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Anatomy

PERSISTENT BILOBED THYMUS GLAND IN AN ADULT HUMAN CADAVER

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ABSTRACT Thymus is a bi-lobed ,irregular gland located in the superior and anterior mediastinum (Nayak SB et al,2015). It is present anterior to pericardium, aortic arch, left brachiocephalic vein, and trachea. The Thymus is one of the two primary lymphoid organs (Gayatri et al ,2016).Thymus sometimes extends superiorly upto 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 gradually increases in size and weighs about 20 to 30 gms at puberty. There after it undergoes involution and is converted into a fibro-fatty mass. It may be persistent in the adult. This fact is clinically important for radiologists to make a differential diagnosis in case of a mediastinalmass(prabhaRranjanTripathy et al,2019). A thorough knowledge of the embryology and anatomy of the thymus and ectopic locations of thymus and its dynamic changes is necessary before doing any invasive procedure(KC Sudikshya et al,2017). **Materials And Methods:** During routine dissections in the Department of Anatomy in K.M.C , Kurnool A.P, from 2020 to 2022, The study was carried out on 20, embalmed adult cadavers which are kept for the students during the regular dissection . A large bilobed thymus was found in an Adult male cadaver. **Result And Conclusion:** Thus we found a large bilobed thymus in adult male cadaver.This fact is clinically important for radiologist to make differential diagnosis in case of mediastinal mass .A thorough knowledge of normal anatomy of the thymus , variations and ectopic location of thymus, its dynamic changes are neccessary before doing any therapeutic,diagnostic and invasive procedures.

KEYWORDS : Thymus, bilobed , Involution, Persistent, Fibrofatty tissue

INTRODUCTION

Thymus is a primary lymphoid organ situated in the anterior mediastinum of thorax, behind the sternum and anterior to the heart(sapnashevade et al;2012) .Thymus is the first lymphoid organ to be developed(susimitha et al; 2014). Early in life it is large and plays an essential role in the development of the immune system. It weighs about 20-30gm at puberty and then gradually atrophies to 10-15g in later part of life, when much of the parenchyma has been replaced by connective tissue and adipose tissue(Rajusugavasi et al;2012) . It produces thymic hormones. During neonatal and postnatal life, it is important for the normal development of lymphoid tissue. Reduction in thymic function results in greater susceptibility to tumors. Age related involution is reversible. Thymus is sensitive to bodily stress, systemic infection, neoplasms, surgery and chemotherapy and responds with rapid atrophy to regrow its original size or even larger (sapnashevade et al;2012). Thymus gland contains right and left pyramidal lobes. It is situated in the mediastimum behind the sternum and in front of the pericardium and great vessels of the heart in the adult. Embryologically its each lobe develops from 3rd pharyngealpouch of same side(JyothiKiran Kohli;2014) in early fetal life and reach its final position in the mediastinum by progressive descent. There are limited reports on variations in thymus anatomy.

MATERIALS AND METHODS

During routine dissections of thorax in Kurnool medical college, Kurnool from 2020-2022 among 20 adult human embalmed cadavers, a large bi-lobed persistent thymus gland was found in an adult male cadaver. The dissection was done as follows - 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 cut then were reflected. The thoracic cage was cut at the costo-chondral 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 bi-lobed thymus gland was found in the anterior mediastinum.

To ensure whether the mass is thymus gland or adipose tissue in the neck region ,1 cm thicness tissue section of thymus specimen has been taken from cadaver and Performed tissue processing in Automatic tissue processor ,Paraffin block prepared, microtomy done, sections mounted on slide & H&E staining procedure done as per standard text books method. Then the cover slip mounted by using DPX. Slide is observed for findings.

OBSERVATIONS

Gross anatomy:

- The gland was seen to be extending from the neck 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 7cms and in the lower part of anterior mediastinum was 5cms (Fig. 2).

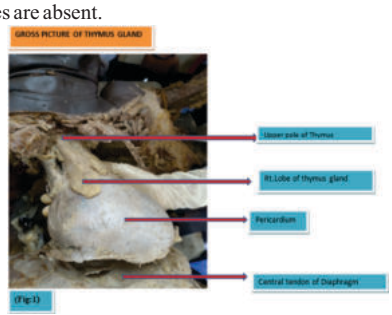
Relations :(Fig.1, 2)

a) Anteriorly - Sternum.
b) Posteriorly -Aortic arch, Pericardium and the heart
c) Laterally on both sides– Right lung hilum and left lung hilum
d) Inferiorly – Extending upto upper 1/3rd of pericardium

Microscopic Anatomy: (Fig. 3, 4)

The microscopic study of the H&E stained sections under lower magnification showed(Fig :3&4)

1) More fibro-fatty tissue in the gland.
2) Few areas of aggregations of lymphocytes are seen
3) Few Blood vessels were also present in the section.
4) Few Hassall's corpuscles were in the centre of lymphocyte aggregations
5) Lobules are absent.



(Fig:1)

(Fig.2)

Histology of thymus

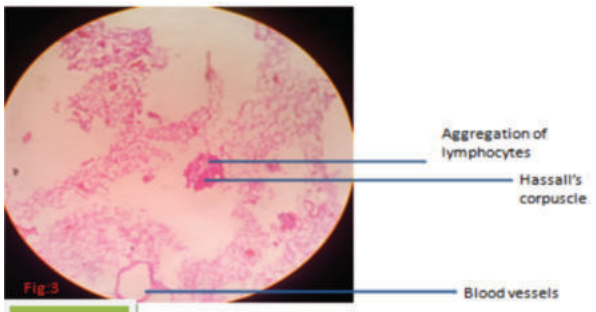


Fig: 3

Thymus histology

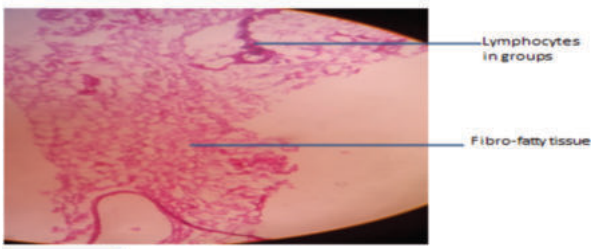


Fig: 4

DISCUSSION

Thymus appears in a variety of shape and size even in same individual at different ages of life. This is mainly because involution during development and partially due to acute shrinkage of thymus during bodily stress. During recovery period, it grows back to its original or even larger size. This phenomenon is known as thymic rebound hyperplasia. Rebound hyperplasia is commonly in children may also occurs in adults. These anatomic variations and dynamic changes appears as main source of confusion. These misinterpretations with pathological condition may lead to prolonged chemotherapy or radiotherapy or unnecessary biopsy. Thus it sets a major confusion for radiologist. Presence of thymus in adult life may be normal or abnormal. The pre pubertal thymic glands were pyramidal in shape, pinkish grey to brown in color while post pubertal thymus were flattened, varied from greyish white to yellow (Krishna Murthy JV, et al,2010) shows. Surgeons dealing with mediastinal structures should have a better knowledge about these variatons. It may be incessant in the adult. Gross features of previous authors were mentioned in the tabular form compared to present study.(table:1)& in the histological findings were compred to are shown in the table no:2.

Table No:1-Comparitive Gross Findings Of Thymus Gland

S r. no	STUDIES	EXTENSION OF THYMUS GLAND	MEASUREMENTS (vertical x horizontal measurement)
1	Nayak SB et al	It extended from root to the neck to the superior mediastinum	12X9Cm
2	KC Sudikshya et al	Extending from root of the Neck below the thyroid gland, to the superior And anterior mediastinum.	5cmx3.2cm(Rt.lobe) 1.4 cmx 2 cm (Lt.lobe)
3	Prabharranjantripathy et al	Lower part of thyroid gland to fifth costal cartilage. It was present In the anterior mediastinum	14.752 cm x6.974 cm (Rt. Lobe) 12.417 Cm X 6.03 Cm (Lt. Lobe)
4	Sapnashevade et al	Gland was seen to be extending from the neck below the thyroid gland into the superior and anterior Mediastinum.	12X3 Cm
5	JyothikiranKohli	Thymus lies in superior and anterior-inferior mediastinum extending inferiorly to fourth costal cartilages	7X3Cm
6	Present study	Extending from the neck into the superior and anterior mediastinum	12X7Cm (Both lobes are equal)

Findings of present study are similar to that of study done by most of the authors mentioned above.

Table No:2 - Histological findings compaired to other studies

Sr.no	STUDIES	HISTOLOGICAL FINDINGS
1	Prabhasranjantripathy et al	The thymus showed fatty infiltration and blood vessels. Lobules were not demarcated.
2	Rajusugavasi et al	The number of Hassall's corpuscles was less but Found the larger size in diameter. The Parenchyma arranged as small islands between replaced Connective and adipose tissue.
3	Present study	More fibro-fatty tissue in the gland with few areas of aggregations of lymphocytes & Blood vessels. Few Hassall's corpuscles were in the centre of lymphocyte aggregations&Lobules are absent.

In histological findings: when compared to other studied findings mentioned in table :2

Findings of present study are similar to that of study done by Prabhasranjantripathy et al ,but didn't commented on Hassall's corpuscles.

Finding are similar in caseofHassall's corpuscles with that of finding mentioned by Rajusugavasi et al.

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