

# Arteriovenous malformation of the trigeminal nerve

## 2014

A 64-year-old man with trigeminal neuralgia (TN) from a right trigeminal nerve AVM supplied by a persistent trigeminal artery (PTA) variant. The patient underwent microvascular decompression and a partial resection of the AVM with relief of facial pain symptoms. His residual AVM was subsequently treated with CyberKnife radiosurgery (Accuray, Sunnyvale, CA, USA). A multimodality approach may be required for the treatment of trigeminal nerve associated PTA AVM and important anatomic patterns need to be recognized before any treatment. Herein, we report to our knowledge the third documented patient with a posterior fossa AVM supplied by a PTA and the first PTA AVM presenting as facial pain <sup>1)</sup>.

## 2011

A 66-year-old man presented with typical right trigeminal neuralgia. Neuroimaging showed a small arteriovenous malformation (AVM) in the right cerebellopontine angle. Suboccipital craniotomy verified that the AVM was almost completely embedded in the root entry zone of the trigeminal nerve and the nerve axis was tilted infero-posteriorly. The patient obtained complete pain relief without sequelae after surgery by transposition of the superior cerebellar artery and correction of the tilted nerve axis. The nidus of the unresected AVM was obliterated by gamma knife radiosurgery <sup>2)</sup>.

## 2010

Intrinsic arteriovenous malformation of the trigeminal nerve <sup>3)</sup>.

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A 52-year-old woman with drug-resistant trigeminal neuralgia underwent a key hole suboccipital cerebellopontine angle exploration after the usual magnetic resonance imaging (MRI) screening had raised the suspicion of a vascular compression. In surgery, the petrosal vein was found to be bigger than usual and arterialized; the trigeminal root was embedded in a tangle of abnormal arterialized vessels. Intraoperative ICG videoangiography showed that the direction of flow in the arterialized petrosal vein was anterograde, thus allowing for the differential diagnosis between micro-AVM and tentorial dural fistula. It was possible to achieve only a partial nerve decompression because of the intimate relationship between the trigeminal root and the pathological vessels. Postoperative angiography and MRI with contrast administration confirmed the intraoperative diagnosis of micro-AVM. The patient was discharged neurologically intact on postoperative day 4. One month after surgery, she remains pain-free despite a 50% reduction in antiepileptic drugs.

Surgeons performing microvascular decompression should be aware that a diagnosis of vascular compression based on MRI without contrast administration could not exclude the presence of a pontine micro-AVM. ICG videoangiography provides an elegant means of showing the flow dynamics of these pathological vessels. An MRI protocol that is suitable to avoid this kind of intraoperative drawback should be defined and systematically used in the preoperative evaluation of all such surgical candidates <sup>4)</sup>.

1)

Choudhri O, Heit JJ, Feroze AH, Chang SD, Dodd RL, Steinberg GK. Persistent trigeminal artery supply to an intrinsic trigeminal nerve arteriovenous malformation: a rare cause of trigeminal neuralgia. *J Clin Neurosci*. 2015 Feb;22(2):409-12. doi: 10.1016/j.jocn.2014.06.007. Epub 2014 Jul 25. PubMed PMID: 25070632.

2)

Sumioka S, Kondo A, Tanabe H, Yasuda S. Intrinsic arteriovenous malformation embedded in the trigeminal nerve of a patient with trigeminal neuralgia. *Neurol Med Chir (Tokyo)*. 2011;51(9):639-41. PubMed PMID: 21946727.

3)

Singh N, Bharatha A, O'Kelly C, Wallace MC, Goldstein W, Willinsky RA, Aviv RI, Symons SP. Intrinsic arteriovenous malformation of the trigeminal nerve. *Can J Neurol Sci*. 2010 Sep;37(5):681-3. PubMed PMID: 21059518.

4)

Ferrolì P, Acerbi F, Broggi M, Broggi G. Arteriovenous micromalformation of the trigeminal root: intraoperative diagnosis with indocyanine green videoangiography: case report. *Neurosurgery*. 2010 Sep;67(3 Suppl Operative):onsE309-10; discussion onsE310. doi: 10.1227/01.NEU.0000381769.15291.4C. PubMed PMID: 20679916.

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