

Rare case demonstrating a bifid facial nerve trunk encircling the posterior belly of digastric muscle

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Abstract

This case report describes a variation of facial nerve trunk (FNT) to the digastric muscle identified during parotidectomy where the superior temporofacial branch traverses anterior to the posterior belly of digastric muscle (PBD) and the inferior cervicofacial branch traversing through the muscle. The variation has not been described in literature previously.

Key words: Parotid gland, Facial nerve trunk, Posterior belly of digastric muscle

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Introduction

Demonstration and preservation of the facial nerve trunk (FNT) and its branches is the most critical step in performing a safe parotidectomy. Recognized bony and soft tissue landmarks are routinely used in parotid surgery to identify the FNT. However, the extracranial course of facial nerve (FN) is often subjected to variation which has challenged parotid surgery despite the availability of anatomical landmarks and nerve monitoring techniques.

Case Report

A 56-year-old female presented to the otorhinolaryngology department with a painless lump on the left parotid region. The clinical examination suggested a benign enlargement of the left parotid gland, identified as a pleomorphic adenoma on ultrasound scan and confirmed by fine needle aspiration cytology.

The patient underwent left superficial parotidectomy under general anaesthesia with a remifentanyl hydrochloride infusion and FN monitoring. A Modified Blair incision was made. Sub-platysmal skin flaps were elevated. The sternocleidomastoid muscle was traced along to the mastoid tip and retracted laterally. The FNT was sought using commonly used bony landmarks, the tragal pointer and the tympano-mastoid suture. The FNT could not be identified. Over the parotid tissue, the zygomatic branch and marginal mandibular branches were identified. The nerve branches were traced retrogradely where the two main nerve trunks were identified. A divided FNT was identified looping around the anterior part of the posterior belly of the digastric muscle (PBD). The superior temporofacial branch was found anterior to PBD and the inferior cervicofacial branch was found to traverse through PBD. The posterior auricular nerve, nerve to digastric and nerve to stylohyoid which often arise from the FNT were not actively sought during the surgery.

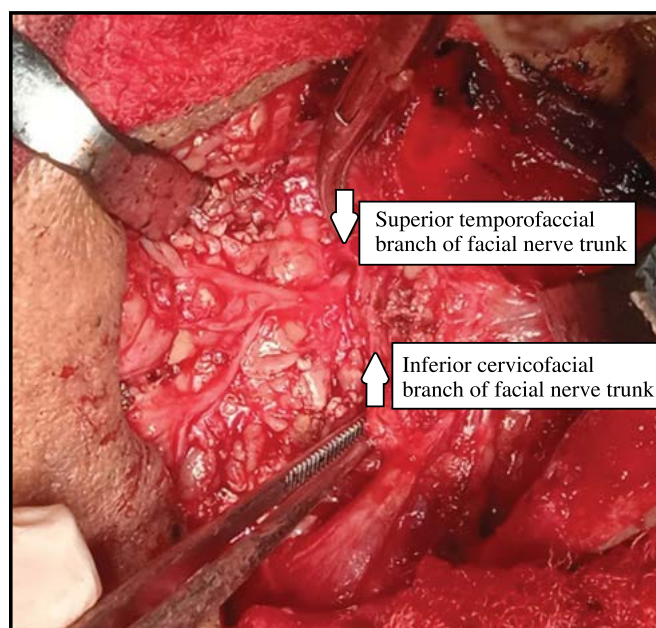


Figure 1 : Branching of left facial nerve around superficial belly of digastric muscle. Non-tooth tissue forceps is pointing at the inferior cervicofacial branch and mosquito forceps is pointing at the superior temporofacial branch of FNT.

With careful dissection, all branches of FN were identified and preserved. Superficial conservative parotidectomy was completed, achieving homeostasis and routine wound closure. The patient did not develop FN palsy in the post-operative period and was discharged on the second post-operative day. Therefore, the aforementioned anatomical variation did not have any clinical impact on the outcome of the patient.

Discussion

FNT is the distal most segment of FN, commencing at the stylomastoid foramen as it initiates its extracranial course until its bifurcation within the parotid gland. The posterior auricular nerve, nerve to digastric and nerve to stylohyoid commonly arise from FNT and it may give off a communicating branch with glossopharyngeal nerve. FNT bifurcates into the superior temporo-zygomatic branch and the inferior cervico-mandibular branch. The nerves form a plexus renowned as the pes anserinus and given off the terminal branches.

Accurate knowledge and understanding of the extracranial course of FN as well as its branches is mandatory in safeguarding FNT and its branches in parotidectomy⁴. Therefore, FNT is actively identified and preserved to prevent the daunting complication of facial disfigurement affecting the quality of life⁴. Hence, bony and soft tissue landmarks have been used as a guidance in identifying FN such as the tragal-pointer, tympanomastoid suture, and superficial belly of digastric.

Two approaches, anterograde approach and retrograde approach are used to identify FNT. The anterograde approach is traditionally used with the aid of landmarks and the retrograde approach is used by following a branch in a retrograde manner which benefits in the occasion of revision surgery or during difficulty in recognizing FN with the use of landmarks.

FNT is commonly subjected to variation. The variations complicate FNT identification and poses a risk to the nerve during surgery despite meticulous dissection and adherence to landmarks. In our case, FNT has bifurcated proximal to PBD. Literature describes an array of variations in immediate branching of FNT including the branching site and branching pattern. In 85% cases, bifurcation was found to occur within the parotid gland and in 15% bifurcation was found to occur prior to penetration into parotid gland^{1,4}. The length of FNT from stylomastoid foramen to bifurcation is described as 16.44 mm \pm 3.20 mm in cadaveric studies¹. Literature describes a few cases of FNT bifurcations and trifurcations in the mastoid segment, three cases with two main trunks documented as a major branch and a minor branch, and one case with trifurcation of FNT proximal to parotid gland^{2,3}.

The anterior border of the posterior belly of the digastric is used as a landmark in FNT identification. However, tympano-mastoid suture and tragal-pointer are commonly used landmarks and superficial belly of digastric is used as a landmark if FNT identification fails with the above. In our case, the superior temporo-facial branch was found anterior to PBD and the inferior cervicofacial branch was found to traverse through PBD.

PBD is a soft tissue landmark at the onset of the extracranial course of FN as it leaves the skull immediately anterior to the attachment of the. According to cadaveric studies, FN could be demonstrated by meticulous dissection 4.8mm to 12.8mm with a mean distance of 8.79mm \pm 3.9mm anterior to PBD¹. It is described to be the most easily identifiable landmark and its relationship to FN is described as consistent in literature.

However, variations in the FN are common and they pose a threat to preservation of the nerve. Therefore, FN identification is important using nerve monitoring and retrograde approach when landmarks fail to demonstrate the FN. Moreover, variations should be anticipated and predicted to prevent iatrogenic damage to FN.

Conclusion

The critical step in parotid surgery is the preservation of FN. Variations in FN poses a challenge to the surgeon in FN identification. Therefore, a good understanding and anticipation of the possible variations of FN is of advantage in safeguarding FN to prevent a negative clinical outcome.

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