Case Report

Thymic Tuberculosis Preoperatively Evaluated with Thallium-201 SPECT: Two Resected Cases

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We present 2 resected cases of thymic tuberculosis, which had been preoperatively diagnosed as invasive thymoma, using a thallium-201 (^{201}T1) single photon emission computed tomography (^{201}Tl SPECT).

[Patient 1] A 74-old-male with a 32-year history of steroid therapy for rheumatic arthritis was diagnosed with an anterior mediastinal tumor by routine chest CT scans after onset of myocardial infarction. [Patient 2] A 56-old-female with a 28-year history of diabetes mellitus presented with a dry cough. A chest CT demonstrated an anterior mediastinal tumor. Neither patient showed pulmonary infiltrations on chest x-ray. ^{201}Tl SPECT was undertaken for each patient. Abnormal findings could not be detected on a planar image of the scintigraphy; however, on SPECT images accumulations of ^{201}Tl were clearly detected in the anterior mediastinal mass and a thymoma was thus suspected in each case. Total thymectomy was carried out in each case and the mass then diagnosed as caseous granuloma in the thymus. Both patients are well without recurrence after operation. In patients with a ^{201}Tl SPECT positive anterior mediastinal tumor associated with an immunologically deficient status, and with negative findings in planar images on thallium scintigraphy, the possibility of thymic tuberculosis should be considered. (Ann Thorac Cardiovasc Surg 2007; 13: 44–6)

Key words: thymus, tuberculosis, thymectomy, mediastinum, scintigraphy

Introduction

Tuberculosis in the thymus is a rare entity. Although various neoplasms arise in the thymus, preoperative diagnosis of thymic tuberculosis is not well defined. Thallium scintigraphy is useful to rule out thymoma or other malignancies from benign thymic tumors. We report on 2 resected cases of thymic tuberculosis where preoperatively the tumors demonstrated an accumulation on thallium-201 (^{201}Tl) single photon emission computed tomography (SPECT).

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Received April 12, 2006; accepted for publication May 20, 2006.
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Case Reports

Patient 1

A 74-old-male with a 32-year history of rheumatic arthritis had received oral administration of both 5 mg of prednisolone every 2 days and 2 mg of methotrexate daily simultaneously for years. He had an acute myocardial infarction the previous year; therefore chest CT scans had been taken routinely. In the series of CT scans, an anterior mediastinal mass was demonstrated as increasing in size (Fig. 1A).

^{201}Tl scintigraphy revealed an accumulation in the anterior mediastinal mass on SPECT (Fig. 1B) and a thymoma was suspected. A total thymectomy was carried out. The resected mediastinal mass was histologically diagnosed as caseous granuloma in the thymus (Fig. 2). The Ziel-Nielsen stain did not demonstrate tubercle bacilli in the specimen. Mycobacterium tuberculosis was

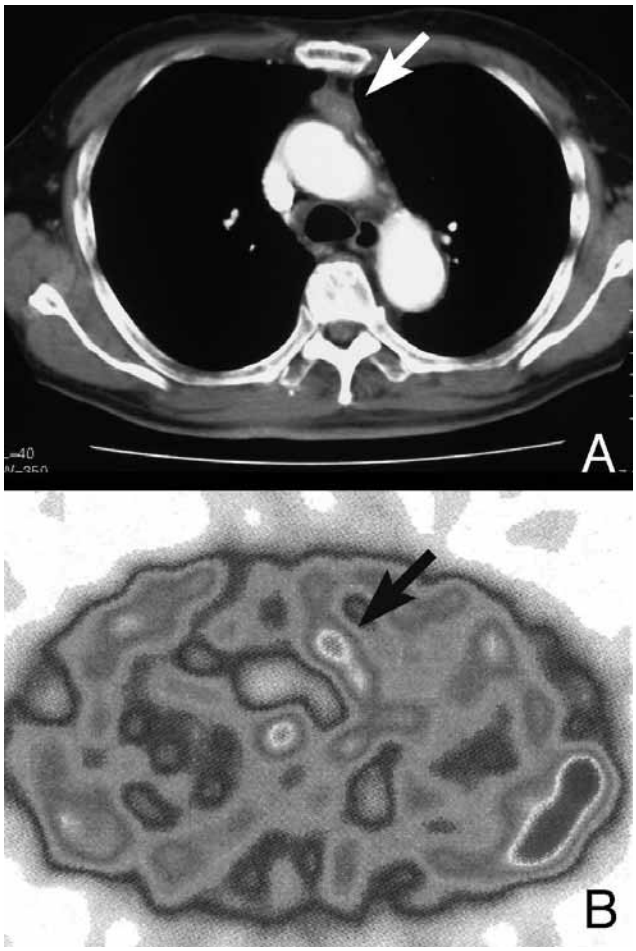

Fig. 1.
A: Chest CT demonstrates a partially enhanced mass in the anterior mediastinum (arrow).
B: An image of the early phase of thallium-201 single photon emission CT (SPECT) shows uptake in the same anterior mediastinal mass (arrow).

not proven from the sputa even by polymerase chain reaction (PCR). Anti-acid fast bacterium antibody titer in serum was negative. Antituberculous agents were started and the patient was discharged on the 40th postoperative day. The patient is well without recurrence 18 months after the operation.

Patient 2

A 56-old-female with a 28-year history of diabetes mellitus presented with a dry cough. Chest CT demonstrated no abnormality in the lung field but a mass lesion in the anterior mediastinum (Fig. 3A). The patient was referred to our outpatient clinic. ^{201}Tl SPECT showed an accumulation in the anterior mediastinal mass (Fig. 3B) and a

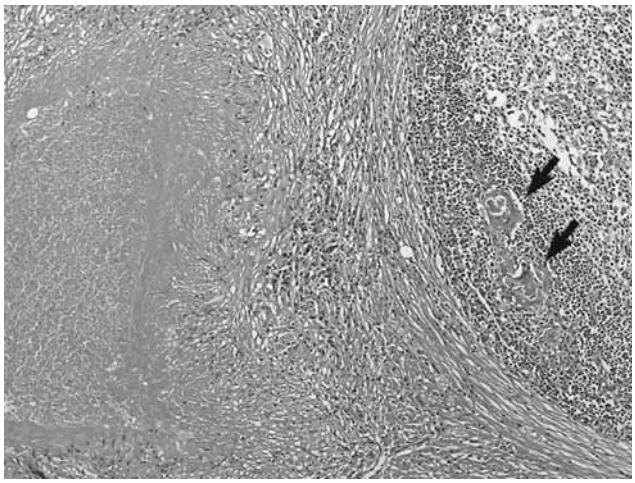

Fig. 2. At low power, microscopic findings revealed caseous granuloma (left one third) in the thymus.
Arrows, Hassal's corpuscules. (HE stain: ×100)

thymoma was suspected. Preoperatively, she was put on hemodialysis due to chronic renal failure that had been a complication for 16 years.

A total thymectomy was carried out and the mass was then diagnosed as a caseous granuloma in the thymus. Ziel-Nielsen staining did not demonstrate tubercle bacilli in the specimen. Mycobacterium tuberculosis was not proven from the sputa even by PCR. Anti-acid fast bacterium antibody titer in serum was negative. Antituberculous agents were started and the patient was discharged on the 22nd postoperative day. The patient is well without recurrence 2 months after the operation.

Discussion

Thymic tuberculosis is a rare entity; only 5 other cases appear to have been reported.[1–5] Our patient 1 had received oral steroids and immune suppressive drugs for decades for rheumatic arthritis. Patient 2 had been a diabetic for decades which was complicated with chronic renal failure. Both patients were thus thought to be in an immunological deficiency state. FitzGerald et al. also reported on a case of thymic tuberculosis associated with human immunodeficiency virus (HIV) infection.[3] Thus, thymic tuberculosis is possibly an immunodeficiency-related opportunistic infection.

^{201}Tl scintigraphy is useful for detection of thymoma.[6] ^{201}Tl scintigraphy is also reported to show accumulation in pulmonary tuberculosis;[7,8] however, there is no previous report describing findings of ^{201}Tl scintigraphy for

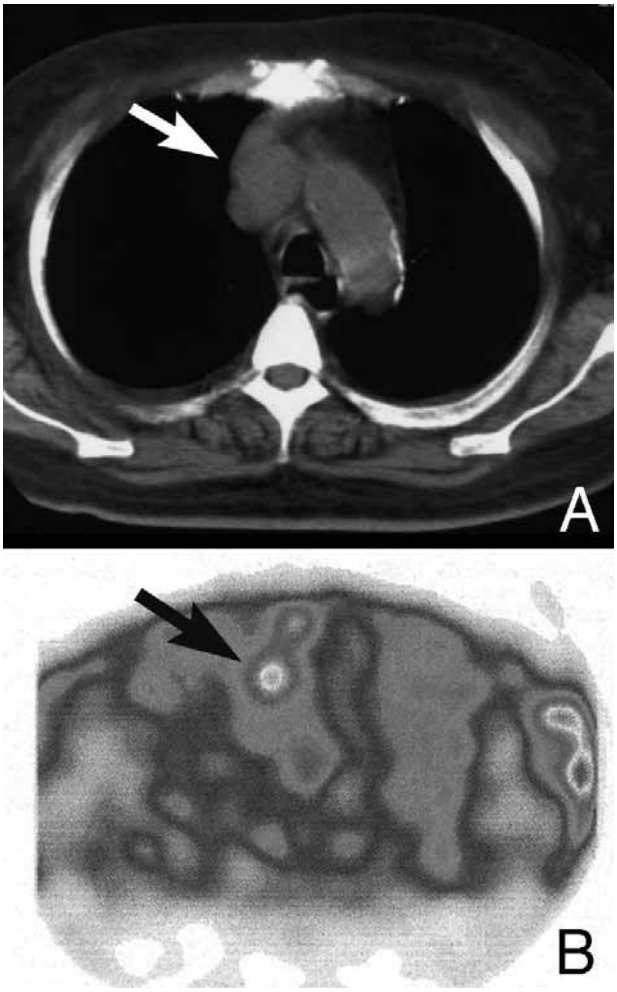

Fig. 3.
A: Plain chest CT demonstrates an anterior mediastinal tumor displacing the superior vena cava laterally (arrow).
B: An image of the early phase of thallium 201 single photon emission CT (^{201}T1 SPECT) reveals an accumulation in the tumor (arrow).

thymic tuberculosis.

Both patients 1 and 2 were not complicated by pulmonary tuberculosis; indeed, chest symptoms were not a complaint. The serum anti-acid fast bacterium titer was not positive; therefore, thymic tuberculosis was not suspected. ^{201}Tl scintigraphy was then undertaken to rule out thymoma. In both cases abnormal findings could not be detected on a planar image on scintigraphy; however, on SPECT images accumulations of ^{201}Tl were clearly detected and thymoma was then suspected in each case. Thymic tuberculosis is difficult to exclude preoperatively from invasive thymoma; therefore, surgical resection was needed in these cases and diagnosis of each could only be made histologically.

Although diagnoses of thymic tuberculosis in both patients were made only by histologically diagnosed caseous granuloma in the thymus, without proving tuberculous bacilli directly, the possibility of nontuberculous mycobacterial infections could not be excluded. However, there was no direct evidence for nontuberculous mycobacterial infections. The lesions had been resected completely. Treatment of mycobacterium kansasii is the same as for tuberculosis. There is no effective treatment for mycobacterium avium complex infections. Moreover, Osaka, the patients' residence, is one of the largest endemic areas of tuberculosis in Japan. These patients were treated with anti-tuberculous drugs postoperatively.

In patients with a ^{201}Tl SPECT positive anterior mediastinal tumor associated with an immunological deficiency, such as HIV infection, those taking steroid and/or immunosuppressive drugs, and diabetics, and with negative findings in planar images of thallium scintigraphy, the possibility of thymic tuberculosis should be considered.

References

1. Sacco O, Gambini C, Aicardi M, et al. Thymus tuberculosis poorly responding to anti-mycobacterial therapy in a young girl with primary infection. *Sarcoidosis Vasc Diffuse Lung Dis* 2004; **21**: 232–6.
2. Stephen T, Thankachen R, Parihar B, Nair S, Shukla V. Multilocular tuberculous cyst of thymus gland. *J Thorac Cardiovasc Surg* 2003; **126**: 2093–4.
3. FitzGerald JM, Mayo JR, Miller RR, Jamieson WR, Baumgartner F. Tuberculosis of the thymus. *Chest* 1992; **102**: 1604–5.
4. Silvola HJ, Lahdesmaki M. On tuberculosis of the thymus. *Ann Chir Gynaecol Fenn* 1966; **55**: 27–30.
5. Duprez A, Cordier R, Schmitz P. Tuberculoma of the thymus. First case of surgical excision. *J Urol Nephrol (Paris)* 1962; **44**: 115–20.
6. Maticke GJ, Sokol JA, Jozwiak J, Ruisi JA. Detection of thymoma by SPECT thallium imaging. *J Nucl Cardiol* 1998; **5**: 449–50.
7. Utsunomiya K, Narabayashi I, Nishigaki H, Tsujimoto K, Kariyone S, Ohnishi S. Clinical significance of thallium-201 and gallium-67 scintigraphy in pulmonary tuberculosis. *Eur J Nucl Med* 1997; **24**: 252–7.
8. Gomez MV, Gallardo FG, Cobo J, Babe J. Identification of AIDS-related tuberculosis with concordant gallium-67 and three-hour delayed thallium-201 scintigraphy. *Eur J Nucl Med* 1996; **23**: 852–4.