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Unusual Variation of the Veins of the Head and Neck: External Jugular Vein and Facial Vein.

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ABSTRACT

Knowledge about variations of the veins of head and neck, especially the variations of the external jugular vein and the facial vein are important as they are used for various clinical procedures. The objective of this study was to observe the variations in the formation and drainage of the facial vein and the external jugular vein. The variations of the superficial veins of the neck were noted in thirty specimens of the south Indian population. Which were used for routine dissection, for teaching the medical students in the department of anatomy, SRM medical college, Kattankulathur, Chennai. This is a report on the unusual drainage of the common facial veins into the external jugular vein and the absence of posterior auricular vein. Another interesting variation is the unusual drainage of common facial vein into the subclavian vein and the absence of external jugular vein. The knowledge of the varying venous pattern in the neck is important for the clinical practitioners, which will help to perform procedures like cannulation and venous graft in endarterectomy.

Keywords: Facial vein, External jugular vein, Subclavian vein.

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INTRODUCTION

Deviation from the normal pattern in the vascular system is a common feature, and it is more common in the vein than in the arteries (Hollinshead 1982) [1]. Usually the superficial temporal vein unites with the maxillary vein to form the retromandibular vein. The retro Mandibular vein divides into the anterior and posterior division within the substance of the parotid gland. The anterior division joins with the anterior facial vein to form the common facial vein and drain into the internal jugular vein. The external jugular vein is formed by the union of the posterior division of retromandibular vein and the posterior auricular vein near the angle of the mandible just below the substance of the parotid gland. It descends from the angle of the mandible obliquely, superficial to sternocleidomastoid muscle and enter the supraclavicular space, where it pierces investing layer of deep cervical fascia terminates in the subclavian vein [2].

The external jugular vein is increasingly being utilized for cannulation to conduct diagnostic procedures or intra venous therapies (Gupta et.al, 2003)[3]. The external jugular vein is easier to visualize than the internal jugular vein and may give an estimate of central venous pressure. Permanent catheterization for haemodialysis via is a simple procedure without any severe complications. (Skandalos et.al, 2005)[4].

MATERIALS AND METHODS

A total number of thirty specimens of both sex (20 Males and 10 Females) on either side, routinely used by the first year medical students for the dissection in the department of Anatomy, SRM Medical College and research centre, Chennai, was taken for the study. The cadaver should be placed in supine position, the skin incisions were made in the midline of the neck and along the inferior border of the mandible and the skin flaps reflected laterally. The platysma was bilaterally removed from it is proximal attachments and the external jugular vein was exposed. After removing the facial skin the facial vein was identified, hooking around the inferior border of the mandible, in front of the masseter muscle running along the with the facial artery. The part of the parotid was removed at the level of the apex to expose the retromandibular vein. The veins were dissected to clearly visualize the formation, course and termination.

OBSERVATION AND RESULTS

Thirty head and neck cadavers were dissected on both sides for the variant anatomy of the veins of head and neck. The normal anatomy of veins of the head and neck were observed in 98% of cadavers. Among the thirty cadavers, 27 cadavers, the common facial veins, external jugular veins and other veins of the head and neck were found to be normally placed.

Variation in the termination of common facial vein and absence of posterior auricular vein.

In one cadaver on right side, there was absence of posterior auricular vein, the posterior division of retromandibular vein continuous as External jugular vein, running superficial to sternocleidomastoid and drained into the subclavian vein. An additional interesting point was the common facial vein draining into the external jugular vein, 5cm below the angle of the mandible on the same side [Fig (1)].

Variations in the termination of the common facial veins into the subclavian vein and the absence of external jugular vein.

In two cadavers, on the left side the common facial vein, running in front of the sternocleidomastoid and terminated into the subclavian vein and the absence of external jugular vein on same side [Fig (2)].

DISCUSSION

These variations patterns may partly be explained by the embryological occurrence of unusual retention or regression of venous anastomotic channels in the primitive pharyngeal regions during development (Bertha and Sugathy, 2011)[5]. The ventral pharyngeal vein (VPV) drains the mandibular and hyoid arches and opens into the common cardinal vein. When the neck elongates (10mm embryo stage), the termination of VPV is transferred to the cranial part of the pericardial vein, which later become the internal jugular vein (Williams et.al., 1985)[6].

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The ventral pharyngeal vein receives the linguofacial vein, which drain the face and tongue. The retromandibular vein drains the temporal region of the skull and joins with the linguofacial vein to form the common facial vein (18mm stage of the embryo) which drains into the pericardinal vein. A second venous channel situated superolateral to VPV, termed maxillary vein, anastomosis with linguofacial vein to form the anterior facial vein (Frazer, 1931) [7].

The external jugular vein (22mm stage of embryo) develops as a tributary of the cephalic vein from the tissues of the neck and anastomosis with the anterior facial vein (Padgett, 1957) [8]. The deepest segment of this venous ring forms the subclavian vein and receives the definitive external jugular vein. The usual course of development, the external jugular vein has an anterior connected with anterior facial vein and a posterior connected with the retromandibular vein. The anterior connections later regresses and the retromandibular vein drains into the internal jugular vein through common facial vein. In most of the embryologic development is suggested the variation in this cases might be caused no transition of the ventral pharyngeal vein (18mm stage of embryo). In the present study, we noticed that, in two cadavers common facial vein on the left side drained into the subclavian vein and the absence of external jugular vein. In these cases the cranial part of external jugular vein fails to develop. The common facial vein, instead of drains into the precardinal vein, anastomosis with the caudal part of the external jugular vein drains into the subclavian vein. Among 30 cadavers, we noticed that, in one cadaver the common facial vein terminates into the external jugular vein. It was due to persistence of anastomotic channel between the linguofacial vein and the secondarily developing external jugular vein (Choudhry R, et, al., 1997) [11]. The same variations of the external jugular vein and common facial vein was reported by Balachandra N.et,al., 2012 [12].

Knowledge of the varying venous pattern in the region of the head and neck is important for surgeons to avoid any intra-operative trial and error procedure which might lead to unnecessary bleeding (Nagase et., al 1997) [9]. These veins are usually grafted into the carotid during endarterectomy and for surgery involving micro vascular anastomosis especially in oral reconstruction procedures (Sabharwal & Mukherjee, (1998) [10].

CONCLUSION

Knowledge of the drainage site of external jugular vein is important for clinical application such as shunt for hydrocephalus, percutaneous central vein cannulation, maxillo facial surgery, invasive monitoring, and external jugular venous by-pass.

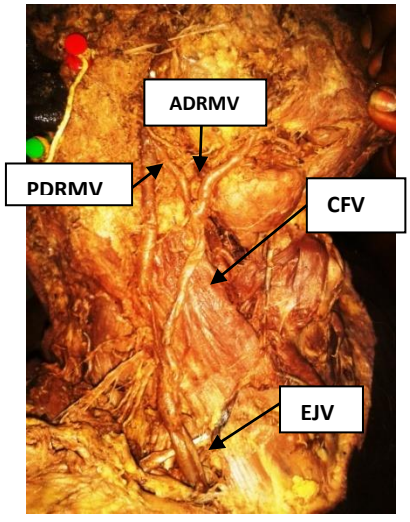

Fig (1): Variation in the termination of common facial vein and absence of posterior auricular vein

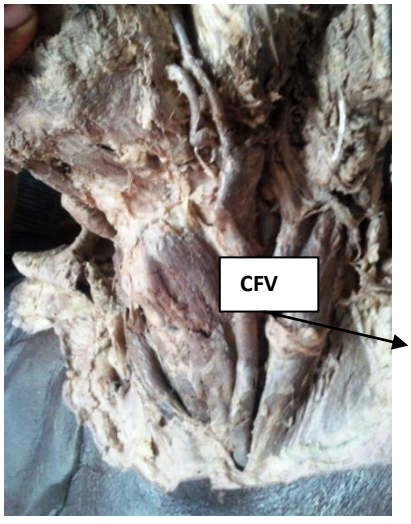

Fig (2): Variations in the termination of the common facial veins into the subclavian vein and absence of external jugular vein

LIST OF ABBREVIATIONS USED

RMV – RetroMandibular Vein
EJV – External Jugular Vein
PDRMV – Posterior Division of RetroMandibular Vein
ADRMV – Anterior Division of RetroMandibular Vein
CFV - Common Facial Vein

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