Neuroimaging of a Wooden Foreign Body Retained for 5 Months in the Temporalis Muscle Following Penetrating Trauma with a Chopstick

—Case Report—

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Abstract

A 48-year-old female was stabbed by her husband with a chopstick made of wood in the left temporal region during a quarrel. She suffered laceration of the left temporal scalp. At initial examination, she concealed the assault with a chopstick. Radiography showed no abnormality, so the wound was sutured. One month after the injury, a painless subcutaneous mass appeared in the left temporal region which grew rapidly for 3 months. She was then admitted to our department. Computed tomography (CT) on admission showed a hyperdense area at the center of the mass. This area was hypointense on both T₁- and T₂-weighted magnetic resonance (MR) images. Temporalis muscle tumor with accompanying central necrosis, old hematoma, and inflammatory granuloma was considered. The mass was totally resected for cosmetic purposes and was found to be wooden foreign body granuloma. High density on CT and hypointensity on both T₁- and T₂-weighted MR images are characteristic of a chronically retained wooden foreign body in the living body and are useful for detecting wooden foreign bodies in the chronic granulomatous phase.

Key words: magnetic resonance imaging, wooden foreign body granuloma, chopstick, temporalis muscle

Introduction

Chopsticks are indispensable for the daily meal in Japan, and chopstick injuries may occur during quarrels at mealtime. Most chopsticks are made of wood and are usually covered with colored paints in Japan. If a chopstick injury occurs, the foreign body must be removed immediately because wood is a porous organic material that provides a natural reservoir for microbial agents. Oral bacteria may become attached to the chopstick during the meal and subsequently propagate, resulting in abscesses and/or fistula formation. Injury on the face may cause serious cosmetic problems. Such sequelae occurring in the intracranial or intraorbital space may result in serious symptoms. For these reasons, detection of the wooden foreign body has been attempted using various diagnostic modalities. Computed tomography (CT) is superior to magnetic resonance (MR) imaging to detect the wood in the orbit, and radiography can easily show a truly radiolucent wooden foreign body. Furthermore, CT and ultrasonography are suitable for the detection of foreign body in soft tissue. However, if the patient has lost consciousness or become upset by the injury, the presence of the wooden foreign body may be missed at the initial examination because of its radiolucency, and only identified following abscess and/or fistula formation. The MR imaging characteristics of wooden foreign bodies are known, but only of wood retained for 3 days. The MR imaging appearance of a wooden foreign body retained for many months is unclear, and may change with time.

We present a case of wooden foreign body granuloma of the left temporalis muscle following penetrating trauma with a chopstick, which was detected 5 months after injury by MR imaging.

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Case Report

A 48-year-old female was stabbed with a wooden chopstick in the left temporal region by her husband following a quarrel. She suffered laceration of the left temporal scalp resulting in significant blood loss. They were too upset to tell whether the chopstick was broken off in the wound. She visited the local hospital and reported being hit in the temporal scalp by a pole. She kept the details of the chopstick a secret. Radiography failed to detect any fracture and/or foreign body, so the wound was simply sutured and antibiotics were administered. Seven days after injury, the sutures were taken out and the wound healed adequately. One month after the injury, a painless subcutaneous mass appeared in the left temporal region and grew gradually over the following 3 months. The woman consulted another physician, who suspected temporalis muscle tumor. She was then referred to our department.

On admission, a 3 cm mass was noted in the left temporal region adjacent to the superior margin of the zygoma. The surface of the mass was smooth and of normal color. The mass was firm, without fluctuation or tenderness, and moved with mastication. Inflammatory signs such as leukocytosis and C-reactive protein were absent in the peripheral blood. CT on admission (5 months after injury) showed a mass in the left temporalis muscle containing a hyperdense area at the central region (Fig. 1). MR imaging showed the mass as hypointense on the T1-weighted images, hyperintense on the T2-weighted images, and homogeneously enhanced by gadolinium-diethylenetriaminepenta-acetic acid. A small hypointense area was seen on T1- and T2-weighted images at the center of the mass (Fig. 2). Preoperatively, we could not identify the nature of this central mass. The tentative diagnosis was temporalis muscle tumor with accompanying central necrosis, old hematoma, or inflammatory granuloma, so the mass was resected for cosmetic purposes.

The operation was done under general anesthesia. A skin incision was made along the margin of the mass. As the incision was carried toward the galea and temporalis muscle, some hairs were found on the surface of the mass. The mass was yellowish in...
color and firm, and involved the temporalis muscle fascia. Excision of the mass from the temporalis muscle revealed a part of chopstick made of wood and covered with paint. The fragment was surrounded by tough granulation tissue. The operative diagnosis was chopstick foreign body granuloma (Fig. 3). The foreign body and granuloma were totally removed and the wound was closed. Historical examination of the mass revealed foreign body granuloma without xanthomatous change.

After the operation, antibiotics were administered for 3 days, and the wound became clear. The patient was discharged with no problems 7 days after the operation.

Discussion

Wooden foreign body may appear hypodense on CT just after the injury because the porous structure of the wood is filled with air. The density of the wood will increase due to absorption of surrounding exudate and hematoma by 7 days. However, high density on CT was found to be a better diagnostic sign for the detection of intraorbital wooden foreign body 2 days after injury. We suggest that wound suppuration had affected on the density change of the wooden foreign body in this case.

The MR imaging appearance of wood within the orbit has been reported in several cases as a hypointense signal on both T1 and T2-weighted images within 3 days of the injury. In our case, severe sequelae such as abscess formation had not occurred. Our case manifested as a granuloma. Temporalis muscle tumor was suspected initially, so MR imaging was done for further investigation.

The mechanism of density change of wood suggests that the T1 and T2 values of wood might also elongate with time due to absorption of exudate and hematoma. The MR imaging of wood retained in the porcine shoulder muscle for 5 months in vitro showed that the wood appeared hypointense on T1-weighted images and hyperintense on T2-weighted images. However, in our case, the intensity patterns of wood were hypointense on both T1- and T2-weighted images. This discrepancy may be due to one of the following: Surrounding hematoma and exudate were not absorbed because the wood was covered with paint; blood absorbed by the wood changed to hemosiderin and water content because blood came in contact with the broken end during the operation may have been absorbed into the wood. The MR imaging intensity pattern of wood in vitro cannot be compared to in vivo, as hemorrhage and inflammation are likely to occur. The discrepancy in CT density and MR imaging intensity patterns seen in our case are probably explained by the second and third reasons.

High density on CT and hypointensity on both T1- and T2-weighted MR images may be the characteristic neuroradiological finding for chronically retained wooden foreign bodies in the living body, and are useful to detect wooden foreign bodies in the chronic granulomatous phase.

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