

## A CASE OF SUDDEN DEATH DUE TO BILATERAL TENSION PNEUMOTHORAX AFTER ACUPUNCTURE

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*Abstract* : We report a case of sudden, unexpected death of a 71-year-old woman due to bilateral pneumothorax after acupuncture. The patient experienced dyspnea and subsequently died 6 hours after acupuncture. Autopsy revealed remarkable inferior displacement of the left hemidiaphragm and hemorrhages on the surface of both inferior pulmonary lobes. The deceased had no risk factors for pneumothorax; no underlying pulmonary disease was found and the needles had not been inserted at dangerous therapeutic points. To our knowledge, this is the first report of a death due to pneumothorax after acupuncture that occurred in the absence of relevant risk factors.

**Key words** : acupuncture, bilateral tension pneumothorax, underlying pulmonary disease, therapeutic points

Acupuncture is a well-accepted therapeutic modality that has been practiced for many centuries, and is indicated for many diseases, with some people choosing it as initial treatment. However, with its increasing popularity as an alternative therapy, there have also been increasing numbers of reports of associated adverse effects, such as infections and mechanical organ injuries<sup>1</sup>. Infection, which seems nearly always to be due to inadequate hygiene, is often reported as a cause of death associated with acupuncture<sup>1-3</sup>. On the other hand, fatalities related to pneumothorax, which is the predominant mechanical organ injury following acupuncture<sup>4-18</sup>, are quite rare as most pneumothoraces occurring after acupuncture are unilateral and significant improvement can be expected with suitable treatment. To the best of our knowledge, only 3 deaths due to acupuncture-related pneumothorax have been reported<sup>4-6</sup>. In these cases, the patient exhibited several risk factors relevant to pneumothorax. We believe that this report describes the first autopsy case in which fatal bilateral pneumothorax occurred after acupuncture in a patient with no risk factors.

### CASE REPORT

A 71-year-old woman had been receiving acupuncture for shoulder stiffness twice a week on a regular basis for a year at an acupuncture clinic. She had no history of pulmonary disease and did not smoke. On the day of the patient's death, the acupuncturist treated her limbs, chest, and back with needles of approximately 0.2 mm diameter for 40 minutes. The patient returned home after treatment but experienced severe chest pain and dyspnea. Over the next 2 hours she became progressively dyspneic and presented at a medical clinic where a chest X-ray showed bilateral tension pneumothorax. Although she was immediately

transported to a general hospital by ambulance, cardiopulmonary arrest occurred en route. On arrival at hospital, chest tubes were inserted and cardiopulmonary resuscitation was performed but these measures were unsuccessful and death was pronounced 6 hours after the acupuncture session. An autopsy was carried out at Nara Medical University around 19 hours after death in order to investigate to what extent acupuncture had contributed to the death.

### AUTOPSY FINDINGS

#### External findings

The woman was 155.0 cm tall and weighed 50.5 kg. Numerous ecchymoses, considered to be needle marks, were apparent on the arms, legs, and back, with those in the bilateral dorsal 10th intercostal spaces on the scapular line being particularly prominent. Subcutaneous emphysema was palpable in the left chest wall. No other external injuries were detected.

#### Internal findings

The left hemidiaphragm showed remarkable inferior displacement and was located at the height of the eighth rib (Fig. 1). The right hemidiaphragm was at a normal position. The size of lungs in the thoracic cavity was normal, consistent with drainage having been performed at hospital. The lungs weighed 320g (left) and 450g (right). Symmetrical hemorrhages, each measuring 3.5 cm in diameter, were found on the surfaces of both lungs, on the dorsal aspects of the inferior lobes (Fig. 2). The hemorrhages were nearly 4 cm beneath the skin and corresponded in location to the ecchymoses at the bilateral dorsal 10th intercostal space.



Fig. 1. Left side of the diaphragm is remarkably expanded

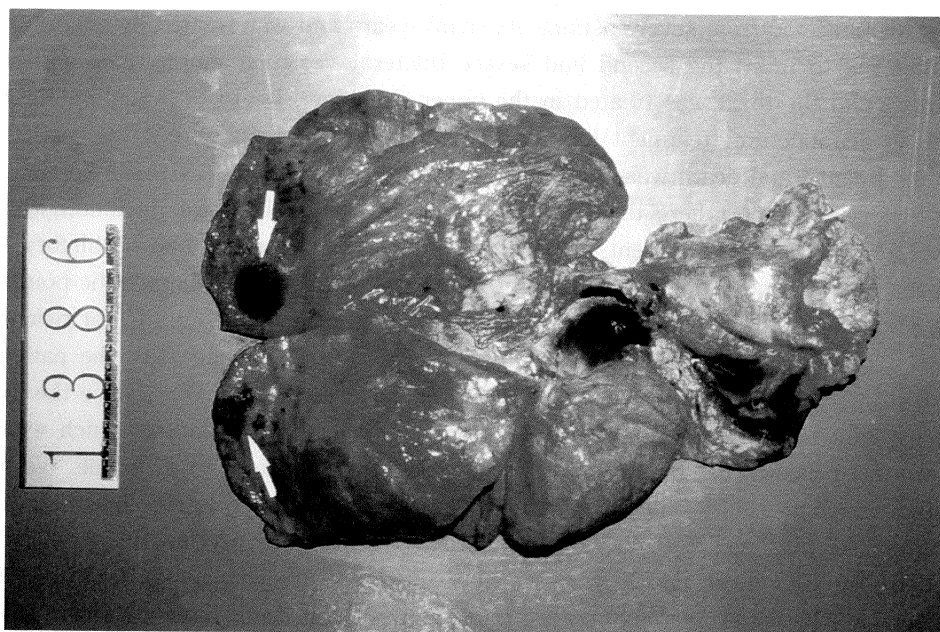


Fig. 2. Hemorrhages at the bottom of the lungs.

The wounds are nearly 4cm beneath the skin.

Microscopically, a fistula was detected in the center of each hemorrhage. Histological examination failed to find evidence of any pulmonary disease. Intramuscular bleeding was found below the ecchymoses at the dorsal 10th intercostal space. We therefore concluded that the needles inserted into the back penetrated the muscular layer and reached the lungs. No significant findings were apparent in any other organ apart from mild coronary atherosclerosis.

## DISCUSSION

When considering pneumothorax associated with acupuncture, 2 risk factors have been identified: the patient-related factor of underlying pulmonary disease, and the practitioner-related factor of needle insertion area.

It is well known that the incidence of secondary pneumothorax in patients with underlying pulmonary disease, such as tuberculosis, chronic obstructive pulmonary disease, and bronchial asthma, is higher than that of the healthy population<sup>1, 19, 20</sup>. Indeed, several reports have described pneumothorax due to acupuncture occurring in those who have such underlying pulmonary disease<sup>4, 5, 7-10</sup>.

The most dangerous therapeutic points in this regard, where needles can easily reach the pleura and lung, are in the supraclavicular region. The infraclavicular region, parasternal points on the kidney meridian, the points of the stomach meridian in the midclavicular line, and the points along the medial scapular line (upper shoulders) are also potentially risky<sup>21</sup>, as soft tissue in these areas is very thin.

In the 3 fatalities previously reported, patients were exposed to at least one risk factor:

the first had suffered from severe asthma for many years and was treated by acupuncture at the parasternal points<sup>4</sup>, the second had severe bilateral vesicular emphysema and chronic bronchitis<sup>5</sup>, and the third was treated in the upper shoulder<sup>6</sup>. Death of an asthmatic patient undergoing acupuncture treatment has also been reported previously, but this patient died during treatment<sup>22</sup>) and death was determined to be from the asthma.

We believe we report here the first case of death due to bilateral pneumothorax after acupuncture occurring in a patient without risk factors; the deceased had no history of any pulmonary disease, and the needles were not inserted into dangerous therapeutic points.

The present case raises questions into why death occurred in the absence of risk factors, and into why it occurred after that particular acupuncture treatment, after the patient had uneventfully received acupuncture twice a week regularly for a year. We believe the incident can be explained by the location of the bilateral pulmonary hemorrhages, which were at a depth of 4 cm beneath the skin and were symmetrical on both sides of the spine. We believe that such wounds could only have resulted from intentionally deep insertion of the acupuncture needles. On the day of the patient's death, the acupuncturist might have inserted the needles more deeply than usual to increase efficiency of treatment, believing deep insertion was not dangerous because the soft tissues on lower back were very thick.

In general, the inferior margins of lungs are located at the level of the 10th or 11th rib. Along the lateral line of the bladder meridian, located approximately on the medial scapular line, the surface of the lung is about 15 to 20 mm beneath the skin<sup>21</sup>). Therefore, insertion of acupuncture needles in the back to a depth over 1 cm is contraindicated.

Acupuncture is a procedure undertaken by inserting needles into therapeutic points in the body. As a matter of course acupuncturists are required to practice with attention to hygiene, professional skills, and a correct knowledge of anatomy. Above all, they need to become conscious of the dangers inherent in the practice of acupuncture, particularly with regard to the surface anatomy of the lungs, and appropriate needle depth.

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