Emergency department presentation of hemoptysis due to nail gun injury

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ABSTRACT

Nail guns are cheap and easy-to-access devices that are common in the industry and personal use and are widely used by untrained people. Life-threatening injuries may occur after a self-accident due to the use of these devices. We report the case of a 47-year-old man who had hemoptysis due to a lung parenchymal injury after nail gun use. Computed tomography revealed focal alveolar hemorrhage. Hemodynamically stable, the patient underwent surgery. Nail guns penetrating the chest can cause life-threatening situations. In the emergency department, rapid diagnosis and treatment is vital in preventing fatal outcome.

Key Words: Alveolar hemorrhage, hemoptysis, nail gun

INTRODUCTION

Nail guns are easy-to-access and cheap devices that are frequently used in the construction and wood industries. They are often used by many untrained people. Although the most frequent hand injuries are due to nail guns, thorax, abdomen, pelvis, facial bones, and skull injuries have also been reported. Injuries often occur in the industrial and nonoccupational environments with a vast majority after self-accidents.[1,2]

In the literature, most thoracic cases with nail gun injuries involve cardiac injuries. To the best of our knowledge, this is the first reported case of hemoptysis due to lung parenchymal injury following nail gun injury. This communication aims to document our experience with the management of this patient who developed hemoptysis after thoracic nail gun injury.

CASE REPORT

A 47-year-old male construction worker was admitted with a history of a nail gun injury to his chest ½ h before. After accidentally falling from the same level, the nail discharged his chest wall, and he had hemoptysis. Hemoptysis was transient and three times. On admission, the hemodynamics was stable; there was no subcutaneous emphysema, and cardiovascular and chest auscultation were normal. There was a nail entry wound to the right of the sternum in the 3rd intercostal space, about 0.5 cm in diameter. The patient’s arterial blood pressure was 130/80 mmHg, pulse was 84/min, and O₂ saturation was 95%. The patient was monitored, and hemodynamic follow-up was obtained. Tetanus vaccination and parenteral antibiotic therapy were started. Electrocardiogram was normal. An anteroposterior and lateral chest X-ray (CXR) [Figure 1] revealed a metallic object – the nail wire. Computed tomography (CT) of the thorax showed the nail penetrating the lung parenchyma and focal alveolar hemorrhage [Figure 2].

Subsequently, the patient was referred to the thoracic surgery department. The patient was taken to the operating room, and a 30-mm nail was slowly manipulated and removed via retrograde extraction. There was no complication post surgery. We thought that this kind of penetrating injury might be pneumothorax in CXRs. Pneumothorax, hemothorax, and vascular injury may occur in the patient post extraction of the nail. Therefore,
patients should be monitored for at least 24 h and followed by CXR. On the 2nd day of hospitalization, the patient was discharged with normal CXR.

**DISCUSSION**

A nail gun is a mechanical device that is used to frame wooden structures, secure the wood, and support concrete and many other construction and home improvement applications. Upper-extremity injuries, especially of the hands and fingers, constitute 75% of all nail gun injuries.[3] Although extremity injuries are most common, life-threatening injuries to the head, neck, chest, abdomen, and pelvis may occur. Paralytic spinal cord transection, bowel perforation, long bone fracture, liver laceration, hemopneumothorax, blindness, cerebral damage, and even fatal injuries have been reported.[1,4]

Penetrating thoracic trauma is usually less common but more fatal than blunt chest trauma. Penetrating chest injuries are rarely seen as preventable causes of death. These injuries are caused by 10% of gunshot wounds and 9.5% of stabbings in the United States.[5,6]

Lung injuries from penetrating trauma may include pneumothorax, pulmonary contusion, hemothorax, and pulmonary laceration. Pulmonary contusion is a direct bruise leading to alveolar hemorrhage of the lung. Clinical symptoms of pulmonary contusion include dyspnea, hypoxia, tachypnea, and hemoptysis. In our patient, focal alveolar hemorrhage in the lung parenchyma was the cause of hemoptysis. However, pneumothorax, hemothorax, and mediastinal injury did not accompany it.[7,8]

Hemodynamically unstable patients should be taken directly to the operating room without diagnostic intervention in the emergency department. In hemodynamically stable patients, imaging techniques such as routine CXR or CT scan should be performed to detect hemothorax, hemopericardium, pneumopericardium, and other complications.[9] A CXR is a valuable and rapid diagnostic tool with appropriate technique and position in case of thoracic penetrant injuries. Computed chest tomography is superior than the CXR in evaluation of lung contusion, hemothorax and mediastinum.[10] In our case, there was no pathology except the nail in the CXR. In order to determine the cause of hemoptysis, we planned a thorax CT for further investigation. CT showed a consistent image of focal alveolar hemorrhage.

Surgical treatment should be considered for all patients regardless of hemodynamic status. Approximately 15% of patients with penetrating thoracic trauma require surgical treatment. Emergency thoracotomy indications include heart tamponade and major bleeding or massive air leakage.[9,11]

Nail guns are cheap and easily accessible tools commonly used in the construction and wood industries. Many people often use them without training. Nail guns penetrating the chest can cause life-threatening situations. In the emergency department, quick diagnosis and treatment is important for preventing fatal outcome. Personnel training and safety must be provided to prevent such injuries. Use of such devices by the untrained should be prevented.

**Declaration of patient consent**
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**
There are no conflicts of interest.
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