

## A case of delayed onset of pneumothorax after a stab injury to the neck

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**Abstract:** A 23-year-old female patient had experienced auditory hallucinations for a few years. One evening, she stabbed herself in the neck a few times while at home before going outside and diving from a bridge at midnight. A passerby found her under the bridge and called an ambulance. On inspection, she had three stab wounds at her neck, subcutaneous hemorrhaging at the right forearm and left elbow, and swelling of the right foot. She showed subcutaneous emphysema of the face, neck, and chest on palpitation. Emergency enhanced whole-body computed tomography (CT) revealed subcutaneous emphysema at her face and neck and pneumomediastinum, in addition to thoracolumbar disrupted fractures and pelvic fracture. However, there was no pneumothorax. Her neck wounds were directly closed by sutures. Emergency fixation of the calcaneus under spinal anesthesia was performed. Follow-up chest roentgen and truncal CT in the afternoon revealed right pneumothorax despite the subcutaneous emphysema at the neck decreasing in volume. She underwent indwelling chest drain for the pneumothorax. The thoracolumbar and pelvic fractures were managed observationally. After the diminishment of pneumothorax, the chest drain was removed. The course of her neck wounds was uneventful. She was transferred to an orthopedic ward on the ninth hospital day. Following the disruption of the membrane between the pneumomediastinum and pleural cavity, air in the pneumomediastinum may move into the pleural cavity, resulting in delayed pneumothorax. Physicians should be alert for the delayed onset of pneumothorax, which may advance to lethal tension pneumothorax, when treating patients with neck stab wounds.

**Keywords:** pneumothorax; stab injury; neck; delay

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### INTRODUCTION

Pneumothorax occasionally contributes to the death in afflicted patients. Although the incidence of delayed pneumothorax is low, it can be life threatening, particularly in patients on positive pressure ventilation [1,2]. A high index of suspicion is required for the accurate diagnosis and treatment of this reversible condition. We herein report a case of delayed onset of pneumothorax after a stab injury to the neck despite the absence of positive pressure ventilation.

### CASE REPORT

A 23-year-old female patient had experienced auditory hallucinations for a few years. One evening, she stabbed herself in the neck a few times while at home before going outside and diving from a bridge (6 m above the water) at midnight. A passerby found her under the bridge and called an ambulance. She had no remarkable medical history except for auditory hallucinations.

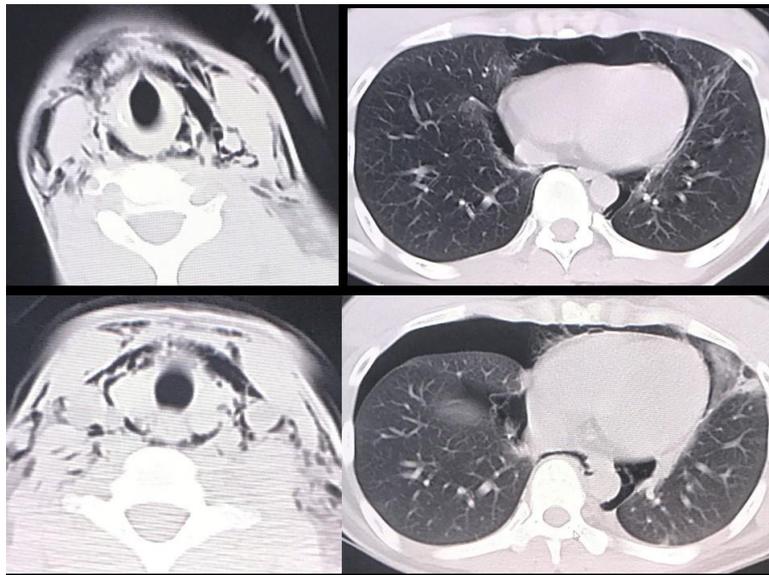
On arrival, she had a blood pressure of 104/68 mmHg, a heart rate of 124 beats per minute (BPM), and a saturated oxygen of 100% under 6 L of oxygen delivered via mask. On inspection, she had three stab wounds at her neck, subcutaneous hemorrhaging at the

right forearm and left elbow, and swelling of the right foot. She showed subcutaneous emphysema of the face, neck, and chest on palpitation. Emergency chest roentgen revealed further subcutaneous emphysema at the neck and mediastinum, pelvic roentgen showed a stable fracture, and foot roentgen revealed a dislocated comminuted calcaneus fracture. Subsequently, enhanced whole-body computed tomography (CT) revealed subcutaneous emphysema at her face and neck and pneumomediastinum, including pneumopericardium, in addition to thoracolumbar disrupted fractures and pelvic fracture without extravasation of the contrast medium (**Figure 1**). However, there was no pneumothorax.

Her major results of a blood analysis performed on arrival were as follows: aspartate aminotransferase, 229 IU/L; alanine aminotransferase, 115 IU/L; creatinine phosphokinase, 1157 IU/L. Her neck wounds were directly closed by sutures after irrigation without exploration. Emergency fixation of the calcaneus under spinal anesthesia was performed. Follow-up chest roentgen and truncal CT in the afternoon revealed right pneumothorax despite the subcutaneous emphysema at the neck decreasing in volume (**Figure 1**). She underwent indwelling chest drain for the pneumothorax.

The thoracolumbar and pelvic fractures were managed observationally. After the diminishment of pneumothorax, the chest drain was removed. The

course of her neck wounds was uneventful. She was transferred to an orthopedic ward on the ninth hospital day.



**Fig-1: Computed image (CT) of trunk on arrival (upper images) and 16 h later (lower images). There was no pneumothorax on arrival; however, follow-up CT revealed right pneumothorax despite a reduction in the subcutaneous emphysema at the neck and the volume of pneumomediastinum**

## DISCUSSION

Neck stab wounds can cause pneumothorax due to direct lung injury [3-5]. However, to our knowledge, this is the first case complicated with delayed-onset pneumothorax, despite a CT evaluation, which has high sensitivity for detecting occult pneumothorax, being performed on arrival [6].

There are two possible mechanisms underlying the delayed onset of pneumothorax in this case. One involves direct minute lung injury due to stabbing but the temporary prohibition of air leakage by coagulation and then the re-leaking air after admission [1]. Another mechanism involves the disruption of the parietal pleura or pericardium by increasing the pressure of the pneumomediastinum or mechanical stimulation induced by respiratory lung movement. Following the disruption of the membrane between the pneumomediastinum and pleural cavity, air in the pneumomediastinum may move into the pleural cavity, resulting in delayed pneumothorax.

## CONCLUSION

Physicians should be alert for the delayed onset of pneumothorax, which may advance to lethal tension pneumothorax, when treating patients with neck stab wounds.

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## Conflict of Interest

The authors declare no conflicts of interest in association with the present study.

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