*Case Report*

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# Absent Median Lobe of Thyroid Gland

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**Abstract**

Thyroid gland is the first endocrine gland to start developing in the embryo. The gland is well known for its developmental anomalies ranging from common and frequently seen to rare ones.

1. The common anomalies include:
   a) Persistence of a pyramidal lobe with or without the fibrous cord
   b) Thyroglossal duct cyst
2. The uncommon anomalies are:
   (a) Failure of median lobe (isthmus) to fuse in the midline
   (b) Absence of a part of the lateral lobe
   (c) Ectopic thyroid
3. Thyroid hemi agenesis with or without isthmus is a rare anomaly.

An uncommon and clinically important developmental anomaly of the thyroid gland showing absent median lobe (isthmus) resulting in two separate lateral lobes, resembling two hockey sticks, is reported and discussed.

## Introduction

The thyroid gland is first endocrine gland to start developing in the embryo.[1] The Thyroid primordium becomes identifiable in about 20 somites embryo as a median endodermal thickening in the floor of the developing pharynx between the first and the second pharyngeal pouches.[2] The thyroid gland develops as a median diverticulum which migrates caudally. Within few days, it becomes a bilobed structure, connected to the developing tongue by a stalk known as the thyroglossal duct.[3] The thyroglossal duct is hollow initially, but soon becomes solid. The duct passes in front of the future hyoid bone. The duct soon disintegrates. But its parts may remain along its course to form cysts, fistulae or the pyramidal lobe. The site of origin of this duct is marked by the presence of foramen caecum on the dorsum of the tongue at the junction of its anterior two third and posterior one third.[4] The thyroid gland descends in front of the future hyoid bone and laryngeal cartilages. It reaches its final position by the seventh week of intrauterine life. By that time it has already acquired two lateral lobes connected by a median lobe or the isthmus.[5]

The thyroid gland is a brownish red, highly vascular structure. It lies anteriority in the lower part of the neck against the fifth cervical to the first thoracic vertebrae. The gland is

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encapsulated by connective tissue that is continuous with the pretracheal layer of the deep cervical fascia. This outer or false capsule is loosely connected to a deeper layer of connective tissue that forms the inner or the true capsule. The space between the two capsules contains blood vessels, recurrent laryngeal nerves and the parathyroid glands.[6]

The gland consists of two lateral lobes connected in the midline by a median lobe known as the isthmus, which measures about 1.25 cm transversely and vertically. It lies against second and third tracheal rings.

A conical pyramidal lobe may be seen ascending towards the hyoid bone from the isthmus or the adjacent part of the lateral lobe. It is more often on the left side.[2]

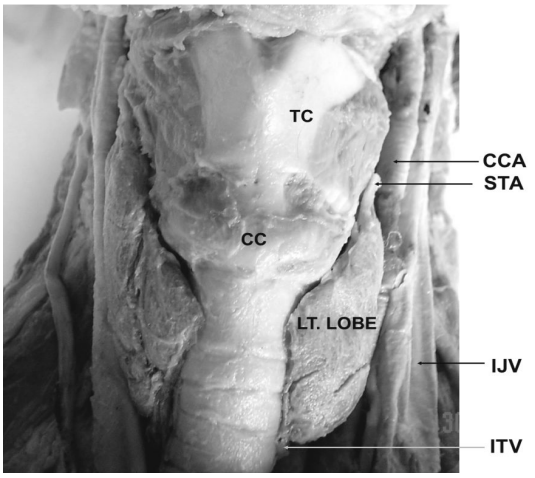
The thyroid gland has an abundant blood supply. The arterial supply to each thyroid lobe is twofold. The superior thyroid artery generally arises from the external carotid artery on each side and descends to reach the upper poles of each lobe where they branch. Each inferior thyroid artery arises from the thyrocervical trunk of the subclavian artery .It crosses beneath the carotid sheath and enters the lower or mid part of the thyroid lobe. Along the posterior border of each lobe, branches from the superior and inferior thyroid arteries anastomose. The arteries ramify on the surface of the gland; form a plexus from which branches enter the tissue. The thyroidea ima artery is sometimes present. It arises either from the arch of aorta or the brachiocephalic trunk and enters the thyroid gland in the midline. Three veins drain each lobe. The superior thyroid vein emerges at the upper pole and drains into the internal jugular vein. The middle thyroid vein emerges at the middle of lobe and either enters into the internal jugular vein or the brachiocephalic vein. Arising from the lower poles, inferior thyroid veins drain directly into respective brachiocephalic veins.[6]

*Observations*

The variations were observed during the routine dissection in a cadaver of a 35 years old male which was procured from the Regional Mental Hospital, Pune as an unclaimed body. No relevant clinical history was available.

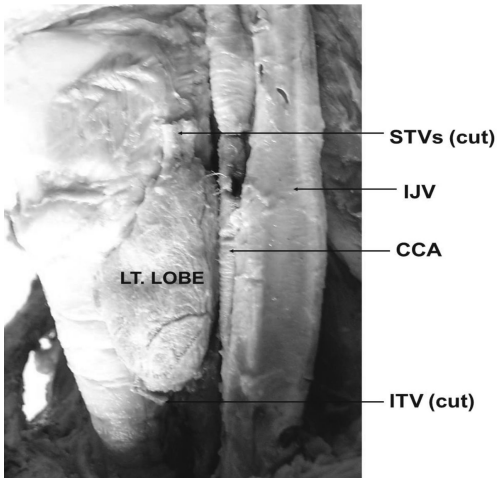
1. During dissection in our specimen two separate lateral thyroid lobes were observed, ensheathed in pretracheal layer of deep cervical fascia.

**Photograph 1: Two separate thyroid lobes without median lobe (isthmus). TC: Thyroid cartilage; CC: Cricoid cartilage; CCA: Common carotid artery; STA: Superior thyroid artery; IJV: Internal jugular vein; ITV: Inferior thyroid vein**

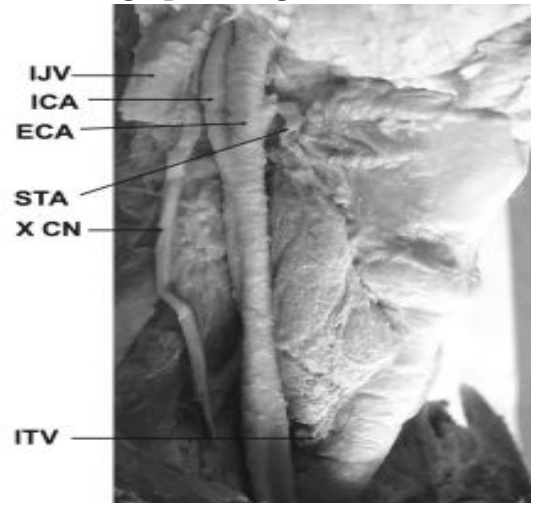



**Photograph 2: Dimensions of separated lobes (Right lobe is larger)**

**Photograph 3: Left lateral view**




**Photograph 4: Right lateral view**




ICA: Internal carotid artery; ECA: External carotid artery

2. The right lobe was slightly larger and higher up then the left lobe. The right lobe was measuring 5.5 cm and X 2.5 cm and the left lobe was measuring 4.5. cm X 2.3. cm.
3. The median thyroid lobe (isthmus) was absent and two separated lateral lobes were seen resembling two hockey sticks.
4. The distance between the free medial borders of two lateral lobes was 1.6 cm.
5. The medial borders of the lateral lobes were related to first to fourth tracheal rings.
6. There was no variation in the arteries supplying either lobe. No cross anastomosis was observed between the superior and inferior thyroid arteries.
7. The venous drainage was normal in both lateral lobes. Superior and middle thyroid vein were seen draining into internal jugular vein. From the lower pole of each lateral lobe emerging inferior thyroid veins were observed, draining into respective brachiocephalic veins.
8. No traces of thyroglossal duct were observed.

## Discussion

Variations in the gross anatomy of the thyroid gland are relatively common. According to Burman *et al*, Marshall in 1895 was the first physician to catalogue the numerous variants observed.[7] Developmental anomalies of the thyroid gland may be classified into the following groups:

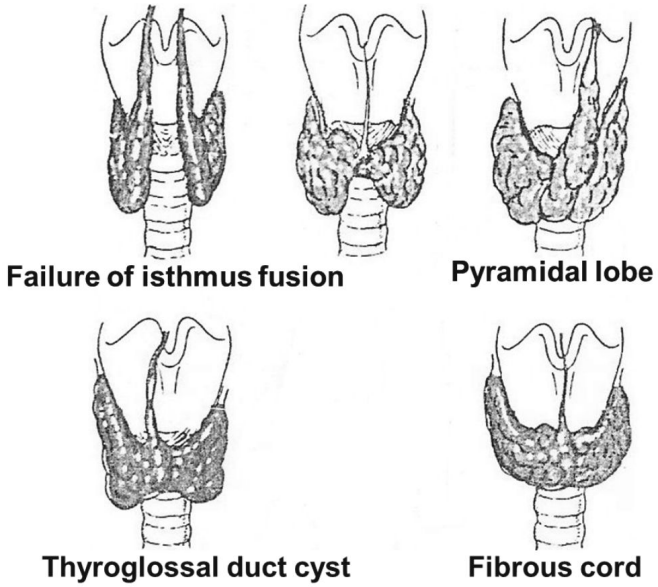
1. Common anomalies include:
   a. Persistence of a pyramidal lobe – 15-30%
   b. Thyroglossal duct cyst – 25%
2. Uncommon anomalies include:
   a. Failure of isthmus to fuse in the midline – 1%
   b. Absence of a significant part of the lateral lobe – 1%
3. Rare anomalies include:
   a. Thyroid hemi agenesis with or without isthmus.[6]

However, Frank H Netter in 1974 has described developmental anomalies of the thyroid gland as under:

1. Persistence of a pyramidal lobe – 15 %
2. Failure of median lobe (isthmus) to fuse in the midline – 1%
3. Absence of a significant part of the lateral lobe – 1 %.[8]

Absent median lobe (isthmus) is an

**Fig 1: Developmental anomalies associated with thyroid gland**




uncommon anomaly in which two separate thyroid lobes exist resembling two hockey sticks. The anomaly presented can be explained on the basis of developmental anatomy. Probably there is division of thyroid primordium into right and left halves along with the division of thyroglossal duct into right and left ducts. From each half of the thyroid primordium only lateral lobes developed. It is difficult to determine the true incidence of thyroid anomalies, since the diagnosis is made in patients only being evaluated for some other thyroid pathology. Thus true frequency can only be determined on the basis of large scale post mortem studies.

The normal thyroid gland is more or less always asymmetric. The right lobe may be even twice as large as the left (8). Hamburger and Hamburger in 1970 suggested that failure or an entire thyroid lobe to develop is an extremely uncommon anomaly and thyroid hemi agenesis is simply an extreme degree of asymmetry in which usually the right lobe persists.[9]

In our case is it a failure of the median lobe (isthmus) to fuse in the midline or failure of the median lobe (Isthmus) to form? Thyroidal agenesis is a congenital anomaly in which one of the lobes fails to develop. If this case is thought to be failure of the development of median lobe (Isthmus) then it can be considered as an agenesis. During our search we could trace similar cases but there were not enough references to verify it.

With the advancement of medical science and availability of diagnostic tools, diagnosis of thyroid variants and anomalies is not very difficult if the physician keeps in mind their existence. In most of the case absence of median lobe of thyroid gland is a benign condition but lack of awareness of its existence may lead to incorrect diagnosis and unnecessary surgery. When the median lobe is absent or fails to fuse with lateral lobes, the medial aspects of the lateral lobes may be misdiagnosed as tumours.[8] Melnick and Stemkowski in 1980 suggested that sonography and CAT scanning may be useful in distinguishing between developmental variations of the thyroid lobes and pathological conditions.[10]

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