Variations of Retromandibular Vein and Its Relation to Facial Nerve Within Parotid Gland

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Abstract Maxillary vein and superficial temporal vein unite to form the retromandibular vein in the parotid gland. The facial nerve lies lateral to external carotid artery and retromandibular vein. Identifying and preserving the facial nerve is the prime motto during parotidectomy. So the variations of facial nerve and the retromandibular vein should be known so as to avoid injury to both. The variations we encountered during parotid surgery will be helpful in avoiding unexpected bleeding and injury to facial nerve.

Keywords Facial nerve · Retromandibular vein · Variations · Parotidectomy

Introduction

The mainstay of parotidectomy is to identify and preserve facial nerve and its branches. In order to achieve this one should be well versed with the anatomy. Various

landmarks have been described to identify the facial nerve one of them is identifying retromandibular vein in the neck and tracing it upwards till inferior division of nerve. Variation of retromandibular vein and facial nerve cause risk in damaging both the structures [1]. So the variations should be known and surgeon should be ready for more variations. We discuss few variations, which we encountered.

Clinical Study

In a period of 1 year from Jan 2017 to Feb 2018 around 30 superficial parotidectomy and 2 total parotidectomies were done. These were done at three different centers. In this study we present the variations of retromandibular vein in relation to the facial nerve. The retromandibular vein is medial to the facial nerve. Various landmarks are described to locate the facial nerve, one of them is identifying retromandibular vein in the neck and tracing it upwards till inferior division of nerve. This method is particularly recommended in cases with tumors located posteriorly between the mastoid process and the parotid. In all the parotidectomies our approach was to first identify the common facial trunk in relation to the tympano-mastoid suture. Then the division and the branches were traced and the retromandibular vein was always watched carefully. During this we observed four types of variation of retromandibular vein in relation to facial nerve.

Case 1 On right side Retromandibular Vein was passing lateral to the temporofacial division on right side (Fig. 1).

Case 2 In this case Buccal branch of facial nerve was encircled by venous ring formed by retromandibular vein on left side. Retromandibular vein was passing lateral to the facial nerve on left side (Fig. 2).

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Fig. 1 Illustration showing retromandibular vein is passing through the branches of facial nerve and also the vein is lying lateral to the nerve (RMV-Retromandibular Vein)

Fig. 2 Illustration showing that the nerve is coming out of the loop made by the retromandibular vein

Case 3 On right side cervico-facial division of facial nerve is seen encircled by retromandibular vein (Fig. 3).

Case 4 On left side the retromandibular vein was related lateral to the facial nerve (Fig. 4).

Knowledge of such variations will definitely help the surgeons to prevent any injury to facial nerve and retromandibular vein.

Fig. 3 Illustration showing the facial nerve is coming out of the vascular ring made by the retromandibular vein (RMV-Retromandibular Vein)

Fig. 4 Illustration showing relation of the retromandibular vein is lying lateral to the facial nerve (RMV-Retromandibular Vein)

Discussion

Meticulous dissection with full knowledge is the key of successful parotidectomy. Out of 32 parotidectomies we encountered 4 variations of retromandibular vein in relation to the facial nerve. Such variations may pose threat to the facial nerve as any damage to the retromandibular nerve causes profuse bleeding and risk of facial nerve injury. Dissection of inferior division of facial nerve at the site of crossing of nerve and vein is very important. Kawakami et al. [2] that the superficial temporal vein and the retromandibular vein are important landmarks in protecting the facial nerve and its branches during the open surgical reduction of mandibular condyle fractures. In the series of 100 dissections Dingman and Grabb [3] observed that retromandibular vein was located medial to facial nerve in 98% and lateral in 2%. Kim et al. [4] reported retromandibular vein crossing medial to facial vein in 83% cases and lateral to the facial in 17% cases. In our series of 32 cases retromandibular vein was medial to facial nerve in 28 (87.5%) cases and different variations seen in 4 (12.5%) cases. Touré and Vacher [5] classified observed relationship of vein to nerve in six types, commonest type in which retromandibular vein lies medial to the facial nerve in 65.2% (Type I) cases and lateral to facial vein in 28% (Type II) cases. In present study branch of facial nerve is encircled by venous ring of retromandibular vein in two cases. Alzahrani and Alqahtani [6] reported a rare variation in which both divisions of the facial nerve are encircled by separate venous rings formed by retromandibular vein.

Bhattacharyya and Varvares [7] mentioned a case, inferior division of facial nerve deep to retromandibular vein and one case where facial nerve was encircled by venous rings. Kopuz et al. [8] observed that in 90% of cases retromandibular vein was medial to facial nerve and lateral in 10%. Piagkou et al. [9] reported a case in which superficial temporal vein cross lateral to the facial nerve branches.

Conclusion

Prevention of facial nerve injury is important task during parotid surgery. Its relation with the retromandibular vein is variable at times. These variations pose biggest fear during parotid surgery. Surgeon must be aware of such variations to prevent complications during surgery.

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