Research Article

Bilateral absence of inferior thyroid artery: A rare variation

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ABSTRACT

Background: There are reports regarding the origin of the inferior thyroid artery from the vertebral artery and internal thoracic artery. The absence of inferior thyroid artery has been reported in studies, but most of these studies have reported the unilateral absence of inferior thyroid artery. **Objective:** The objective of the study was to identify and variations in origin (especially presence or absence of artery) and branches of inferior thyroid artery. **Materials and Methods:** A total of 96 cadavers were dissected and observed for origin and branching pattern of inferior thyroid artery. **Results:** Inferior thyroid artery originated from thyrocervical trunk in 94 cadavers, in one cadaver there are bilateral absence of inferior thyroid artery and in one case unilateral absence of Rt. inferior thyroid artery. Multiple variations of relations of recurrent laryngeal nerve and inferior thyroid artery are found. **Conclusion:** Knowledge of arterial variation is extremely important while carrying out surgical procedures in the neck region. During operations of the thyroid gland, surgeries of neck region, carotid angiographies any misinterpretation can lead to life-threatening complications. This study is not only focusing on the presence of different branching pattern but also the absence of major arteries. Studies like these can help surgeons to look closely for variations in both cases either presence or absence of main arteries.

KEY WORDS: Inferior Thyroid Artery; Thyroid Gland; Thyroid Surgery; Variation

INTRODUCTION

The thyroid gland is a highly vascular endocrine gland that has a very important role in the maintenance of the basal metabolic rate of the body. The thyroid gland is supplied by superior and inferior thyroid arteries and sometimes by thyroidea ima artery from brachiocephalic trunk. Inferior thyroid artery usually arises from thyrocervical trunk then passes posterior to the carotid sheath to supply inferior pole of the corresponding lobe of thyroid gland. Inferior thyroid artery gets terminated by anastomosing with each other and superior thyroid artery.

Anatomy for Surgeons[1] Hollinshead mentioned that one inferior thyroid artery is sometimes absent; the incidence of absence has been from 0.2% to 5.9%. In the absence of inferior thyroid artery, it is usually replaced by a branch from the superior thyroid artery of same side or inferior thyroid artery of opposite side; less frequently its place is taken by thyroid ima artery. Rarely doubling of inferior thyroid artery may occur.

Some authors have reported the incidence of origin of the inferior thyroid artery from the vertebral artery[2] and internal thoracic artery. The absence of inferior thyroid artery has been reported in other studies[1,3-6] but most of these studies have reported the unilateral absence of inferior thyroid artery.

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MATERIALS AND METHODS

A total of 96 cadavers available in the Department of Anatomy Lala Lajpat Rai Memorial Medical College Meerut, Goverment Medical College Surat, Era's Lucknow Medical College and Hospital Lucknow and Goverment Medical College, Pali, were dissected and observed for origin and branching pattern of inferior thyroid artery.

Table 1: Comparison between reported studies of absence of inferior thyroid artery

Studies	Right side		Left side	
	Cases examined	Absent artery	Cases examined	Absent artery
Chandrakala *et al*.[2]	80	3 (3.75%)	80	5 (6.25%)
Gandhi[8]	50	1 (2%)	50	4 (8%)
Bowden[12]	30	00	30	2 (6.66%)
Present study*	96	2 (0.02%)	96	1 (0.01%)

*In present study, in one cadaver there is bilateral absence of inferior thyroid artery and one cadaver absence of Rt inferior thyroid artery was reported

Both sides of the neck of cadavers were dissected, and data related to the absence of inferior thyroid artery, site of origin of inferior thyroid artery, site of an anastomosis of two major arteries and relation of inferior thyroid artery to recurrent laryngeal nerve was collected.

RESULTS

In this study, inferior thyroid artery originated from thyrocervical trunk bilaterally in 94 cadavers, in one cadaver there are bilateral absence of inferior thyroid artery and in one case unilateral absence of Rt. inferior thyroid artery. Multiple variations of relations of recurrent laryngeal nerve and inferior thyroid artery are found. In this study, bilateral absence of inferior thyroid artery is present in 0.01% cases. In this variation, thyroid gland is supplied by anastomosing branches of superior thyroid artery [Figures 1 and 2].

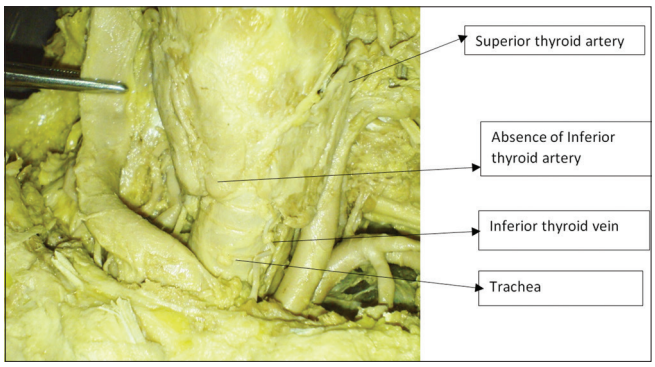

Figure 1: Anterior surface of the thyroid gland with superior thyroid artery and the absence of inferior thyroid artery

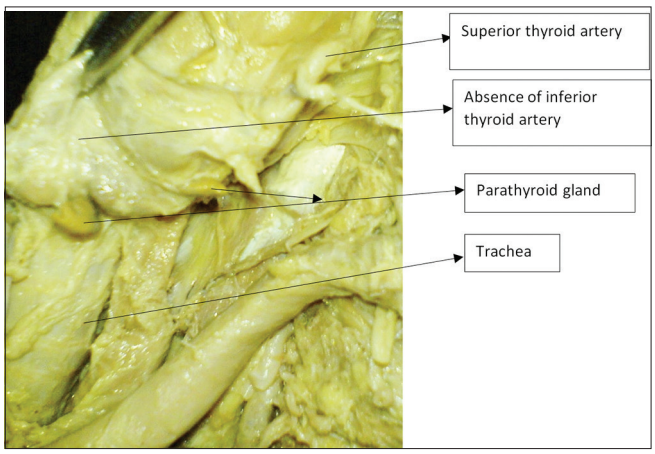

Figure 2: Posterior surface of the thyroid gland with the absence of inferior thyroid artery

DISCUSSION

In this study, inferior thyroid artery originated from thyrocervical trunk in 94 cadavers which is most common variety as described in most of books and studies, in one cadaver there is bilateral absence of inferior thyroid artery, and it is least reported variation and in the present study its incidence is 0.01% and in one case unilateral absence of Rt. inferior thyroid artery which is less reported by others most of the studies as mentioned above is about the absence of left inferior thyroid artery. In addition to, these multiple variations of relations of recurrent laryngeal nerve and inferior thyroid artery were found.

Natsis *et al.*[7] reported an abnormal origin of a left inferior thyroid artery from the left vertebral artery that, in turn, originated from the aortic arch on a 72-year-old Caucasian male cadaver during a dissection anatomy practice.

In a study by Morrigyl and Sturm,[8] absence of the left-sided superior and inferior thyroid arteries was observed. In this case, the thyroidea ima artery originating from the internal thoracic artery supplied the thyroid gland. Similarly Sherman *et al.*[9] during dissection of an adult male cadaver revealed absence of the left inferior thyroid artery; its usual area of distribution to the thyroid gland was supplied by the right inferior thyroid artery.

A rare case of ectopic thyroid tissue in subhyoid region by Rao *et al.*[10] In the same case, median thyroid tissue was supplied by right and left superior thyroid arteries arising from the respective external carotid artery. The inferior thyroid artery was found to be absent on both sides.

Another variation described is a double inferior thyroid artery. Sedy[11] reported a case of doubled inferior thyroid artery on the right side and an accessory thyroid artery arises from subclavian artery.

Thorough observation of arterial supply of thyroid gland is of great importance during the various procedure of to the thyroid gland and neck surgeries to avoid damage to vital structures.

Bilateral absence of inferior thyroid artery is reported in very few studies, and in this case, entire thyroid gland is supplied by anastomosis between superior thyroid artery which is very rare. As this is a cadaveric study, so it is not possible to correlate variations to clinical features.

CONCLUSION

Knowledge of arterial variation is extremely important while carrying out surgical procedures in the neck region. During operations of the thyroid gland, surgeries of neck region, carotid angiographies any misinterpretation can lead to life-threatening complications. This study is not only focusing on the presence of different branching pattern but also the absence of major arteries. Studies like these can help surgeons to look closely for variations in both cases either presence or absence of main arteries.

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