TITLE: The Internal Auditory Canal anatomic variability project findings.

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ABSTRACT:

Introduction

The internal auditory canal (IAC) contains the vestibulocochlear and facial nerves and is an important landmark during surgery for vestibular schwannomas, cerebellopontine (CP) angle meningiomas, and other lesions of the CP angle. There is significant variability in the position and orientation of the IAC radiographically and the authors have noted differences in surgical exposure depending on the individual anatomy of the IAC. We hypothesize that IAC position and orientation affects the surgical exposure of the IAC and facial nerve, especially in translabyrinthine approach.

Methods

The authors retrospectively reviewed magnetic resonance imaging (MRI) studies of 50 randomly selected patients with pathologically confirmed vestibular schwannomas. Measurements were obtained to quantify the position and orientation of the IAC within the petrous temporal bone.

Results

Our results quantitatively demonstrate tremendous variability of the position and orientation of the IAC in the petrous temporal bone. We provide multiple extreme examples using radiographic imaging to demonstrate this anatomic variability and we demonstrate the surgical relevance of IAC position and orientation. Specifically, a horizontally-oriented IAC angle and position may have significant impact on visualization of the facial nerve within its cisternal segment with the translabyrinthine approach. The retrosigmoid and middle fossa approaches are less affected with the IAC variability in position and angle.

Conclusion

IAC variability can have a substantial effect on the surgical exposure of the IAC. Neurosurgeons and neuro-otologists should take note of position and orientation variability on pre-operative imaging when planning an optimal surgical approach to the IAC.

Abbreviations:

IAC- Internal Auditory Canal
APD- Anterior Petrous Distance
PPD- Posterior Petrous Distance
APA- Anterior Petro-auditory Angle
PPA- Posterior Petro-auditory Angle
IAA- Internal Auditory Angle