Anatomical Limitations for Endoscopic Endonasal Skull Base Surgery in Pediatric Patients

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CONCLUSIONS

- The major anatomical parameters governing midline skull base access do not pose limitations on the use of EEA in pediatric patients with skull base lesions.
- Piriform aperture is likely a limit only in the youngest patients (under 2 years).
- While incomplete sphenoid sinus pneumatization necessitates more drilling, the early maturation of intercarotid distances as well as the availability of intra-operative imaging and neuronavigational systems indicate that this is not a contraindication for EEA in pediatric patients.
- Drilling distances for trans-planar, trans-sellar, and trans-clival approaches are described.
- Demarcation of the posterior sellar wall is not possible by trans-sphenoidal visualization in the majority of pediatric patients. Therefore, it is important to consider age-specific length of the pituitary fossa, which increases by more than 50% from age 2 to adulthood.

RESULTS: PIRIFORM APERTURE WIDTH

- Significantly different between patients under 2 years of age (17.2 ± 0.5 mm) and adults (22.2 ± 1.3 mm) (p<0.0003)
- Significantly narrower in patients up to 6-7 years of age compared to adults (p<0.002)
- No significant difference among patients 9-10 years of age and older

RESULTS: SPHENOID BONE PNEUMATIZATION

Anterior sphenoid bone/planum sphenoidale: anterior cranial fossa
- Pneumatization begins after age 2 at the antero-inferior wall of the sphenoid bone
- By 6-7 years of age, the sphenoid anterior wall was fully pneumatized in all patients
- By 6-7 years of age, 88 ± 17% of the planum was pneumatized

Sella turcica: middle cranial fossa
- On average, 6-7 year-old patients had 77% of the anterior sellar wall and 32% of the sellar floor pneumatized
- 84% (42/50) of patients under 16 years of age had no dorsum pneumatization
- Sellar floor length in patients under 2 years of age was only 66% of that in adults

Superior clivus: posterior cranial fossa
- Not observed prior to age 10
- Present in 89% of patients 15 years of age and older

RESULTS: INTERCAROTID DISTANCES

At the level of the cavernous sinus:
- Significantly narrower in patients up to 6-7 years-old (10.2±1.0mm) compared with adults (12.6±0.9) (p<0.003)
- No significant difference among patients 9-10 years of age and older (p>0.36)

At the level of the superior clivus:
- Not statistically different between adults and any of the pediatric cohorts (p>0.18)

LITERATURE CITED


ACKNOWLEDGEMENTS

This work was funded by a T35 training grant from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) (T35-DK007386-29)

None of the authors have any conflicts of interest, financial or otherwise.