

A Rare Anatomical Variation of the Spinal Accessory Nerve

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Abstract: Anatomical variation of the spinal accessory nerve to the internal jugular vein are reported in the literature and anatomy text. Knowledge of the landmarks of the spinal accessory nerve and its relationship to the internal jugular vein are extremely helpful in its identification during neck surgery for precluding neurovascular complications. The nerve mostly passes lateral (anterior) or medial (posterior) to internal jugular vein at the level of medial aspect of posterior belly of digastric muscle. On the other hand, there is a rare anatomical and surgical variant. As in our case report, we describe an unusual relationship of the spinal accessory nerve to the internal jugular vein. In our case study, the nerve pierces the internal jugular vein.

Key words: Accessory Nerve; Accessory Nerve relation; Jugular Veins; Neck anatomical variation; neck Surgical variation.



Case report:

A 35 years old female medically free presented with neck mass for one month. Physical examination revealed a mass commencing anterior side of the neck with multiple lymph node enlargement involving right sided lymph node level II III IV and V.

Fine needle aspiration report shows papillary thyroid cancer. Patient was taken to operating room and half apron incision from right side. As the dissection proceeded at the upper end of the internal jugular vein, the accessory nerve was detected coursing through the center of the vein (Figure 1). Following surgery, no accessory nerve dysfunction was observed.

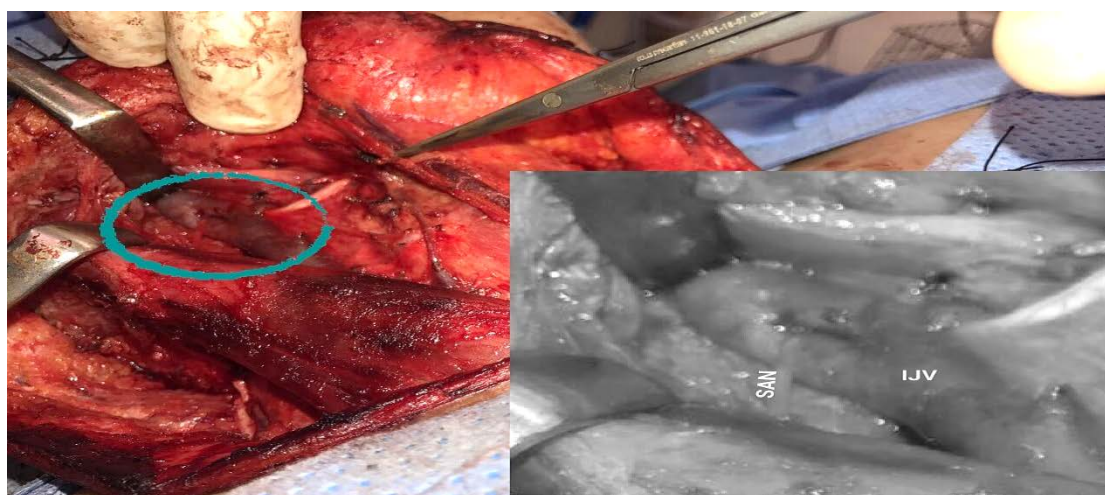


Figure 1

Intraoperative appearance of the patient was shown. (Arrow ring shows the right spinal

accessory nerve passing through the fenestrated internal jugular vein. SAN: spinal accessory nerve, IJV: internal jugular vein.

Discussion:

The anatomic relationship between spinal accessory nerve (SAN) with internal jugular vein (IJV) is very important for precluding neurovascular complications. During surgical intervention dealing with level II; the most important anatomical structure is spinal accessory nerve. The spinal accessory nerve has been described as having various intra- and extra cranial connections with other nerves, and the term 'spinal accessory nerve plexus' has been introduced to describe this(1). A lot of studies in literature it described and define the course of the accessory nerve and its relation to other structures in the neck, however, there is few articles have been published describing rare anatomical variations of this nerve intraoperatively in neck surgery (2–4). Moreover, most publications have been based on cadaver studies (5 –8).

Anatomic relationships and variations between spinal accessory nerve and internal jugular vein must be well known. In the series of Lee et al. SAN passes IJV ventrally (anterior) in 39.8 % of cases, dorsally (posterior) in 57.4 % of cases. There was only 2.8 % of cases SAN passes through the fenestrated IJV like our case (9). In addition, in other series of Christine B et al he fined the most common location of the SAN was lateral to the IJV (95%). In (2.8%) cases the SAN was identified medial to the IJV and 2 nerves pierced the IJV. A new variant of the SAN splitting around the SAN was identified (10).

The terms fenestration and duplication were used interchangeably by authors for describing the accessory lumen of IJV. Downie et al. suggested a new classification; they argued that the term duplication should be used for cases of IJV joining the subclavian vein as separate two veins in an up-side-down Y pattern. They also mentioned that the term fenestration should be used for cases who have IJV branching into two veins for some distance; the veins refuse and enter the subclavian vein as a single vein like our case (11)

Many theories have been trying to explain this duplication(12). The vascular theory is the common one that is usually accepted embryologically. According to this theory, the accessory nerve passes between two veins in fetal life: the lateral and the medial veins of the head. The lateral vein, which is superficial to the spinal accessory nerve, usually disappears, leaving the nerve superficial to the vein. More rarely, the medial vein disappears, leaving the nerve lying deep to the vein. Duplication is thought to result from the appearance of a secondary venous ring at a lower level surrounding the spinal accessory nerve. The persistence of this secondary ring in adult life may be important in the etiology of venous duplication. The other less common two theories assume a neural or bony anomaly. The neural hypothesis depends on the position of the spinal accessory nerve in relation to the transverse process of the atlas. Normally, the nerve emerges in the neck at the level of this transverse process, but it may lie up to 2 cm below the process. If this occurs, development of the internal jugular vein may be disrupted, leading to its duplication. The bony hypothesis suggests that a variation in the ossification of the bony bridges of the

jugular foramen causes the venous duplication. However, this theory does not explain the relation of the spinal accessory nerve to the duplicated jugular vein(13).

Conclusion:

The most common location of the Spinal accessory nerve was lateral to the internal jugular vein. Also there common rare variant as nervewas medial to the internal jugular vein or passing through the fenestrated internal jugular vein. Since the cause of this variation is mostly accepted to be an embryological insult. By the way, the surgeon should be aware the common and rare variation during surgical manipulation in level II to avoidiatrogenic injury to Spinal accessory nerve which can cause shoulder syndrome (9).

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