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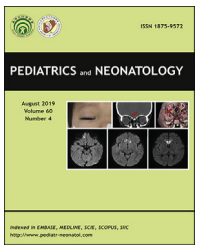

Short Communication

Penetrating craniocerebral injury by chopsticks in a Japanese boy confirmed by combined brain computed tomography and magnetic resonance imaging

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1. Introduction

Penetrating craniofacial injuries by chopsticks rarely occur in children living in Oriental societies.[1–3] In many cases, the penetrating accident is caused by accidentally holding chopsticks in their hands and can be identified based on the stab wound in their face.[1–3] Here we report a case with the difficult diagnosis of a transorbital penetrating intracranial injury in a child because of a minor stab wound.

2. Case report

A 17-month-old boy was admitted to our hospital because of a refractory convulsion accompanied by a high fever up to 38.7 °C. The day before, his mother observed him fall while the child was carrying wooden chopsticks in his hand. Immediately, his mother took him to a surgical clinic and pediatric hospital, but the doctors could not identify the cause. The physical examination revealed a small scar on the inner corner of the right eye, without swelling, hematoma, or limitation of eye movement (Fig. 1A). To screen for the causes of fever and convulsion, a computed tomography (CT) scan and cerebrospinal fluid (CSF) exam were performed. The CT scan showed a superior orbital wall fracture with a small amount of intraorbital hemorrhage (Fig. 1B and C). Diffusion-weighted magnetic resonance imaging (MRI) showed a marked hyperintensity from the base of the right frontal lobe to the genu of the corpus callosum and cingulum, without any retained wooden fragments (Fig. 1D–F). There was no indication of major artery injuries on MR angiography. The blood examination showed that the white blood cell count was 17.6×10^9/L and C-reactive protein was 19.6 mg/dL. The CSF exam revealed 7039 white blood cells/μL, 0 red blood cells/μL, glucose levels <20 mg/dL, and protein of 527 mg/dL. The CSF culture was positive for *Streptococcus pneumoniae*. Therefore, we diagnosed bacterial meningitis that resulted following the transorbital penetrating intracranial injury by the chopsticks that were self-removed without being noticed by the mother. The patient was treated with anticonvulsant and intravenous antibiotics (Ceftriaxone, 120 mg/kg/day for 3 weeks; Meropenem, 120 mg/kg/day for one week). A follow-up MRI showed no other abnormalities except for the brain penetration tract after the third week. He was discharged without neurological deficits the fourth week after trauma. During the 1-year follow-up, he showed no neurological abnormalities.

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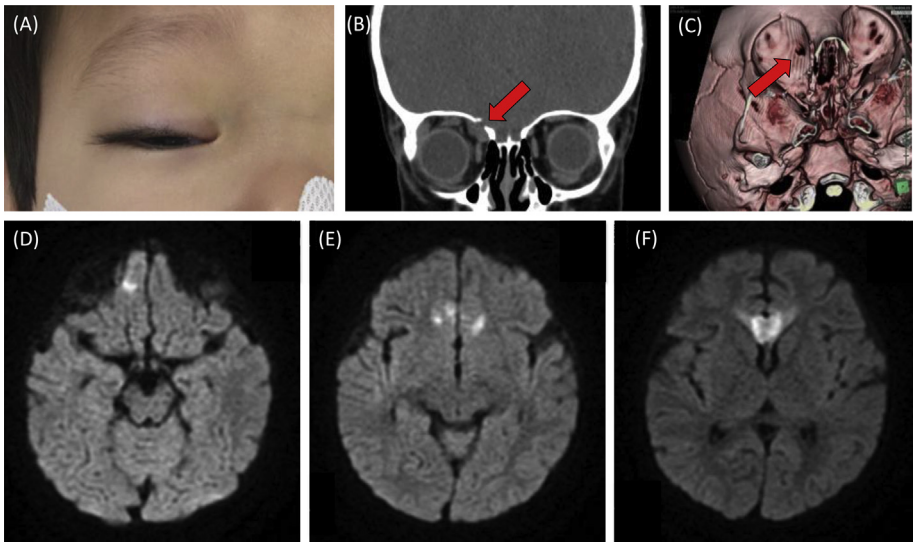

Figure 1 External appearance and imaging findings of the patient. (A) Photograph showing a minor wound on the right medial canthus. (B, C) Coronal computed tomography (CT) scan with bone window setting and three-dimensional reconstructed CT scan showed the chopstick penetrating the superior orbital wall (arrow). (D, E, F) Diffusion-weighted magnetic resonance image shows a high intensity area extending from the right orbital, coursing postero-superiorly across the medial right frontal lobe, and closely adjacent to the frontal horn of the lateral ventricle.

3. Discussion

Accidental stabbing by a chopstick in children is very rare in Japan, China, and Korea.[1–3] Typically, appropriate first-aid management, if a chopstick penetrates a young child's face is to leave the transorbital object *in situ*, to avoid damage to the surrounding tissues, and to transport the patient to the trauma center carefully.[4] As for appropriate management in the emergency department, a primary survey and stabilization of the patient should be achieved regarding the patient's airway, breathing, cervical spine, and circulation, including external hemorrhage. A complete physical examination, including full neurological and ophthalmological examinations, are essential for both diagnosis and appropriate treatment.[5,6] However, in this case, several clinic doctors could not make a diagnosis from such examinations, because of the minor wound around the right eye, the child's poor communication, and self-removal of the chopstick before being seen by his parents. In addition, both repeated careful medical interviews and imaging were essential to disclose the injury. The CT scans were required to identify the extent of bone and parenchymal injury, and the MRI was necessary to detect wooden foreign bodies. To make an accurate diagnosis, including complications such as cerebrovascular injuries, a CT, MRI, and MR angiography should be performed.[5]

If the foreign body is retained in the orbit and cranium, severe infectious complications may occur later, so it is important to remove foreign bodies completely.[5] If required, prompt craniotomy for decompression and meticulous hemostasis for vascular injuries under direct vision is also important.[4] Infectious complications are common after a penetrating brain injury. *Staphylococcus aureus* and gram-negative bacteria are frequent causes of infection.[4] Cephalosporins should be administered in all penetrating brain injury cases for at least 7—14 days.[4]

In this case, the difference from previous reports was that the wound around the child's eye was minor. Japanese chopsticks are sharper at the tip than chopsticks used in China and Korea. We speculate that the patient used a Japanese-style chopstick, as the point of penetration of his face was unclear.

If listening to the medical history of children is incomplete, such injuries may be overlooked. Furthermore, major neurological abnormalities do not usually manifest immediately. When a transorbital penetrating intracranial injury by chopsticks is suspected in a Japanese child, repeated follow-up observations and imaging are considered necessary.

Conflicts of interest

The authors have no conflicts of interest to declare.

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