Anatomic comparison of the endonasal and transpetrosal approaches for interpeduncular fossa access

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Introduction & Objectives

- The interpeduncular cistern (IPC), including the retrochiasmatic area, is one of the most challenging regions to approach surgically.
- The endoscopic endonasal approach (EEA) with pituitary transposition and the transpetrosal approach (TPA) provide ideal exposure with a caudal-cranial view.
- We compared the EEA and TPA to clarify the limitations and advantages of these approaches for the removal of retrochiasmatic craniopharyngiomas.

Material & Methods

- Four fresh cadaver heads were studied.
- An EEA transdorsum sellae with pituitary transposition was performed to expose the IPC.
- A TPA was performed bilaterally combining a retro labyrinthine and a subtemporal transtentorial approach.
- “Water balloon tumors” (WBT) were placed (volume 0.5 ml and 1 ml) in the IPC to compare their visualization by the two approaches.
- The distance between cranial nerve III (CN III) and the posterior communicating artery (PcomA), and between CN III and the edge of the tumor, were measured through a TPA to determine the width of surgical corridors using 0-6 ml WBT in the IPC (Fig. 2A).

Results

- Both approaches provided sufficient exposure of the IPC.
- With a WBT in the IPC, the EEA yielded a good visualization of both CNs III and the PcomA (Fig. 3A,C).
- The visualization of anatomical structures on the contralateral side was impaired when we used the TPA relative to the EEA (Fig. 3B, D).
- The surgical corridor to the IPC via the TPA was narrow when the WBT volume was small, and its width increased as the volume of WBT increased (Fig. 3B, D).

Discussion

- While both approaches are valid surgical options for retrochiasmatic pathology, the EEA transdorsum sellae provides a direct and wide exposure of the IPC with negligible neurovascular manipulation.
- Although the TPA also allows direct access to the IPC without pituitary manipulation, the surgical corridor is narrow due to the surrounding neurovascular structures with poor contralateral visibility.
- On the other hand, for large or giant tumors in the IPC, the spaces between neurovascular structures are widened, and the TPA becomes an exceptional route whereas the EEA may have limited freedom of movement in the lateral extension.

Comparison of TPA & EEA

- Both the EEA and TPA seem to be considerable good surgical approaches to the interpeduncular fossa.
- The EEA provides a midline surgical corridor to the tumor in the IPC without traversing neurovascular structures.
- We suggest the TPA in patients with large or giant tumors because the space between neurovascular structures is narrow.
- Further clinical experience must be collected to clarify the advantages and limitations of these approaches to the IPC in the clinical settings.

Conclusions

Fig. 2 Visibility of IPC harboring 0.5-1 ml WBT

Fig. 3 Width of the Surgical Corridor with the TPA

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