Penetrating Injury of the Upper Cervical Spine by a Chopstick

—Case Report—

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Abstract

A 35-year-old man presented with penetrating spinal injury after attempting suicide by stabbing a wooden chopstick into his mouth. The object penetrated the pharynx, and the tip entered the spinal canal of the atlantoaxial vertebrae. Emergent surgery disclosed that the tip of the chopstick had penetrated between the dural sac and the vertebral artery. There was no dural tear or vertebral artery injury. The foreign body was removed successfully from the oral side. He recovered without neurological sequelae.

Key words: spine, penetrating injury, chopstick

Introduction

Penetrating injury is the third most frequent cause of spinal injury in adults, only surpassed by traffic accidents and falls.5) Gunshot wounds and knife stabblings account for the majority of penetrating spinal injuries.14) Rarer objects causing spinal injury include a pencil, a wood piece of a banister, a glass fragment, and an injection needle.1,6,12–14) Here we report a case of chopstick injury to the upper cervical spine.

Case Report

A 35-year-old man who was a prisoner in jail attempted suicide by stabbing a wooden chopstick into his pharynx. The chopstick was broken into two pieces; one piece was retrieved by a guard, but the other piece was retained in his mouth. He was transferred to our hospital by ambulance.

Neurological examination on arrival revealed no definite abnormality. Physical examination revealed the broken tip of the chopstick in his pharynx (Fig. 1). Emergent computed tomography (CT) showed the chopstick as a high density object with a CT number of 330. The chopstick had penetrated the pharynx and entered the spinal canal. The tip extended posterior to the C-2 lamina (Fig. 2). CT angiography was performed to examine the patency of the right vertebral artery, but resulted in poor visualization. This was probably due to mal-development of the patient’s peripheral vein after drug abuse. The patient began to complain of breathing difficulty and numbness in all four extremities after the CT. Magnetic resonance imaging was not available at that time. We decided to operate on this patient to remove the foreign body because of the possibility of spinal cord injury or hematoma formation in the spinal canal.
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A tracheotomy was performed to prepare for intraoral manipulation during surgery. The patient was placed in the prone position to explore the trajectory of the chopstick and the spinal canal via the posterior approach. Partial laminectomy of the C-1 disclosed that the tip of the chopstick was located between the dural sac and the venous plexus (asterisk) around the right vertebral artery, but no dural tear or vertebral artery injury was identified. An assistant examined the chopstick from the oral side. Extensive force was necessitated to pull out the chopstick, which was fixed in the right facet joint between the atlas and the axis. Under manual traction of the patient’s head, the chopstick was finally pulled out from his mouth (Fig. 4). Bleeding from the venous plexus around the vertebral artery was easily controlled with a piece of gelfoam and fibrin glue. The operative field was repeatedly irrigated with saline.

Comparison of the two pieces of the broken chopstick confirmed that there was no residual fragment. Postoperative CT also revealed no foreign body left in the wound. Antibiotic was administered after the operation. The patient’s neurological symptoms diminished immediately after the operation. The tracheotomy was closed 3 days later. No infection was evident in the postoperative course. The patient was transferred back to the jail after a 2-week observation period.

Discussion

A chopstick is relatively a rare cause of penetrating injury in the cranio-spinal region. Typically, such accidents involve the chopstick entering the orbit or the mouth of an infant. The tip of the chopstick most often injures the intracranial contents, except in one case of injury in the cranial base.3,7,8,16) The present case involved injury to the upper cervical spine in an adult.

Management of a retained foreign body in a spinal penetrating injury is often challenging because removal of the object may cause neurological sequelae.15) There is no standardized strategy for removal of the foreign body through closed or open surgery. Previous patients with transoral stab wounds penetrating the craniovertebral junction underwent closed surgery to remove the foreign bodies, with no resultant cerebrospinal fluid leakage or infection.2,16) However, in our case, CT did not show the precise location of the chopstick in the spine, so injury to the
spinal cord, dura mater, nerve root, or vertebral artery were all possible. Therefore, closed surgery to remove the foreign body carried the risks of spinal cord injury, dural tear, and hematoma formation. Open surgery and exploration around the chopstick avoided these dangers.

The possibility of major vessel involvement should be examined before removing a foreign body in penetrating injury.16 In our case, CT angiography failed to provide good visualization because the patient’s peripheral vein was poorly developed, probably due to a past history of drug abuse. Catheter angiography might have been the second choice after failed CT angiography. However, an emergent surgery was performed because the patient began to complain of numbness in all four extremities. Fortunately, the operation proved no involvement of the dural sac or vertebral artery. Also, postoperative MR imaging showed no evidence of spinal cord injury. The patient’s complaint might have been a psychological reaction in a panic situation or a symptom of hyperventilation syndrome.

There remains the question as to whether a tracheotomy was essential to remove a foreign body, because this procedure is not always performed in transoral surgery.32 In our case, special instruments, such as a Davis retractor, were not available in the emergent situation. Moreover, the patient was placed in the prone position. The risk of accidental extubation, which may lead to fatal complications, seems to be higher in the prone position than in the supine or sitting positions. The tracheotomy was also useful to afford working space in the mouth and secured the airway after the operation, due to the risk of delayed soft tissue swelling. Thus, we believe that the choice of tracheotomy was appropriate in our case.

Delayed abscess formation may occur after wooden foreign body injury to the brain. Infectious complications occurred at various terms, even tens of years after the injury.4,7,11 If a retained wood particle is overlooked, the chance of delayed infection will increase.10 Thus, if a foreign body is broken into pieces during an accident, the retrieved foreign body must be carefully inspected to account for all fragments. A chopstick made of dry wood will appear as very low density on CT. Such a wooden foreign body might be mistaken for free air.9 CT number can distinguish the wood fragment from air because the CT number of unglazed wood fragment is −500 to −200, and that of air is −1000.10 The chopstick in our case, which had CT number of 330, was easily identified on CT.

References


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