

Chest wall seeding of nocardiosis as a complication of a percutaneous transthoracic needle biopsy

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ABSTRACT

This paper highlights an uncommon complication of a percutaneous transthoracic needle biopsy (PTNB). A patient with rheumatoid arthritis who was on immune suppressive drugs underwent a PTNB of a lung nodule. The histology showed “organizing usual interstitial pneumonia-like changes.” Unfortunately, one month after the PTNB, she developed a large deep-seated chest wall abscess at the biopsy needle tract and the previously seen lung nodule was larger. *Nocardiosis sp.* was isolated from the chest wall abscess. The lung and chest wall lesions were resolved with Bactrim and Fluconazole. The final diagnosis was pulmonary nocardiasis complicated by chest wall seeding following the PTNB procedure. © 2012 Biomedical Imaging and Intervention Journal. All rights reserved.

Keywords: Nocardiosis, Chest wall seeding, Complication, Percutaneous transthoracic needle biopsy (PTNB)

INTRODUCTION

A percutaneous transthoracic needle biopsy (PTNB) of pulmonary nodules is a reliable, simple and commonly practiced diagnostic procedure. The infectious complication of a PTNB is rare but possible. Pulmonary nocardiosis is not commonly diagnosed. This entity frequently presents as either a subacute or chronic suppurative disease in the immune-compromised individual. There is no characteristic radiographic finding of pulmonary nocardiosis. The purpose of this case report is to highlight an uncommon complication of a PTNB of a lung nodule with an uncommon aetiology. A review of the literature revealed only one reported case

of chest wall dissemination of nocardiosis following a PTNB procedure [1].

CASE HISTORY

A 58-year-old woman with multiple co-morbidities and long standing rheumatoid arthritis was on a 5mg daily dose of Prednisolone tablets. She was wheelchair-bound due to severe joint pain and stiffness. She also had lung fibrosis, which required domiciliary oxygen therapy.

She was admitted for the first phase of Rotaximab infusion because she had developed drug-induced hepatitis while she was on disease-modifying antirheumatic drugs (DMARDs). Ten days post-admission, she complained that she was suffering from worsening shortness of breath, which was of sudden onset. The computed tomography pulmonary angiography (CTPA) to detect pulmonary embolism was negative. However, a sub-pleural, intra-parenchymal,

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spiculated mass that measured $3.3 \times 2.7 \times 2.5$ cm was identified at the left upper lobe. The mass showed central necrosis (Figure 1).

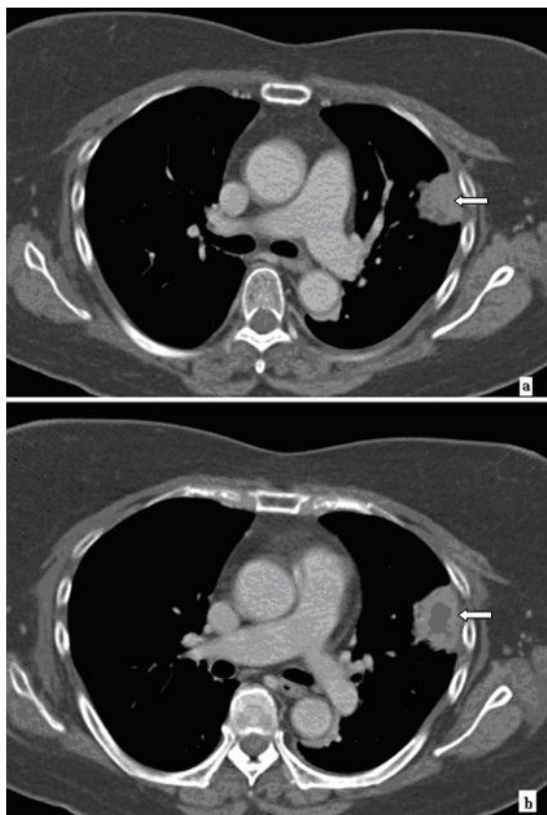


Figure 1 CTPA shows an intraparenchymal spiculated mass with central necrosis (arrow) that is located in the subpleural region at the left upper lobe. There is a clear fat plane between the lesion and the adjacent ribs.

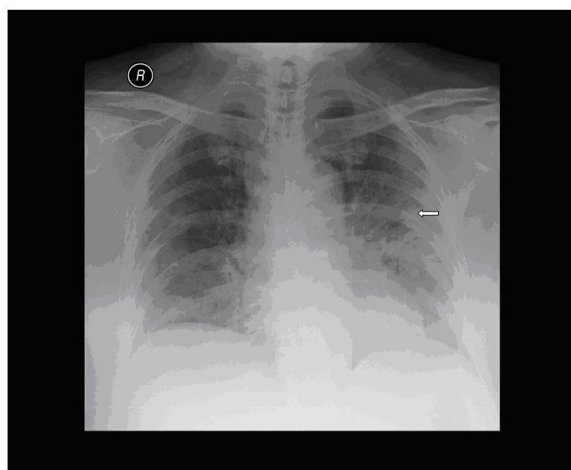


Figure 2 CXR on second admission shows mixed interstitial and air space opacity at the left mid zone (arrow).

A computed tomography (CT) guided percutaneous transthoracic needle biopsy (PTNB) was performed one week later. It was performed under local anaesthesia while the patient was in the supine position. An 18G core biopsy needle was introduced once via a left parasternal approach to avoid the thick breast tissue. There was no

immediate complication post-procedure. Histology revealed “organizing usual interstitial pneumonia-like changes.” The features were consistent with the lung changes that are seen in individuals that suffer from rheumatoid arthritis. The tissue sample was not sent for culture and sensitivity. She was discharged a few days after the lung biopsy.

One month after the PTNB procedure, the patient was readmitted after she experienced a productive cough with scanty sputum, worsening shortness of breath and low-grade fever for over a week. A chest radiograph (CXR) showed a slightly larger left upper lobe opacity and interstitial changes (Figure 2). Her condition was treated as community acquired pneumonia. However, she had persistent spiking fever and worsening dyspnoea, despite a few courses of antibiotics. Investigations for pulmonary tuberculosis were negative.

Five weeks later, she complained of left chest pain and swelling. Further investigations revealed she had experienced tender left breast swelling for one month and that the pain had gradually increased in severity. On physical examination, her left breast was tense but there were no overlying skin changes. CT thorax (Figure 3) showed a large deep-seated collection in the left anterior chest wall, causing mass effect onto the adjacent breast parenchyma. The collection had peripheral rim enhancement and was multi-septated. The left pectoralis muscle was not clearly delineated. There was subcutaneous fat stranding over the left breast. The previously seen left upper lobe lung nodule had increased in size and there was an adjacent new lesion. As the chest wall lesion was at the biopsy needle tract, the findings were indicative that there could potentially be the presence of a left anterior chest wall abscess due to infectious seeding. The possibility of needle tract tumour implantation was initially considered. However, pus was aspirated from the chest wall lesion. The acid-fast bacilli (AFB) stain revealed a partially acid fast fungal filament, which is consistent with *Nocardiosis sp.*

An incision was made and the left chest wall abscess was drained. Intra-operatively, there was a deep-seated abscess deep to the left pectoralis muscle and 800cc of pus was aspirated. The left breast was normal. Culture of the aspirate again showed *Nocardia sp.* C-penicillin and Imipenem were withheld as Imipenem can aggravate nocardiosis. The patient's symptoms, intramuscular abscess and lung lesions resolved after 2 weeks of intravenous Bactrim and oral Fluconazole. Complete response to the appropriate treatment further supports the diagnosis of pulmonary nocardiosis with needle tract seeding.

DISCUSSION

Imaging is useful in the assessment of lung pathology but a definitive diagnosis is often not possible. Thus, PTNB is required to evaluate the lung mass. It is simple and reliable as it has a high diagnostic yield and low morbidity [2].

There are several complications one should anticipate when performing PTNB. These include pneumothorax (17–54%), haemoptysis (0–8%) and haemothorax (3%) [3]. Rare complications include air embolism (0.07%) and needle tract seeding of malignancy (0.08%) [3]. Needle tract seeding is a potential, but extremely uncommon complication [2, 3]. The incidence of needle tract seeding of infection in PTNB is not documented. The risk of needle tract seeding after biopsy was first raised in a 1942 report that examined two cases of PTNB with unusual site of metastasis [4]. An incidence of 0.08% was reported, where only one case of needle tract tumour seeding occurred in a total of 1264 patients [5]. Another series reported 2 out of 66 patients experienced needle tract tumour implantation after PTNB [6]. A Japanese series reported only one tumour implantation in approximately 900 needle biopsy cases over a 7-year period [7].

The possibility of needle tract seeding occurring after PTNB is affected by the size of the biopsy needle, the distance between the lung lesion and the chest wall, the skill of the operator, the number of punctures, the speed of the lung lesion's growth and the patient's immune status [5]. The usage of large bore needles, increased number of punctures and a wider distance

between lung pathology and the chest wall, results in more severe visceral injuries and thus increases the risk of needle tract dissemination [6]. As needle tract tumour seeding is a rare complication, it should not affect the use of this procedure in lung cancer patients [7]. One should avoid PTNB and perform an open biopsy when a CT scan indicates malignancy or that the patient needs to undergo tumour resection.

Needle tract seeding of infection in PTNB is rarely reported. This is due to low incidence of lung biopsy for lung infection to look for the causative organism. Only lung lesions that mimic lung mass will undergo PTNB. A review of the literature revealed only one reported case of chest wall dissemination of nocardiosis two months following PTNB [1]. A case of needle tract dissemination of cutaneous blastomycosis following transthoracic needle aspiration has been reported [8].

Nocardia sp. are gram-positive aerobic actinomycetes that typically exhibit weak AFB staining. They are saprophytes in soil and decaying organic matter. At least 30 species have been identified, and at least 13 of these are reported to cause human disease. New *Nocardia* species continue to be identified. Nocardiosis produces suppurative necrosis with frequent abscess formation at the sites of the infection. Inhalation

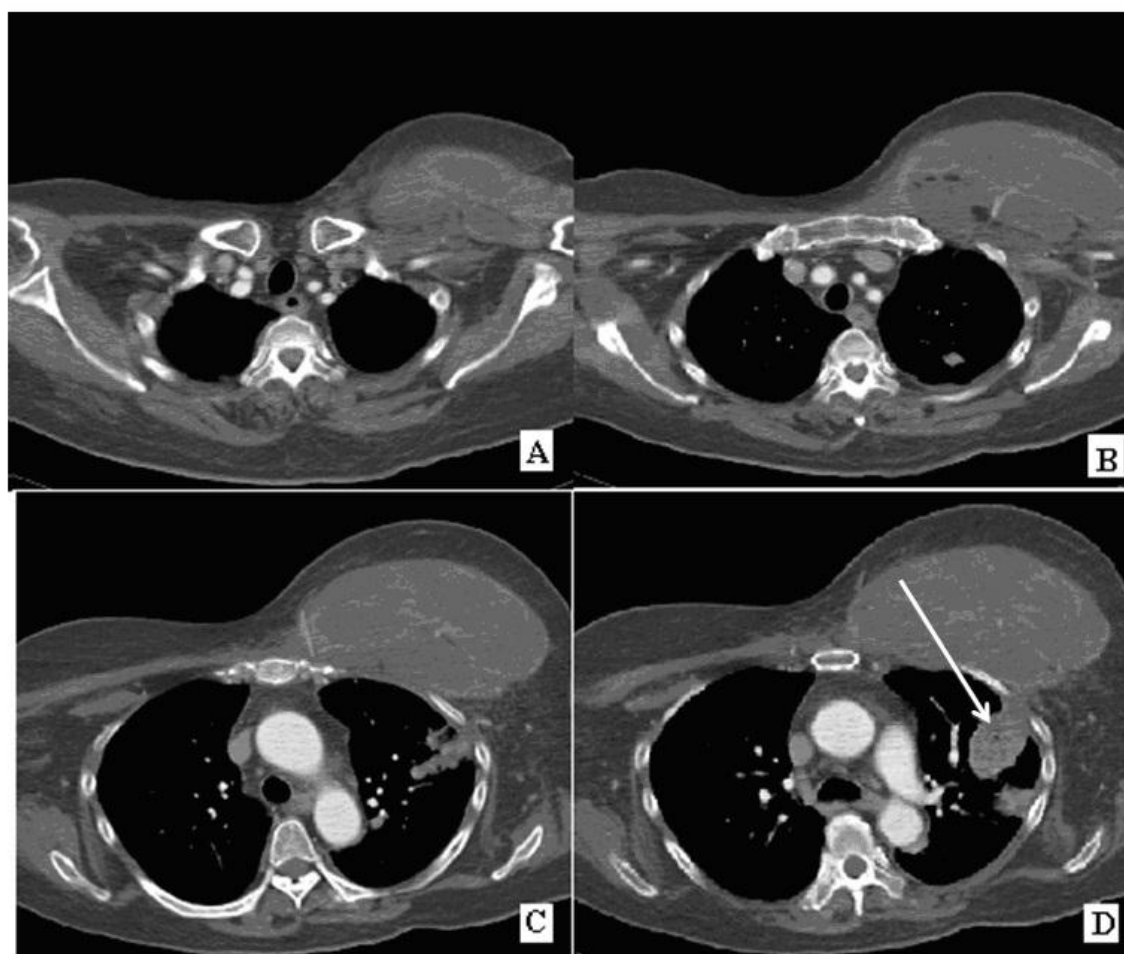


Figure 3 CT thorax shows increasing numbers and size of the left upper lobe lesions. There is a large collection in the left chest wall. The mass is at the needle tract of the PTNB (arrow).

exposure predisposes to pulmonary nocardiosis. The nocardia infection can disseminate haematogenously, usually from a pulmonary focus. Nocardiosis can disseminate to any site, but is commonly found in the lower extremities, brain or meninges. The combination of pneumonia and a lower extremity abscess is particularly suggestive of nocardiosis.

On CT, pulmonary nocardiosis has variable features; these include consolidation, pleural effusion and multiple nodules that may form cavity, and empyema. Some cases show a mass that resembles lung carcinoma.

With the increasing usage of PTNB, clinicians should be aware of the potential threat that infectious materials can be implanted along the needle tract. Dissemination of cancer cells by needle aspiration biopsy can change a potentially resectable localized lung cancer to an unresectable one. The early recognition of this complication allows prompt therapeutic intervention. As a precaution, biopsy should be carried out using a small bore needle. Multiple punctures with a single needle should be avoided because this carries a higher risk of implantation of either tumour cells or infective material along the needle tract.

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REFERENCES

1. Shimamoto H, Inaba Y, Yamaura H, Sato Y, Kamiya M, Miyazaki M, Arai Y and Horio Y. Chest wall dissemination of nocardiosis after percutaneous transthoracic needle biopsy. *Cardiovasc Intervent Radiol.* 2007; 30(4):797–799.
2. Irie T, Kajitani M, Matsueda K, Arai Y, Inaba Y, Kujiraoka Y and Itai Y. Biopsy of lung nodules with use of I-I device under intermittent CT fluoroscopic guidance: preliminary clinical study. *J Vasc Interv Radiol.* 2001; 12(2):215–219.
3. Yamagami T, Arai Y and Inaba Y. CT-guided percutaneous needle biopsy of lung nodules smaller than 3 cm in diameter. *J Jpn Soc Angiogr Interv Radiol.* 1997; 12:69–73.
4. Oschner A and DeBaakey M. Significance of metastasis of primary carcinoma of the lungs: report of two cases with unusual site of metastasis. *J Thorac Surg.* 1942; 11:357–387.
5. Sinner WN and Zajicek J. Implantation metastasis after percutaneous transthoracic needle aspiration biopsy. *Acta Radiol Diagn (Stockh).* 1976; 17(4):473–480.
6. Harrison BD, Thorpe RS, Kitchener PG, McCann BG and Pilling JR. Percutaneous Trucut lung biopsy in the diagnosis of localised pulmonary lesion. *Thorax* 1984; 39(7): 493–499.
7. Yoshikawa T, Yoshida J, Nishimura M, Yokose T, Nishiwaki Y and Nagai K. Lung cancer implantation in the chest wall following percutaneous fine needle aspiration biopsy. *Jpn J Clin Oncol.* 2000; 30(10):450–452.
8. Carter RR 3rd, Wilson JP, Turner HR and Chapman SW. Cutaneous blastomycosis as a complication of transthoracic needle aspiration. *Chest* 1987; 91(6):917–918.