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Original Article

Venous variations of the neck and the inferior vena cava: two cadaveric case reports

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Abstract: Anatomical variations in the venous system of the head and neck remain important for clinicians and also for radiologists and surgeons. This paper reports a case of a unilateral cervical vein variation and a disproportion of the inferior vena cava to the aorta observed in two adult male cadavers. Out of twenty well preserved dissected cadavers, these findings are rare, even in the medical literature. The left external jugular vein was formed by three proximal tributaries draining to it. The left internal jugular vein bears lymph nodes and was smaller in diameter than the right pair. As a normal pattern, the right and left subclavian veins drained to the superior vena cava. In the second cadaver, the inferior vena cava was found to be abnormal prior to its opening to the right atrium.

Keywords: Veins of the neck, inferior vena cava, variations, cadavers

Introduction

The veins draining the regions of the face and neck establish their identity only after the development of the skull. The largest vascular abnormalities in the head-neck can remain without realizing them during one's entire life. These asymptomatic variations can become symptomatic in of the case of pathological situations such as atherosclerotic vascular diseases, aneurysms, and changes in senility. Therefore, significant clinical problems can occur in surgical procedures [1]. Thus, the variations of the superficial veins of head and neck, though common, are important clinically [2-4]. As per the standard description the EJV begins in the substance of the parotid gland [5] or at the level of mandible, just below the apex of the parotid gland [6]. It is normally formed by the union of the posterior auricular vein and posterior division of the retromandibular vein (posterior facial) or by a single one or some combination of these and the facial, maxillary or other veins near the mandibular angle [7]. It starts and runs vertically down in the superficial fascia till a point just above the midpoint of clavicle. It pierces the deep fascia and opens into the subclavian vein. It usually receives the occipital, posterior external jugular, anterior jugular and transverse cervical veins [5]. Yadav et al. [2] said that the external jugular vein is used as a venos manometer and for catheterization [6] and that, variations are also important medico-legally and to the surgeon doing head and neck surgery [8]. Where difficulty or failure has been encountered, or urgent access is required, the external jugular vein should not be forgotten [9].

Case 1: The external jugular vein (EJV) is developed from a tributary of the cephalic vein from the tissues of the neck and anastomoses secondarily with the anterior facial vein. In this case, the left external jugular vein was formed by three veins. The posterior auricular vein and the non-bifurcated retromandibular vein formed a common venous portion joined by the facial vein. The EJV drained into the subclavian vein but was smaller in size compared to the right one. Also, obvious deep lymph nodes were found on the left internal jugular vein while these lymph nodes were not found on the right side. The EJV receives the greater part of the blood from the exterior of the cranium and the deep parts of the face being formed by the junction of the posterior division of the retroman-

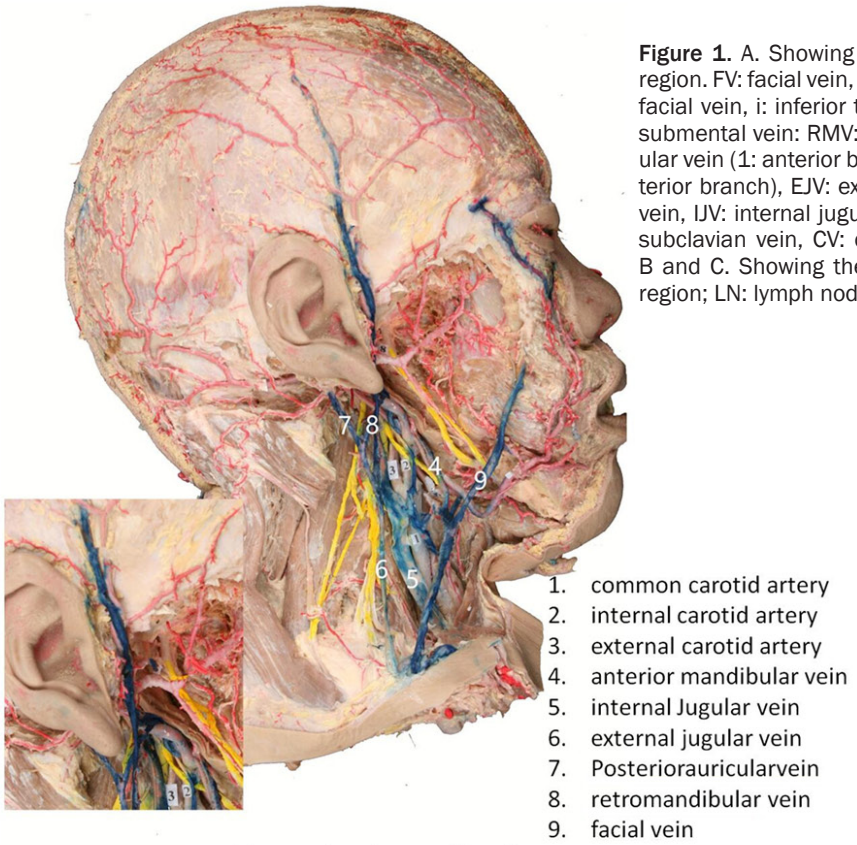
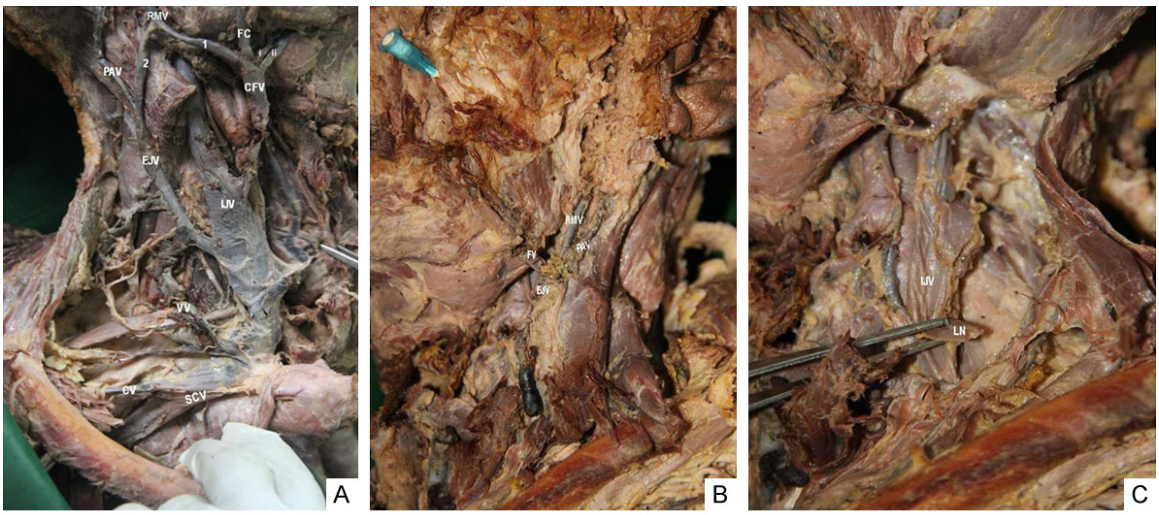
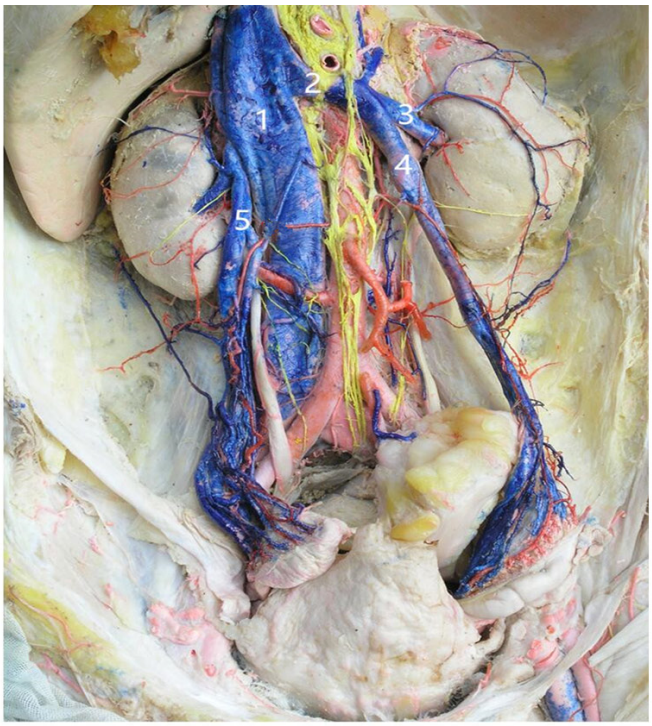


Figure 1. A. Showing right cervical region. FV: facial vein, CFV: common facial vein, i: inferior thyroid vein, ii submental vein: RMV: retromandibular vein (1: anterior branch, 2: posterior branch), EJV: external jugular vein, IJV: internal jugular vein, SCV: subclavian vein, CV: cephalic vein. B and C. Showing the left cervical region; LN: lymph nodes.



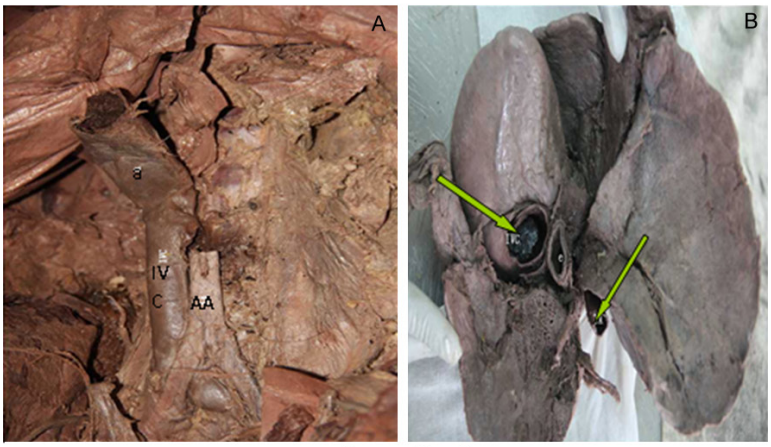
dibular vein with the posterior auricular vein. In this case, the left internal jugular vein was smaller in diameter than the right pair and was found free from blood stagnant (**Figure 1C**).

Case 2: Aneurysms of the inferior vena cava (IVC) are extremely rare, with a range of reported presentations including deep venous thrombosis [10]. In this case, the diameter of both the thoracic and abdominal aorta are 13 mm, and the IVC is 24 mm. The IVC total length is 26 cm from the diaphragmatic hiatus to its bifurcation at the level of the first lumbar vertebra (right common iliac vein 18 mm and



1. inferior vena cava
2. portal vein
3. renal vein
4. superior mesenteric vein
5. inferior mesenteric vein

normal schematic diagram



cases schematic diagram

Figure 2. A: Showing the inferior vena cava (IVC), abdominal aorta (AA), aneurysm level (a). B: Shows the diaphragmatic view of IVC and AA.

left common iliac vein 20 mm in diameter [while the right and left common iliac arteries are 11 mm and 10.5 mm respectively in diameter]). The aneurysm found is in a V-shaped 90 mm in length, 40 mm to 30 mm in diameter from the diaphragmatic hiatus opposite the eight thoracic vertebral body downward to the eleventh one (See **Figure 2**). This is a rare case of dextrocardia of embryonic arrest in which previous findings reported that most patients who survive that is the cause of their death in childhood [11].

Discussion

There is not any detailed investigation about the jugular vein anomalies; we can see only one case report in the English literature [12]. But, Variations of the superficial veins of the neck are very common [5]. The embryological origin of multiple variations of different structures cannot be informed absolutely. The multiple variations concerning the different structures such as vessels, nerves, and muscles should be kept in mind before clinical applications [13]. Superficial veins of head and neck develop from the superficial plexus of the capillaries, which will ultimately form the primary head vein. Larger channels are formed by enlargement of individual capillaries, the confluence of adjacent ones, and the regression of some from where the flow has been diverted [4]. Congenital aneurysms of the inferior vena cava (IVC) are very rare; one report is of a 62-year-old woman admitted on whom investigations revealed an aneurysmal dilatation of the IVC measuring 51 × 50 × 38 mm inferior to the right atrium [14]. The cadaver in this case report is also beyond sixty years old. However, aneurysms of the inferior vena cava (IVC) are extremely rare, with a range of reported presentations including deep venous thrombosis [10]. There is a difference between the right and left venous pattern. There was an absence

of the retromandibular vein, a presence of smaller internal and external jugular veins on the left side than the right.

Conclusion

These investigations are one of the few giving measurements of the veins and are rarely encountered and will surely enlighten the academic arena by creating awareness during routine medical dissections.

Disclosure of conflict of interest

None.

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References

[1] Zümre Ö, Salbacak A, Ciçecibasi AE, Tuncer I, Seker M. Investigation of the bifurcation level of the common carotid artery and variations of the branches of the external carotid artery in human fetuses. Ann Anat 2005; 187: 361-9.

[2] Yadav S, Ghosh SK, Anand C. Variations of superficial veins of head and neck. Anat Soc India 2000; 49: 61-2.

[3] Porwal Satishkumar, Bidwe Archana, Joshi Deepak. Variant formation of the external jugular vein and branching pattern of external carotid artery. Int J Anat Var 2013; 6: 140-2.

[4] Rajanigandha V, Rajalakshmi R, Ranade AV, Pai MM, Prabhu LV, Ashwin K, Jiji PJ. An anomalous left external jugular vein draining into right subclavian vein: a case report. Bratisl Lek Listy 2008; 26: 893-5.

[5] Shetty SD, Nayak S, Kumar N, Marpalli S, Madahv V. Unusual veins in the neck-a case report. J Morphol Sci 2013; 30: 203-5.

[6] Baumgartner I, Bollinger A. Diagnostic importance of jugular vein. Vasa 1991; 20: 3-9.

[7] Klionsky DJ, Abdelmohsen K, Abe A, Abedin MJ, Abeliovich H, Acevedo Arozena A, Adachi H, Adams CM, Adams PD. Guidelines for the use and interpretation of assays for monitoring autophagy (3rd edition). Autophagy 2016; 12: 1-222.

[8] Salmeri KR, Bellah JR, Ackerman N, Homer B. Unilateral congenital aneurysm of the jugular, linguofacial, and maxillary veins in a dog. J Am Vet Med Assoc 1991; 198: 651-4.

[9] Hall AP, Russell WC. Toward safer central venous access: ultrasound guidance and sound advice. Anaesthesia 2005; 60: 1-4.

[10] Jeong SY, Kim JU, Park SY, Lee JH, Lee KJ. Lumbar intradiscal invaginated inferior vena cava aneurysm. NMC Case Rep J 2018; 5: 115-7.

[11] Pinar H. Postmortem findings in term neonates. Semin Neonatol 2014; 19: 289-302.

[12] Micozkadioglu SD, Erkan AN. Internal jugular vein anomaly: a lateral branch of the internal jugular vein in the neck. Egyptian Journal of Ear Nose Throat and Allied Sciences 2011; 12: 77-9.

[13] Dogan NU, Cicekcibasi AE, Fazliogullari Z, Yilmaz MT, Uysal II, Salbacak A. Unilateral variations of vessels and nerves in the neck. Int J Morph 2010; 20: 963-6.

[14] Gusani R, Shukla R, Kothari S, Bhatt R, Patel J. Inferior vena cava aneurysm presenting as deep vein thrombosis-a case report. Int J Surg Case Rep 2016; 29: 123-5.