brain, DSA and MRI aid diagnosis and identification of underlying feeding arteries and draining veins. Satisfactory outcomes with complete occlusion were achieved with microsurgical approach.

REFERENCES