Bamboo in the Brain—an Unusual Mode of Injury

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Abstract A 22-year-old male presented with a history of penetration of bamboo over the head which had fallen from the height of 40 ft. The position of the object was confirmed by computed tomography and patient underwent surgery immediately with removal of the object. The patient did well after surgery. Different modes of penetrating injury to the brain by bamboo and wooden objects, complications and management issues are discussed with a brief review of literature.

Keywords Penetrating injury · Calvarium · Bamboo · Skull

Introduction

Bamboo is not actually a wood, but is classified as a type of grass by botanists. We do, however, refer to bamboo as a wood in this article, as it relates to building uses and the similar strategy of management of penetrating injury to brain by bamboo or wooden objects. Penetrating injury to the brain by bamboo is rare. Orbit is the most common site of such injuries [1–4]. We report a case of calvarial penetration by bamboo. In our case, the bamboo had fallen down from the height. This mode of penetrating injury by bamboo has never been reported.

Case Report

A 22-year-old man reported to the emergency room with a history of fall of a bamboo over the head from a height of 40 ft while working at the construction site of a high-rise building about 3 h back. On neurological examination, he was conscious but disoriented and hemiplegic on left side with normal power on right side (Glasgow Coma Score 14/15). His pupils were bilaterally equal in size and reaction. There was evidence of penetrating injury by bamboo in the right parietal region. Approximately 4 in. of the bamboo was seen externally (Fig. 1a, b). His computerised tomography (CT) revealed penetrating injury to the right parietal cortex by a hypodense object (Fig. 1c) with a depressed fracture of the right parietal squama (Fig. 1d).

The patient was operated in emergency in supine position approximately within 4 h after the injury. Right parietal craniotomy was performed under antibiotic cover (ceftriaxone, amikacin and metronidazole). The wooden foreign body was completely removed, wound debrided and irrigated with gentamicin diluted in normal saline. The small wooden particles were safely removed with copious irrigation. The depressed bone fragment was elevated and repositioned after duraplasty which was carried out with autologous pericranial graft.

The patient improved in sensorium after surgery but remained hemiplegic on his left side. Postoperative CT was done suggestive of complete removal of the foreign body with postoperative changes (Fig. 2a). At follow-up, after 3 months, the patient was ambulant with significant improvement in hemiparesis (Fig. 2b) and at recent follow-up, 21 months after the injury, he had normal power in his left limbs. Patient has no evidence of meningitis or osteomyelitis under regular follow-up till date.

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Fig. 1 **a, b** Preoperative photograph of the patient with bamboo in situ. **c** Axial plain computed tomography (CT) scan showing hypodense object in the right parietal region and **d** its corresponding bone window showing depressed bone fragments

Discussion

Penetrating injuries of the brain are relatively rare representing about 0.4 % of all head injuries, and those caused by wooden objects are still uncommon [1–7]. Orbit is the most common and easy portal to the intracranial cavity for these injuries due to the thinner bone [1–7]. There is only one case report of penetrating injury by a wooden object through the tough calvarial convexity as in our case reported by Arifin et al [5]. All of the penetrating injuries caused by wooden objects reported to date are of low-velocity impact caused by tumbling down and falling over the wooden object or falling while holding chopsticks or pencils. Therefore, they rarely result in

neurodeficits [5–7]. But, fall of a wooden object from the height of 40 ft as in our case is a very unusual mode of injury by a wooden object causing high-velocity impact on the calvarium. In this case, a large amount of kinetic energy is disposed in a shorter time over the rigid skull surface causing its fracture and resulting in neurodeficits. It also causes small wooden particles to be deposited in the depth of the brain matter as in our case.

Diagnosis of wooden foreign bodies based on plain X-ray examination is difficult. Computed tomography (CT) remains the primary imaging of choice in the emergency department. CT values of the wooden objects vary with time due to absorption of surrounding water. Contrast-enhanced magnetic

Fig. 2 **a** Postoperative plain axial computed tomography (CT) scan showing complete removal of the object with postoperative changes. **b** His photograph at 3 month follow-up showing improvement in hemiparesis

resonance imaging (MRI) is useful in early as well as late diagnosis of retained wood in the brain. It is also useful for differentiating it from the surrounding air and fatty tissue particularly in orbital injuries [7].

Apart from bleeding and neurological damage, penetrating injuries by wooden objects pose different sets of complications such as central nervous infection in the form of meningitis in 64–70 % and brain abscess in 48–52 % [6, 7] Usually, there is a delay of 1 week to 6 months between the injury and the appearance of the CNS infections. But, it can manifest as long as 13 years after injury [7]. The etiological bacteria are varied, but usually include *Staphylococcus*, *Streptococcus* and *Escherichia coli* [7]. Early prompt surgery under antibiotic cover with meticulous debridement, generous irrigation with saline mixed with antibiotic, complete removal of the wood and regular follow-up can minimise these complications.

Conclusion

Penetrating calvarial injury by bamboo is rare. Falling of such object from the height poses different sets of challenges. Early and safe removal of object and wound debridement under

antibiotic cover remain the only way to minimise these complications.

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