2195: Skull-Base Vascular Anatomy Pertinent To Percutaneous Access To The Foramen Ovale For Treatment Of Trigeminal Neuralgia: A Cadaveric Study Of Latex-Injected Heads

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Introduction

- Trigeminal neuralgia may be treated by glycerol rhizotomy, radiofrequency rhizotomy and balloon compression via a percutaneous needle access to the foramen ovale.
- Vascular complications associated with the needle trajectory, though rare, could result in serious morbidity and mortality.
- This study aimed to delineate the vascular relations of the foramen ovale at the skull-base.
Methods

- Two fresh cadaver heads were injected with red and blue latex to show arteries and veins respectively.
- An exploratory dissection of the neck and infratemporal fossa was carried out on one side of a cadaver head to assess the quality of the latex injection.
- The Hartel technique was then used to cannulate the foramen ovale on the remaining 3 sides of the two cadaver heads. Cannulation of each foramen ovale was confirmed by direct visualization via a small temporal craniotomy.
- Neck and infratemporal fossa dissections were then carried out to delineate the vascular relations of the foramen ovale.
Cerebral blood vessel cannulation for latex injection

A: Exposure and cannulation of common carotid artery

B and C: Exposure and cannulation of internal jugular vein

D – H: Exposure and cannulation of vertebral artery
Foramen Ovale Cannulation and Exposure of Maxillary Artery

Max A = Maxillary artery; MMA = Middle meningeal artery; ICA = Internal carotid artery
Results

- The maxillary artery branches and the internal carotid artery were dissected out in each cadaver head. The needle was identified and its anatomical relation and distance to each of the arteries determined.

- The middle meningeal artery was located $0.8 \pm 0.16$ cm posterior and the internal carotid artery $2.4 \pm 0.12$ cm posterior to the needle at the skull-base, as it enters the foramen ovale.

- The posterior and anterior deep temporal branches of the maxillary artery as well as aberrant maxillary artery branches were more variable in location to the needle but within the cannulation zone.
Relation of Needle Trajectory to MMA
Relation of Needle Trajectory to ICA

Specimen 1

Specimen 2

Specimen 3
Conclusion

- An errant needle trajectory during percutaneous interventions for treatment of trigeminal neuralgia is more likely to injure the middle meningeal artery, temporal meningeal branches, and the maxillary artery rather than the internal carotid artery at the skull-base.