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Original Research Article

Bilateral unusual Termination of Retromandibular Vein and Variations in the Superficial Veins of Face and Neck –A Morphological Study

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Abstract

Variations in the superficial veins of the face and neck are quite common and this knowledge is important in performing various head and neck surgical procedures. Aim of this study was to observe variations in the formation and termination of the superficial veins of face and neck. We studied 30 cadavers of male and female of South Indian population which were used for routine dissection for teaching medical graduates. During the study, we found an unusual termination of retromandibular vein on both sides in one cadaver and also variations in the formation and termination of anterior facial vein, lingual vein and superior thyroid vein were found in the same cadaver.

Keywords: Superficial veins of face and neck, retromandibular vein, anterior facial vein, lingual vein, superior thyroid vein.

INTRODUCTION

Variations in the superficial veins of face and neck are common because of their complex developmental pattern. Anterior facial vein is formed near median canthus of the eye as angular vein by the union of supraorbital and supratrochlear vein. Maxillary vein joins with the superficial temporal vein to form the retromandibular vein within the parotid gland. Retromandibular vein divides into anterior and posterior division at the apex of the parotid gland. The anterior division joins with the anterior facial vein to form common facial vein and drains into the internal jugular vein whereas posterior division of retromandibular vein joins with the posterior auricular vein to form the external jugular vein which runs superficial on the sternocleidomastoid muscle and terminates into subclavian vein [1]. External jugular vein is used to perform central venous catheterization and also administering non-sclerosing agent in case of difficulty in accessing the other veins. The other veins used through subcutaneous access are internal jugular vein, Subclavian vein and femoral vein [2].

Retromandibularvein is used as landmark to explore facial nerve in parotid surgery [3]. Also variations of termination of retromandibular vein is noted, it either continues to form external jugular vein or common facial vein without dividing into anterior or posterior division [4]. The present study shows an unusual variation in the termination of retromandibular vein where the anterior division drains into internal jugular vein without joining the linguo-facial trunk. Also the course of anterior divisionis found to be unusual.

MATERIALS AND METHODS

A total number of 30 cadavers of both male and female used for routine dissection for teaching medical graduates were used for the study. Head and neck region of the cadavers were dissected as per the guidelines. The vascular structures were teased carefully and the fascias were separated and variations in the formation and termination of superficial veins of the face and neck were noted.

OBSERVATION AND RESULTS

Out of 30 cadavers, one cadaver showed variations in the termination of retromandibular vein on both sides. Initially with superficial dissection, the retromandibular vein seems to be undivided and joins the posterior auricular vein to form external jugular vein on both sides. After deep dissection, we found on the right side, the retromandibular vein divided within the parotid gland itself. The posterior division run downward and emerges at the apex of the parotid gland and later joins with the posterior auricular vein to form the external jugular vein. The anterior division runs medially within the substance of the gland and emerge at antero-medial surface and winds around the stylohyoid and posterior belly of digastric muscle to

join the internal jugular vein directly (without receiving any tributaries or joining the anterior facial vein) (Fig-1). The anterior facial vein after receiving submental vein also receives lingual vein and superior thyroid vein to form a common trunk and drains into the internal jugular vein (Fig-2). On the left side, the retromandibular vein divides within the parotid gland into anterior and posterior division. The posterior division run downward and emerges through the apex of the parotid gland and later joins with the posterior auricular vein to form external jugular vein. The anterior division passes medially within the substance and emerge from the anteromedial surface and winds around the stylohyoid, posterior belly of digastric, occipital artery and external carotid artery to join the internal jugular vein. Here again it does not unite with the anterior facial vein (Fig-3). The anterior facial vein runs downward below the level of thyroid gland and drains directly into the internal jugular vein. Alsothe lingual vein and the superior thyroid vein drains directly into the internal jugular vein (Fig-4). On both sides, external jugular vein drains into subclavian vein. Hence such bilateral variations of face and neck veins draining pattern in a single cadaver is to be noted.

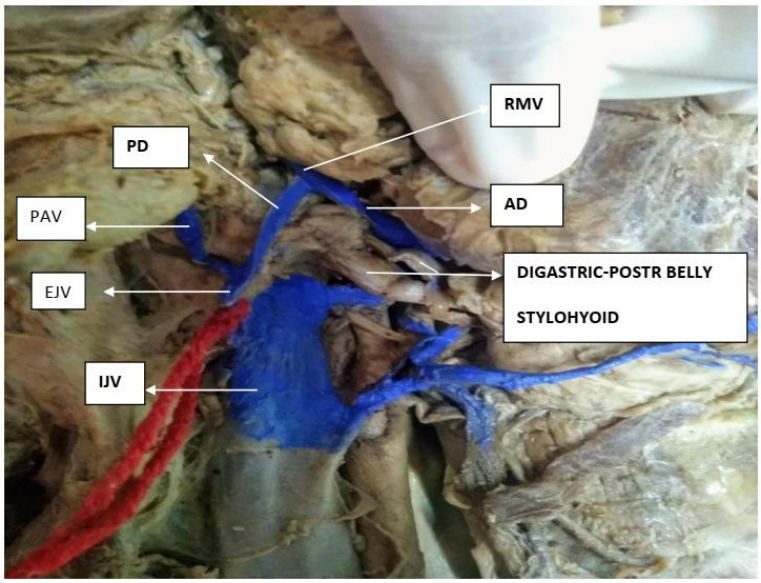

Fig-1: RIGHT SIDE OF THE FACE AND NECK: Showing termination of the Retromandibular vein [RMV] into anterior division [AD] and posterior division [PD]. The anterior division winds round the posterior belly of digastrics muscle and the stylohyoid muscle and draining into the internal jugular vein [IJV]

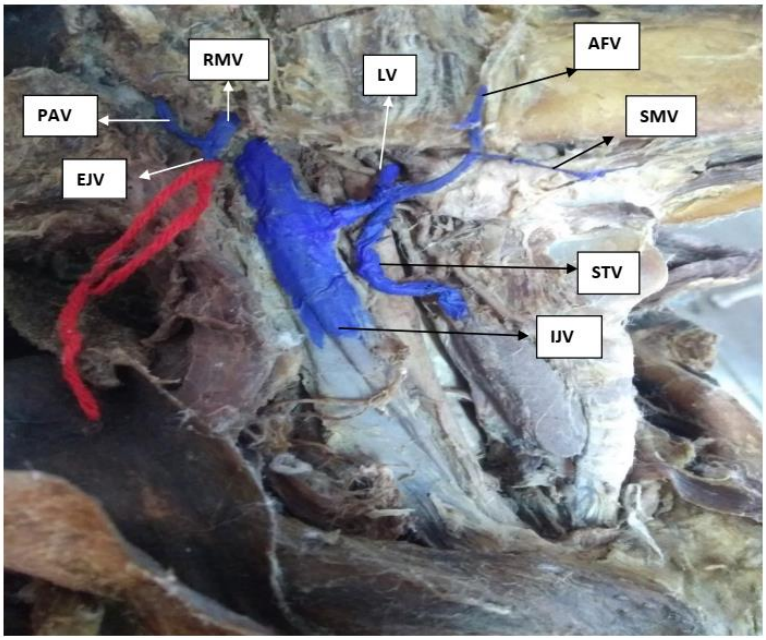

Fig-2: RIGHT SIDE OF THE NECK: Showing anterior facial vein[AFV] after receving the submental vein [SMV] forming a common trunk with lingual vein[LV] and superior thyroid vein[STV] and draining into the internal jugular vein[IJV].Also formation of the external jugular vein [EJV] by union of the posterior auricular vein [PAV] and posterior division of the retromandibular vein [RMV]

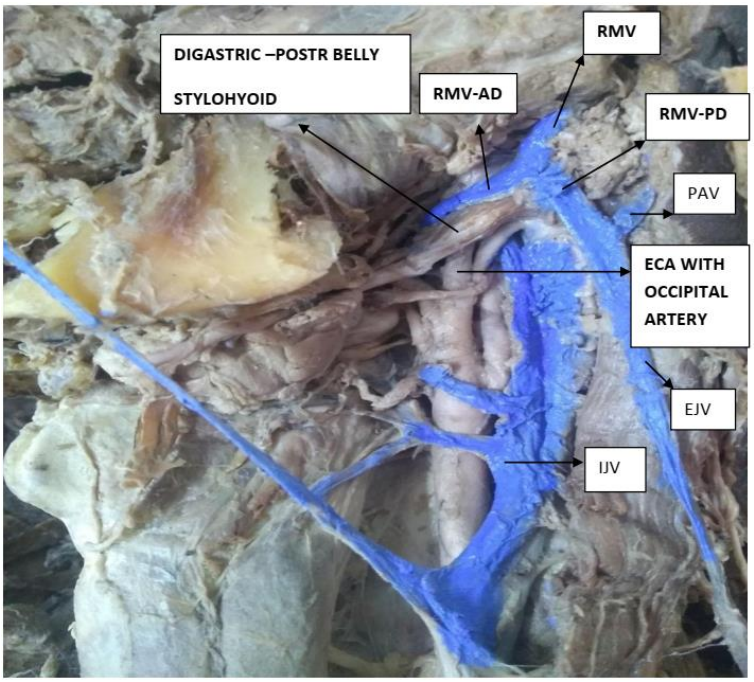

Fig-3: LEFT SIDE OF THE FACE AND NECK: Showing termination of the Retromandibular vein [RMV] into anterior division [AD] and posterior division [PD]. The anterior division winds round the posterior belly of digastrics muscle, stylohyoid muscle, external carotid artery [ECA] and occipital artery and draining into the internal jugular vein [IJV].

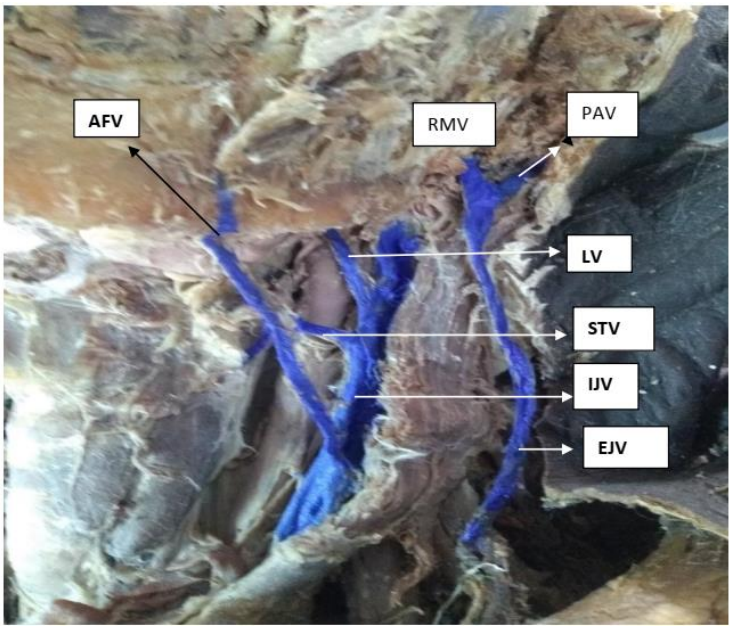

Fig-4: LEFT SIDE OF THE NECK: Showing anterior facial vein [AFV], superior thyroid vein [STV] and lingual vein [LV] draining into the internal jugular vein [IJV]. Also formation of the external jugular vein [EJV] by union of the posterior auricular vein [PAV] and posterior division of the retromandibular vein [RMV]

DISCUSSION

Knowledge about anatomy of the superficial veins of face and neck and their variations are essential in performing head and neck surgeries. We should also know that the pattern of variation will vary from side to side in a same individual. Variations in the external jugular vein formation and its termination had been noted earlier [5]. In our study the external jugular vein formation and termination is normal on both side. Similarly variation in formation and termination of the common facial vein was noted earlier [6]. Bertha noted the common facial vein draining into the external jugular vein in one specimen and draining into the subclavian vein in other specimen [7]. The common facial vein draining into the posterior auricular vein was noted in one study [8]. An unusual drainage of the common facial vein draining into contralateral internal thoracic vein and pericardiophrenic vein was noted earlier in one study [9]. In the present study, on right side the common facial vein was not formed instead the anterior facial vein receives the submental, lingual and superior thyroid vein to form a common trunk and drain

into the internal jugular vein. On the left side the common facial was not formed again and instead the anterior facial vein run downward and drain directly into internal jugular vein at the level of cricoid cartilage. The lingual vein and the superior thyroid vein also drain into the internal jugular vein separately. The common facial vein has been used as patch in carotid endarterectomies [10, 11], ventricular shunt in the management of hydrocephalus [12] and for placing central venous catheter [13]. Variations in the common facial veins as noted in this study could help the surgeons and the radiologists. Retromandibular vein and its relation to facial nerve within parotid gland had been studied [14]. Undivided retromandibular vein joining with the anterior facial vein to form the common facial vein which after receiving the posterior auricular vein drains into the internal jugular vein was noted earlier [15]. Mehra *et al.*, reported an undivided retromandibular vein with the posterior auricular vein terminating into the subclavian vein [16]. An unusual formation and termination of the retromandibular vein bilaterally was noted in earlier study [17]. In their study on left side the retromandibular vein was formed by union of the anterior division of temporal vein and maxillary vein, also the anterior division of retromandibular vein after receiving the anterior facial vein unites with the posterior division of retromandibular vein and finally drains into the subclavian vein. On the right side the retromandibular vein was formed by union of the maxillary vein and the anterior division of the temporal vein, the retromandibular vein trifurcates where the anterior division joins with the anterior facial vein, the middle division continues downwards and joins with anterior jugular vein and finally drains into the subclavian vein and the posterior division drains into the internal jugular vein. In the present study, the retromandibular vein was formed normally but divides within parotid gland into anterior and posterior division. The posterior division runs downwards and emerges at the apex of the parotid gland and joins with the posterior auricular vein to form the external jugular vein bilaterally. The anterior division course medially and emerge at anteromedial border of the parotid gland and winds round the stylohyoid and posterior belly of digastric muscle and drains into the internal jugular vein laterally on the right side. On the left side, the anterior division course medially and emerge at anteromedial border of the parotid gland and winds round the stylohyoid and posterior belly of digastric muscle, external carotid artery and occipital artery and finally drains into the internal jugular vein laterally. This pattern could be explained as failure of retromandibular vein to join the linguo facial trunk and unites with the precardinal vein which is the future internal jugular vein. Such variation in the course of retromandibular vein has not been noted before as far as our knowledge. While performing superficial parotidectomy, retromandibular vein is used as a guide to explore facial nerve [14] also the lower end of the gland is retracted to expose the posterior belly of digasric muscle. Knowledge about the unusual course as noted in the present study will help the surgeon to avoid complications and undue hemorrhage during surgery. Retromandibular vein is also used in case of open reduction of mandibular condylar fractures [3].

CONCLUSION

A wide knowledge about variations of face and neck veins is essential in performing a successful surgical procedure. Jugular veins are used for catheterization and its ligation is important in performing various radical neck surgeries. Facial veins can be used as a patch for various reconstructive surgeries and carotid endarterectomies. During any maxillofacial or head and neck surgeries such a rare variations of the retromandibular vein as noted in the present study would help the surgeons to preplan and perform the surgery without any complications.

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