Convergence of the right and left external jugular veins to the midline: a rare finding of anatomical variation

Convergência das veias jugulares externas direita e esquerda para o plano mediano: um achado raro de variação anatômica

Convergencia de las venas yugulares externas derecha e izquierda en el plano medio: un hallazgo infrecuente de variación anatómica

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ABSTRACT
Venous blood from the head and neck are drained mainly by the internal and external jugular veins. The external jugular vein is located in the anterolateral region of the neck taking a complex pathway perpendicularly down the neck to join the subclavian vein, however, there can be anatomical variations that affect its course. To describe an anatomical variation in the
left and right external jugular veins discovered during the dissection of a cadaver in Human Anatomy class. The present study is a case report describing an anatomical variation in the external jugular veins observed during a routine dissection for Human Anatomy class at the Faculty of Medical Sciences of Minas Gerais on an adult male cadaver of unknown age, preserved in formaldehyde solution. The dissection showed that the right and left external jugular veins converged toward the midline, joining just above the level of the jugular notch. Knowledge of variations in the neck superficial venous system is crucial to avoid complications from medical procedures. The present variation was not found described in the literature.

**Keywords:** cadaver, jugular veins, anatomic variation.

**RESUMO**
O sangue venoso da cabeça e do pescoço é drenado principalmente pelas veias jugulares interna e externa. A veia jugular externa está localizada na região anterolateral do pescoço, percorrendo um caminho complexo perpendicularmente pelo pescoço até se juntar à veia subclávia; no entanto, pode haver variações anatômicas que afetam seu curso. Descrever uma variação anatômica nas veias jugulares externas esquerda e direita descoberta durante a dissecação de um cadáver na aula de Anatomia Humana. O presente estudo é um relato de caso que descreve uma variação anatômica nas veias jugulares externas observada durante uma dissecação de rotina para a aula de Anatomia Humana na Faculdade de Ciências Médicas de Minas Gerais em um cadáver adulto do sexo masculino de idade desconhecida, preservado em solução de formaldeído. O conhecimento das variações no sistema venoso superficial do pescoço é crucial para evitar complicações em procedimentos médicos. A presente variação não foi descrita na literatura.

**Palavras-chave:** cadáver, veias jugulares, variação anatômica.

**RESUMEN**
La sangre venosa de la cabeza y el cuello es drenada principalmente por las venas yugulares interna y externa. La vena yugular externa se localiza en la región anterolateral del cuello, recorriendo un complejo trayecto perpendicularmente a través del cuello hasta unirse con la vena subclavia; sin embargo, puede haber variaciones anatómicas que afecten a su curso. Describir una variación anatómica en las venas yugulares externas izquierda y derecha descubierta durante la disección de un cadáver en clase de Anatomía Humana. Este estudio es el relato de un caso clínico que describe una variación anatómica en las venas yugulares externas observada durante una disección de rutina para la clase de Anatomía Humana de la Facultad de Ciencias Médicas de Minas Gerais, en un cadáver masculino adulto, de edad desconocida, preservado en solución de formol. El conocimiento de las variaciones del sistema venoso superficial del cuello es fundamental para evitar complicaciones en procedimientos médicos. Esta variación no ha sido descrita en la literatura.

**Palabras clave:** cadáver, venas yugulares, variación anatómica.
1 INTRODUCTION

The veins of the neck are distributed in two separate venous systems: one present superficially, which comprises the external jugular vein (EJV) and anterior jugular veins, mainly receiving blood from subcutaneous tissues, and the other located deep, represented by the internal jugular vein (IJV), which drains the brain and other structures of the face and neck (Dalip, 2018).

Regarding its formation, the EJV is formed by the union of the posterior division of the retromandibular vein with the posterior auricular vein. It originates in the substance of the parotid gland and descends perpendicularly down the neck toward a line that joins the angle of the jaw and the midpoint of the clavicle. In its course, it crosses the sternocleidomastoid muscle and runs parallel to its posterior part until it inserts into the clavicle. At this point, the vein perforates the deep fascia and joins the subclavian vein (Gray, date unknown).

In the neck, the EJV is separated from the sternocleidomastoid muscle by the superficial layer of cervical fascia. The vein is covered by the platysma muscle, cervical fascia, and skin. In its middle part, cutaneous branches of the cervical plexus cross it, and the great auricular nerve accompanies the EJV in its upper half (Gray, date unknown).

The external jugular vein varies in size, inversely proportional to the other veins in the region. Furthermore, it has two pairs of valves, with the lower pair located at the point where it joins the subclavian vein and the upper pair about four centimeters above this. The portion of the vein between the two pairs of valves is called the sinus (Gray, date unknown).

The EJV is a common site for peripheral access, catheterization, and venous manometry. Therefore, it is crucial for radiologists, anesthesiologists, and head and neck surgeons to be familiar with possible anatomical variations in the neck's venous system (Chauran, 2011).

2 METHOD

The variation described in this case report was observed during one of the routine dissections for Human Anatomy classes at the Faculty of Medical Sciences of Minas Gerais on an adult male cadaver of unknown age, preserved in formaldehyde solution.
3 RESULTS - CASE REPORT

During a careful dissection and preparation of the anterior and lateral cervical regions performed on a cadaver used for educational and research purposes in the Department of Anatomy at the Faculty of Medical Sciences of Minas Gerais, an anatomical variation involving the right and left external jugular veins was discovered. After dissecting the cervical quadrilaterals, removing the skin and subcutaneous tissue, and retracting the platysma muscle, it was observed that both EJVs converged toward the midline, joining just above the level of the jugular notch (Figure 1).

To further investigate this variation, the thoracic cavity was opened to expose its contents. It was observed that the junction of the EJVs gave rise to a common trunk, 3 cm in length, which ran to the right and joined the right subclavian vein, terminating just before the right jugulo-subclavian confluence (Figure 2).

The cause of death of the cadaver is unknown and is unrelated to the conduct of this study. No other abnormalities, signs of previous pathological conditions, or surgical procedures in the cervical region were detected.
Figure 1 - The photograph shows the union of the jugular veins.


Source: Research data
4 DISCUSSION

The complex embryological development of the vascular system can result in clinically relevant anatomical variations, as in this case. The veins draining the head and neck region establish their course after cranial development. The EJV develops from a tributary of the cephalic vein, which drains neck tissues and secondarily anastomoses with the anterior facial vein. It receives tributaries such as the transverse cervical vein, suprascapular vein, anterior jugular vein, and anterior cervical vein. The EJV may be absent unilaterally or bilaterally, with its tributaries destined to the IJV (Dalip, 2018).

According to Dalip's systematic literature review in 2018, the EJV joins the jugulo-subclavian confluence in 60% of cases, in 36% it joins the subclavian vein some distance away from the junction with the IJV, and in 4% it joins the internal jugular vein. Additionally, the EJV has been described as double before penetrating the deep cervical fascia and even once as
triple, running parallel to each other and joining the subclavian vein (Dalip, 2018). However, the variation described in this article was not found documented in the literature.

Most venous catheterizations and accesses are inserted using anatomical landmarks. Therefore, even simple anatomical variations can complicate or even render procedures involving the EJV impossible, causing complications, along with the inexperience of the professional and imprecise and difficult-to-recognize anatomical landmarks (Paraskevas, 2014).

5 CONCLUSION

In summary, superficial veins, especially the external jugular vein, are increasingly used for peripheral access and for conducting diagnostic procedures and intravenous therapies. Knowledge of these veins is also necessary for head and neck surgeons to avoid unnecessary bleeding. Ultrasound-guided venous puncture is a possible alternative in cases of variations (Sangeeta, 2013). The same variation presented in this report was not found described in the literature.
REFERENCES


DOUBLE EXTERNAL JUGULAR VEIN - A CASE REPORT Sangeeta .M1, Sridevi N.S1, Raja Parthiban², Nandish .C1, M.B.1


