

Thymus Gland, a Rarely Observed Structure in the Dissecting Room, Report of Two Cases

Amit Massand¹, Mohammed Asif¹, Latha V. Prabhu¹, B.V. Murlimanju¹, Mangala M. Pai¹

¹Department of Anatomy, Kasturba Medical College, Mangalore, Manipal Academy of Higher Education, Manipal, India

Disclose and conflicts of interest: none to be declared by all authors

ABSTRACT

Introduction: thymus gland is an infrequently observed structure in the cadaveric dissection. It is a primary lymphoid organ, which is made up of two lobes and enveloped by a capsule. It involutes at the time of puberty and is eventually replaced by the fatty tissue, which is known as remains of thymus. Thymus receives the nutrition by the branches of internal mammary artery and inferior thyroid artery. During our routine dissection procedure performed for the medical students, we observed only 2 cases over the past 10 years. The knowledge of anatomy of thymus will be enlightening to the students. The details of its morphology is supportive to radiologists and surgeons for the differential diagnosis. This will help in preventing the biopsy.

Keywords: Dissection; Mediastinum; Puberty, Thymus gland.

Introduction

Thymus gland is a bi-lobed primary lymphoid organ, which develops from the third pharyngeal pouch. It is lobulated in morphology, pinkish in appearance. It produces T-lymphocytes and it is a content of the anterior mediastinum. However, this may extend into the superior mediastinum and rarely can reach up to the lobes of thyroid gland. It gets its arterial supply by the branches of internal mammary artery and inferior thyroid arteries¹. It weighs about 10-15 grams at birth, which may reach to 20-30 grams, during the puberty. Thymus starts involuting after the puberty and replaced by the fatty tissue. But in a middle aged person, it can still weigh about 10 grams. Thymus gland enlarges in size in some autoimmune disease like myasthenia gravis. In the medical anatomical teaching, thymus gland is a rarely detected structure. This is because, the medical teaching usually utilizes aged adult cadavers, which are donated cadavers. It is believed that, thorough knowledge of anatomy, morphology and embryology of the thymus gland is essential to the students. This will help them to become good doctors in their clinical practice in the future. Here we report 2 cases of thymus gland, which were observed in adult dissecting room cadavers. We observed only these 2 cases over the past 10 years. The morphology and surgical anatomy of the thymus gland will be emphasized in this report.

Case Report

Case 1

During our routine dissection executed for the teaching of first year medical students, a thymus gland (Fig. 1) was observed in a male cadaver of approximately 55 years of age. It was present at the

anterior mediastinum and found superficial to the pericardium. The thymus was having two lobes which were connected by an isthmus (Fig. 1). It was soft in consistency and was 25 grams by weight. This organ was confirmed histologically by performing the eosin and haemotoxylin staining. The thymic corpuscles (Fig. 2) were observed in the sections studied. The thorough visualization of microscopy revealed the normal histology of thymus. This thymus was demonstrated to our students and is now presently preserved in our departmental anatomy museum.



Figure 1. Thymus gland observed in an adult male cadaver of 55 years of age. It was having bilobar morphology, which were interconnected by an isthmus.

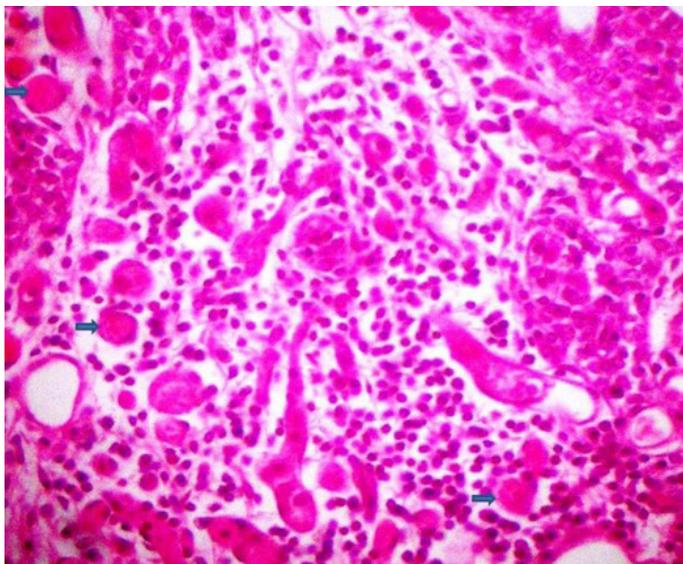


Figure 2. The microscopic picture of thymus, showing the Hassall's corpuscles (→); Stain: haematoxylin-eosin.

Case 2

During the regular dissection class of anatomy for the first year MBBS, in a male cadaver, of 47 years, it was found to have a lump in the mediastinum. This was located in the anterior mediastinum, anterior to the pericardium and heart, posterior to the body of the sternum. It was a bilobed swelling, from upper to the lower end. Both the lobes of this swelling were found merged in the mid-part. It was also observed that the structure was extending from lower portion of thyroid region to the upper portion of pericardium (Fig. 3), going behind the medial border of right and left lungs. After the discussion with the colleagues, it was considered as the structure detected is a thymus gland. In this case, the upper left lobe of thymus was pierced by the left brachiocephalic vein. After tracing the arterial supply of it, on right side it was supplied by right pericardiophrenic artery, which is a branch of

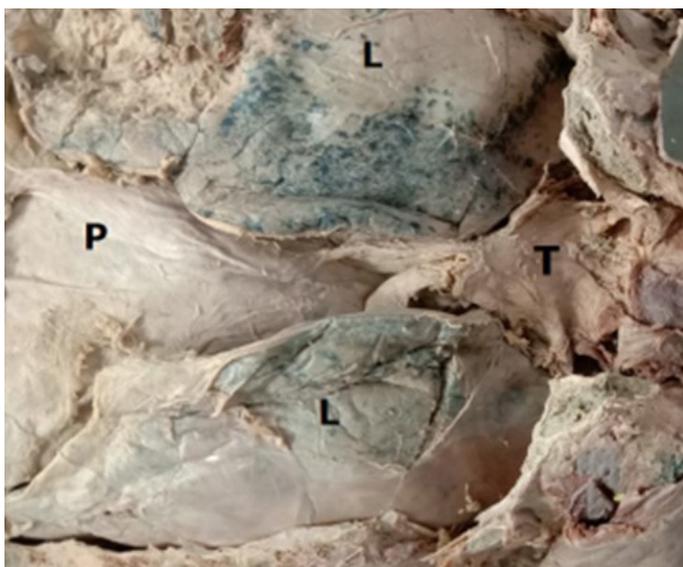


Figure 3. Thymus, which was divided inferiorly into two lobes, which were blended with the pericardium (T-thymus; L-lung; P-pericardium).

right internal thoracic artery and there was no arterial supply from the left side. However, this thymus gland was having plenty of venous drainage, mainly it was drained by the thymic veins and inferior thyroid veins. The weight of this thymus gland was 22 grams, after removing from the cadaver. The right border of thymus was measuring 90 mm and left border was measured 135 mm in length. The hematoxylin and eosin staining of the tissue was done.

Discussion

The thymus gland may appear in various morphology and size. In a radiological study by Araki *et al.*², 74% of cases had complete fatty replacement of the thymus, 18% cases had fatty attenuation and 7% of the cases showed semi-fatty and semi-soft tissue attenuation. Susimitha and Anitha³ reported a very bigger sized thymus in a cadaver, which was bilobed. Nayak *et al.*⁴ also reported a bilobed thymus in an elderly male cadaver, but this had lobes only in the superior aspect. In the present study also, the observed two cases had bilobed morphology. The arterial supply and venous drainage of thymus is known for its variability. Usually thymus gets arterial supply by the inferior thyroid artery, internal mammary artery, pericardiophrenic artery and anterior intercostal artery. The venous drainage of thymus is also known for its variations, however most of the times, thymus is drained by the left brachiocephalic vein and internal mammary vein⁵. In one of our cases, it was found that the right and left inferior thyroid veins and thymic veins were the major venous drainage. These were the tributaries of left brachiocephalic vein.

Enlarged thymus gland is common in children but rare in adults. It is very important to distinguish the persistent thymus gland from any pathological condition⁶. Kissan *et al.*⁷ reported the benign thymic enlargement after the chemotherapy in a patient of malignant teratoma of testis. In one of our case, the male cadaver had history of malignancy and probably he must have undergone for chemotherapy. This enlarged thymus gland of 22 grams must be due to the rebound phenomenon after the chemotherapy in this case. There are chances that, a radiologist may mistake the rebound hyperplasia of thymus as a thymoma case⁸. So it is important to understand this condition of thymic enlargement due to chemotherapy. This is particularly important to the radiologist and cardiothoracic surgeon. In our other case, we could not able to figure out the cause for this enlargement. In our both the cases, the microscopy revealed the normal histology. The haematoxylin and eosin staining revealed mainly of fatty tissue with some lymphatic infiltration and thymic corpuscles. There may be possibility of an anatomical variation and hypertrophy of thymus due to post chemotherapy. Enlargement

of thymus found in the middle age person, cannot be considered as normal. This condition leads to lots of confusion to rule out the exact cause.

Conclusion

The present study provided morphological details of thymus in two cases, which were observed in dissecting room specimens. The knowledge of

thymus, change of its size during different stages of life, variations in blood supply, hypertrophic changes due to some medications are very important before performing the biopsy and surgical intervention. The details can be helpful to thoraco-cardiac surgeon, oncologist, anatomist and general physician. We also believe that the details about the thymus are also essential to a medical student in the future.

References

1. Snell RS. Clinical anatomy for students, 9th ed., Lippincott, William & Wilkins, Philadelphia, 2012. pp. 100.
2. Araki T, Nishino M, Gao W, *et al.* Normal thymus in adults: appearance on CT and associations with age, sex, BMI and smoking. *Eur Radiol* 2016;26(1):15-24.
3. Susimitha SV, Anitha V. Presence of large bilobed thymus in adult male cadaver. *Int J Anat Res* 2014;2(3):541-544.
4. Nayak SB, Kumar N, Aithal PA, Shetty SD, Rao SS, Guru A. Possibly active persistent thymus found in a human adult cadaver: a morpho-histological study. *Online J Health Allied Sci* 2015;14(4):15.
5. Rezzani R, Nardo L, Favero G, Peroni M, Rodella LF. Thymus and aging: morphological, radiological, and functional overview. *Age (Dordr)* 2014;36(1):313-351.
6. Nasser F, Eftekhari F. Clinical and radiologic review of the normal and abnormal thymus: pearls and pitfalls. *Radiographics* 2010;30(2):413-428.
7. Kissan CM, Husband JE, Nicholas D, Eversmn W. Benign thymic enlargement in adult after chemotherapy: CT demonstration. *Radiology* 1987;163(1):67-70.
8. Kumar V, Abbas A, Fausto N, Aster J. Robbins and Cotran Pathologic Basis of Disease, 8th ed., Elsevier, Gurgaon, 2013.

Received: July 18, 2022
Accepted: July 27, 2022

Corresponding author
BV Murlimanju
E-mail: flutemist@gmail.com