

Left Sided Thymus: Persistent Chest X-ray Shadow Mimicking Recurrent Pneumonia or Congenital Lung Anomaly

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Abstract

The thymus is a T-cell producing lymphoid organ in the anterior mediastinum that plays a role in the development of the immune system, particular the maturation of T-cells. It typically has a retrosternal location and hence can mimic retrosternal pathology. In Infants presenting with repeated respiratory tract infection, after ruling out other system involvement, Higher imaging techniques must be utilized to differentiate physiological from pathological lesions so as to clinch diagnosis and implement relevant intervention. This rare case in a 7-month infant shows how a left upper zone persistent shadow, a rare X-ray findings of left thymus is misdiagnosed as persistent pneumonia or pulmonary sequestration and how imaging helps in avoiding unnecessary treatment.

Keywords: T-cell; Lesions; Immune system; Pneumonia.

Introduction

The thymic sail sign represents a triangular-shaped inferior margin of the normal thymus seen on a neonatal frontal chest radiograph. In a series of 1020 unselected newborns, Tausend and Stern (1965) did not detect any enlargement of the mediastinal shadow due to thymic tissue in 50% cases. Prominence of the right thymic lobe was present in 25%; the left lobe was affected in 8%, and bilateral prominence was described in 17%. Control radiographs performed in individual cases after 2-4 weeks revealed both enlargements and reductions in the thymic shadow.¹

Thymus prominence can be graded into 3 stages on either side and correlated with area of hemithorax involved.¹

Grade 0 - thymus not visualized

Grade 1 - < 5% area of hemithorax

Grade 2 - 15-30% area of hemithorax

Grade 3 - > 30% area of hemithorax

Only Left sided thymic sail sign shadows are rare. Thus this case becomes interesting because of its rarity and confusing picture- Left sided thymic shadow on chest X-ray resembling congenital malformation or consolidation.

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Case Report

A 7-month, 4.5 kg male infant was referred to our institution with complaints of cough, cold and fever since 3 days. The infant had a NICU stay for 1-month - Preterm 34-week baby with 900 gm birth weight. The respiration was smooth but on auscultation there were wheezing and conductive sounds in bilateral lung fields with equal air entry on both sides in all zones.

Complete blood count was normal with no leucocytosis, C-reactive protein was negative, Blood culture report showed no growth. X-ray chest showed a patch on upper zone in left lung. Ultrasound done showed the patch as consolidation.

The clinical findings suggested a viral infection but radiological findings suggested more of a bacterial involvement. Keeping in mind the small age of the patient, Empirical Antibiotics with 3% NaCl nebulization was given for 5 days. Diagnosis was kept as Left lung upper zone lobar pneumonia. He was discharged on oral antibiotics to complete the 7-day course of bacterial pneumonia.

The patient presented again after 7 days with complaints of fever and cold. He was referred from a private institution, was treated there also as pneumonia. There was no respiratory distress and the chest was clear. Higher empirical antibiotics were given with frequent 3% NaCl nebulization. Again, complete blood count was normal with no leucocytosis, C-reactive protein was negative, Blood culture showed no growth. Tuberculosis workup – gastric aspirate CBNAAT and Mantoux test was normal.

X-ray showed left sided patch of the same size, location and density (Fig. 1). The trachea was central in position and no mediastinal shifting was seen. Suspecting a congenital lung malformation, antibiotics were omitted (on Day 2). Ultrasound suggested the patch as enlarged thymus. The patient was advised HRCT scan as the non-resolving linear patch suggested congenital pulmonary sequestration. However, the scan showed the mass as a Triangular shaped soft tissue opacity seen extending from anterior mediastinum and reaching left upper lobe with its base towards mediastinum (Positive sail sign) and suggested the lesion as benign anterior mediastinal structure – Enlarged left sided thymus (Fig. 2).

Symptomatic viral upper respiratory tract infection treatment was given and the patient was discharged after 5 days.

Discussion

The thymus is by far the most frequent cause of an enlarged mediastinal shadow in newborns and infants. It varies enormously in size and shape and in general is well differentiated on chest radiographs up to the second year of age or beyond. In newborns the thymus, in conjunction with the relatively large cardiac shadow, occasionally gives rise to a shadow that occupies the entire hemithorax and totally obscures the cardiac silhouette (so-called cardiomegaly type; “giant thymus”). This phenomenon is indicative of an uncomplicated perinatal period. In contrast a small thymic shadow, or its total absence, indicates pre-, peri-, or postnatal stress situations, e.g., Intrauterine growth retardation, respiratory distress syndrome, etc., and is very seldom caused by thymic aplasia.²

The thymus continues to grow after the birth reaching the maximum size by the end of the first year of life. After that the thymic perivascular space grows proportionally in volume while the true thymic epithelial space decreases in size. It again increases during puberty. The process continues to proceed slowly after puberty – thymus decreases both in size and activity as the thymic perivascular space and connective tissue is replaced with fat (a phenomenon known as organ involution).

The child was treated for pneumonia in 2 hospital stays. The non-resolving chest X-ray findings prompted us to rule out congenital lung anomalies: Congenital lobar emphysema (The incidence of left upper lobe involvement is 43%, right middle lobe 32%, right upper lobe 20%, and bilateral involvement 20%).³, congenital pulmonary sequestration, congenital cystic adenomatoid malformation (CCAM).

While pulmonary sequestrations have white shadow on X-ray, congenital lobar emphysema and CCAM have darker shadows with persistent X-ray findings.

When these findings were ruled out, thymic shadow was thought of as next possibility which was confirmed by CT scan. A 7-month infant is unlikely to have foreign body inhalation.

In earlier days, when CT scan was not regularly done, such abnormal thymic shadows led to unnecessary surgical intervention.⁴

Right sided thymic shadows are normal findings on routine infant chest X-ray, but rare occurrence of left sided thymic shadow on chest X-ray delayed the diagnosis in this case.



Fig. 1: Chest X-ray PA view showing left lung upper lobe opacity.

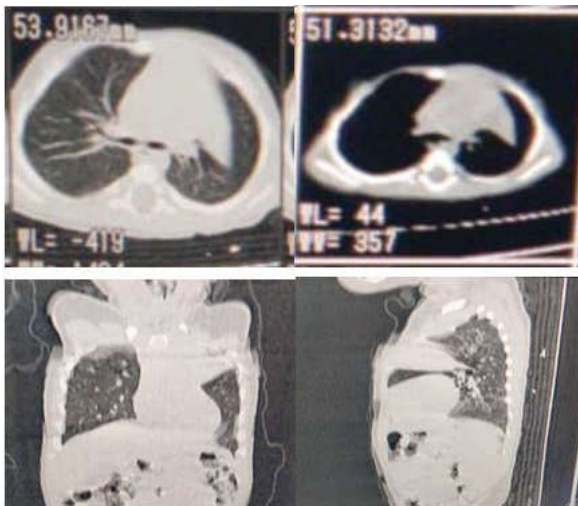


Fig. 2: HRCT indicating left sided thymic sail sign; base of triangle at mediastinum and apex towards periphery.

Conclusion

Congenital anomalies, atypical thymus configurations and physiological changes in chest X-ray must be ruled out whenever dealing with persistent X-ray findings of infants so as to differentiate consolidation or congenital anomaly to prevent irrational antibiotic drug exposures and subsequent drug toxicity. Although radiation exposure is a risk but always ask for higher imaging when X-ray and ultrasound are inconclusive.

Conflict of interest: The authors declare that they have no conflicts of interest.

References

1. Tausend ME, Stern WZ. Thymic Patterns in the Newborn. *Am J Roentgenol* 1965;95(1):125-30.
2. Willich E, Walter E, Webb WR, de Geer G. Diagnostic Imaging of the Normal Thymus. In: Walter E, Willich E, Webb WR. (ed.)1992. pp. 35-55. *The Thymus. Medical Radiology (Diagnostic Imaging and Radiation Oncology)*. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-84192-7_5.
3. Monin I', Didier F, Vert I', et al. Giant lobar emphysema: neonatal diagnosis. *Pediatr Radiol* 1979;8:259-60.
4. Lanning P, Heikkinen E. Thymus simulating left upper lobe atelectasis. *Pediatr Radiol*. 1980;9:177. <https://doi.org/10.1007/BF01464316>.