Penetrating Brain Injury Caused by Retained Plastic Tip of Ballpoint Pen

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Intracranial extension after a low-velocity transorbital injury due to a sharp object is relatively rare but has been well documented in the pediatric population [1–7]. Penetrating brain injury has potentially serious and, in some cases, fatal consequences. In addition, it is generally difficult to acquire a medical history from children. Accurate and rapid multidisciplinary clinical and radiological evaluation of such injuries is essential [4, 7].

Here, we present a case in which a 2-year-old girl sustained a transorbital penetrating brain injury caused by the retained tip of a ballpoint pen, which was clearly detected using multidetector row computed tomography (MDCT).

A 2-year-old girl was brought to the emergency room of our hospital, with complaints of hemorrhage in her right eye. She had been playing by herself in her mother's presence, when her mother noticed the girl crying, holding a ballpoint pen, and bleeding from her right eye.

On admission to our hospital, the girl was still crying but was conscious, and her motor functions were normal. Ophthalmological examination revealed laceration of the conjunctiva over the inner canthus of the right eye. This injury was considered to have occurred because of the penetration of the ballpoint pen. Importantly, the plastic tip of the ballpoint pen was not found.

Radiological evaluation was performed using a 64-MDCT scanner without any sedation. Multiplanar reformation images clearly revealed a residual foreign body – possibly the tip of the ballpoint pen – in the frontal lobe (fig. 1). Therefore, surgical removal of the foreign body was planned.

Bifrontal craniotomy was performed. The orbital roof was found to be fractured, and bone fragments were lodged in the dura mater. The tip of the pen was found in the frontal lobe and carefully removed using a microsurgical technique (fig. 2).

After the operation, the patient remained conscious, and no new neurological or ophthalmological deficits were observed. The postoperative MDCT scan showed no residual foreign body or intracranial hemorrhage. The patient was discharged on postoperative day 10 without any neurological deficit. During the follow-up period of 1 year, no apparent neurological event has occurred.

The institutional review board approved the publication of this case illustration.

Fig. 1. a, b Nonenhanced multiplanar reformation images of 64-MDCT showing the retained end tip of the ballpoint pen in the frontal lobe (white arrowheads).

Fig. 2. a Intraoperative photograph showing the plastic tip of the ballpoint pen in the frontal lobe. **b** Photograph demonstrating the removed plastic tip of the ballpoint pen.

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