

Original Research Article


# Observation of various thymic lesions in pediatric age group

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## Abstract

**Background:** The thymus is a central lymphoid organ that plays a vital role in the development and maturation of the immune system during childhood, the thymus appears as a bilobed triangular structure located in the anterior mediastinum.

**Aim and objectives:** To provide radiologists a comprehensive understanding of Recognition of the variable appearance of thymic lesions and evaluation of thymic lesions on different radiological modalities like X-Rays and CT-scan for early diagnosis as well as management.

**Materials and methods:** 10 cases of either strong suspicion or symptoms related to thymic lesion were evaluated who came to Dhiraj Hospital with different radiological modalities (X-ray, CT-scan).

**Results:** Out of total no. of 10 patients who were diagnosed and evaluated with thymic lesion on X-rays and CT-scan are: Thymic Hyperplasia, Thymic Cyst, Thymic Lymphoma, Thymoma, Benign Teratoma, Malignant Teratoma.

**Conclusion:** CT Imaging remains the ideal scanning modality to evaluate Radiologists play a major role in differentiating normal thymus from its variants, various thymic lesions and tumor. But common associated radiological modality used along with CT scan done is X-ray.

## Key words

Thymic lesions, X-ray, CT scan.

## Introduction

The thymus is a central lymphoid organ that plays a vital role in the development and

maturation of the immune system during childhood, the thymus appears as a bilobed triangular structure located in the anterior mediastinum [1-3].

At imaging, the thymus appears in a variety of shapes and sizes, even in the same individual. At birth it is about 5 cm in length, 4 cm in breadth, and about 6 mm in thickness. The organ enlarges during childhood, and atrophies at puberty.

A variety of pathologic conditions are known to be associated with thymic lesions like, thymic hyperplasia, thymic cyst, thymoma, thymic teratoma thymic lymphoma [4, 5].

### **Aim and objectives**

To provide radiologists a comprehensive understanding of

- Recognition of the variable appearance of the normal thymus and thymic lesions.
- To avoid mistaking the gland for a mediastinal mass and to diagnose an anterior mediastinal mass correctly even in the presence of significant thymic tissue.

### **Materials and methods**

Thymic imaging was evaluated retrospectively in 10 patients with clinical evidence of thymic abnormality that came to radiology.

This study aimed at diagnosing thymic lesions presenting at radiology department of Dhiraj general hospital, by using CT scan.

**Setting:** Department of Radiodiagnosis, Dhiraj General Hospital, SBKS Medical College and research centre.

**Population:** All the patients presented to Dhiraj General Hospital for the purpose of diagnosis and treatment.

### **Selection of patients**

#### **Inclusion criteria**

- Only those patients who were willing to participate in study were included.
- Patients referred to the radiology department for CT scan with complaints of swelling in the neck and found to have thymic lesion, were included in this study.

- Already diagnosed cases of thymic lesions which need follow up radiological investigations and were referred to our radiology department were included in study.
- Patients came for CT scan for diseases other than thymic lesions, and were accidentally found to have thymic lesion, were included in this study.

#### **Exclusion criteria**

- Patients presented to radiology department having thymic lesion in past and were cured completely were excluded from the study.

#### **Description of Tools**

- CT scan Machine: Emotion semiens 16
- Contrast agent used: Urografin

### **Results and Discussion**

#### **Normal thymus**

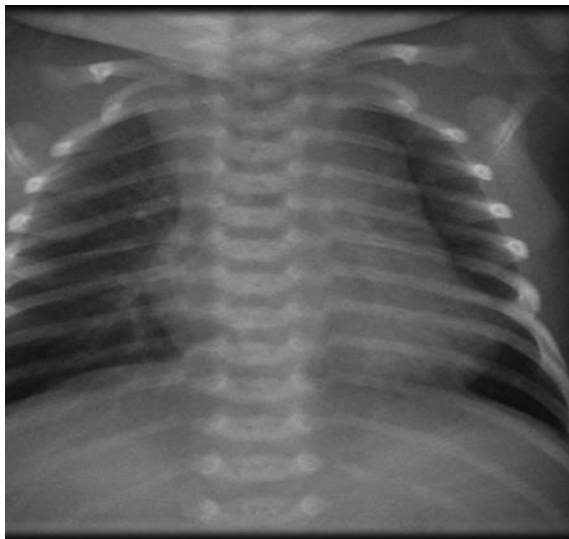
- In infant and young children thymus is of a pinkish-gray color, soft, and bilobed gland.
- In older children, the thymus gradually assumes a triangular or arrow head configuration with straight or concave margins.
- By 15 years of age it is triangular in nearly all individuals.
- Chest X-ray images showed normal appearance of thymus (**Photo – 1**).
- At CT, the thymus appears as a bilobed triangular structure located in the anterior mediastinum (**Photo – 2**).

#### **Thymic hyperplasia**

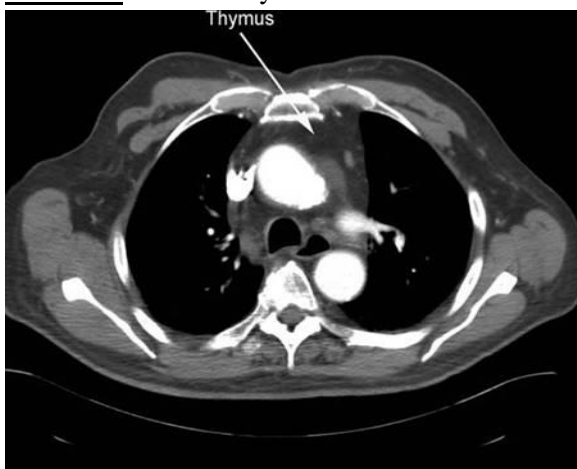
- Diffuse symmetric enlargement of the gland which remains normally organized, beyond the upper limit of normal for a given patient age.
- In childhood, thymic hyperplasia is most often 'rebound' hyperplasia associated with chemotherapy, particularly therapy with corticosteroids.

- In lateral chest X-ray shows wedge shaped (normal in shape) Soft tissue opacity and antero-superior mediastinum (Photo – 3, 4).

**Photo – 1:** Normal thymus – Chest X-ray.



**Photo – 2:** Normal thymus – CT scan.



**Photo – 3:** Thymic hyperplasia – Chest X-ray.

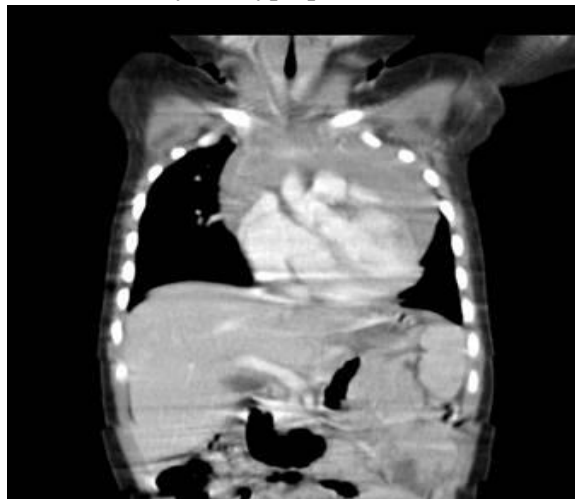


**Photo – 4:** Thymic hyperplasia – Chest X-ray.



- Diffuse homogenous isodense lesion occupying antero-superior mediastinal region as per CT scan (Photo – 5, 6).

**Photo – 5:** Thymic hyperplasia – CT scan.



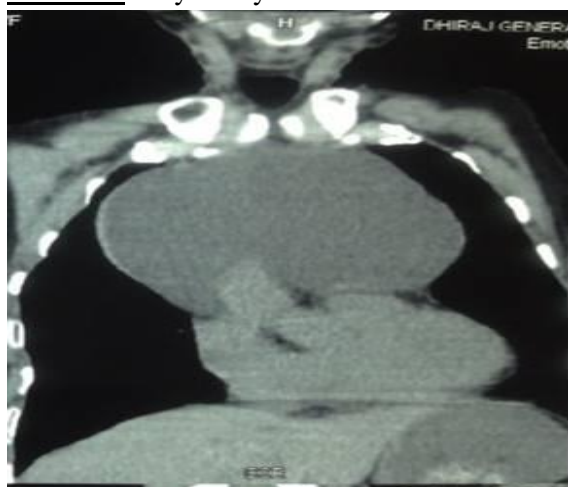
**Photo – 6:** Thymic hyperplasia – CT scan.



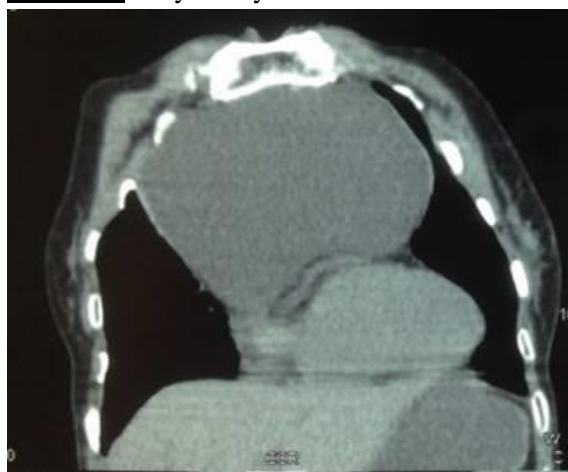
### Thymic cyst

- Thymic cysts are usually congenital lesions resulting from persistence of the thymopharyngeal duct, can also occur after thoracotomy.
- Typically, they are thin walled, homogeneous masses of near water attenuation and higher than simple cyst on CT (**Photo – 7, 8**).
- Cystic lobulated hypodense lesion in anterior mediastinum of fluid density without calcification.

**Photo – 7:** Thymic cyst – CT scan.



**Photo – 8:** Thymic cyst – CT scan.



### Lymphoma

- Lymphoma may involve the thymus as part of disseminated disease. Hodgkin disease accounts for the majority of thymic lymphomas.

- The major imaging findings include thymic enlargement, with mediastinal single or multiple nodular masses.
- Chest X-ray findings shows soft tissue opacity in anterior mediastinum. Diffuse indistinct Iso-hypodense lesion in anterior mediastinum Pretracheal, paratracheal and post tracheal region and displace the major vessels without calcification (**Photo – 9, 10**).

**Photo – 9:** Lymphoma – Chest X-ray.



**Photo – 10:** Lymphoma – CT scan.



### Thymoma

- Thymic carcinomas are extremely rare and account for less than 1% of all thymic tumors.
- Appears as a enlarged, asymmetrical smooth, lobulated mass in the superior aspect of the anterior mediastinum. The mass may be calcified or cystic.

- Soft tissue mass with well-defined margin and foci of calcification in anterior mediastinum.
- Post contrast study shows inhomogeneous enhancement (**Photo – 11, 12**).

**Photo – 11:** Thymoma – CT scan.



**Photo – 12:** Thymoma – CT scan.



#### Germ cell tumor (Teratoma)

- Germ-cell tumors are the second most common cause of an anterior mediastinal mass in children.
- Most common is Benign Teratoma which appears as a well-defined, thick-wall cystic mass containing a variable mixture of water, calcium, fat and soft tissue.
- Malignant teratoma makes up 10 % of all teratoma. They tend to have irregular or nodular walls and a predominance of soft tissue components.

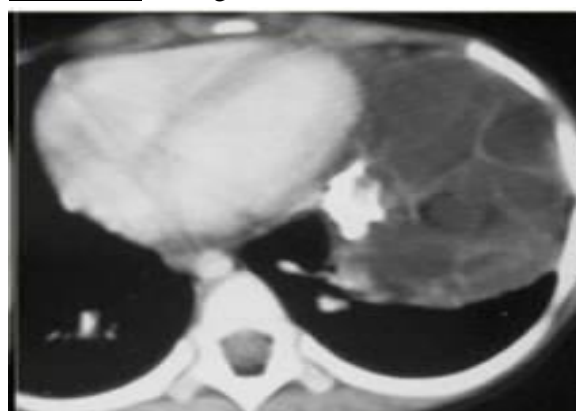
#### Benign teratoma

- There is mix density mainly cystic hypodense with enhancement noted.
- Calcification and fat also seen (**Photo – 13, 14**).

**Photo – 13:** Benign teratoma.



**Photo – 14:** Benign teratoma.



Distribution of various thymic lesions was as per **Table – 1**.

**Table – 1:** Various thymic lesions.

Thymic lesion	% of cases	Male	Female
Thymic hyperplasia	30%	2	1
Thymic cyst	10%	1	0
Thymic lymphoma	20%	1	1
Benign teratoma	20%	1	1
Malignant teratoma	10%	1	0
Thymoma	10%	1	0
<b>Total</b>	<b>100%</b>	<b>7</b>	<b>3</b>

## **Conclusion**

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Radiologists play a major role in differentiating normal thymus from its variants, various thymic lesions and tumor. Knowledge of the embryology and anatomy of the thymus, normal variations and ectopic locations of the thymus, and its dynamic changes is essential to prevent performance of unnecessary invasive procedures.

## **References**

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