ORIGINAL RESEARCH PAPER

General Surgery

ANATOMIC VARIATION OF RETROMANDIBULAR VEIN AND THE FACIAL NERVE DURING SUPERFICIAL PAROTIDECTOMY – A CASE REPORT

KEY WORDS:
retromandibular vein, facial nerve, variation, classification

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ABSTRACT

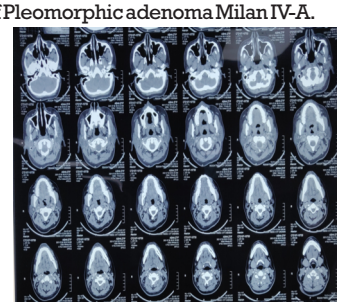
Knowledge of anatomic variations occurring in the head and neck region is very important for surgeons performing surgeries in these regions. Identification of facial nerve and its branches is the most important step while performing parotidectomy. During the parotid surgery, retromandibular vein is used as a guide to expose the facial nerve inside the parotid gland. The vein is also used as a landmark to identify facial nerve preoperatively, during computed tomography, magnetic resonance imaging and sonography. In our report we describe the anomalous relationship of retromandibular vein and facial nerve during left superficial parotidectomy in a 27year old female. In normal anatomical relation the retromandibular vein passes medial to the branches of facial nerve, in our case the retromandibular vein was found to pass lateral to the cervicofacial trunk of facial nerve and medial to the temporofacial trunk of facial nerve. These kinds of anomalous relation between these two structures are very important to be known to the surgeons while performing parotid surgeries.

INTRODUCTION

The facial nerve (FN) is an important cranial nerve with several essential functions and hence proper identification of the nerve and its preservation when performing parotidectomy is crucial (1). Its location and anatomic relationship with the surrounding tissues in the parotid gland, especially the retromandibular vein (RMV), are of great importance. Surgeons typically identify the FN and its branches during parotidectomy by locating the RMV. However, variations in the relationship of the FN and the RMV, as in the presented case, can complicate parotid surgery and increase the possibility of nerve injury or bleeding.

Case Study

A 27-year-old female presented to our institution with complaints of progressive painless preauricular swelling in the left parotid region for the last 2 months. A 1.5*1.5*2cm parotid swelling was observed on physical examination that was firm, static and mildly tender. The colour of the skin over and around the mass was normal with no trophic changes. The FN was intact with no other swellings. Neck lymph nodes were not palpable. A computed tomography (CT) scan showed an ill-defined irregular non enhancing hypodense lesion of size 1.2*1.2cm in superficial lobe of left parotid involving lower pole and an enlarged level II node measuring 2*1.5cm. The patient underwent fine needle aspiration cytology (FNAC) of the parotid swelling that showed moderately cellular duct epithelial cells and myoepithelial cells with abundant chondromyxoid material. Features were suggestive of Pleomorphic adenoma Milan IV-A.



CT image shows an enlarged left parotid gland

Surgical Procedure

The surgical procedure was initiated with a modified Blair incision. The tragal pointer was used as a standard anatomic landmark for the identification of the FN trunk. After elevating the superficial lobe of the parotid gland, it was observed that the FN bifurcated into the cervicofacial (inferior) division and the upper temporofacial division. The main trunk was carefully isolated in order to avoid nerve injury. While performing lower trunk dissection of the FN, the RMV was identified to pass lateral to the cervicofacial trunk but medial to the temporofacial trunk. After exposing and isolating meticulously all the FN branches the operation continued in a standard fashion. At the end of the surgery once again all the FN branches were evaluated. Post-operative period was uneventful with intact facial nerve function and the patient was discharged on the 4thpost-operativeday. The histo pathological report showed small ductules with adjacent fairly circumscribed neoplasm composed of small ductules lined by cuboidal epithelial cells with intervening extensive chondromyxoid stroma showing cords of myoepithelial cells. These features were consistent with pleomorphic adenoma.

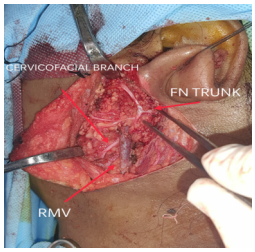


Figure shows the retromandibular vein being lateral to the cervicofacial trunk of facial nerve

DISCUSSION

The FN is the most important anatomical structure that has to be identified and preserved during parotidectomy. The FN is a mixed cranial nerve (CN VII) that transmits sensory information from the anterior two-thirds of the tongue and innervates the muscles of facial expression (2). Thus, knowledge of the normal anatomy of the extra-cranial FN and

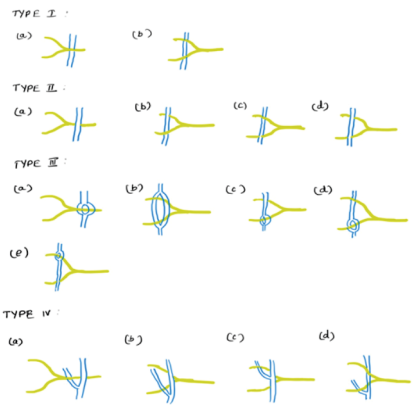
its relationship with the RMV is essential for surgeon's performing parotidectomy. Formation of the RMV by union of the superficial temporal vein and maxillary vein mostly occurs at a level higher than the passage of the main trunk and branches of the FN, where they pass laterally to the vein.

There are several anatomic landmarks for the intraoperative identification of FN, such as the stylomastoid foramen, the tympanomastoid fissure, the posterior belly of the digastric muscle, the tragal pointer and the retromandibular vein (RMV) (3)(4)(5). The relationship between the FN and RMV is of paramount clinical significance during the operation, for the identification and protection of all the FN branches. In normal anatomical variation in the Patey's faciovenous plane the RMV lies medial to the FN. In such cases the risk of bleeding from the RMV as a result of its injury is not high during parotid surgery. In contrast, in cases of abnormal anatomical variation as seen in our case where the RMV passes laterally to the FN or its branches the risk of nerve injury and bleeding during parotid surgery is much higher (6).

The classic relationship, in which the RMV lies deep to the FN, is not detected as usually as thought during parotid surgery. In fact, anatomic variations of the relation between FN and RMV occur with a prevalence of 11.83% in a study by Piagkou et al in 2013 (7). They pose a high risk of FN branches injury and bleeding. The reported incidence of FN palsy during parotid surgery is almost 21% and such a postoperative complication is even more probable when surgeons encounter anatomic variations.

Piagkou et al proposed an updated classification system of the RMV relation with respect to FN after various literature reviews (7). As per the guide, type I, the most common presentation has the RMV lying medial to FN trunk or its divisions. In type II, the RMV is medial to either FN trunk or its divisions. Type III depicts RMV with a loop around FN or its branches and with type IV having the divisions of RMV related to FN which are relatively rare and carries high risk of FN injury during parotid surgeries. In our scenario we present a case of type IIc as per piagkou classification.

UDATED CLASSIFICATION BY PIAGKOU:



The bifurcated yellow scheme corresponds to the FN trunk and its superior and inferior divisions, while the blue refers to the RMV and its branches. Note that in Type IV the deep division of RMV is the maxillary vein and the superficial division is the superficial temporal vein, the two converge to form the RMV

Although several classification systems have been suggested in the literature there seems to be no "rule" concerning the relation between RMV and FN (8). Nevertheless, these two anatomic structures are always in close proximity. And so, the RMV may be used during MRI or CT in order to localise approximately the distance between the parotid lesion and the FN, for avoidance of FN injury during surgery, since preoperative radiographic analysis cannot allow direct visualisation of the FN. Therefore, the relation between the RMV and FN is of key importance in localizing the parotid tumour's preoperatively in order to minimize FN surgical injury as well (9).

CONCLUSION

Anomalous RMV and FN relationship is not that infrequent as believed. Literatures in the past have described 10%-15% incidences of RMV lying superficial to FN. All these anatomic variations are major risk-factors of bleeding and of FN injury. Hence, surgeon's deep knowledge in addition to detailed exposure of the operative field and particularly of the relation between the FN and the RMV, are the cornerstone on order to perform a safe parotid surgery without adverse impacts to the patient.

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Abbreviations
FN- Facial Nerve
RMV- Retromandibular vein
CT- Computed Tomography
MRI- Magnetic Resonance Imaging
CN- Cranial Nerve
FNAC- Fine Needle Aspiration Cytology

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