

## Persistent Enlarged Thymus in an Adult Human Cadaver

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**Abstract:** Thymus is an irregular bilobed gland situated in the superior and anterior mediastinum. It lies above the pericardium, aortic arch, left brachiocephalic vein, and trachea. Superiorly thymus may extend to the lower pole of thyroid gland and inferiorly up to the diaphragm.. Each thymic lobe is covered by a fibrous capsule. It weighs about 10 to 15 gms at birth and progressively increases in size and weighs about 20 to 30 gms at puberty. There after it undergoes involution and is converted into a fibrofatty mass. Thymus does show morphological variations in the gross anatomy. It may be persistent in the adult. This fact is clinically important for radiologists to make a differential diagnosis in case of a mediastinal mass. A thorough knowledge of the embryology and anatomy of the thymus, normal variations and ectopic locations of thymus and its dynamic changes is necessary before doing any invasive procedure.

**Key words:** Fibrofatty, Involution, Mediastinal mass, Persistent, Thymus

### I. Introduction

Thymus is a primary lymphoid organ located in the chest, behind the sternum and anterior to the heart. Early in life it is quite large and plays an essential role in the development of the immune system. It weighs about 40g at puberty and then slowly atrophies to 10-15g late in life, when much of the parenchyma has been replaced by connective tissue and adipose cells<sup>1</sup>. It is a ductless gland hence it also belongs to endocrine system. It synthesises thymic hormones which strengthen the immune system. During neonatal and postnatal life it is essential for the normal development of lymphoid tissue<sup>2</sup>. A reduction in thymic function results in greater susceptibility to tumors, rheumatic disease, growth disorders and general geriatric conditions<sup>3</sup>. It is one of the earliest glands to start involution after 15 years of age. Age associated involution seems to be reversible<sup>2</sup>. Thymus is sensitive to any kind of bodily stress, including systemic infection, neoplasms, surgery and chemotherapy and responds with rapid atrophy only to regrow its original size or even larger<sup>4</sup>. Thymus consists of two pyramidal lobes. It is located in the mediastinum behind the sternum and in front of the pericardium and great vessels of the heart in the adult. The bilateral primordia of thymus develop in the region of superior neck from the endoderm of third pharyngeal pouch<sup>5</sup> in early fetal life and reach final destination in the mediastinum by progressive descent. The thymus is attached to the thyroid by thyrothymic ligament<sup>6,7</sup>. There are limited reports on variations in thymic anatomy.

### II. A Case Report

During routine dissection of thorax in Dr. D.Y. Patil Medical College, Pimpri, Pune a large bilobed persistent thymus gland was found in an approximately 65 year old male cadaver. The dissection was done as follows<sup>8</sup> - A vertical incision over the skin of thorax was given extending from the suprasternal notch to the xiphoid process. The skin was reflected following which the pectoral muscles were exposed. The pectoralis major and minor muscles were reflected. The thoracic cage was cut at the costochondral junction and the anterior thoracic wall was removed. The thoracic cavity was exposed. The fascia over the anterior mediastinum was dissected carefully and a large bilobed thymus gland was found below the thyroid gland.

Following observations were noted –

- The gland was seen to be extending from the neck below the thyroid gland into the superior and anterior mediastinum.
- The length of the gland measured from upper pole to the lower pole was found to be 12cms. The width of the gland in the superior mediastinum was 3cms, in the middle of anterior mediastinum was 3cms and in the lower part of anterior mediastinum was 5cms.
- The gland showed following relations –
  - a) Anteriorly – Sternum. The sternopericardial ligaments passed between the two lobes of the gland.
  - b) Posteriorly – Pericardium and the heart
  - c) Laterally – Right and left lung
  - d) Superiorly – Thyroid gland
  - e) Inferiorly - Diaphragm

- Two thymic veins were found draining into the right brachiocephalic trunk separately. Two veins were observed coming from thyroid gland which joined to form a single trunk and drained into right brachiocephalic vein.



**Figure 1 - Anterior view of thymus**

1. **Thyroid gland**
2. **Persistent Thymus**
3. **Right lung**
4. **Left lung**
5. **Pericardium & Heart**
6. **Right lobe of thymus**
7. **Left lobe of thymus**



**Figure 2 - Thymus gland turned to view its posterior aspect**

- 1 : **Vein coming from thymus**
- 2 : **Vein coming from thymus**
- 3 : **single trunk formed by two veins coming from thyroid gland**
- 4 : **Right brachiocephalic vein**
- 5 : **Persistent Thymus**

### **III. Discussion**

- Thymic primordia arise from the ventral wing of the endoderm of the 3<sup>rd</sup> pharyngeal pouch during the 6<sup>th</sup> week of gestation. During the 7<sup>th</sup> week<sup>2</sup> thymic primordia elongate and grow caudally and meet with the opposite fellow thymic rudiment in front of the aortic sac. Initially both ventral and dorsal wings of this pouch communicate with the primitive pharynx by the superior pharyngobranchial duct. Eventually the duct disappears.
- Descent of the heart and caudal migration of the aortic sac lead to the caudal migration of thymic rudiments<sup>9</sup>.
- The thymus shows morphological variation in gross anatomy. It may be persistent in the adult. This fact is clinically important for radiologists to make a differential diagnosis in case of a mediastinal mass.
- A thorough knowledge of the embryology and anatomy of the thymus, normal variations and ectopic locations of the thymus and its dynamic changes is necessary to avoid invasive procedures.

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