Preservation of the Frontal and Parietal Branches of the STA using the Posterior Interfascial Dissection Technique: A Pilot Study

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Introduction

Anterolateral cranial approaches routinely require sacrificing one branch of the superficial temporal artery (STA), which can lead to postoperative aesthetic and functional complications.[1-3] Currently, no technique in the literature preserves both STA branches. We developed the posterior interfascial dissection technique (PIDT) through cadaveric studies to address this limitation. This pilot study assessed the feasibility of PIDT in preserving both STA branches during pterional approaches.

Methods and Materials

We enrolled consecutive patients undergoing conventional pterional approaches for various pathologies. All patients provided written informed consent to participate in this prospective pilot study.

The PIDT involves six sequential steps:

1) Subgaleal dissection with anteroinferior scalp flap reflection.
2) Exposure of interfascial fat pad containing facial nerve and frontal STA branch.
3) Precise middle fascial space incision.
4) Conventional anterior interfascial dissection with facial nerve protection.
5) Posterior interfascial technique dissecting temporoparietal fascia from superficial temporal fascia to the parietal STA branch.
6) Posterosuperior reflection of the posterior triangle containing both STA branches.

Primary endpoints included successful preservation of both STA branches. Secondary measurements documented the space between the dorsal rami of the facial nerve (DRFN) and the frontal branch of the STA FBSTA) to define the anatomical safe zone.

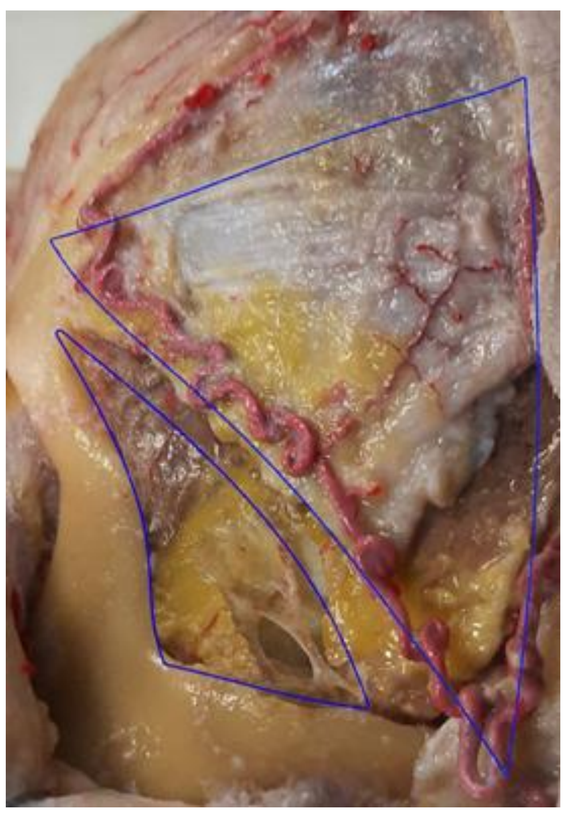

Figure 1. The middle fascial space is located between the anterior temporal triangle, which is bounded inferiorly by the zygomatic arch, anteriorly by the lateral orbital rim, and posterosuperiorly by the facial nerve; and the posterior temporal triangle, which is bounded anteroinferiorly by the frontal branch of the STA , superiorly by the superior temporal line, and posteriorly by the parietal branch of the STA.

Results

Ten patients underwent conventional pterional approach with interfacial dissection (mean age 53 years, 60% female). Primary diagnoses included meningioma (n=5, 50%) and pituitary adenoma (n=3, 30%). We observed no perioperative mortality or complications related to PIDT. The technique successfully preserved both STA branches in all cases, maintaining a minimum 7 cm length on both branches. The mean distance between the dorsal rami of the facial nerve and the frontal branch of the STA measured 8.24 ± 0.46 mm.

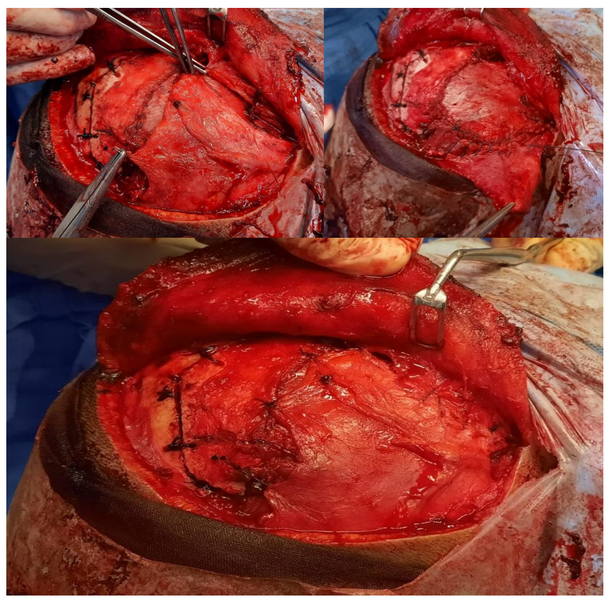

Figure 2. The posterior temporal triangle, which contains both branches of the STA, is reflected posterosuperiorly, leaving an unobstructed view of the deep temporal fascia and the temporalis muscle, to continue with the additional surgical steps according to the final approach.

Discussion

STA preservation is crucial as it serves as the most common donor vessel for low-flow bypasses, with STA-to-MCA anastomosis being the cornerstone of cerebral revascularization procedures.[4] Even when bypass is not planned, STA preservation remains essential for potential salvage revascularization procedures. Thorough understanding of the complex anatomy of the temporoparietal region is critical for anatomical preservation of the structures involved.[5, 6] The variable relationship between the temporoparietal facial nerve and STA branches requires careful assessment of STA bifurcation patterns to ensure safe dissection. PIDT addresses these anatomical challenges by providing a systematic approach that preserves both STA branches while maintaining surgical exposure.

Conclusions

PIDT is a novel, simple technique for preserving both STA branches during pterional approaches. This strategy has the potential to improve aesthetic and functional outcomes while maintaining both branches as donor vessels for planned or rescue revascularization procedures. The technique demonstrated feasibility in this pilot series, warranting larger studies to confirm these findings.

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