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Mini Case Study

Internal Jugular Vein Duplication: Case Report

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Abstract

Percutaneous catheterization of the internal jugular vein is an intervention commonly used in transvenous pacemaker placements, administration of medications, hemodialysis and a lot more. The technique is based on knowing the usual vein course. However, the published literature showed the existence of an anatomic variation: IJV duplication. In order to have an exhaustive vision about this anomaly: the statistics, the most common types, and the exact implications, we report a case of an IJV duplication accidently discovered during a cerebral CT angiography investigation in a 40 year old male.

Keywords: *Internal Jugular Vein; IJV; Classification; Duplication; Course; Phlebectasia*

Introduction

The vascular development of the embryo takes place from the 3rd to the 8th week of gestation. The head, the neck, the upper torso and upper limbs drain through the precardinal veins [1]. Three embryological hypotheses have been proposed to explain the occurrence of the internal jugular vein duplication: The venous, the neuronal and the bony one [2].

No pathological consequences have been demonstrated so far. Nevertheless, this anomaly can create challenges during interventional and surgical procedures. Which makes the investigation and the cases gathering much more important.

We present an IJV duplication case that has been identified during a cerebral CT angiography.

Case Report

We present the case of a 40-year-old man with no prior surgical, medical, or familial history, who presented a cluster headache. A cerebral CT angiography has been done and showed a type A of the Nayak., *et al*. IJV duplication classification [3]: The duplicate left jugular veins join each other cranial to the level of central tendon of omohyoid muscle. We also report a phlebectasia of the contralateral jugular vein (Figure 1 and 2).

Discussion

The internal jugular vein runs in the carotid sheath with the common carotid artery and vagus nerve. It collects blood from the brain, the face and the neck. However, dissections, imaging and surgical procedures brought out unusual numbers and courses of the IJV: IJV duplication. The prevalence remains unknown and that is due to the rarity and the non-expression of clinical symptoms of this variation.

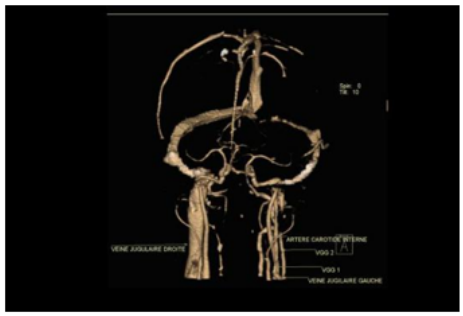

Figure 1

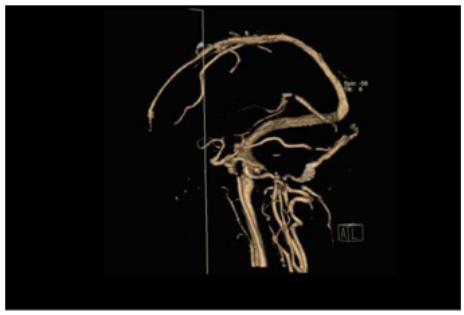

Figure 2

Figure 1 and 2: *3D angiography in coronal (1) and lateral (2) projection showing a duplication of the left internal jugular vein with ectasia of the contralateral internal jugular vein.*

Classification

Based on the 22 cases reported to date, the literature could propose two different classifications. Downie., *et al*. classified it into a duplicated and fenestrated vascular pattern. In a duplicated pattern, IJV bifurcates into two veins which separately join the subclavian vein, thereby, forming an inverted-Y pattern. While in a fenestrated pattern, IJV commences from the base of the skull as a single vein and then branches into two for some distance before uniting again proximal to the subclavian vein [4]. On the other hand, the level and the extent of IJV duplication are the criteria of Nayak., *et al*. recent classification. Three main patterns were described. Type A where the duplicate veins join each other cranial to the level of the omohyoid muscle tendon. Whereas type B shows a caudal extent, the duplication continues inferior to the omohyoid tendon. In type C, the most complex of all duplications, it starts around the level of hyoid bone. The lateral component takes a course outside the carotid sheath and lateral to the omohyoid muscle, traversing the posterior triangle of neck, before curving and entering the carotid sheath at the root of the neck [3].

Phlebectasia

The literature highlights that the contralateral internal jugular vein dilatation usually go with the IJV duplication [5].

We believe that the existence of two jugular veins instead of one increases the flow speed coming from the brain, which pushes the contralateral vein to dilate as a compensation mechanism (Figure 3).

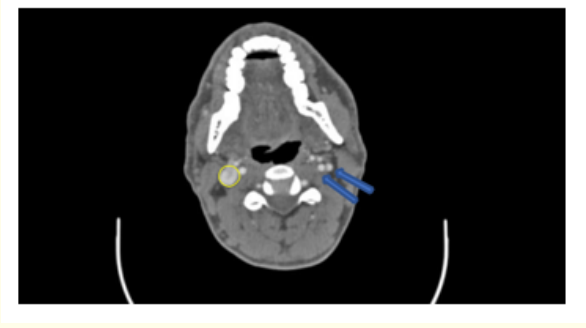

Figure 3: *CT image in injected axial section showing ectasia of the right IJV (yellow circle) and two left IJVs (Blue arrows).*

Clinical implications

There is no thick line between an anomaly with pathological consequences and a simple variation when it

comes to the description of an anatomic dissimilarity recently reported (2006). Knowing the exact implications of the duplication of the internal jugular vein is no easy task because of the lack of precise clinical descriptions in the published articles. But in spite of being a major vein of the human body, the discovery mode of the IJV duplication has always been accidental [5]. No pathological implications have been reported so far. The real challenge in this matter has to do with interventions that are based on assuming the natural course of the internal jugular vein such as central venous catheterization and neck incisions.

In order to prevent accidents, especially in type B and C IJV duplications, we believe that the instauration of an ultrasound-guided catheterization and presurgery neck imaging should be discussed.

Conclusion

The internal jugular vein duplication is an unusual rare congenital anatomic variation that needs a further investigation and a better understanding. In this article, we have reported a type A IJV duplication case with a contralateral phlebectasia discovered during a cerebral CT angiography in a 40 year old male.

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