

Posterior Mediastinal Thymus: Case Report and Literature Review

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Received: Nov 19, 2010; Final Revision: May 04, 2011; Accepted: May 21, 2011

Abstract

Background: The incidence of aberrant thymus in the posterior mediastinum is very uncommon. It is difficult to exclude malignancy before surgical procedure.

Case Presentation: In a six-month-old male coughing for two weeks prior to admission a posterior mediastinal mass was found incidentally by chest roentgenogram. Thoracotomy was performed. Histologic study revealed normal thymic tissue.

Conclusion: When a mass located in the posterior mediastinum, ectopic thymus should be included in differential diagnosis. Imaging techniques may spare thoracotomy. Ectopic thymus has a benign clinical course, and surgical resection is not recommended.

Iranian Journal of Pediatrics, Volume 21 (Number 3), September 2011, Pages: 404-408

Key Words: Ectopic Thymus; Mediastinum; Thoracotomy; Pulmonary Atelectasis

Introduction

The thymus plays a critical role in the development of immune system during early life. It is derived from the third and fourth pharyngeal pouches during sixth week of embryologic development. Generally, the thymus is located in the upper anterior portion of the mediastinum overlying the pericardium and the great vessels at the base of heart. However, during fetal development a remnant of thymus is probably detained along the thymopharyngeal duct due to abnormal migration. Most cases of reported ectopic thymus are in the neck and upper anterior

mediastinum [1-3]. In rare instances, the thymus extends from its usual anterior mediastinal position into posterior mediastinum. Less than 20 cases have been reported in English literature [4-17]. Thymic tissue located in the posterior mediastinum may enlarge disproportionately and may cause airway and/or vascular compression.

Differential diagnoses of posterior mediastinal masses include neurogenic tumors, infection, hematomas, segmental lung atelectasis, or tumors arisen from bone [4,5]. Preoperative diagnosis of posterior mediastinal thymus usually is very difficult; mostly the correct diagnosis is only made during operation or histological examination. We

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report an additional case of aberrant thymus in the posterior mediastinum, which was diagnosed through thoracotomy. To our knowledge, this is the first case of posterior mediastinal thymus in a Chinese patient.

Case Presentation

A six-month-old male presented with dry cough for two weeks, without wheezing, fever, respiratory difficulties and restlessness. An outpatient diagnosis of respiratory tract infection was considered. He received antibiotics for 10 days in the outpatient department. The cough didn't resolve. Roentgenogram revealed a smooth mass in the right superior mediastinum (Fig. 1). It was suspected of ectopic thymus or segmental lung atelectasis. The patient was hospitalized. His past medical history was non specific. Physical examination disclosed a few wet and dry rales in the right lung. Cardiovascular and other system findings were normal. The blood cell counts, blood chemistry, C-reactive protein were no normal. Type 3 parainfluenza virus infection was diagnosed by direct fluorescent antibody staining and the patient was accordingly treated.

Further imaging techniques including computed tomography (CT) and magnetic resonance imaging (MRI) were utilized to limit the differential diagnosis. Contrast-enhanced chest CT scan (Fig 2) demonstrated a well-circumscribed, uniform mild enhancing mass (3.7×3.4cm in size) located in the right superior posterior mediastinum, adjacent to chest vertebrae, trachea, and superior vena cava (SVC). The trachea and SVC were not displaced or narrowed. The MRI confirmed the CT anatomic findings (Fig 3a and 3b).

A diagnosis of ectopic thymus was considered; nonetheless neurogenic tumors could not be excluded definitely. After he was healed of cough, right thoracotomy was performed which revealed a smooth mass located in the posterior mediastinum grossly resembling normal thymus, which had a communication with normally positioned thymus. A complete excision of the mass was carried out and the normal thymus was left alone. The resected specimen was 5×5×4cm in

size. Normal thymic tissue was identified by histologic study. Postoperative chest x-ray showed that the mass in the right superior mediastinum was disappeared. The child obtained a good recovery and was discharged from hospital 10 days postoperatively. On follow-up he has been in good condition for 6 months.

Discussion

The occurrence of aberrant thymus in the posterior mediastinum is very uncommon. Among 3236 pediatric necropsies, ectopic thymus

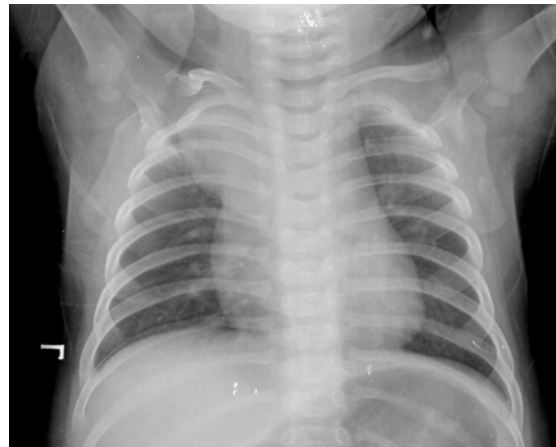


Fig. 1: Chest radiograph shows a smooth mass in the right superior mediastinum

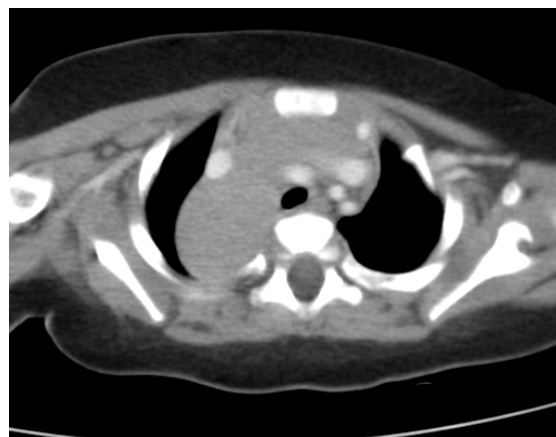


Fig. 2: CT scan of chest illustrates a mass in the right posterior mediastinum, which is connected with anterior thymus.



Fig. 3a: Axial T2 MRI demonstrates the mass in continuity with the normal thymus. Thymus and the mass have similar signal intensity.

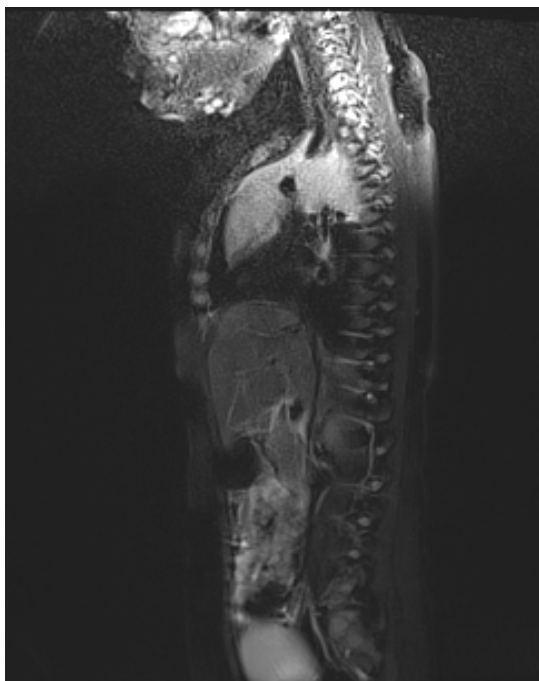


Fig. 3b: Sagittal T2 MRI shows the continuity of the posterior mass and normally located thymus.

situated in the posterior mediastinum was recorded only in 1 case [18]. To our best knowledge, including ours, 20 cases have been reported in English. The clinical data is shown in Table 1. Of the 20 children, 85.5% were found in their first year of life. Ectopic thymus in posterior mediastinum has a male predominance; the male-female ratio is 17:3. It is usually positioned in the right side, 85.5% located in the right in this series.

Aberrant mediastinal thymus is detected mostly incidentally by chest X-ray and is asymptomatic. However, ectopic thymus in posterior mediastinum may cause problems when it has an impact on adjacent structures such as airway, esophagus, innominate artery and SVC. Presenting symptoms include cough, respiratory distress, wheezing, fever, dysphagia and emphysema [4-8,13,15-17]. Postoperatively the symptoms resolved rapidly in those reported cases. Interestingly, two children with pressure symptoms gained good recovery, which received only open excisional biopsy [8] and conservative therapy [15], respectively.

Open thoracotomy was the most prevalent surgical procedure for the purpose of excluding malignancy or eliminating compression to neighboring structures. More than half cases of this series received complete dissection of the masses, and yet all the 20 patients had good prognosis whether complete resection was performed or not. Similarly, the two with compression to neighboring structures without resection also had good prognosis [8,15]. We consider that ectopic thymus in posterior mediastinum has a benign clinical course. Surgical resection is not necessary when CT-guided biopsy [12] or noninvasive methods may help diagnosing. At thoracotomy, the “mass” should remain if the frozen section biopsy discovers normal thymic tissue [4,8,14], avoiding a potential hazardous excision [8]. We thus recommend that ectopic thymus should not be resected unless there is an emergency due to compression.

The differential diagnosis of a mass in posterior mediastinum includes neurogenic tumors, ectopic thymus, lymphadenopathy, hematoma [19]. Franco et al [19] suggested the following “four diagnostic criteria” for ectopic mediastinal thymus: (1) signal intensity similar to normally located thymus on MRI, (2) homogeneous signal intensity, (3) uniform mild enhancement of contrast, and (4) continuity with normally located thymus. Slovis et al [11] claimed that the diagnosis is assured when all the imaging criteria are met, further investigation or therapy is not suggested. In our case, CT and MRI findings fulfilled these four criteria. A diagnosis of ectopic thymus in the posterior mediastinum could be made before surgery, though without histologic evidence. Nevertheless,

Table 1: Summary of 18 Reported Cases of Posterior Mediastinal Thymus

Case No. Ref	Publish year	Age	Sex	Location	Related clinical signs	Diagnostic method	Surgical procedure
1 [4]	1974	4m	F	R	Wheezing, emphysema	X-ray	Complete resection
2 [4]		4m	M	R	No	X-ray	Excisional biopsy
3 [5]	1976	9w	M	R	No	X-ray	Complete resection
4 [5]		9m	M	R	Cough, wheezing	X-ray	Complete resection
5 [6]	1983	6m	M	L	Cough	X-ray, CT Scan	Complete resection
6 [7]	1984	40d	M	R	respiratory distress, wheezing	X-ray, ultrasonography	Complete resection
7 [8]	1987	NA	M	R	respiratory difficulties	X-ray, ultrasonography, CT Scan	Complete resection
8 [8]		6w	M	R	Apneic episodes, respiratory tract infection	X-ray, ultrasonography, CT Scan	Excisional biopsy
9 [9]	1988	3m	M	R	No	X-ray, MRI	No
10 [10]	1991	24m	F	L	No	X-ray, CT Scan, MRI	No
11 [11]	1992	3m	M	R	No	X-ray, CT Scan, MRI	No
12 [11]		6m	F	L	No	X-ray, CT Scan, MRI	No
13 [12]	1993	6m	M	R	No	X-ray, ultrasonography, CT Scan	CT-guided biopsy
14 [13]	1995	3m	F	R	Inspiratory stridor	X-ray, bronchoscopy, MRI	Complete resection
15 [14]	1998	2m	M	R	No	X-ray, CT Scan	Complete resection
16 [14]		3m	M	R	No	X-ray, CT Scan	Excisional biopsy
17 [15]	1999	7m	M	R	Dyspnea, cough, wheezing	X-ray, CT Scan, MRI	No
18 [16]	2008	20m	M	R	Cough, dysphagia, fever	X-ray, CT Scan	Complete resection
19 [17]	1992	4m	M	R	Cough	X-ray, CT Scan	Complete resection
20	Present case	6m	M	R	No	x-ray, CT Scan, MRI	Complete resection

M, male; F, female; NA, not available; m, month; d, day; w, week; R, right; L, left; CT, computed tomography; MRI, magnetic resonance imaging

because we had no such experience, the boy was wrongly treated with surgical dissection.

Conclusion

Posterior mediastinal thymus is a rare entity. When a mass located in the posterior mediastinum, a diagnosis of ectopic thymus should be considered. Imaging techniques may help differential diagnosis. Ectopic thymus has a benign clinical course, and surgical resection is not recommended.

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