What You See Is Not Always What You Get:

A case of striking discordance in neurovascular compression for trigeminal neuralgia between pre- and intraoperative visualization

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BACKGROUND

• Gold standard treatment for classical trigeminal neuralgia (TN) is microvascular decompression (MVD), relieving the trigeminal nerve of neurovascular compression (NVC).

• Visualization of venous and/or arterial compression of the nerve is essential to understanding the nature of a patient's TN and determining appropriate treatment.

• Previous literature discusses the varied validity of magnetic resonance imaging (MRI) in predicting NVC of the trigeminal nerve, as visualization of NVC of the trigeminal nerve on MRI can be complicated by the small size of the critical structures, potential positional differences from upright to prone, adjacent scarring, or artifacts.

• Patients gain significant pain relief from MVD when compression is found preoperatively. When NVC remains undetected on imaging, physicians may overlook critical opportunities to provide surgical care to their patients.

CASE PRESENTATION

Following CARE guidelines, the authors present a case of a 43 year old patient suffering from severe TN characterized by constant burning, sharp headaches, and pain in the right sided V3 distribution. Providers at previous institutions reported no signs of gross abnormality or NVC along the trigeminal nerve using high resolution 0.8mm axial T2 FIESTA images and, resultantly, did not offer MVD as treatment.

The same MR examination was reviewed with additional reformations by an experienced radiologist and neurosurgeon who noted that the superior cerebellar artery passed near dorsal right cisternal trigeminal nerve, with possible abutment of the nerve but not near the root entry zone, a nonspecific finding. The decision was made to proceed with retrosigmoid craniectomy for exploration with possible MVD and microsurgical descending pontine tractotomy, a novel procedure in which the nociceptive fibers of descending trigeminal spinal tract are lesioned.

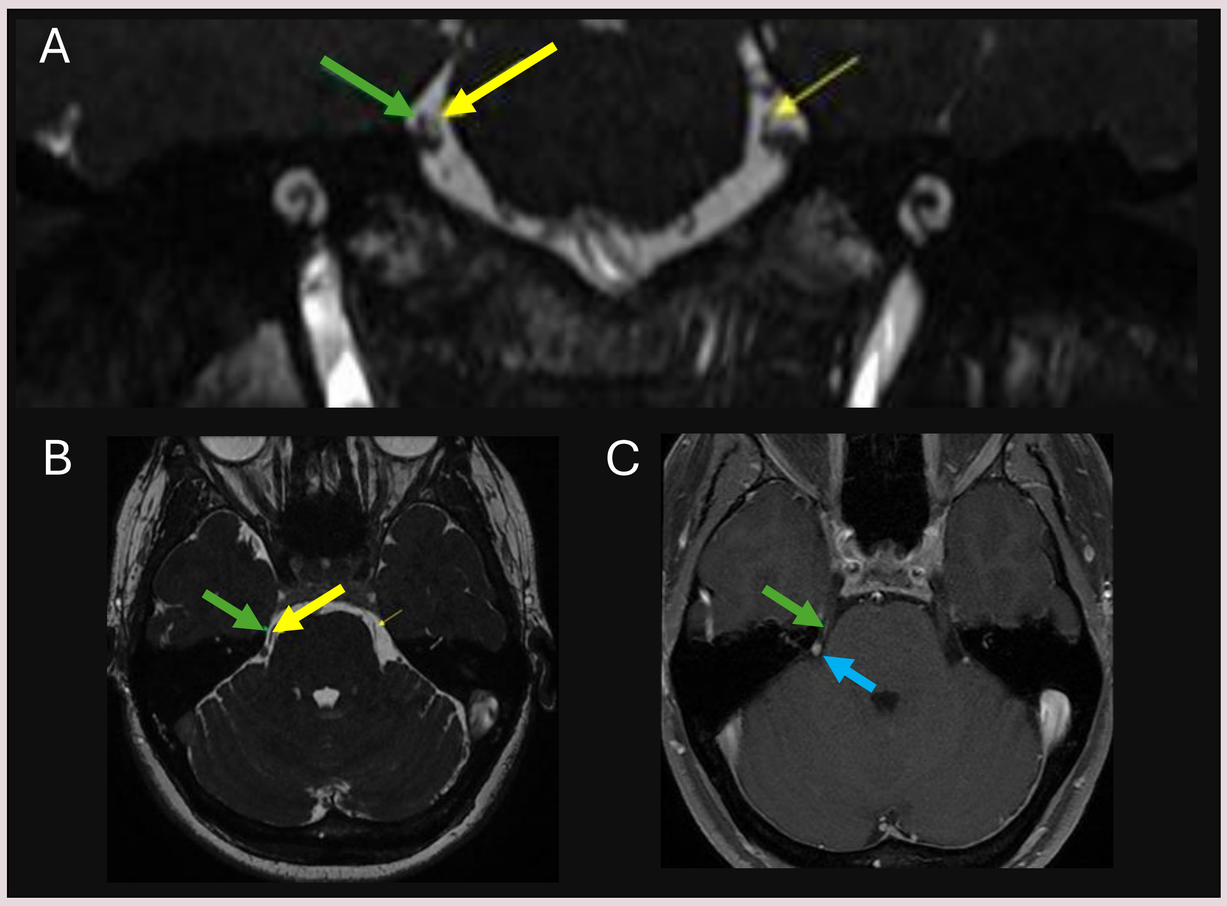

Figure 1: A) Coronal T2 FIESTA (fast imaging employing steady-state acquisition, heavily T2 weighted) demonstrates a right superior cerebellar artery (SCA) loop near the cisternal right trigeminal nerve (green arrow). Other small apparent structures (yellow arrows) were prospectively subthreshold but retrospectively may have corresponded with intraoperative findings. B) Corresponding axial FIESTA image demonstrates both the right SCA (green arrow) and the adjacent and contralateral subthreshold findings (yellow arrows). C) Corresponding thin section axial T1 fat saturation image demonstrates an adjacent right superior petrosal vein branch (blue arrow) with different contrast enhancement and caliber from the right SCA (green arrow). Unlike the vein, the right SCA was also not well seen on other axial post contrast images depending on its angle to the axial plane (not shown).

Figure 2: Intraoperative microscope image demonstrating numerous prominent arterial and venous structures contributing to multifocal vascular compression.

RESULTS

Intraoperatively, numerous prominent arterial and venous structures contributed to multifocal vascular compression despite equivocal evidence of NVC on preoperative imaging. Upon intraoperative and postoperative review, some near artifactual or subthreshold structures may have been present on coronal reformations. In retrospect, post contrast T1 imaging was helpful for differentiation of arteries and veins. The microvascular decompression and descending pontine tractotomy were performed without complication. Upon discharge, the patient was pain free.

CONCLUSION

On re-examination, prominent NVC found intraoperatively appear to have correlated with subthreshold preoperative observations, suggesting that exploration for potential MVD may be warranted in some cases of clinically classical TN with equivocal NVC on imaging. To circumvent unnecessary surgery, our institution has implemented the descending pontine tractotomy, performed at the discretion of the operating surgeon in cases of mild NVC. Our findings show that this safe and effective procedure provides pain relief to patients with Type 1 TN despite discrepancies in nerve compression severity.

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