

IATROGENIC BRAIN FOREIGN BODY

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Abstract

We describe a case of an adult patient admitted following severe head injury. His condition necessitated the insertion of intracranial pressure monitoring catheter for brain protection management. When the initial crisis was settled, the ICP catheter was gently removed. However after extracting the catheter it was noted that a considerable part of the tip was missing. Plain X-ray of skull confirmed the presence of radio-opaque fragment inside the brain tissue. The patient needed drainage operation within one week of the episode when the catheter fragment was removed with complete recovery.

The aim of this paper is to review the literature and to present warning notes on the untoward effects of iatrogenic brain foreign body.

Key words: Intracranial pressure monitoring catheter, brain foreign body, cranial injury.

Introduction

Intracranial pressure monitoring has been used in severe head injuries for decades in various intensive care units to establish continuous monitoring of intracranial pressure or CSF controlled drainage. Despite

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the known dangers associated with it has been used under very strict guidelines and policies. We present here a case of a foreign body left in the brain following removal of an ICP catheter employed in the management of the head injury.

Case Report

A 25 years old manual laborer having fallen from a height and sustained head injury was brought unconscious to the Emergency Room at King Khalid University Hospital (ER-KKUH), with a Glasgow Coma Scale (GCS) of 12. CT scan brain showed mild intra ventricular hemorrhage, bilateral frontal contusion and brain edema. He was intubated in ER, ventilated then shifted to the Surgical Intensive Care Unit. (SICU). On the third day following the trauma, neurosurgeons performed a burr hole and inserted an intracranial catheter (RAUMEDIC LOT E 811 8673) in the parenchyma of the brain to monitor intracranial pressure. This was used as a guide tool to control the hemodynamic parameters, measure cerebral perfusion pressure and to treat patient's brain edema.

On the fifth day, a gross improvement in his clinical condition was noted. His trachea was extubated, became fully conscious, though confused, he was hemodynamically stable and his respiratory parameters were satisfactory. On the eight day, as his condition was improving, it was decided to remove the ICP catheter. Neurosurgical registrar attempted to remove the catheter. Initially there was a little resistance. After applying a gentle [pull] the catheter came out but it was noticed that an outer plastic sheet of the catheter, about 10cm in length and 0.25cm in diameter, was broken and stayed in the brain parenchyma (Fig. 1, Fig. 2A, 2B).

Fig. 1
 Picture of the broken intracranial catheter inserted for the purpose of (ICP) monitoring and CSF drainage. The metallic core was pulled out after it was removed, but only small piece of plastic which was left in the brain.



Fig. 2
 Plane X-ray skull demonstrating the small radio opaque foreign body



Fig. 2A
 Lateral view



Fig. 2B
 A-P view with slight neck flexion

The foreign body was left inside the brain. Four days later the patient developed obstructive hydrocephalus and his level of consciousness decreased. He was re-intubated and extra ventricular drain (EVD) was inserted under general anesthesia to treat his hydrocephalus.

During this procedure surgical exploration was done and the left-over catheter covering was removed. Two days later patient was extubated and he recovered uneventfully.

Discussion

This incident brings to light the hazard of the breakage of an inserted ICP catheter. ICP monitoring is needed in severe head trauma. The presence of concussion, contusion and laceration of the brain matter will cause a rise in ICP, which if not controlled, would lead to devastating results. Monitoring ICP would help in its control, either by directing the line of management or by direct draining of CSF. Modern investigations like CT scan, MRI, and angiography can detect intra-cerebral hematoma, cerebral contusion, intraventricular hemorrhage, pneumocephalus, brain stem lesions and carotid sinus fistula.

Foreign body in the brain is acquired mainly through penetrating injury, which can occur with or without fracture of skull i.e. through orbital penetrating injuries. Iatrogenic foreign bodies however, can either be due to resuscitation efforts i.e. like nasogastric tube¹, Foleys catheter in brain², due to chronic implants^{3,4}, embolisation of air⁵, or operative left over foreign body⁶. Rarely self inflecting foreign body was reported⁷.

Different types of accidental intra cerebral foreign bodies have been reported: metallic pieces, splinters of missiles, pieces of grenade and bomb, wooden pieces and different other articles^{8,9}.

Site of foreign body in brain is very important in the management and prognosis. Patients may die immediately or soon after such major penetration⁹ and some patients may remain symptom free for many years with foreign body in the brain^{10,11}. A case with 48 years of symptom free interval has been reported with foreign body and presenting with brain abscess^{11,12}.

Another case due to cerebral injury with metallic object without fracture of skull passing through the supraorbital fissure has been reported. Ten years passed before the onset of complications was reported^{13,14}.

Generally the intracranial foreign bodies seen are bullets, pieces of glass, plastic pellets, etc... The route of entry of the intra-cranial wooden foreign body is commonly through the orbit¹⁵. Here we report the first case of iatrogenic intracranial foreign body due to breakage of a catheter.

The good prognosis in this case was evident from the beginning. Time of recognition was short. The initial decision was not to interfere and to keep the patient under observation. Then hydrocephalus was progressing and drainage operation was necessary, so the foreign body was removed. The location of an intracranial body determines the severity of its outcome. Foreign bodies in the middle cranial fossa are associated with poor prognosis, while foreign bodies in the anterior cranial fossa are associated with better prognosis¹⁶.

Diabetes insipidus appeared within few hours after the surgery. It was not related to catheter remains, and was easily controlled. This is a syndrome of inappropriate vasopressin secretion and is usually characteristic of severe head injury. Its features include polyuria, hypernatremia and decreased urine osmolality. It is treated by a combination of vasopressin and appropriate crystalloid administration with close monitoring of plasma and urine osmolalities; intravenous vasopressin may be more reliable than desmopressin¹⁷.

The reasons contributing to catheter breakage could be due either to faulty manufacturing, prolonged storing making it fragile and breakable or it was removed with an extra force.

In conclusion, an unusual iatrogenic brain foreign body is reported. We bring attention to the awareness of the physicians of the possible dangers of inserting and removal of intracranial catheters. We recommend that the catheter should be meticulously inspected for weak points before insertion which later may break, and practice safe cautious manouvers during its removal.

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