Attempted suicide with screw penetration into the cranium

Kraniyumda vidalama ile intihar girişimi

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Intracranial foreign bodies are usually secondary to penetrating injuries. Nails, knives, screwdrivers, sewing needles, bullets, and shrapnel have been described related to penetrating brain injury. In this report, we present a 34-year-old prisoner with an intracranial screw located in the right parietal lobe. The screw was used by prisoner in an attempted suicide. A right parietal craniectomy was performed, and the screw was removed successfully. It is important to know the type of penetrating brain injury preoperatively in order to determine the best surgical approach to remove the foreign body settled in the brain. A long-term radiological assessment should be performed to detect any future complications, such as a cerebral abscess.

Key Words: Penetrating brain injury; screw; suicide.

Intracranial foreign bodies are usually secondary to penetrating injuries through the orbita, ear or cranial bones. Nails, knives, screwdrivers, sewing needles, bullets, and shrapnel have been described related to penetrating brain injury.\[1\] Surgical objects can sometimes be left in the brain during surgery.\[2\] The majority of deaths from trauma reflect unintentional accidents, but a significant minority follow suicide and an even smaller proportion (less than 10%) reflect homicide.\[3\] Of deaths from suicide, self-inflicted head injury appears to be uncommon.\[4\] Suicides or suicidal injuries due to a screw are rare and seldom reported in the medical literature.\[5\] We present an interesting case of a suicide attempt using a chair screw.

CASE REPORT

A 34-year-old male prisoner was admitted to our hospital emergency service with an intracranial foreign body. From the prisoner’s personal history it was learned that he had forcefully driven the screw into his cranium in an attempted suicide. Following the attempt, he had no history of seizure or loss of consciousness. It was also learned that he had no previous psychiatric diagnosis. A neurological examination was entirely normal. During the physical examination, a small penetrating wound and screw head were identified on the right parietal bone close to the middle of the superior sagittal sinus (Fig. 1a).

A skull lateral X-ray (Fig. 2a) and a computed tomography (CT) scan of the head (Fig. 2b) demonstrated a hyper dense foreign body penetrating through the parasagittal region of the right parietal lobe, which appeared to be a screw.

Surgical exploration of the wound was performed under general anesthesia showing the screw in the skull (Fig. 1b). A right parietal cranietomy was performed and dura mater laceration around the screw was noted. The foreign body, a screw 4 cm in length, was removed following the original entrance trajectory.
Postoperative neurological examination revealed no neurological deficit. Both antiseizure prophylaxis and antibiotic had been started preoperatively. The patient was assessed by a psychiatrist confirming the suicide attempt diagnosis; however, the mental-status examination results of our patient were found normal. After a one-week follow-up period, the patient was discharged to the prison under psychiatric guidance. Neither clinical nor radiological evidence of infection and/or any other complication was documented during the three months of follow-up.

**DISCUSSION**

In the civilian population, most penetrating brain injuries are caused by high velocity objects, resulting in more complex injuries and high mortality rates. The range of vascular complications after penetrating brain injury was reported to range from 5% to 40%.[6] Formation of traumatic aneurysms is a commonly described vascular injury.[7] The orbitofacial penetrating brain injury and presence of intracranial hematoma with fragments crossing dura mater compartments have been associated with higher risk of vascular injury development in missile wounds.[8] The suspicion of vascular injury indicates preoperative cerebral angiography.[7,8] In our case, the screw was located in the right parietal region behind the coronal suture. On CT images, superior sagittal sinus and cerebral vascular structures were revealed intact. Thus, we considered it unnecessary to perform a postoperative angiography. Cranial infections after brain injuries are common and are also associated with high morbidity and mortality. Cerebrospinal fluid leaks and air sinus wounds increase the risk of cerebral infections. Nevertheless, they do not seem to be related to the presence of bone fragments in the brain.[9] Prophylactic broad spectrum antibiotic therapy is recommended and must be started as soon as possible.[10] In the present case, treatment with the prophylactic antibiotic therapy was initiated preoperatively. In addition, antibiotic therapy was continued seven days after surgery as recommended in the literature.[7,3] Seizures may develop in about 30-50% of patients suffering a brain injury. To reduce the early
posttraumatic seizure incidence, prophylactic anti-seizure drugs should be started after the injury.[11] In our patient, there was no seizure development during a three-month follow-up period.

Penetrating brain injury must be excluded in the presence of scalp wounds. To discover underlying injuries, a thorough exploration of wounds is the first step. Surgical exploration should be done when deemed necessary. The generally recommended procedure is debridement of the necrotic brain tissue, removal of accessible bone or foreign body fragments only if the neurological risk is not increased, removal of brain hematomas with significant mass effect, and watertight closure of dura mater defects.[9,11] The question about the best technique (craniotomy or cranietectomy) to achieve it remains unclear. Comparison of the morbidity and mortality rates associated with these two procedures has shown no statistically significant differences.[12] Because the screw head was inserted tightly into the parietal bone, cranietectomy was the preferred technique in this case. The screw was removed after cranietectomy in order to protect the superior sagittal sinus. A CT scan of the head should be performed as the mainstay radiological procedure for diagnosis of brain injury. While skull lateral X-ray is not recommended routinely, it can be useful in order to identify metallic foreign bodies,[11] as in our case. In case a nonmagnetic object is suspected, a magnetic resonance imaging scan may be superior to CT.[13]

In this paper, we report a case of cranial penetrating injury caused by a screw. The clinicoangiologic findings in our patient strongly suggested that the screw was intentionally introduced to the brain by the patient himself. Suicidal behavior in prisons is common and has attracted substantial research interest.[14] The first phase of imprisonment carries the highest risk of suicide.[15] Other factors that have been reported as predictors of suicide in prisons are the remand phase,[16] history of psychiatric illness,[17] history of suicidal behavior,[17] isolation in a single cell,[18] overcrowding in small cells,[19] long-term sentences after violent crimes,[20] alcohol and illicit drug use,[21] and feelings of guilt.[22] Although the mental-status examination results of our patient were normal, living in the fear of being killed by other prisoners may have been the contributing factor in his suicide attempt. Several objects could be used for this purpose. The presented case is interesting from the standpoint of the method used - a screw - which has not been reported previously. The patient may have struck his head and screw against the wall in order to perforate the parietal bone, since the screw was inserted into the parietal bone without a screwdriver. The patient was fortunate that the screw did not injure the branches of the anterior cerebral artery, and that no other complications occurred.

In conclusion, to our knowledge, there are no previously reported cases of craniocerebral penetrating wounds caused by a screw. A family history of suicidal behavior, history of psychiatric hospitalization and symptoms of anxiety or depression are the risk factors for suicidal ideation among prisoners. It will be important to learn the type of penetrating brain injury preoperatively in order to determine the best surgical approach for removing a foreign body settled in the brain. A long-term radiological assessment should be performed to detect any future complications, such as a cerebral abscess.

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