



Review Article

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# A Review on Some Important Notes about the Surgical Anatomy of the Internal Jugular Vein



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## Abstract

Internal Jugular Vein is an important anatomical structure in the head and neck region. As a paired jugular vein, it originates from sigmoid and inferior petrosal sinuses. At the skull base level, it begins at the jugular foramen posterior compartment. Then it goes down to the neck. It collects blood from some parts of the face and neck and also the brain.

Considering the importance of having knowledge about the anatomy of the internal jugular vein specifically for the surgeons and other clinicians who are dealing with the patients with head and neck and vascular pathologies, this brief review tries to point to some important anatomical aspects related to the internal jugular vein as well as some important clinical points.

**Keywords:** Jugular Vein; Internal; Anatomy; Surgery; Clinical Relevance

## Body

Internal jugular vein as a paired jugular vein, originates from sigmoid and inferior petrosal sinuses and is usually known as the largest neck vein. At the level of the skull base, it begins at the jugular foramen posterior compartment and since it is somehow dilated at its original part, it would be named as superior bulb at this level. Internal jugular vein runs downward in an almost vertical direction in the carotid sheath.

Internal jugular vein has some relations with the internal carotid artery at different levels. At the C2 level, internal jugular vein would be in the posterior part of the internal carotid artery. Then it turns towards the lateral direction while still being in the posterior part of the artery which at the level of C3, internal jugular vein would be in a posterolateral part of the internal carotid artery. At the level of C4, the internal jugular vein would be located at the lateral part of the internal carotid artery. It is important to notice that the tenth cranial nerve lies between the internal jugular vein and the internal carotid artery. After leaving the carotid sheath, deep cervical lymph nodes surround the internal jugular vein. In a downward direction, the internal jugular vein lies on the lateral mass of the first cervical vertebra, prevertebral fascia, middle scalene muscle, anterior scalene muscle and the cervical pleura dome.

In case of dividing the internal jugular vein into three anatomical parts meaning upper, middle, and lower thirds, it will be crossed and overlaid by different anatomical structures. The eleventh cranial nerve's spinal root would cross the internal jugu-

lar vein at its origin. The middle third of the internal jugular vein would be crossed by the inferior root of the ansa cervicalis. The lower third of the internal jugular vein would be covered by the omohyoid muscle tendon and the sternocleidomastoid muscle. Usually, the right internal jugular vein is larger than the left one because its blood drainage is done from the superior sagittal sinus which in contrast with the left one meaning the inferior sagittal sinus, is larger in its size [1-4].

From the clinical point of view and at the bedside, the internal jugular vein can be found while it runs from the posterior part of the jaw angle to the posterior part of the sternoclavicular joint. Central venous catheterization with or without the ultrasound guidance, would preferably be done through the internal jugular vein. Estimation of the jugular venous and right atrium pressures and also estimation of the patients hemodynamic status, can be done at the bedside by observing the internal jugular vein. In Trauma settings, the internal jugular vein is susceptible to various damages given its superficial course in the neck. So, any blunt or penetrating trauma can cause injury to the internal jugular vein which result in the occurrence of hemorrhage and increased risk for the occurrence of air embolism. Thrombosis of the internal jugular vein and Lemierre syndrome which is known as a thrombosis of the internal jugular vein due to infection of the pharynx, are other pathologies which can affect the internal jugular vein.

Surgery of the internal jugular vein requires paying enough attention to its and surrounding anatomical structures. Surgical repairing of the internal jugular vein should be considered first

and during this, it should be tried by the surgeon to limit the amount of narrowing the vessel as much as possible. Ligation may be necessary in the cases which the amount of damage to the vessel is high.

In any of these cases, care should be taken to avoid causing injury to the surrounding anatomical structures like internal carotid artery and the tenth cranial nerve. In case the carotid sheath is affected by the injury, the surrounding anatomical structures should be evaluated for possible injury and necessary surgical repair as well [2,5,6].

## Conclusion

Internal jugular vein is an important anatomical structure which having detailed knowledge about its anatomy is of great importance specifically for the surgeons and other clinicians whom are dealing with the patients with head and neck and vascular pathologies, to approach its relevant pathologies and damages with more precision and with lowest surgical complications at the bedside.

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