VARIATIONS IN THE VENOUS DRAINAGE PATTERN OF FACE AND NECK

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ABSTRACT

The study of the variations in the superficial veins of head and neck and their draining pattern is very important due to the complexity in their developmental pattern. A total of 32 cadavers of both sexes were used for the study and the head and neck region were dissected carefully and photographed in the department of anatomy, Vinayaka Mission Kirupananda Variyar Medical College & Hospital, Salem. We observed one cadaver presenting with undivided retromandibular vein on its right side draining into internal jugular vein after receiving anterior facial vein and posterior auricular vein with absence of external jugular vein. Second cadaver showed a common facial vein draining into external jugular vein and also doubling of External jugular vein. Third specimen presented with termination of anterior division of retromandibular vein into external jugular vein and occipital vein into internal jugular vein. Hence, Knowledge on variations of veins of head and neck were important for clinicians, radiologist and surgeon for planning the operative procedures.

KEYWORDS: Retromandibular vein, Variation, External Jugular Vein, Facial vein.

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INTRODUCTION

Variation in venous drainage of head & neck are common due to its complex developmental pattern. Variations are more common in veins than arteries\(^1,2\). Normally, supraorbital and supratrochlear veins unites to form angular vein at the medial angle of eye which continues as anterior facial vein. Superficial temporal vein joins with maxillary vein to form retromandibular vein or posterior facial vein within the parotid gland. At the apex of parotid gland it divides into anterior and posterior division. The anterior division unites with anterior facial vein to form common facial vein which in turn drains into internal jugular vein. The posterior division joins with the posterior auricular vein to form external jugular vein, then it runs obliquely downward crossing the middle of sternocleidomastoid and after piercing deep fascia in the supraclavicular triangle it drains into subclavian vein\(^3\). Superficial veins of head and neck are used for measuring venous pressure or intravenous infusion. External jugular vein is used for catheterisation and also for administering non-sclerosing agent in case of failure of other veins\(^4\). There are many earlier reports on the variations of venous drainage of head and neck. The present study shows some rare cases of draining pattern of anterior division of retromandibular vein into external jugular vein without forming linguofacial trunk and another case showing the posterior auricular vein draining into common facial vein.

MATERIALS & METHODS

A total of 32 cadavers of both sexes with different age groups were used for the study after obtaining ethical clearance from institutional ethics committee. Head and neck region of the cadavers were carefully dissected as per the standard dissection procedure in the department of anatomy, Vinayaka Mission Kirupananda Varies Medical College & Hospital, Salem. The vascular structures were teased carefully using blunt artery forceps and the fascias were cleaned, carefully observed for any variation in the formation and termination of superficial veins of the region and photographed.

OBSERVATIONS & RESULTS

Out of 32 cadavers dissected, 3 cadavers showed variations of the superficial veins on the right side. In one of the cadaveric specimen, there was absence of external jugular vein with undivided retromandibular vein (RMV). This undivided RMV united with the facial vein to form a common facial vein which later received posterior auricular vein and terminated by opening into internal jugular vein (Fig.1). The other cadaver presented with termination of Common facial vein into external jugular vein which was doubling in its terminal part, one part draining into subclavian vein and the other one terminating into internal jugular vein (Fig 2). Another cadaveric specimen had termination of anterior division of retromandibular vein into external jugular vein and occipital vein into internal jugular vein with a complex venous plexuses in the subclavian triangle (Fig.3).
Figure 1
Union of Undivided retromandibular (RMV) with the facial vein to form a vein (CFV) and terminating into (IJV) after receiving posterior auricular vein (PAV).

Figure 2
Common facial vein (CFV) vein terminating into external Jugular Vein and doubling in its terminal parts.

Figure 3 & 4
Termination of Anterior division of retromandibular vein (ADRMV) into external jugular vein (EJV) and occipital vein (OV) into internal jugular vein (IJV) and complex venous plexuses in Subclavian triangle.
DISCUSSION

Variation in the superficial veins of head & neck had been reported earlier in many literatures. Mehra et al (2003) reported a case presenting an undivided retromandibular vein with posterior auricular vein terminating into subclavian vein. Most of the previous studies showed the variations on the right side of head & neck, where present study also adds to it. Variation in the veins of left side has also been reported. In the present study one of the cadaver showed undivided retromandibular vein (Fig.1) receiving anterior facial vein to form common facial vein which after receiving posterior auricular vein drains into internal jugular vein. This anomalous pattern could be explained by the failure of development of EJV as a tributary of the cephalic vein and anastomosis secondarily with the anterior facial vein. Posterior auricular vein which drains into posterior connection of external jugular vein remained as single channel and opened into common facial vein. The common facial vein receiving posterior auricular vein has not yet reported in the literature. To conduct diagnostic procedure, external jugular vein is increasingly utilized for cannulation. External jugular vein cannulation is used as an integral part of central venous access like repeated blood sampling, administration of fluids, medication, parenteral nutrition, chemotherapy, and blood products, radiological contrast agents (computed tomography, magnetic imaging, and nuclear imaging) but at the same time administration of high pressure intravenous contrast agents should be avoided. A study conducted by Dilek et al (2009) showed successful rate of external jugular vein cannulation with intra-arterial electrocardiogram. Central venous cannulation via external jugular vein is a recognized technique. The other study done by Youngber described that the pulmonary artery catheterization via external jugular vein is safe and reliable. Hence the absence of external jugular vein should be borne in mind while attempting all the above surgical procedure. The common facial vein terminating into external jugular vein had been reported. Bertha reported in three cadaveric specimens, the draining of common facial vein into external jugular vein. The draining of common facial vein into external jugular vein in the present study of another cadaver could be due to persistence of anastomotic channel between the primitive lingulofacial vein and developing external jugular vein (Fig. 2). The termination of common facial vein into external jugular vein was on the right side, about 6.3cms from the angle of mandible with doubling of EJV. Facial vein acts as draining site of shunt procedure involving lateral ventricle in hydrocephalus surgery. The common facial veins are used as a patch material for carotid endarterectomies. A sound knowledge on variation of the course and termination of facial veins is essential for avoiding undue bleeding during radical neck dissection surgeries and also effective usage of these veins for grafting. In normal course of development, external jugular vein has an anterior connection with RMV and posterior connection with posterior auricular vein. The anterior connection later retrogresses and RMV drains into internal jugular vein via common facial vein. In another case, anterior connection persists, hence anterior division of retromandibular vein drains separately into external jugular vein and the lingual vein and facial vein via linguofacial trunk opens into internal jugular vein (Fig. 3&4). The occipital veins usually begins as plexuses at the posterior aspect of scalp and drains into venous plexuses of suboccipital triangle, joins deep cervical and vertebral veins, occasionally it ends in internal jugular vein wherein fig.3&4 presents the same draining pattern of occipital vein into internal jugular vein after travelling a long course in the posterior triangle of neck. In Superficial parotidectomy, retromandibular vein is used as a guide to explore the facial nerve, knowledge on variation in venous pattern is very important to avoid intra operative errors. Nature of circulation of head and neck skin plays important role in designing the cutaneous flap for reconstructive surgery. Hence knowledge of all these variations helps to avoid damage to the fascia and survival of flaps. Knowledge on abnormal variations of veins of head and neck were important for clinicians, radiologist and surgeon for planning the operative procedures.
CONCLUSION

To achieve the successful surgical procedure, a sound knowledge on the anatomy of variation of superficial veins of head & neck are of great important. During neck block dissection surgeries, the rare cases presented in this study will help the surgeons to preplan the operative procedures.

REFERENCES