


## Lung *Mycobacterium avium* developed after removing an acupuncture needle from the lung

Mikihito Saito<sup>1,2</sup> , Hajime Kasai<sup>1,2,3</sup>, Kengo Shimazu<sup>2,4</sup>, Takashi Urushibara<sup>1</sup>, Tomohiko Iida<sup>5</sup> & Toshihide Shinozaki<sup>1</sup>

<sup>1</sup>Department of Respiratory Medicine, Kimitsu Chuo Hospital, Kisarazu, Japan.

<sup>2</sup>Department of Respirology, Graduate School of Medicine, Chiba University, Chiba, Japan.

<sup>3</sup>Health Professional Development Center, Chiba University Hospital, Chiba, Japan.

<sup>4</sup>Department of Japanese-Oriental "KAMPO" Medicine, Graduate School of Medicine, Chiba University, Chiba, Japan.

<sup>5</sup>Department of Thoracic Surgery, Kimitsu Chuo Hospital, Kisarazu, Japan.

### Keywords

Acupuncture, *Mycobacterium avium*, non-tuberculosis mycobacteria infection.

### Correspondence

Hajime Kasai, Department of Respirology, Graduate School of Medicine, Chiba University, Chiba 260-8670, Japan. E-mail: daikasai6075@yahoo.co.jp

Received: 28 August 2017; Accepted: 18 September 2017;

Associate Editor: Coenraad Koegelenberg.

*Respirology Case Reports*, 6 (1), 2018, e00279

doi: 10.1002/rcr2.279

## Introduction

Non-tuberculosis mycobacterium (NTM) usually causes lung infection and, sometimes, skin infections [1]. Acupuncture is used for various conditions, such as muscular and neuropathic pain. The risk of a serious adverse event due to acupuncture is very low, and the most common adverse events are pneumothorax, injury to the central nervous system, and infection [2]. NTM infection of the skin rarely occurs after acupuncture [2]. Moreover, there have been no reports showing that acupuncture causes lung NTM infections. Here, we present a case of lung *Mycobacterium avium* (*M. avium*) that developed after removing an acupuncture needle from the lung.

## Case Report

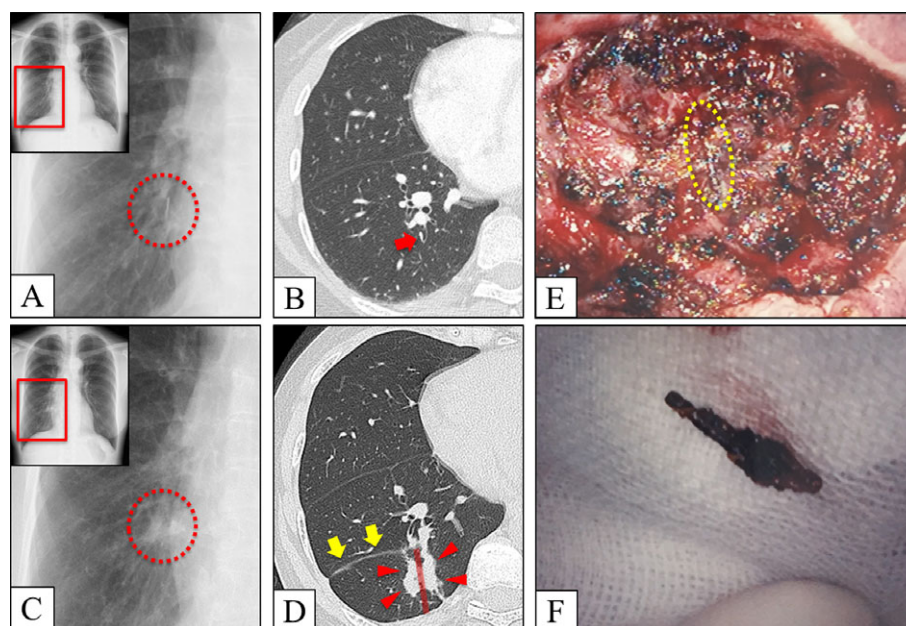
A 63-year-old woman received acupuncture treatment once a week from a doctor of oriental medicine in 2007. She came to the thoracic surgery department of our hospital with an abnormal nodule shown by a chest X-ray during a health check-up in 2008. Chest X-ray and computed

## Abstract

Acupuncture needles can cause non-tuberculosis mycobacteria (NTM) infection on the skin, but there are no reports that acupuncture needles inserted into the lung have caused lung NTM infection. A 63-year-old woman, who underwent removal of a broken acupuncture needle inserted into the lung nine years ago, was admitted with nodules in the right lung. The shadow was positioned where the needle had existed. Partial lung resection of the right lower lobe was performed, and the resected area showed caseous necrosis histopathologically. Furthermore, *Mycobacterium avium* was cultured from the specimen. When abnormal lung shadows are located where a resected foreign body appeared, NTM infection should be considered.

tomography (CT) showed that a foreign body was present in the right lower lung (Fig. 1A, B). It appeared to be an acupuncture needle, but the exact time of migration of the needle to the lung was unclear. Removal of the foreign body was performed, and the specimen comprised an approximately 10-mm broken needle with granulations (Fig. 1E, F).

Nine years later, the patient was admitted to our department with a nodule shadow on chest X-ray after a health check-up (Fig. 1C). A chest CT showed several nodules located in the same place in right lower lung along the pathway where the needle had been inserted (Fig. 1D). Although bronchoscopy was performed, no remarkable findings were acquired. A partial lung resection of the right lower lobe was performed. The resected specimen included some small nodules and a white necrotic region (Fig. 2A). Histopathological examination of the resected specimen revealed caseous necrosis with some multinucleated giant cells. (Fig. 2B, C) Although no bacteria were found by microscopic examination of a direct smear, *M. avium* was cultured. There was no recurrence for six months after surgery despite no administration of treatment for *M. avium*.



**Figure 1.** (A, B) Chest X-ray and computed tomography (CT) showed an abnormal shadow, like a needle, in the right lower lung (A, red dotted circle; B, red arrow). (C, D) Chest X-ray and CT showed several nodules were located on the same place in right lower lung (C, red dotted circle; D, red triangle) along the pathway where the needle had been inserted (D, translucent red line). The yellow arrow shows the scar of the lung incision during surgery to remove the foreign body. (E) A foreign body, like a broken needle, was detected in the right lower lobe (yellow circle) when removal of the foreign body was performed. (F) The specimen comprised an approximately 10-mm broken needle with granulations.

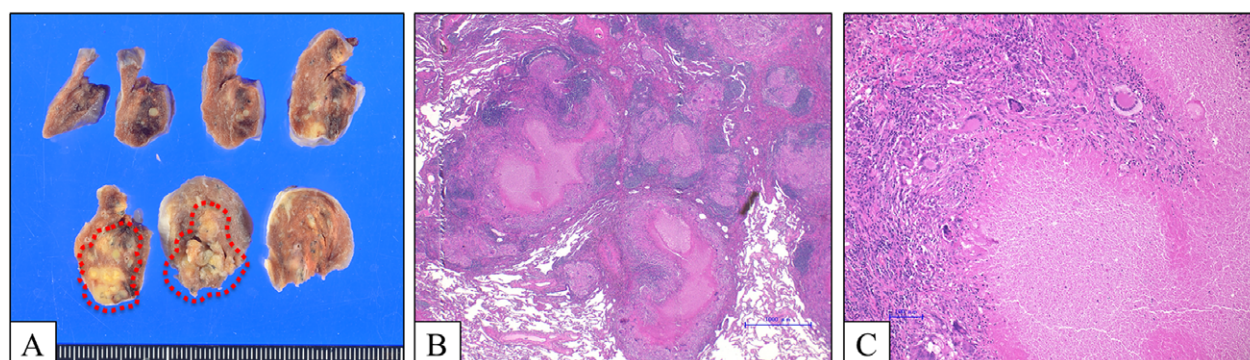
## Discussion

The present case shows notable clinical findings. Acupuncture can not only cause skin infections but also lung NTM infections. Moreover, NTM can reach the lung through the contaminated needles.

Acupuncture caused lung NTM infections in this case. There are some reports of deeper organ injury, such as lung, heart, and blood vessels, caused by acupuncture [2]. Kim et al. reported five patients who had migrated acupuncture needles in the thoracic cavity, and they reported a very high occurrence rate of empyema if the acupuncture needle migrates to the pleural cavity [3]. However, there have been no reports referring to cases of lung NTM developing after acupuncture. In a report on skin NTM infection, three cases developed skin NTM infection following acupuncture [1]. Skin NTM infection appears as subcutaneous nodules, abscess, and papules. However, this case had no rash on the chest skin. In this case, the

nodules in the lung were located just on the pathway where the acupuncture needle was inserted, and there were no other nodules in the lung field that suggested lung NTM was distributed through the airway. These facts strongly indicate that the NTM was introduced by the acupuncture needle. Therefore, this case is the first to report the development of lung NTM after acupuncture.

The acupuncture needle may have been contaminated by NTM in this case. In Japan, two types of needle are used for acupuncture. One is a disposable needle, which is thin and is not easily inserted deeply. The other type of needle is a traditional Chinese needle, which is thicker and longer than the disposable ones, and are sometimes inserted deeper and reused. Needle breakage can be caused by reuse as well as poor quality manufacture, erosion between the shaft and the handle, strong muscle spasm or sudden movement of the patient, incorrect withdrawal of a stuck or bent needle, and prolonged use of a galvanic current [4]. Washing



**Figure 2.** (A) The resected specimen from the operation indicated small nodules and white necrotic region. (B, C) H&E staining for the resected specimen revealed caseous necrosis with some multinucleated giant cells.

needles for reuse can introduce NTM contamination because portable water can be a source of *M. avium* [5]. Furthermore, other tools (acupuncture pipes, etc) are sometimes used repeatedly and may also cause contamination. In this case, the needle seemed to be a Chinese needle because of the thickness of the needle removed. Since acupuncture was also performed at other clinics eight years ago, it is unclear how the treatment was performed. However, the patient thought the needles to be Chinese. The needle may have broken at the surface of the right lung and been delivered to a deeper part of the lung by respiratory movement. In this instance, *M. avium* appears to have reached the lung via a contaminated needle, and the remaining *M. avium* formed granulomas, even after the needle was removed.

Here, we present a case of *M. avium* that developed after removing an acupuncture needle from the lung. When abnormal nodules appear in lung after removing a foreign body, NTM infection should be considered.

### Disclosure Statement

Appropriate written informed consent was obtained for the publication of this case report and the accompanying images.

### Acknowledgments

We express our gratitude to Toru Inoue for performing histopathological examinations.

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