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Case Report

Nail gun injury through the parapharyngeal space in a carpenter: a unique case report

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ABSTRACT

In developing countries, head and neck penetrating injuries from construction nails are rare can be dangerous or fatal. The use of nail guns in the construction industry gained popularity during the 1990s and is now widespread. In majority of nail gun injuries, the extremities are involved, although injuries to the head and neck region have also been described with approximately 45 cases of cranium penetrating nail gun injuries published in the literature. The management of such cases includes a neurological examination, systemic physical examination, and determination of the optimal surgical method to approach and remove the foreign body. we report a case of penetrating skull base injury caused by a nail gun in a 46-year-old man that was successfully managed by a transnasal endoscopic approach. The patient recovered completely and was discharged. To prevent complications and achieve the best outcomes in such cases, careful diagnosis and assessment are necessary.

Keywords: Skull base, Foreign body, Nail gun, Transnasal approach

INTRODUCTION

Skull base injuries caused by penetrating objects are relatively uncommon, representing about 0.4% of head injuries.[1,2] Skull base injuries due to foreign bodies such as wood, glass, knives, and metallic fragments may result in breaking of these objects and their entrapment in the soft tissue, causing diagnostic and therapeutic challenges. With the widespread use of nail guns in industrial construction and home decoration, nail gun injuries have markedly increased in recent years. They most frequently involve the limbs, while facial injuries are relatively uncommon.[3-7] They may be self-inflicted and associated with psychiatric conditions. Therefore, appropriate psychiatric assessment is indicated during hospitalization.

Although the patient may be asymptomatic initially, serious consequences may occur after several days, months, or even years after the injuries.[4] In addition to a thorough medical history, careful clinical assessment and radiological review are essential for effectively diagnosing foreign bodies that are not clinically evident. The majority of the foreign bodies are detected by computed tomography (CT); however, the most important factor determining the management of such cases is the relationship between the foreign body and surrounding vital structures.[8] Here, we have described a case of penetrating skull base injury caused by a nail gun that was successfully managed by a transnasal endoscopic approach.

CASE REPORT

A 46-year-old man was referred to the emergency department of King Saud Medical City with a history of

foreign body injury to the face. On arrival, he was fully conscious and oriented.

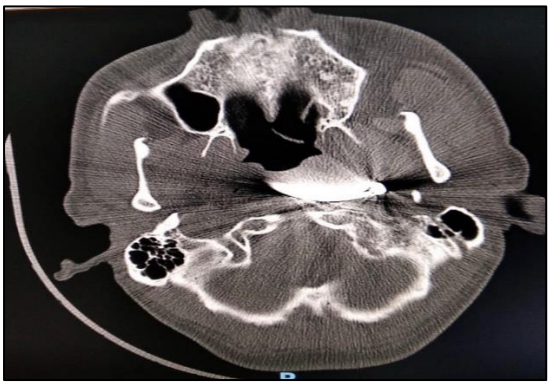

Figure 1: CT scan of the head showing metallic foreign body extending from the left parapharyngeal space and crossing the midline to the right side at the level of C1.

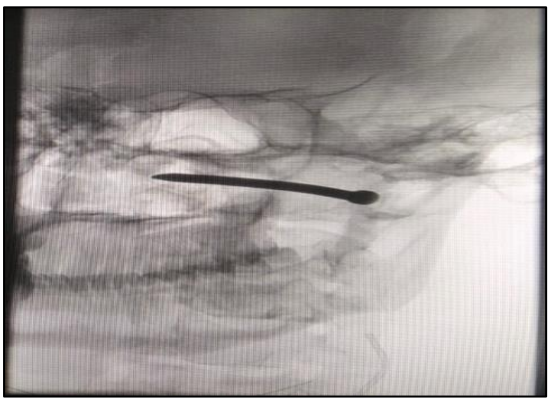

Figure 2: CT angiogram of the head showing 4 cm metallic foreign body, with intact left internal carotid artery, intimal flap and pseudoaneurysm formation.

Figure 3: 3D reconstructed CT showing metallic foreign body in the left parapharyngeal space and crossing the midline.

He was a carpenter by profession and was nailing the ceiling of a house with an automatic nailing gun powered by compressed air. Suddenly, he felt a severe blow against his left cheek and initially thought that it was caused by the recoil of the gun. He presented to a private hospital and was subsequently referred to our center. Examination revealed a small penetrating wound just below the left infraorbital margin about 2 cm away from the medial canthus. an Urgent CT scans of the head and brain revealed an approximately 4 cm long and 0.8 cm wide metallic nail extending from the left parapharyngeal space and crossing the midline to the right side at the level of C1 and clivus. It had perforated the medial wall of the left maxillary sinus as well as the nasal septum and lodged in close proximity to the left internal carotid artery below the skull base. Marked surgical emphysema was observed in the parapharyngeal and retropharyngeal spaces. The patient was urgently admitted to ENT care for further investigations and management. He was fully conscious with stable vital signs. CT angiography was performed, and after consulting with vascular and neurosurgeons, the patient underwent surgery under general anesthesia. A transnasal 0 degree endoscope was passed through the left nostril and nasopharynx. Mucosal lacerations were identified and gently dissected. The head of the nail was seen and slowly dragged medially, followed by successful removal via closed gentle traction through the oropharynx with no hemorrhagic or ischemic sequalae.

DISCUSSION

Pneumatic nail guns are commonly used in residential and commercial construction and are also readily accessible to public consumers. Since the first report in 1959, nail gun injuries have become increasingly common.[9] According to the 2005 Centers for Disease Control and Prevention report, nail gun-related injuries have increased threefold in the United States since 1991. An estimated 37,000 patients were seen annually from 2001 to 2005.[10] Up to 66% of these injuries are due to occupational hazards.10 Simultaneous depression of the nose piece and gun trigger causes nail discharge, increasing the risk of accidental injury to oneself and others.[11] If the nose element is depressed before the trigger, accidental injury can be avoided.

The complex anatomy of the skull base makes surgery difficult due to restricted access and proximity of vital structures. For good results and low morbidity, thorough anatomical knowledge is essential.[12] Skull base injuries caused by penetrating nail guns are rare and usually nonfatal; however, depending on their location and degree of penetration, they may be life-threatening.[13]

The approach to patients with nail gun injuries includes a detailed history and examination including neurological examination. Patients with life-threatening injuries should be first stabilized by securing air ways and managing blood loss.[14]

No attempt should be made in primary care to remove any penetrating foreign bodies without Propper

assessment, as the foreign bodies may act as a tamponade preventing severe bleeding.[15]

Finally, surgery should not be performed in centers which lack expertise in craniotomy and vascular surgery because the anterior cranial fossa contains major arteries and cranial nerves. Removal of foreign bodies without precise anatomical knowledge might have disastrous consequences.

CONCLUSION

Although penetrating skull base injuries with construction nails are uncommon, they can be life threatening and difficult to diagnose, particularly when the object is not clearly visible. Appropriate diagnosis is important to avoid potential complications such as vascular injury, intracranial infection, and hemorrhage. A detailed history, physical assessment, and imaging tests such as brain CT, with or without angiography, therapeutic embolization, and preoperative 3D modeling with 3D Slicer may help in envisioning the penetrating injury pathway and surrounding neurovascular structures. To extract foreign bodies from the base of the skull, neurosurgical and otolaryngologic techniques are most frequently used and require a thorough understanding of the neuroanatomy. Optimal planning of foreign body removal and precise reconstruction of soft tissue injuries is required for the best possible outcome with regard to form, function, and esthetics, while ensuring optimal rehabilitation.

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