

Cervical impalement injury to a child by a chopstick diagnosed with computed tomography and ultrasonography

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Abstract Injuries penetrating into the floor of the mouth in the oral cavity caused by chopsticks are rare. We report a case of neck impalement injury caused by a wooden chopstick fragment penetrating all the way through the base of the tongue. An 18-month-old boy fell off his chair when he was biting on a wooden chopstick. Four centimeters of the chopstick broke off but could not be found, so he was brought to our emergency department with minor bleeding from the tongue. Computed tomography (CT) revealed that the fragment had penetrated through the tongue into the neck. Ultrasonography (US) revealed that the fragment was in close proximity to the common carotid artery. Surgery for the removal of the chopstick tip was uneventful, with minimal soft tissue trauma. Postoperative progress was satisfactory and without complications. Of particular interest is the sensitivity of US in outlining the broken chopstick fragment lodged in the neck. It is noteworthy that the contrast of the chopstick greatly varied between CT and US.

Keywords Neck injury · Penetrating trauma · Impalement trauma · Chopstick · Transoral trauma

Introduction

Chopstick penetrating injuries are relatively rare, but when they do occur, it is usually in young children [1–3].

Diagnosis is straightforward when the absence or presence of the foreign body fragment in the wound is confirmed. However, diagnosis based on an incomplete history and minor trauma is difficult, and the penetrating injury may be overlooked. Furthermore, the patient may not exhibit immediate symptoms, and serious complications may occur several days, months, or years after the injury [1, 3]. We report a rare case of a boy with a transoral chopstick fragment penetration all the way through the base of the tongue and on into the neck.

Case report

An 18-month-old boy fell off his chair while biting on a wooden chopstick. His parents did not see it happen, but the child was crying and bleeding from his mouth. The chopstick had broken off, but its tip could not be found, so he was taken to the emergency department of our hospital immediately. He was in stable cardiovascular condition, and his airway patency was maintained adequately with no major hemorrhage or secretions from the mouth. He presented with only a 5-mm laceration of the tongue and cervical tenderness. To rule out a foreign body, a plain computed tomography (CT) was performed. CT of the head revealed no intracranial lesions. However, CT of the neck revealed a low-density abnormality in the right side of the pharynx (Fig. 1a). CT reconstruction clearly revealed a low-intensity structure extending from the root of tongue to the neck (Fig. 1a). It was hoped that further diagnostic imaging would help to locate the foreign body and thereby minimize the risk associated with its surgical extraction. On the neck ultrasonographic (US) examination (Aloka ProSound $\alpha 7$) using a 5.0 MHz transducer, a high-echoic linear abnormality was found in the right cervical area. The

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Fig. 1 Computed tomography (CT) (a) indicating the position of the penetrating foreign body (arrow). Sagittal (b) image of the reconstructed CT scan shows a low-density abnormality (arrow) in the right side of the pharynx

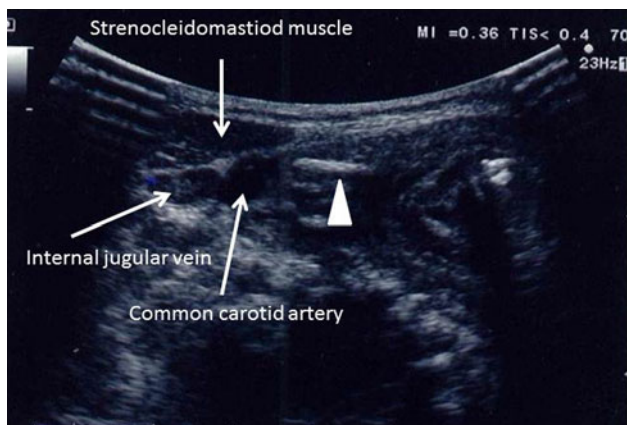
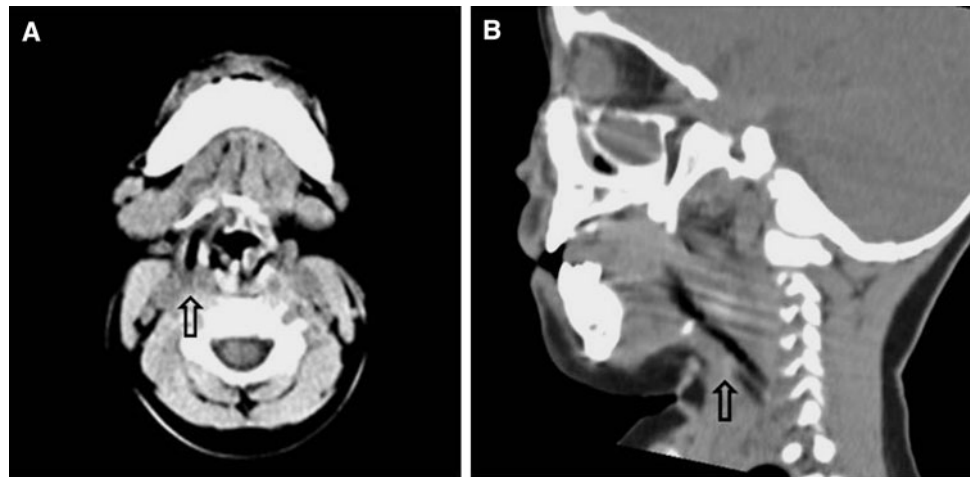


Fig. 2 Ultrasonography (US) of the foreign body (arrowhead) in the carotid triangle. The tip was under the sternocleidomastoid muscle, on the medial side of the common carotid artery and the internal jugular vein. There is no sign of hematoma or edema

US examination indicated a foreign body under the right sternocleidomastoid muscle on the ventromedial side of the common carotid artery and internal jugular vein (Fig. 2). This fragment was in close proximity to and pointing toward the common carotid artery, but, other than the 5-mm laceration of the tongue, there were no indications of other injuries or inflammation. Emergency exploratory surgery was performed under general anesthesia using a 3.5-mm reinforced endotracheal tube. The distal tip of the wooden fragment was found under the sternocleidomastoid muscle exactly as the US showed and was removed to avoid injury to the carotid artery. The extracted, broken chopstick was approximately 4 cm in length. Extubation was postponed until the next day because of tracheal stenosis. Intravenous antibiotic therapy was administered to prevent postoperative bacterial infection. The postoperative course was uneventful, and the patient was discharged without any complications on day 10 after admission.

Discussion

Penetrating craniofacial injuries by chopsticks have been occasionally reported in children in Asian societies [1, 2]. There are very few reported cases of impaling injury to the floor of the mouth [3]. In the present case, the entry point was at the back of the tongue. The direction of penetration was downward at an acute angle, which differs from all other known cases. Some Japanese chopsticks have grooves in them, which means that a fragment could easily break off and, if lodged somewhere in the body, could possibly remain undetected. In the present case, the patient may have been impaled with his neck in a hyperextended position. When his head returned to the normal position, the tip snapped off and remained lodged in his neck.

Foreign bodies can present a diagnostic challenge to even the most experienced surgeon. Sometimes definite information on whether a fragment remains in the wound cannot be obtained from the patient or the parents. In the present case, the patient had no ‘hard’ signs that would indicate that any major vessels or the trachea were damaged [4]. The tip of the broken chopstick was obtuse and blunt; therefore, direct injury to the mobilized vessel was unlikely.

In most such injuries, removal of the foreign body is delayed, because it was initially radiologically missed or misdiagnosed. In acute cases, penetrating wooden bodies mimic air bubbles on a CT scan. A wooden chopstick can display a variety of CT appearances depending on the materials of which it is made, its type and coating, and the time-course of the injury [5]. In selected cases, US offers hope for visualization of a suspected foreign object in the superficial tissue of the body. Diagnosis of an impalement injury includes evaluating the direction and associated organ injuries. In our case, during US, the chopstick fragment gave a localized, reproducible hyperechoic signal. When considering all the important cervical structures that must be avoided in surgery, going in blindly was not a

viable option. If the risks associated with tamponade are underestimated, the tip could be extracted leading to the possibility of massive hemorrhage. Of particular interest in this case is the sensitivity of US in outlining the wooden chopstick in the neck. US is superior to CT in the evaluation of soft tissue and musculoskeletal tissue of the neck, thus lessening the need of expensive diagnostic imaging such as magnetic resonance imaging (MRI). Pediatric applications for bedside emergency or point-of-care US is beneficial, preventing exposure to repeated radiation.

A wooden foreign body carries a high risk of infection because the porous organic material provides good culture conditions for bacterial agents. It has been reported that foreign bodies made of inorganic materials such as plastic are less likely to cause infection [3, 6]. However, wooden chopstick remnant fragments may result in subsequent infection and abscess formation. Surgery should be the first choice. Early radical debridement and removal of the foreign body are necessary to prevent potentially fatal infectious complications.

Conclusion

We reported a rare case of a boy with a transoral chopstick fragment penetration of the neck. The imaging of a wooden

chopstick varies greatly between CT and US. Both modalities can be used effectively, depending on the stage of diagnosis, from screening to pointing out the wooden chopstick.

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