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Research Article

UNILATERAL ANATOMICAL VARIATION IN THE VENOUS DRAINAGE OF FACE AND NECK

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ABSTRACT

Background: Venous system of the head and neck are subject to variations of morphology, size and termination.
Aims: To present an anatomical variation in the venous drainage of face and neck, which has not been previously mentioned in the literature.
Materials and Methods: The variations was found during routine dissection performed in the laboratory of Morphology of the University of Pamplona.
Findings: Union between the superficial temporal and maxillary veins at a lower level, undivided retromandibular united with the facial veins to form common facial vein, absence of posterior auricular vein, occipital and maxillary veins formed external jugular vein. Transverse cervical and suprascapular veins- superficial branch, the dorsal scapular and suprascapular vein- deep branch drained independently within the external jugular vein through common venous trunks.
Conclusions: Knowledge of the venous drainage of the face and neck is necessary to prevent inadvertent injury during surgical, diagnostic and therapeutic interventions.

Key Words: Anatomical variations, retromandibular vein, external jugular vein, fenestrate external jugular vein, common venous trunk.

INTRODUCTION

The retromandibular vein (RMV) is formed within the parotid gland by union of the maxillary and superficial temporal veins. The RMV is used as a guide to expose the facial nerve branches inside the parotid gland, during parotid surgery and open reduction of mandibular condyle fractures. 1 within the gland, the RMV divides into anterior and posterior divisions. After exiting the gland, the anterior division joins the facial vein to form the common facial vein, which drains into the internal jugular vein. 2-4 The posterior division of the RMV unites with the posterior auricular vein to form the external jugular vein (EJV). The EJV descends obliquely superficial to the sternocleidomastoid muscle. The EJV then enters the roof of the posterior triangle of the neck and pierces the investing layer of deep cervical fascia to drain into the subclavian vein. 5 The EJV usually receives the occipital, posterior external jugular, anterior jugular, transverse cervical veins, superficial cervical vein and suprascapular vein. It collects most of the blood from the exterior of the cranium and deep part of the face. The dorsal scapular vein is a tributary of the subclavian vein or external jugular vein, in the substance of the parotid, a large branch of communication from the internal jugular joins it. 6,7 The aim of the present study is reported an unilateral anatomical variation in the venous drainage in the left side of face and neck, an entity that has not yet been reported.

MATERIALS AND METHODS

This work was previously approved by the Ethics Committee in Research and Environmental Impact of the University of Pamplona, conformed by resolution 030 of January 16 of 2014 and Resolution No. 008430 of 1993 of October 4 of the Ministry of Health of Republic of Colombia, which regulates the scientific, technical and administrative norms for health research. The anatomical variations were observed in the left region of the face and neck of a75-year-old male cadaver that was dissected in the Laboratory of Morphology of the University of Pamplona. This work was carried out by routine dissection classes for undergraduate medical students. Topographic

details of the variations were examined, recorded and photographed. Measurements were taken with assistance of a sliding Vernier caliper with an accuracy of 0.01 mm during the course of the anatomical dissection.

FINDINGS

On the left side. Figure 1. Is shown the superficial temporal vein (STV) united with the maxillary vein (MV) to form retromandibular vein (RMV) at a lower level between angle of the mandible and sternocleidomastoid muscle (ECM). MV was located behind, from medial to lateral and down, with respect to STV. At 1 cm below its formation, the RMV received as a tributary to the inferior masseteric vein. An undivided RMV existed united with the facial vein to form common facial vein (CFV). The facial vein has as tributaries to the lingual vein (LV), submental vein (SMV) and the external palatine vein (EPV).

Also noted the absence of posterior auricular vein. The external jugular vein was formed by occipital vein (OV) and maxillary vein (MV) through a communicating branch (CB) or connecting venous channel which measuring 4.7 cm, ran superficial to the sternocleidomastoid muscle. Figure 1 and 2.

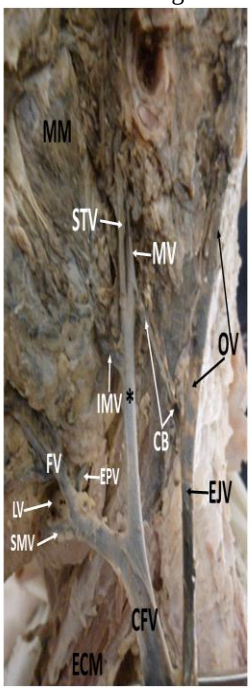

Figure 1. Left side of the face and neck region (upper third). MM: masseter muscle; ECM: sternocleidomastoid muscle; CFV: common facial vein; STV: superficial temporal vein; MV: maxillary vein; OV: occipital vein; IMV: inferior masseteric vein; EPV: external palatine vein; FV: facial vein; LV: lingual vein; SMV: submental vein; black asterisk: undivided retromandibular vein; CB: communicating branch or connecting venous channel between maxillary vein and occipital vein; EJV: external jugular vein.

In the figure 2. It is noted that EJV was comparatively thinner than CFV. CFV drain into EJV in the middle third of the neck, 1 cm below this point, the EJV presents a fenestration, which bifurcated into medial and lateral branch. It reunited again at the posterior border of the sternocleidomastoid muscle. The fenestrate segment was 3 cm in length. The diameter of the medial branch was of 0.7 mm and the diameter of the lateral branch was of the 0.6 mm. Figure 2 and 3. The EJV ran vertically downward, and in the posterior triangle of the neck above the inferior belly omohyoid muscle (IOH), has two tributaries; the superficial cervical vein (SCV) and a common trunk of 3 cm in length and 0.6 mm in diameter, formed by the transverse cervical vein (TCV) and suprascapular vein-superficial branch (SSV-SB). Figure 2 and 3.

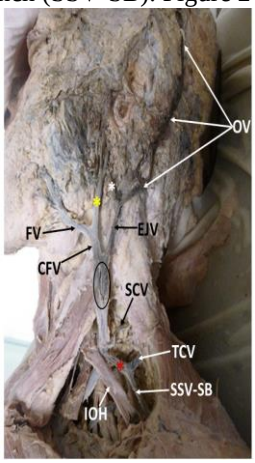

Figure 2. Left side of the face and neck region. FV: facial vein; yellow asterisk: undivided retromandibular vein; OV: occipital vein; CFV: common facial vein; white asterisk: communicating branch between maxillary vein and occipital vein; EJV: external jugular vein; Circle: fenestration of external jugular vein; SCV: superficial cervical vein; red asterisk: venous common trunk formed by transverse cervical vein and suprascapular vein-superficial branch; TCV: transverse cervical vein; SSV- SB: suprascapular vein- superficial branch; IOH: Inferior belly of omohyiod muscle.

In the lower third- base of the neck is observed a second venous common trunk at 2 cm from the first. This second common venous trunk also drains into the EJV, has 2 cm in length and 0.5 mm in diameter, is formed by the dorsal scapular vein (DSV) and suprascapular vein- deep branch. Figure 3. Finally, EJV turned medially and termined in the jugulosubclavian join on the same side. Figure 2.

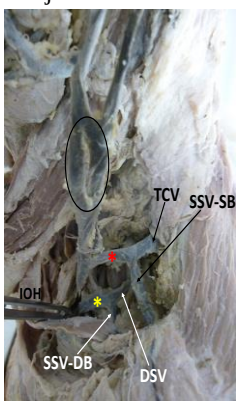

Figure 3. Left side of the face and neck region (lower third). Circle: fenestration of external jugular vein;

IOH: Inferior belly of omohyiod muscle; TCV: transverse cervical vein; SSV-SB: suprascapular vein- superficial branch; DSV: dorsal scapular vein; SSV-DB: suprascapular vein- deep branch; red asterisk: venous common trunk formed by transverse cervical vein and suprascapular vein- superficial branch; yellow asterisk: venous common trunk formed by dorsal scapular vein and suprascapular vein deep brach.

On the left side, there was no evidence of formation of anterior jugular vein or posterior external jugular vein.
On the right side, the formation and drainage of the veins of the face and neck was as per the classical pattern.

DISCUSSION

The RMV is formed by the union between the STV and the MV at a higher level into the parotid gland, near the neck of the mandible. 8 In the present study, similar to the report by Silva et al., 9 is observe that the union between the tributary veins of the RMV occurred at a lower level between angle of the mandible and ECM, but differs why in our case the MV was located behind, from medial to lateral and down, with respect to STV.

Sateesha et al. have reported the absence of posterior auricular vein, this was associated with undivided retromandibular vein, which joined with facial vein to form external jugular vein. 10 Our findings were the absence of posterior auricular vein and the absence of anterior and posterior divisions of retromandibular vein, the undivided RMV received as a tributary to the inferior masseteric vein, additionally is observe a communicating branch (CB) or connecting venous channel (CVC), that connect to the MV with the OV to form EJV. This communicating branch measuring 4.7 cm and ran superficial to the sternocleidomastoid muscle. This finding has not yet reported in the literature.

The anterior facial vein or facial vein receives below the mandible at the submental, palatine, and submaxillary veins, and, generally, the vena comitans of the hypoglossal nerve.7 In the present study, the facial vein has as tributaries to the lingual vein (LV), submental vein (SMV) and the external palatine vein (EPV).

The anterior division of the RMV joins the facial vein to form the CFV, which drains into the internal jugular vein. 2-4 CFV draining into EJV, an incidence of 5% was noted in the study done by Choudhry R et al. 11 In another study conducted by Gupta V et al., 12 the incidence of this particular variation was 9%. Pai et al., 13 reported an incidence of 7.7%, is at par with the reported incidence which ranges between 5-9%. 11,12 In our case, an undivided RMV existed united with the facial vein to form common facial vein (CFV). CFV drain into EJV in the middle third of the neck, it is noted that EJV was comparatively thinner than CFV.

The EJV usually receives the occipital, posterior external jugular, anterior jugular, transverse cervical veins, superficial cervical vein and suprascapular vein. It collects most of the blood from the exterior of the cranium and deep part of the face. The dorsal scapular vein is a tributary of the subclavian vein or external jugular vein. Usually they drain into the external jugular vein independently. 6,7,14 In the present case, above the inferior belly omohyoid muscle (IOH), EJV has two tributaries; the superficial cervical vein (SCV) and a common trunk formed by the transverse cervical vein (TCV) and suprascapular vein- superficial branch (SSV-SB), additionally, is observed a second venous common trunk at 2 cm from the first. This second common venous trunk also drains into the EJV and were formed by the dorsal scapular vein (DSV) and suprascapular vein- deep branch. There was no evidence of formation of anterior jugular vein or posterior external jugular vein.

Fenestration of the EJV is rare, a few cases have been reported, more predominant in female, and there was no predominant side; right: 2 cases, left: 3 cases. 15-19 This findings are similar at the present in this case, were EJV presents a fenestration, which bifurcated into medial and lateral branch. It reunited again at the posterior border of the sternocleidomastoid muscle. Finally, EJV turned medially and termined in the jugulosubclavian join on the same side. Venous system of the human body has variability. The regions of the head and neck are not the exception. Knowledge of the veins and their variations is crucial since conducting diagnostic, examinations and surgical planning which is determinant for health professionals such as anatomists, anesthetists, oral and maxillofacial surgeons, general surgeons, plastic surgeons, clinicians and radiologists to avoid inadvertent injury to these vascular structures during catheterization or surgical procedures in the head and neck region.

CONCLUSION

The anatomical variations reported in this study reinforce the need for adequate knowledge of the venous drainage system of the head and neck to plan approaches for diagnostic, therapeutic and surgical purposes.

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COMPETING INTERESTS

None

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