Technical Note

The Orbitomeningeal Band as a Way to Bloodless Transcavernous Dissection and Anterior Clinoidectomy

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Abstract

The meningo-orbital band (MOB) is a dural fold which runs along the lateral border of the superior orbital fissure and contains few small dural veins and the orbitomeningeal artery. MOB detachment is relatively easy to understand step-wise procedure, provides a wider exposure, and better orientation thus facilitating relatively easy approach to paraclinoid and cavernous sinus region. The present microsurgical technique helps to preserve the true cavernous membrane and thereby providing almost bloodless dissection of the cavernous sinus. The same technique can be used to uncover the anterior clinoid process laterally, posteriorly, superiorly, and also in the inferolateral region thereby decreasing the risk and time of clinoidectomy.

Keywords: *Anterior clinoid process, clinoidectomy, orbitomeningeal band, paraclinoid region*

Introduction

Anterior clinoidectomy (AC) is a technique that is of paramount while clipping the aneurysms involving the internal carotid artery (ICA) and resecting the tumors in the paraclinoid region.[1-3] Due to deep location and proximity to the vital structures of anterior clinoid process (ACP), the AC is a technically challenging surgical procedure.[4-6] We describe a technique which helps to preserve the true cavernous membrane thereby providing almost bloodless dissection of the cavernous sinus.

Surgical Technique

The orbitomeningeal band is found on the lateral most edge of the superior orbital fissure. It has been common knowledge that there are no cranial nerves on the lateral most border of the superior orbital fissure. Hence, cutting the orbitomeningeal band on the lateral aspect does not produce any cranial nerve deficit. However, we intend to take this technique a step forward. After we cut the orbitomeningeal band, we enter a compartment since the cut orbitomeningeal band separates into two folds. Using the microscope one can dissect between these folds. As one develops the compartment between the folds using sharp dissection inferiorly, the true cavernous sinus membrane is preserved and the cavernous sinus can be uncovered. Developing the compartment by blunt and sharp dissection superiorly will help to uncover the ACP [Figures 1-5]. This technique helps in cases such as skull base tumors, aneurysms, and trauma when one needs to combine cisternal opening with or without a decompressive hemicraniectomy. It helps in avoiding troublesome cavernous sinus bleeding which often requires fibrin glue injection into the cavernous sinus thus producing an iatrogenic lateral cavernous sinus thrombosis.

Discussion

The sharp posterior border of the lesser wing of the sphenoid (the sphenoid ridge) projects into the lateral sulcus and apex which ends medially is the ACP, which gives rise to the attachment to the tentorium cerebelli.[7-10] ACP is closely related to many vital neurovascular structures which include optic nerves and ICA.[11] The meningo-orbital band (MOB), orbitotemporal periosteal fold, or frontotemporal fold is a dural fold which runs along the lateral border of the superior orbital fissure and contains small dural veins and the orbitomeningeal artery and encountered during conventional frontotemporal craniotomies.[4,12,13]

The objective of AC is to remove the bony process and to create the clinoid

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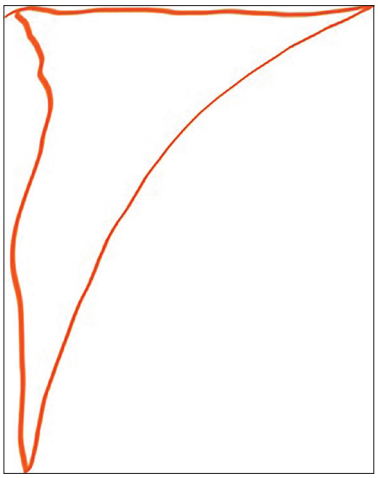

Figure 1: A sequential understanding of the superior orbital fissure anatomy

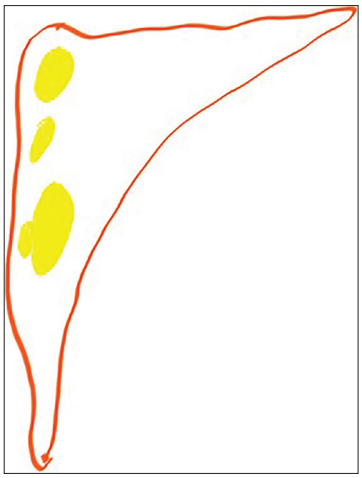

Figure 2: The shape of the superior orbital fissure with a vertical and lateral horizontal aspect

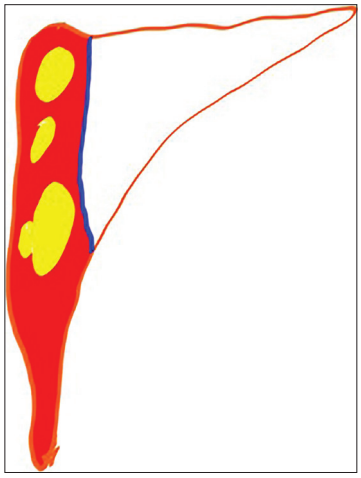

Figure 3: The location of the cranial nerves passing through the fissure

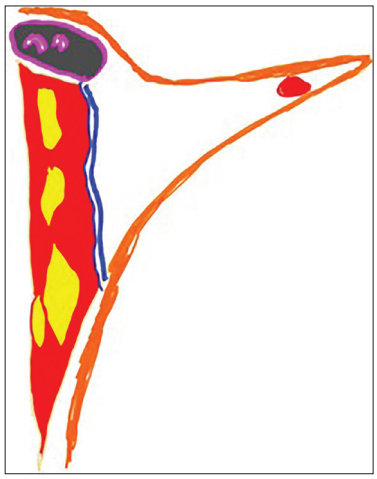

Figure 4: The cranial nerves within the outer layer of the cavernous sinus and true cavernous membrane (blue color)

space to reduce the retraction on the brain and allows easy access the intended structures.[14,15] While opening the orbitotemporal periosteal fold exposes the structures which lie in cleavage plane between the inner layer of dura mater (temporal dura propria) and lateral wall of the cavernous sinus (lacrimal, oculomotor, trochlear, ophthalmic [V1], and abducens nerves).[16,17] The classic Dolenc's approach includes an AC and a transcavernous dissection.[3] Majority of the experts perform this procedure by drilling of the ACP after exposing it laterally and superiorly and also peel the dura off the cavernous sinus starting at V2.[1,2]

The extradural ACs have been described to approach the surgical lesions in the paraclinoid space and anterior cavernous sinus without detachment of the MOB;[4,12,13,18,19] however in contrast to intradural approach, the extradural AC approach requires more experience and a detail understanding of regional anatomy.[20] MOB detachment is relatively easy to understand step-wise procedure, provides a wider exposure, and better orientation to approach paraclinoid and cavernous sinus region thus facilitates easier manipulation of the lesion and reduces chances of transmission of direct heat and injury to the surrounding structures.[4,12-14,21-24]

Conclusion

The present microsurgical technique helps to preserve the true cavernous membrane and thereby providing almost bloodless dissection of the cavernous sinus. The same technique can be used to uncover the ACP laterally, posteriorly, superiorly, and also in the inferolateral region thereby decreasing the risk and time of clinoidectomy.

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Conflicts of interest

There are no conflicts of interest.

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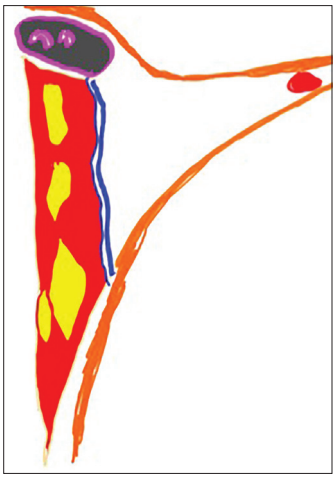

Figure 5: The orbitomeningeal artery at the lateral end of the orbitomeningeal band which needs to be coagulated before the dissection starts; the anterior clinoid process

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