ENDOSCOPIC APPROACH TO THE INFRATEMPORAL FOSSA

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Background

- Multiple surgical approaches have been described to access the infratemporal fossa. One of them is the endoscopic endonasal transpterygoid approach to the infratemporal fossa.
- The endoscopic endonasal transpterygoid approach is considered the best to access the midline structures such as the nasopharynx, Eustachian tube, sella, and clivus. Through this work, we try to describe the anatomical structures and landmarks of the infratemporal fossa from the endoscopic endonasal transpterygoid point of view.

Methods & Results

- A cadaveric study was performed on five adult specimens.
- Endoscopic medial maxillectomy and complete resection of the posterior wall of the maxillary antrum was performed.
- Extension of the medial maxillectomy anteriorly was done to reach the lateral part of infratemporal fossa.
- Endoscopic Denker’s or Sturm-Canfield approach was done.
- After dissecting the periosteum and the fat of the pterygopalatine fossa, the main branches of the third part of the internal maxillary artery are identified including the infraorbital, descending palatine, vidian, sphenopalatine, and posterior nasal arteries (Figure 1).
- All branches were transected to expose the underlying neural structures including the infraorbital, descending palatine, vidian, and pharyngeal nerves.
- The infraorbital nerve traversing the infraorbital fissure is dissected, just after arising from the maxillary nerve near the foramen rotundum, and before entering the infraorbital canal. This portion of the infraorbital nerve accurately defines the border between infratemporal fossa and pterygopalatine fossa.
- Wide exposure of the infratemporal fossa requires complete removal of the posterior wall from floor to roof of the maxillary sinus.
- Removal of bone from the floor and lateral wall of the sphenoid sinus exposes the bone comprising the floor of the middle cranial fossa, which is the superior boundary of the infratemporal fossa.
- The lateral limit is reached when the vertically-oriented temporalis muscle is visualized, while the lateral pterygoid muscle is readily identified by the horizontal orientation of the muscle fibers.
- The second part of the internal maxillary artery has a variable course, which may run lateral or medial to the lateral pterygoid muscle.
- This segment of the internal maxillary artery gives off several branches near the anterior border of the lateral pterygoid muscle, including the lingual and buccal arteries, which course anteriorly.
- The middle meningeal artery may be seen medial to the lateral pterygoid muscle, coursing superiorly toward the foramen spinosum.
- Resection of the lateral pterygoid muscle and drilling the lateral pterygoid plate improve exposure of the infratemporal fossa, including V3, which lies posterior to the lateral pterygoid plate (Figure 2, 3).

Advantages

- Better exposure of midline structures such as the nasopharynx, sella, and the clivus.
- Some of the branches of V2 like descending palatine and alveolar branches are sacrificed.
- This leads to loss of sensation of hard palate and ipsilateral upper dentition.
- Excellent exposure of foramen rotundum, V2, nerve of pterygoid canal, foramen ovale and V3.
- The exposure done using the endoscopic endonasal transpterygoid approach to the infratemporal fossa equals or exceeds the exposure provided by traditional open or sublabial approaches.
- Avoidance of multiple morbidities that are resulting from other lateral and non-endoscopic anterior approaches like cosmetic issues related to skin incision, need for orbitozygomatic osteotomies, or temporalis muscle manipulation, TMJ dysfunction, facial nerve paralyzation, craniotomy, and brain retraction.

Disadvantages

- Some bleeding from the pterygoid venous plexus is expected, that can be controlled with cautery, hemostatic agents and warm saline irrigation.
- Not Useful in resection of extensive malignant tumors of maxilla or nasopharynx that extend to the infratemporal fossa that should be safely and completely resected using the traditional anterior or lateral approaches or combinations.

Conclusion

- Endoscopic endonasal transpterygoid approach is considered one of the most useful surgical solutions to manage most of tumors that involve the infratemporal fossa and middle cranial fossa.
- A good understanding of the endoscopic anatomy of infratemporal fossa allows safe and complete resection of lesions arising or extending to infratemporal fossa.

The following table illustrates advantages & disadvantages of transpterygoid approach in comparison to other open approaches:

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