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A Case Report on the Asymptomatic First Presentation of a Pencil-Piercing Neck Injury in a 22-Year-Old Boy

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Abstract

Introduction

The neck is an important part that contains vital structures of vessels, nerves, and aerodigestive organs. Clinically, it's divided into three zones, each containing specific structures, and any penetrating injury is a high risk of multiple serious case scenarios that could be fatal.

Case Presentation

Here, we report a case of a 22-year-old male who was asymptomatic on the initial visit to the Emergency room except for a slight limitation of jaw movement and tenderness that was attributed to a punch he got from his friend in a fight. No history of a penetrating injury was provided. 10 days later, the boy presented with significant neck swelling. CT scan showed a small pencil in zone III of the neck -which is the area between the angel of the mandible and the base of the skull. The patient underwent successful surgery to remove the sharpened object and was discharged on the third day post-op without any neurovascular complications.

Discussion

Even though there are common symptoms and signs of penetrating neck injury, such as non-expanding hematoma, subcutaneous or mediastinal air, mild hemoptysis, hematemesis, dysphonia, and dysphagia. There are some asymptomatic penetrating neck injury cases. Notifying a trauma team or a surgeon, if either is available, is necessary for the evaluation of neck injuries. Physical examinations in individuals with neck trauma may not be useful in excluding injuries, so a low bar for requesting additional imaging tests and/or surgical consultation should be considered.

Conclusion

A penetrating neck injury could have an asymptomatic initial presentation. Imaging and careful examination are necessary in neck trauma cases.

Keywords: Emergency, Neck Injury, Adult accidents, Case report, Radiology

Introduction

5–10% of all trauma cases involve a penetrating neck injury [**1**]. Given that death rates can reach 10%, clinicians must be knowledgeable about management techniques.[**2**]

A neck injury that has crossed the platysma muscle is referred to as a penetrating neck injury.[**3**] A knife wound obtained during a violent assault is the most frequent type of injury in the world, followed by gunshot wounds, self-harm, auto accidents, and other high-velocity objects.[**4,5**] Important vascular, aerodigestive, and neurological structures are located in the complicated anatomical region of the neck, which is comparatively exposed. [**5**] So we are expecting devastating injuries to the neck structures. Those injuries can be vascular, The most frequent type of vascular injury is a partial or total blockage. Other types include dissection, pseudoaneurysm, extravasation of blood, and arteriovenous fistula development.[**6**] About 25% of penetrating neck injuries result in arterial injury.[**7**] A significant death rate is linked to aerodigestive damage, which affects 23–30% of patients with penetrating neck injuries.[**3**] Despite being less frequent than laryngotracheal injuries, pharynx-oesophageal injuries nonetheless have a mortality incidence of about 20%. [**5,8**]

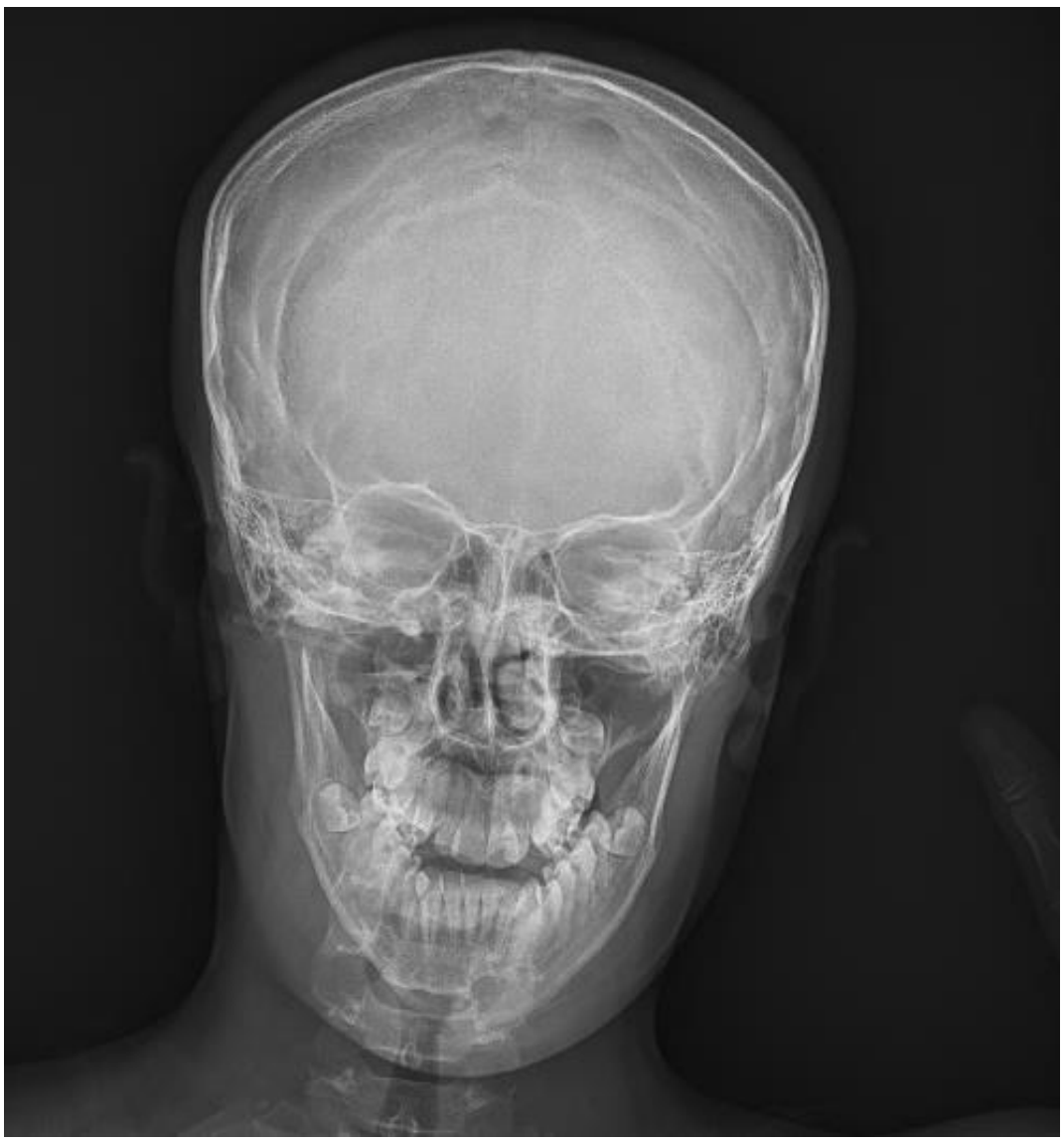
The spinal cord, cranial nerves VII-XII, the sympathetic chain, peripheral nerve roots, and brachial plexus are among the neurological structures that run the risk of being involved. [**9**] Knowing all those sensitive structures in the neck makes the likelihood of having penetrating trauma to it, without any complications to any structure located there almost impossible, But here is our case making this real and possible.

Case Presentation

A 22-year-old boy presented to the emergency department complaining of tenderness and limited jaw movement after he had been punched in his face by a friend. The patient had a free past medical and surgical history. He's not on any medications with no known food or drug allergies.

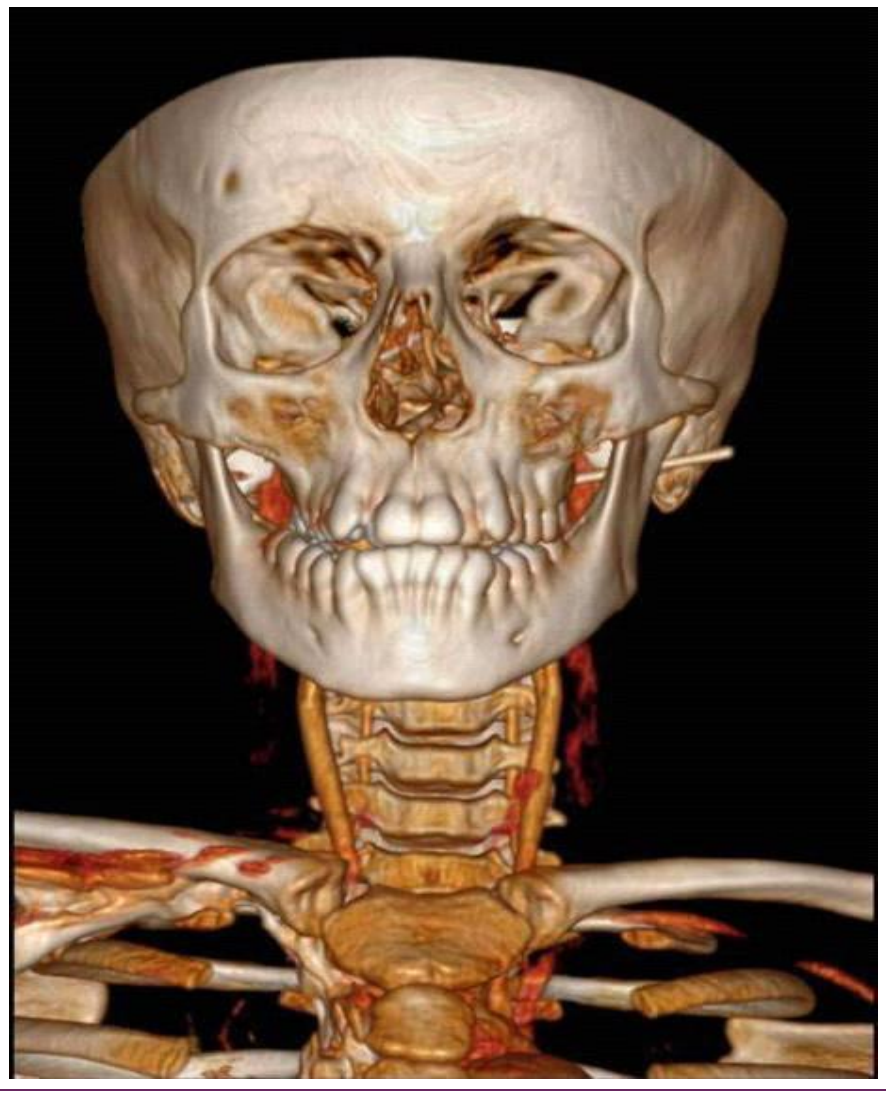
On initial physical examination, the patient was stable vitally, sitting calmly in place without any abnormal neurological findings or bleeding. A small black spot was the only thing to be observed on his neck and a skull X-ray **(figure-1)** was done the slight shadow of the pencil was missed due to no history provided of penetrating trauma by the patient. so he was discharged on NSAIDs. The patient presented with a slight limitation of jaw movement and tenderness that was attributed to a punch he got from his friend in a fight. No history of a penetrating injury was provided.

Figure 1: Skull X-ray showing the slight shadow of the pencil that was missed due to the absence of penetrating trauma history.



However, 10 days later, he presented to the clinic with significant swelling in his neck. A 3D CT scan revealed a surprising finding of a small pencil that had penetrated the third neck Zone uneventfully and without causing any vascular or neurological damage **(Figure 2)**

Fig. 2: 3D CT scan showing pencil penetrating the third neck zone.



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It is worth mentioning that the patient didn't feel the pencil penetrating his neck therefore that wasn't mentioned to the doctor in the history. The patient underwent surgery to remove a sharpened pencil from both sides. He recovered well after the operation and was discharged home on day three post-operation without any vascular or neurological injuries.

Discussion

A neck injury that has ruptured the platysma muscle is referred to as a penetrating neck injury.[**3**] A knife wound sustained during a violent attack is the most frequent type of injury in the world, followed by gunshot wounds, self-harm, auto accidents, and other high-velocity items.[**4,5]** Important vascular, aerodigestive, and neurological structures are located in the complicated anatomical area of the neck, which is comparatively exposed.[**3]** Zones I, II, and III are used to denote the neck for descriptive and clinical treatment purposes.

Zone I is the region situated in the middle of the cricoid cartilage and the clavicles. The innominate vessels, the common carotid artery origin, the subclavian vessels, the vertebral artery, the brachial plexus, the trachea, the esophagus, the apex of the lung, and the thoracic duct are all located in this zone. Furthermore, due to the presence of the clavicle and bony structures of the thoracic inlet, surgical exposure, and access may be challenging in this region. Zone II is the region situated between the cricoid cartilage and the mandibular angle. The internal jugular veins, the trachea, and the esophagus are all situated here, along with the carotid and vertebral arteries. Clinical evaluation and surgical investigation are rather simple in this area**. [10]** It is the neck's biggest zone and frequently suffers injuries. **[4]**

The most frequent type of vascular damage is a partial or total blockage. **[2]** Other types include dissection, pseudo-aneurysm, extravasation of blood, and arteriovenous fistula development. **[5]** About 25% of penetrating neck injuries result in arterial damage, 80% of which affect the carotid artery and 43% of which involve the vertebral artery. Injuries to both the carotid and vertebral arteries raise serious neurological and hemorrhagic concerns, **[2]** and it is uncommon for individuals to have cervical damage without a neurological disability. **[11]** Additionally, there was a considerable risk of bleeding and perhaps death if the injury was in zones I or III because these areas are rich in major blood vessels and cranial nerves.**[4]**

Even though there were common symptoms and signs of penetrating neck injury, such as non-expanding hematoma, subcutaneous or mediastinal air, mild hemoptysis, hematemesis, dysphonia, and dysphagia, There were some asymptomatic cases, as was seen in our case, where the patient presented with tenderness and slight limitations in jaw movement even with a foreign body like a sharp pen in his neck, which made the doctor think that the punch he got from a friend was the cause of these symptoms and it will get better with time.

So, as in our patient with an asymptomatic penetrating injury, where no history of a pen that penetrated his neck was mentioned and the patient did not feel its presence even though it penetrated Zone III, which is the area between the angle of the mandible and the base of the skull and contains the internal and external carotid arteries, the jugular vein, the lateral pharynx, and the cranial nerves VII, IX, X, XI, and XII, where the majority of patients with injury in the same place presented with vascular injury.**[10]**

Notifying a trauma team or a surgeon, if either is available, is necessary for the evaluation of neck injuries. Physical examinations in individuals with neck trauma may not be useful in excluding injuries, so a low bar for requesting additional imaging tests and/or surgical consultation should be considered. To detect worsening clinical status and any persisting issues, regular assessment is necessary. Such individuals must have a comprehensive secondary examination to look for any other damage. Patients who are stable and exhibiting subtle indicators of harm, as well as occasionally those who are initially asymptomatic, are subjected to diagnostic tests [**12,13]** such as chest radiography with an anterior and lateral view to check them for hemothorax, pneumothorax, or pneumomediastinum, CT angiography to evaluate for vascular injury, duplex ultrasound, and conventional angiography, which is the "gold standard" for assessing vascular damage. The carotid and vertebral arteries, the intracranial carotid artery in zone III injuries, and the aortic arch and its branches in zone I injuries should all be examined, if possible. **[4]**

In our case, physical examination on the initial visit to the emergency room was normal except for some tenderness and mild limitation of the jaw movement that was attributed to the punch. The skull x-ray appeared normal too.

Conclusion

Penetrating neck injuries have a high mortality rate. This case is a rare presentation of penetrating neck injury in zone III of a foreign object, a pencil, with the patient's initial presentation with a slight limitation of jaw movement and tenderness that was attributed to a punch he got from his friend in a fight. No history of a penetrating injury was provided. Ten days later, the boy presented with significant neck swelling. A CT scan showed a small pencil in zone III that was removed successfully without any neurovascular injury. Imaging and careful examination are necessary in neck trauma cases in addition, careful reading of X-ray images is needed to pick up any abnormalities as early as possible.

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