Intracranially Retained Sewing Needle in a Child: Does the Rust on the Needle Have any Implication?

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Abstract
A penetrating injury with a sewing needle is a rare phenomenon. The pathophysiological mechanism of late epilepsy after penetrating injuries is not clear. A 10-year-old female child had a seizure. An X-ray study of the skull and the cranial computed tomography scans showed a foreign object retained in the skull cavity. She was intact on neurological examination. Electroencephalogram (EEG) showed that there was bioelectrical disorganization in both hemispheres, being more prominent on the left side. A right posterior frontal median craniotomy was performed in order not to retract the left hemisphere within the interhemispheric fissure and the sewing needle was removed successfully. The sewing needle was rusted. The reason for the patient’s seizure, 10 years after the injury, may be the corrosion of the sewing needle and rust formation in this case.

Key Words
Corrosion · Epilepsy · Penetrating brain injury · Rust · Sewing needle

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Introduction
Penetrating trauma to the head is most commonly the result of missile/gunshot wounds [1, 2]. There are reported rare cases of various sharp objects that have penetrated the skull ranging from a knife [1] to metal splinter [3]. A cerebral penetrating injury caused by a sewing needle is extremely rare [4, 5].

Animal and clinical studies suggest that closed versus penetrating head injuries may lead to different pathophysiological reactions in the brain, and these differences may be important indicators of survival and successful recovery [1]. Indications and techniques for surgery are controversial since the available data are not sufficient to support a treatment standard for surgical management of penetrating brain injuries [2].

We operated on a child with a retained sewing needle and successfully removed the needle from the brain. The decision of surgery was made in light of previous literature. The surgical approach was planned according to the anatomical location of the object and the physical specifications of the object.

Penetrating head injuries may be diagnosed with late symptoms, years later after the traumatic event. Epilepsy is one among the late presenting symptoms [2, 4, 6, 7]. The pathophysiological mechanism of late epilepsy after penetrating injuries is not clear.

Case Report
A 10-year-old female child had an abscess in one of her left upper teeth. Her dentist started antibiotic therapy. The next day, she visited the doctor again due to a seizure at school. An X-ray study of the maxilla showed coincidentally a retained foreign object in the skull cavity. The child was referred to our clinic of
She had been experiencing occasional headaches and nausea since the last year. At the time of neurological examination, she exhibited no neurological abnormality. A skull X-ray and a computed tomography (CT) of the cranium showed an approximately 3-cm-long thin metallic object localized interhemispherically, slightly on the left side of the midline. (Figures 1, 2). Electroencephalogram (EEG) showed that there was bioelectrical disorganization in both hemispheres, but it was more prominent on the left side.

Operative Approach
Although the foreign object was seen in the left side of the falx cerebri on the CT, a right posterior frontal median craniotomy was performed in order not to retract the left hemisphere within the interhemispheric fissure. Otherwise, any retraction in the vicinity of the sewing needle could have resulted in its movement and possible damage to the surrounding area. The dural flap was opened and based along the sagittal sinus. The sewing needle was located with the help of an intraoperative X-ray in anteroposterior and lateral positions. Then, the interhemispheric fissure between the surface ascending cortical veins was explored. The falx cerebri was opened to reach the left hemisphere. There was a yellowish-gray area on the medial part of the left superior frontal gyrus. After carefully dissecting the arachnoid adhesions on this area, the upper tip of the sewing needle became visible. The dissection was extended a few millimeters further and the sewing needle was grasped carefully with a clamp. The sewing needle was pulled straight out slowly, not moving it from side to side. After its removal, no bleeding occurred. The wound was irrigated with normal saline and the wound closed in layers. There was no sign of any abscess or acute infection, even though the sewing needle was rusted. Postoperative course was uneventful. A cranial CT was done postoperatively (Figure 3). The child was discharged without any neurological abnormality on the postoperative third day. There was no complication during follow-up for a year after the surgery and the patient experienced no seizures after the surgery. Postoperative EEG was normal.

Discussion
The pathophysiology of epileptic seizure and epilepsy is not well understood [8]. Epilepsy, following penetrating head injuries, has been reported to reach 50%, 15 years post-injury [6]. No relationship between retained bone fragments and seizure disorder has been found, whereas the presence of metal fragments, location and the size of the lesion have been demon-