CASE REPORT

Case Report: Bone fragment in the third ventricle of a 22 year-old woman [version 1; peer review: 1 not approved]

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Abstract

Here we present a very rare case of a woman with a bone fragment in the third ventricle of the brain following compound-depressed skull fractures due to a road traffic accident.

There are only few case reports of bullets and textiloma being removed from the third ventricle. Following operative removal of the fragment, the patient was started on cortisol, mineralocorticoid and thyroid hormone replacement. However, the patient eventually died of the severe traumatic hypothalamic insult.

Keywords

bone fragment , brain surgery , compound-depressed fracture

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Any reports and responses or comments on the article can be found at the end of the article.

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Case report

A 22 year-old female, with no significant past medical and surgical illnesses, was brought to the casualty room with a Glasgow coma scale of 6/15 following a collision between two bikes three hours earlier. Local examination revealed two compound depressed skull fractures in the frontal and the parietal region with egress of brain matter. Following primary resuscitation, computed tomography (CT) of the head confirmed the local findings along with the presence of one bone fragment in the third ventricle (**Figure 1**). The patient was taken for debridement of the wound and craniotomy with retrieval of the bone fragment (**Figure 2**, **Figure 3**) following hematoma tracking. Intraventricular drain was placed and neurosurgical intensive care was provided. Repeated CT scans showed hypodensities around the third ventricle (**Figure 4**). On the second post-operative day, the patient was started on ionotropic support because of the refractory hypotension, and was also replaced with hydrocortisone, fludrocortisone and thyroid hormones. Wound dressing and the ventricular drain care was continued. Cerebrospinal fluid (CSF) culture from the drain resulted sterile. The patient died on the 8th post-operative day because of the traumatic severe hypothalamic insult.

Figure 1. CT image showing the bone fragment lodged in the third ventricle.

Figure 2. Intra-operative picture showing two sites of compound depressed fracture and the craniotomy performed circling both of them.

Figure 3. Image showing the bone fragment retrieved from the third ventricle.

Discussion

As brain abscesses may result from driven bone fragments and other retained foreign bodies in the brain, the removal of readily accessible foreign bodies has received much attention³⁻⁶. Migration of foreign bodies can occur because of gravitational force. Other routes of migration can be subdural, parenchymal, transventricular or along streamlining along the white matter track⁷. The removal of foreign bodies is mostly done via craniotomy^{8,9}, but other methods such as burr hole, stereotaxy¹⁰ and sometimes by ventriculoscopy¹¹ have also been described.

The goals of modern treatments include removal of the foreign body under a controlled environment in the neurosurgical operation

Figure 4. Post-operative image showing evidence of hypodensities surrounding hypothalamic region.

setting. Surgical principles include removal of bone fragments, intracerebral hematoma, control of hemorrhages and prevention of further loss of neural tissue. Patients should receive a broad spectrum

intravenous antibiotic therapy along with tetanus prophylaxis. Monitoring and control of elevated intracranial pressure with maintenance of cerebral perfusion pressure plays a significant role in the patient's survival and outcome. The follow-up of such patients is essential, considering known complications like cerebrospinal fluid fistula in the early post-operative period and brain abscesses and seizures which may occur years after injury. Outcome after a penetrating head injury is directly related to the Glasgow coma scale at the time of presentation, which is the reflection of the extent of brain tissue damage caused directly by the primary impact. Intensive post-operative monitoring of intracranial pressure, cardio-respiratory function and metabolic status are required for optimizing the outcome of victims of penetrating craniocerebral injuries¹². Penetrating head injuries have a higher mortality and morbidity than blunt trauma even in a civilian set up¹³. Even after timely removal of the penetrating objects and intensive medical management, the outcome may remain poor.

Consent

Informed written consent for publication of images and clinical details was obtained from the patient's husband.

Author contributions

Sunil Munakomi wrote and submitted the manuscript. Balaji Srinivas, Binod Bhattarai and Iype Cherian formatted and reviewed the paper.

Competing interests

No competing interests were disclosed.

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It seems obvious that surgery even on symptomatic intracerebral foreign bodies is determined by the anatomical availability and physiological fact. In this case, initially, it seems that the risk of surgery was higher than the risk of complications due to the presence of a foreign body and, therefore, the intervention was not justified.

In order to give a more detailed review we would need to have a tomogram data on the patient's condition. Based on the currently available outline of the situation, this patient would require more conservative treatment (aggressive antibiotic therapy in the presence of the slightest signs of SIRS or antibiotic prophylaxis from the first hours).

Only if the patient on admission had a detailed diencephalic syndrome (and judging by the description they did not) and clinical signs of meningitis, would we try endoscopic removal of the foreign body (if it is of small size, somewhere up to 1 cm). Thus one alternative conservative intervention is to attempt endoscopic evacuation.

If endoscopic evacuation is not possible (large size foreign bodies, technical inaccessibility through the ventricle), another possible surgical action that I would have done (but only in the case of ventriculitis) is external ventricular drainage. No more.

Competing Interests: No competing interests were disclosed.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to state that we do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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