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Technetium-99m-Tetrofosmin Uptake in Sarcoidosis Stage I

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The uptake of ^{99m}Tc-tetrofosmin in enlarged lymph nodes, of the lung hilus, in the case of sarcoidosis Stage I (histopathologically confirmed by mediastinoscopic biopsy) is demonstrated. On a routine chest radiograph of a 78-yr-old woman, hilar lymphadenopathy was first detected. In the following mammography, disseminated micro calcifications were found in the left breast and a ^{99m}Tc-tetrofosmin study was performed for detection of breast cancer. Scintigraphy using ^{99m}Tc-tetrofosmin showed clear uptake in the hilar lymph nodes, but not in the left breast. The ^{99m}Tc-tetrofosmin uptake in the hilar lymph nodes was due to sarcoidosis confirmed by histology. Therefore, ^{99m}Tc-tetrofosmin scintigraphy may be useful in patients with suspected sarcoidosis, especially in Stage I.

Key Words: technetium-99m-tetrofosmin; hilar lymphadenopathy; sarcoidosis Stage I; SPECT

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Sarcoidosis is a chronic inflammatory multisystem disease of uncertain etiology. The diagnosis of pulmonary sarcoidosis is often established by exclusion. It is difficult to assess the activity of sarcoidosis by conventional clinical, radiological and physiological parameters as none of these are specific for the inflammatory process. Gallium-67 scintigraphy is effective in the detection of lesions not revealed by conventional methods of investigation, particulary those affecting mediastinum (*1–3*). Technetium-99m-tetrofosmin is a lipophilic, cationic complex proposed for myocardial perfusion imaging. It has been found that ^{99m}Tc-tetrofosmin also has other useful applications especially in oncology. Recent articles were able to demonstrate its uptake in parathyroid adenomas (*4*), recurrence and distant metastases of differentiated thyroid cancer (*5–7*) as well as in malignant breast tumors (*8–10*).

We report a case of positive ^{99m}Tc-tetrofosmin uptake in hilar lymphadenopathy in a case of sarcoidosis Stage I.

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CASE REPORT

In a 78-yr-old woman, who underwent a routine check-up, a chest radiograph was taken and hilar adenopathy was first detected. The subsequently performed mammography showed a region (about 15 mm in diameter) with disseminated microcalcifications in the left breast. To reveal possible breast cancer, a ^{99m}Tc-tetrofosmin study was performed. For imaging, we used a double-headed gamma camera with LEHR collimators. Five minutes after intravenous injection of 370 MBq ^{99m}Tc-tetrofosmin, three static images were taken in prone position (right lateral, left lateral and anterior), followed by SPECT and three-dimensional reconstruction 20 min postinjection. All images showed an increased uptake in the mediastinal cavity (Fig. 1). In the region of the left breast, no pathological uptake could be detected. Because of these findings, the patient underwent MRI of the chest and mediastinum. The images showed a conglomerate of partially, but distinctly enlarged, mediastinal and hilar lymph nodes (Fig. 2). Other investigations, including laboratory findings (full blood count, angiotensin-converting enzyme, tumor markers, lymph cell typing), spirometry, ECG, sonography of the neck and the abdomen, transmission CT of the abdomen and bone marrow biopsy were all reported to be normal. Subsequent mediastinoscopy with lymph node biopsy was performed. Pertaining to histology, the diagnosis sarcoidosis was confirmed (Fig. 3).

DISCUSSION

Sarcoidosis is a systemic granulomatous disease of unknown etiology. Uptake for ^{67}Ga and J001 macrophage targeting glycolipopeptide has been previously described in sarcoidosis by various authors (*2,3,11*). In addition, only a few case reports on ^{201}Tl and ^{99m}Tc-sestamibi for imaging sarcoidosis are found in the literature (*12,13*). One article describes the uptake of ^{99m}Tc-tetrofosmin in lung tumors (*14*), but not in sarcoidosis (neither Stage I nor other stages). Technetium-99m-labeled tetrofosmin is a cationic, lipophilic radiopharmaceutical proposed for myocardial imaging. The mechanism by which it concentrates in tumor tissue was recently described by Arbab et al. (*15*). In our case, the images showed that capture of the tracer by the enlarged hilar lymph nodes was quite satisfactory, and it left the area of the

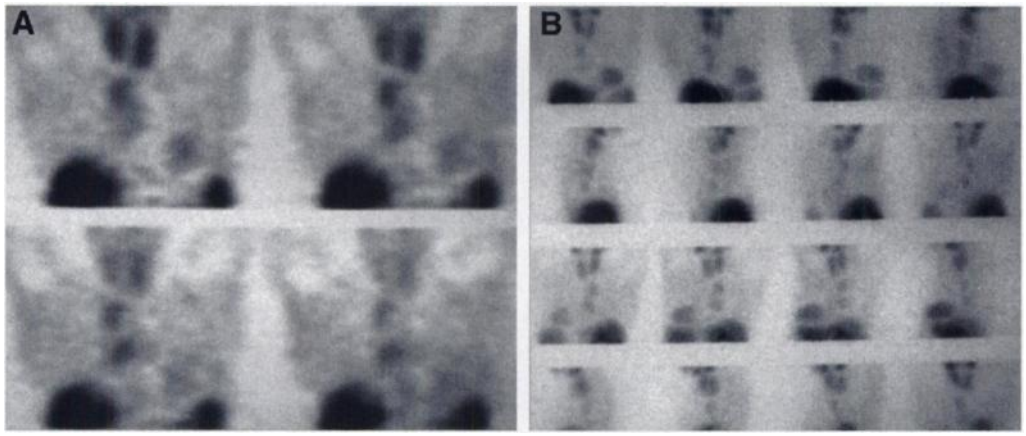

FIGURE 1. (A) Four coronal SPECT slices that show ^{99m}Tc-tetrofosmin uptake in posterior mediastinum, according to lymphadenopathy, due to sarcoidosis Stage I. (B) Three-dimensional imaging (from anterior over right lateral, posterior, left lateral to anterior position) clearly demonstrates the ^{99m}Tc uptake in the posterior part of the mediastinum. Additional uptake in the thyroid, heart and liver is also shown. This image also shows no pathologic ^{99m}Tc-tetrofosmin uptake in the left breast.

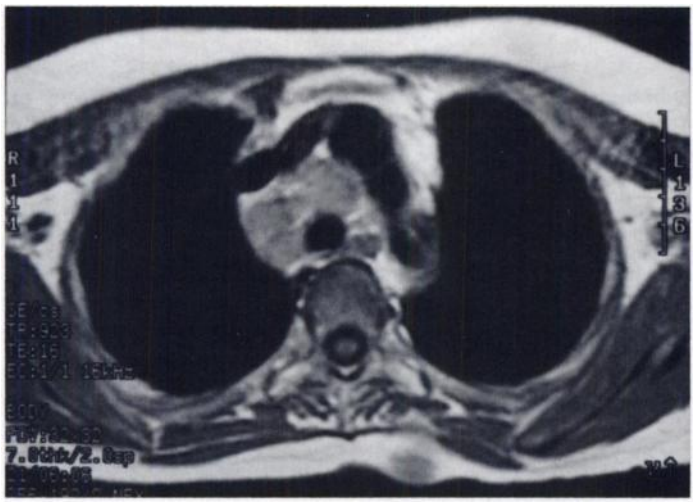

FIGURE 2. MRI revealed enlarged paratracheal lymph nodes located anterior to the thoracic spine.

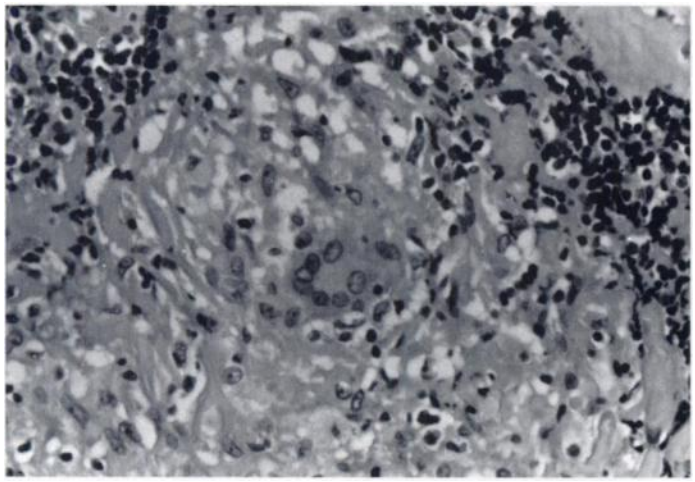

FIGURE 3. Paratracheal lymph node (hematoxilin-eosin; magnification × 400). Confluent histiocytic granulomas with epitheloid histiocytes and sparsely distributed giant cells consistent with sarcoidosis were demonstrated by histopathology. At this higher magnification, a giant cell of Langhans' type is seen within a granuloma.

lymph nodes clearly distinguishable from normal lung tissue. The observation of increased ^{99m}Tc-tetrofosmin uptake in the mediastinum, at a very early stage (Stage I), may add to the findings obtained by conventional radiograph analysis and may be of predictive value in the detection of sarcoidosis.

CONCLUSION

This article demonstrates accumulation of ^{99m}Tc-labeled tetrofosmin in mediastinal lymph nodes affected by sarcoidosis. It may prove useful in the detection of sarcoid lesions at an early stage of the disease. Further studies, however, will be necessary to evaluate its ultimate role in pulmonary sarcoidosis imaging.

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