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A RARE VARIATION OF DOUBLE SUPERIOR THYROID ARTERY- A CADAVERIC STUDY

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ABSTRACT

Background: Thyroid surgery is one of the major surgeries and quite often performed, a thorough knowledge of variations in the arterial supply to thyroid gland is very essential for surgeons to prevent alarming number of table deaths in patients with thyroid disease due to excessive and uncontrollable bleeding. Knowledge about the variations in the origin of superior thyroid artery and its branches are important for surgical procedures in the neck region, such as radical neck dissection and other neck surgeries. **Materials and Method:** 60 sides of the neck from the 30 formalin embalmbed cadavers on both sides (30 right and 30 left) were studied. Dissection method was employed for this study. The infrahyoid group of muscles were identified and reflected. The sternocleidomastoid muscle and superior belly of omohyoid were displaced laterally. The fascia was removed from the lobes of the thyroid gland exposing its arteries and veins and studied the origin of superior thyroid artery and its branches. **Results:** A rare variation of Double Superior Thyroid artery was observed in 3.3% of cases and the accessory superior thyroid artery originated in one specimen from the thyro-linguo-facial and the other specimen from thyro-lingual trunk, the main artery was from external carotid artery. **Conclusion:** From the present study it was concluded that the knowledge of variations of the superior thyroid artery can be used during thyroidectomy surgery and other surgical procedures in the neck region, where the ligation of all the thyroid vessels is highly essential to ensure proper homeostasis.

KEYWORDS: Superior Thyroid Artery, external carotid artery, thyroid gland, thyroidectomy.

INTRODUCTION

The vascular pattern of the human body especially the arterial systems, is one of the systems that show many number of variations. A variation in the origin, course, branching pattern and relation with the adjacent structures of an artery is both interesting and significant for anatomists, surgeons and radiologists. Thyroid gland is a butterfly shaped reddish brown coloured, highly vascular gland situated in the midline of the neck. Blood supply to the thyroid gland shows three to four times higher flow when compared to that of brain[1] and is six times more than the kidney.[2] Each thyroid lobe is supplied by a pair of superior and inferior thyroid arteries, a thyroidea ima artery and is drained by pair of three veins. Blood circulation to the thyroid gland is very rich in the hyperthyroid state and there may be enormous increase in the volume of blood circulating through the gland. Detailed knowledge of Superior thyroid artery becomes essential to carry out surgeries of the thyroid gland without complications.[3]

Thyroid surgery is the one of the surgery, performed since the olden days. It is commonly performed surgical procedure in the various regions of the world, irrespective of its dangerous postoperative complications.[4] Lack of knowledge about the anatomy of Superior thyroid artery contributed to the lethal complication during thyroidectomy – such as haemorrhage and damage to the external laryngeal nerve. Knowledge of the normal as well as abnormality of the superior thyroid artery and its relation with the other structures of the neck region is extremely useful while performing various procedures like radical neck dissections, thyroid resections, tracheostomies and carotid angiographies.[5]

MATERIALS AND METHODS

The study was conducted in the institute of anatomy, Madurai medical college, Madurai, Tamil nadu, with a total number of 60 sides of the neck from the 30 formalin embalmbed cadavers on both sides (30 right and 30 left). The institutional ethical clearance was obtained before the commencement of the study. Observation after dissection method was employed. The superior thyroid artery and its branches were studied by gross dissection method, which involves exposure of the artery in the carotid triangle of the neck, opening of the carotid sheath, tracing its origin from the external carotid artery and its origin, branches were studied in detail.

RESULTS

The results are presented in Table 1. In the present study only 3.3% of cases(in two specimens) exibit a rare variation of double superior thyroid artery. The main artery originated from the external carotid artery. The accessory superior thyroid artery arose as a common thyro-linguo-facial trunk in one specimen on left side and the other it is originated as thyro-lingual trunk on right side , both the trunks arose from the external carotid artery, above the greater cornu of the hyoid bone.

Table 1: Showing the number of superior thyroid artery.

Showing the number of superior thyroid artery			
Side of the neck	**Single**	**Double**	**Absent**
Right side of the neck	29	1	0
Left side of the neck	29	1	0
Total Percentage	58 (96.6%)	2 (3.3%)	0 (0%)

DISCUSSION

Normally, the Superior thyroid artery originated as a single artery from the external carotid artery, but in some rare occasions the artery originated as a double artery from the external carotid artery.

In the present study, the specimen number 8 and 26 (fig 1&2) shows the double superior thyroid artery. In specimen no 8 on the left side the first artery which was from the ECA is considered as a main superior thyroid artery. The main STA was arisen from the ECA, above the level of superior border of thyroid cartilage, which was slightly higher level than normal. The accessory superior thyroid artery originated as a common thyro-linguo-facial trunk from ECA, just above the greater cornu of the hyoid bone. The accessory superior thyroid artery gave the infrahyoid branch and finally ends in the anterior surface of the lateral lobe of thyroid gland as anterior glandular branch. An additional lateral glandular artery arose from the accessory artery and supplies the lateral aspect of thyroid gland. The other branches of the STA arose from the main artery and it ended as a posterior glandular branch and has got normal relation with the external laryngeal nerve.

In the specimen no 26, on the right side the main artery originated from the ECA at the level of upper border of thyroid cartilage, which gives all the branches of the superior thyroid artery except superior laryngeal artery and it continues as posterior glandular branch, which supplies the thyroid gland. The accessory superior thyroid artery arises from the common thyro-lingual trunk just above upper border of thyroid cartilage. The accessory artery gives the superior laryngeal artery which pierces the thyrohyoid membrane and supplies the larynx. Then the accessory superior thyroid artery continues as anterior glandular branch. Finally it ends by anastomosing with the opposite anterior glandular branch.

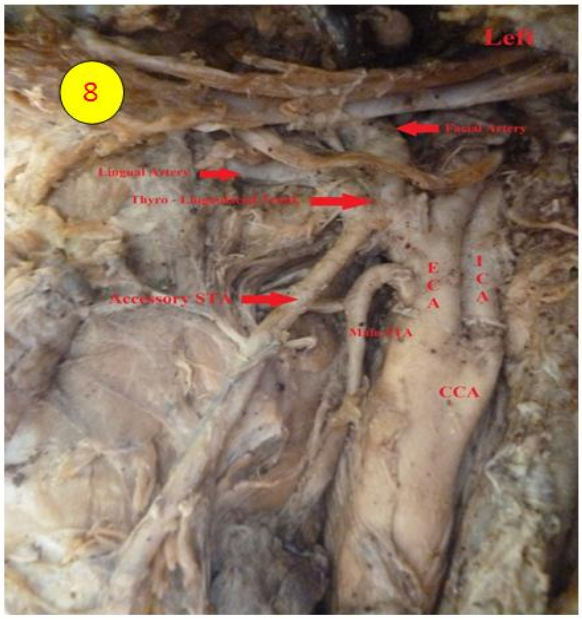

Fig no 1: Shows – double superior thyroid artery and thyro-lingual-facial trunk.

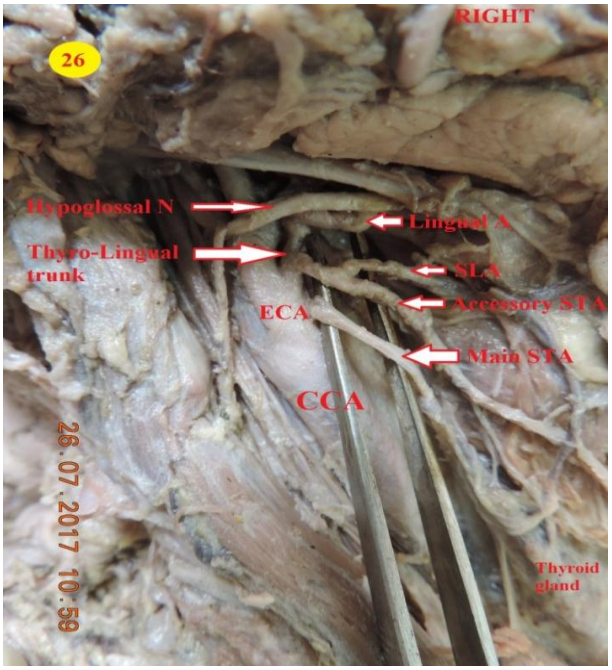

Fig no 2: Shows – double superior thyroid artery and thyro-lingual trunk.

A study conducted in 57 post-mortem cadavers in Bangladeshi people by Kanta Roy Rimi (2009)[6] and colleagues. They studied the number of superior thyroid artery. It was shown that superior thyroid artery mainly arose as a single branch and in a small number of cases it arose as a double superior thyroid artery (in 4 to 6% of cases). In his study, Quain R (1844)[7] stated that variation in the superior thyroid artery origin and he also reported the rare variation of double superior thyroid artery in 1% of cases. The present study showed, in 3.3% of cases the superior thyroid artery originated as a double artery from the external carotid artery. Results are compared with other studies in the table no 2.

Table 2: Show comparison of occurrence double superior thyroid artery in *various studies.*

Quouting author	Double superior thyroid artery
Quain (1844)[53]	1%
Kanta Roy Rimi (2009)[33]	4-6%
Present my study	3.3%

Figun and Garino, (1989)[8] stated that superior thyroid artery has got combined origin with lingual and facial arteries, as common thyro-linguo-facial trunk. Shima et al (1998)[9] mentioned the common origin of superior thyroid artery with the lingual and facial arteries in their studies. Dangelo and Fattini, (2000)[10] reported the occurrence of thyrolinguofacial trunk from the ECA in their studies. The present study also showed thyro-linguo- facial trunk in one specimen.

Schunke et al., (2000)[11] mentioned in their study that, the origin of facial artery, superior thyroid artery and lingual artery was from the external carotid artery as a common trunk. Zumre O and colleagues (2005)[12] studied the branches of the ECA in human foetuses and they stated that, in 2.5% of superior thyroid artery originated as a thyro-linguo-facial trunk and they also mentioned, in 20% of cases showed the linguo-facial trunk and in 2.5% of samples showed thyro-lingual trunk. In the present study, 3.3% of cases the accessory superior thyroid artery arises, one specimen it arises from a branch of a common thyro-linguo-facial trunk which is originated from the external carotid artery and other specimen the accessory artery asises from a common thyro-lingual trunk which inturn arises from the ECA.

CONCLUSION

Based on this study, it can be inferred that 3.3% of cases (in two specimens) exibit a rare variation of double superior thyroid artery. The main artery originated from the external carotid artery. The accessory superior thyroid artery arose as a common thyro-linguo-facial trunk and common thyro-lingual trunk, which inturn is a branch of the external carotid artery. Thus the study of superior thyroid artery is very useful in performing thyroidectomy, carotid artery catheterization, head and neck surgeries, ENT surgeries and it is also essential to the radiologists and interventional radiologists for proper identification and therapy. By having through knowledge about the superior thyroid artery, the iatrogenic injuries can be prevented and proper haemostasis can be obtained.

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