

Agnesis of Isthmus of the Thyroid Gland in an Adult Male Cadaver: A Case Report

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Abstract: The isthmus is a connecting part between the two lateral lobes of the thyroid gland. The anatomical variations of thyroid gland are very common but the absence of isthmus in humans is very rare congenital anomaly. The case was an agnesis of isthmus of thyroid gland adult male cadaver during undergraduate dissection. The absence of isthmus is due to the congenital cause and it may associated with other anomalies like enlarged lateral lobes, absence of one lateral lobe, thyroid nodule and variations in arterial supply. Therefore, the clinicians should keep in mind during differential diagnosis of thyroid pathologies and surgical procedures involving full or partial thyoidectomy.

Keywords: Isthmus, Agnesis, Lateral lobes, Thyroid nodule.

INTRODUCTION

The developmental anomalies of thyroid gland lead to structural variations of adult human beings, which place clinically crucial role in the evaluation and management of thyroid disorders. The thyroid is highly vascular and active endocrine gland placed anteriorly in the lower neck. It is ensheathed by deep cervical fascia and consist of right and left lobes connected by narrow, median part called isthmus [1]. The normal weight of the gland is 25 g, but this varies and it is more in females than males [2]. The conical shaped each lobe is usually 5 cm long, its greatest transverse and anteroposterior extents being 3cm and 2 cm respectively [1]. The isthmus extends across the midline in front of the second, third, and fourth tracheal rings [3]. Occasionally, the isthmus may be absent [1]. The anatomical variations of the thyroid gland are mostly due to the developmental abnormalities [4, 5]. The gland develops as an endodermal thickening in the midline of the floor of the pharynx between first and second branchial arches, during third week of intrauterine life [6]. The thickening is then depressed below the surface to form thyroglossal duct [7].

The incidence of agnesis of the thyroid isthmus has been reported to vary from 5% to 10 % [8, 9]. The anatomical and clinical significance of absence of isthmus is important for medical personnel and the surgeons in effective planning and operating on the thyroid gland [10]. The present case report highlights a rare case of agnesis of isthmus of thyroid gland and its developmental and its clinical significance.

CASE REPORT

The deep dissection of the neck was carried out on 61 years male cadaver in department of anatomy, J.N.M.C., Wardha, Maharashtra. It was observed that the thyroid gland has two lobes with absence of connecting isthmus. The location and the vascular supply of the lobes were absolutely normal. The right and left lobes are pyramidal in shape and the length was 5.5 cm and 4.9 cm respectively. The breadth was 3.8 cm in right lobe and 3.4 cm in left lobe. The nerve supply of both lobes was normal, no accessory thyroid tissue was found.



Fig- 1: Photograph showing the Right and Left of Thyroid gland
RLT – Right Lobe of Thyroid gland, LLT – Left Lobe of Thyroid gland



Fig- 2: Photograph showing the agenesis of isthmus of Thyroid gland
TC – Thyroid Cartilage

DISCUSSION

The developmental anatomy of the thyroid gland is very important to know the reason behind the anatomical variations of thyroid gland. The anatomical variations of thyroid gland are due to a partial persistence of the median or thyroglossal duct failure of the development of the entire gland or a part of the gland results in agenesis [5, 11]. The absence of isthmus is a rare anomaly which can be associated with other types of dysorganogenesis, like absence of lobe or the presence of ectopic thyroid tissue [9, 12].

In present study, 29 adult human cadavers were dissected for routine undergraduate teaching, out of 29 cadavers 24 were male and 5 were female all aged between 35 to 70 years. All the cadavers are dissected carefully, only one male cadaver showed the absence of isthmus with two normal lateral lobes.

Usually the two lobes of thyroid gland are connected by an isthmus in front of the second, third, and fourth tracheal rings [13]. The absence of isthmus is rare in humans [14]. The agenesis of isthmus or any part of the gland is a result of anomalous embryological development [9]. The literature suggests that the chromosome 22 plays a major role in the thyroid development [5, 15].

The incidences of absence of isthmus are more in North West Indian population around 7.9 % [16] when compared to the other regions i.e. 5 to 10% [8, 9, 17].

The study was done on Caucasian cadaver reported that the lobes are enlarged with the results of agenesis of isthmus. Along with the agenesis of isthmus there are some other anatomical variations of thyroid

gland are worthy to note before planning the operating procedure for thyroid surgeries such as enlarged lateral lobes, pyramidal lobe, presence of levator glandulae thyroideae, ectopic thyroid tissue, accessory thyroid tissue and accessory arteries of thyroid gland [5, 18]. Thyroid nodule may be present around lateral lobes of thyroid with absence of isthmus; in such cases the tracheotomy can be potentially dangerous in securing invasive airway during emergencies, injuries [19, 20].

CONCLUSION

A thorough knowledge of the thyroid anatomy and its associated anatomical variations is very important for the clinicians especially surgeons, so as to avoid undue complications pre-operatively and while securing difficult invasive airway.

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