

Accidental Finding of a Buried Foreign Body in the Occipital Clivus of a Child: A Case Report

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ABSTRACT

Buried foreign bodies in occipital clivus are scarce in the pediatric age group. We present an unusual pediatric case in which was accidentally found a buried High-density foreign object inserted into the occipital clivus at the deep side of the adenoid. Clinical examination and CT angiography showed no critical blood vessels or brain tissue involvement. By transoral approach, minimally invasive surgery with the guidance of a computer-assisted navigation system was conducted to remove the foreign body.

Keywords: Buried foreign body; Nasopharynx; Occipital clivus; Navigation system.

INTRODUCTION

Buried foreign bodies are found to occur due to traffic accidents, bullet wounds, assaults, trauma, and iatrogenic injuries in adults.^[1,2] Buried foreign bodies in children are generally rare, and a buried foreign body not realized and detected for a long time in a child is even rarer. Foreign body injuries can result in severe complications depending on the category of the object and its anatomical location. They are even potentially life-threatening. It has been widely demonstrated that preventing complications requires early diagnosis and prompt clinical reaction.^[3] Here we report a case in which a buried foreign body inserted into the occipital clivus at the deep side of the adenoid was found accidentally by conventional X-ray imaging. Visual identification of a foreign body via imaging is feasible. However, accurately determining its position within the tissues and removing it with minimal invasiveness can be challenging.

CASE PRESENTATION

A 4-year-old boy was brought to see the doctor for snoring. The later radiograph of the adenoid showed posterior nasopharyngeal soft tissue thickening, narrowing the nasopharyngeal air column slightly. Surprisingly, a hyperdense foreign body was found at the deep side of the adenoid and inserted into the Occipital clivus (Figure 1A). When asked about the boy's medical history, the parents reported that the child had a history of

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trauma two years ago. They recalled that the child once fell to the ground with a ballpoint pen in his mouth, and much blood flowed out. Then, the child was taken to the emergency room of the local hospital and done debridement and suture. The emergency doctor claimed there was no foreign object found during the debridement. Furthermore, the parents did not realize or check if some part of the ballpoint pen was missing.

Our further physical examination revealed old scar tissue on the left surface of the soft palate (Figure 1B). The stereotactic thin-slice CT angiography showed a high-density foreign body inserting but not penetrating the occipital clivus, and no critical blood vessels were involved (Figure 2). In order to locate the buried foreign body accurately and reduce damage in surgery, we decided to use intraoperative navigation. Therefore, the thin-slice CT imaging was input and registered to the Fusion Navigation System (Medtronic, Minneapolis, Minnesota, United States) (Figure 2). The oral approach was chosen due to the narrow nasal cavity of children. Two catheters, inserted from one nostril and passing through the oral cavity, were tied up respectively to lift the soft palate to expose the nasopharynx. No foreign body was found at the nasopharynx under endoscopy with a 45-degree endoscope. Therefore, adenoidectomy was performed first with a microdebrider, and hemostasis was adequately done (Figure 3A). Under the guidance of the fusion navigation system, the foreign body was located, and the prevertebral fascia and occipital longus muscle were cut open in layers longitudinally until the bony surface of occipital clivus (Figure 3B and C). Then, separate along the bone surface of the occipital clivus, and a foreign body surrounded by granulation tissue can be seen, which is inserted into the left side of the occipital clivus (Figure 3C). Separate the granulation tissue and stop bleeding correctly. Then, the foreign body was successfully removed, leaving a deep hole in the occipital slope (Figure 3D). No cerebrospinal fluid leak was found. After proper hemostasis, suture the incision intermittently (Figure 3E). Next, we checked that the foreign body was a metal tip of a ballpoint pen, which was more than 1cm long (Figure 4).

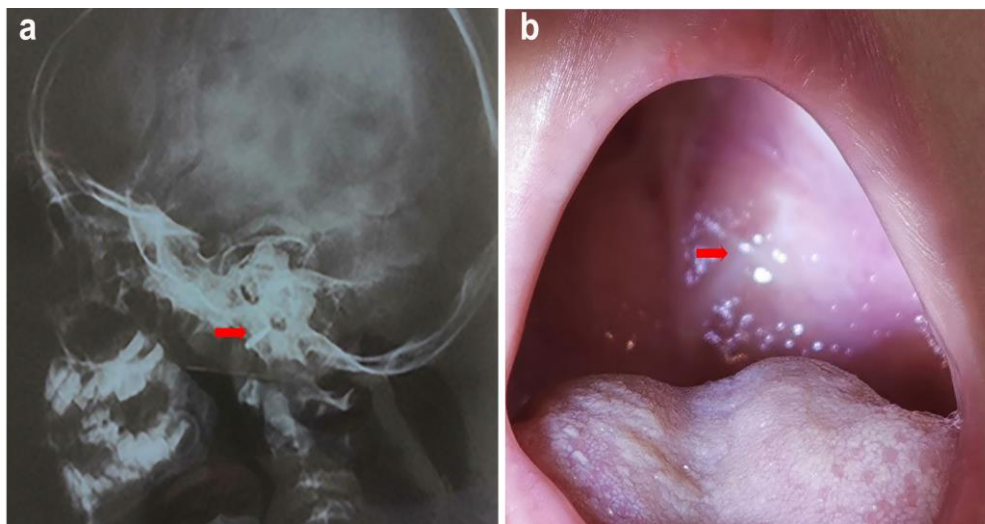


Figure 1 : A: A conventional X-ray radiograph displaying a high-density foreign body inserted into the Occipital clivus (arrow). B, A picture of a scar in the patient's soft palate (arrow).

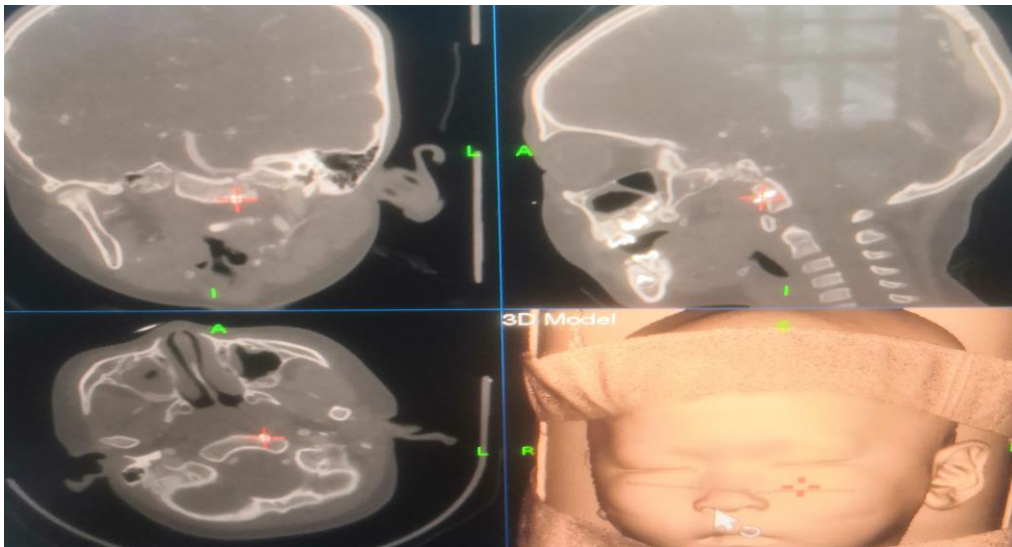


Figure 2: The buried foreign body in the occipital clivus (cross in red) displayed in the fusion navigation system.

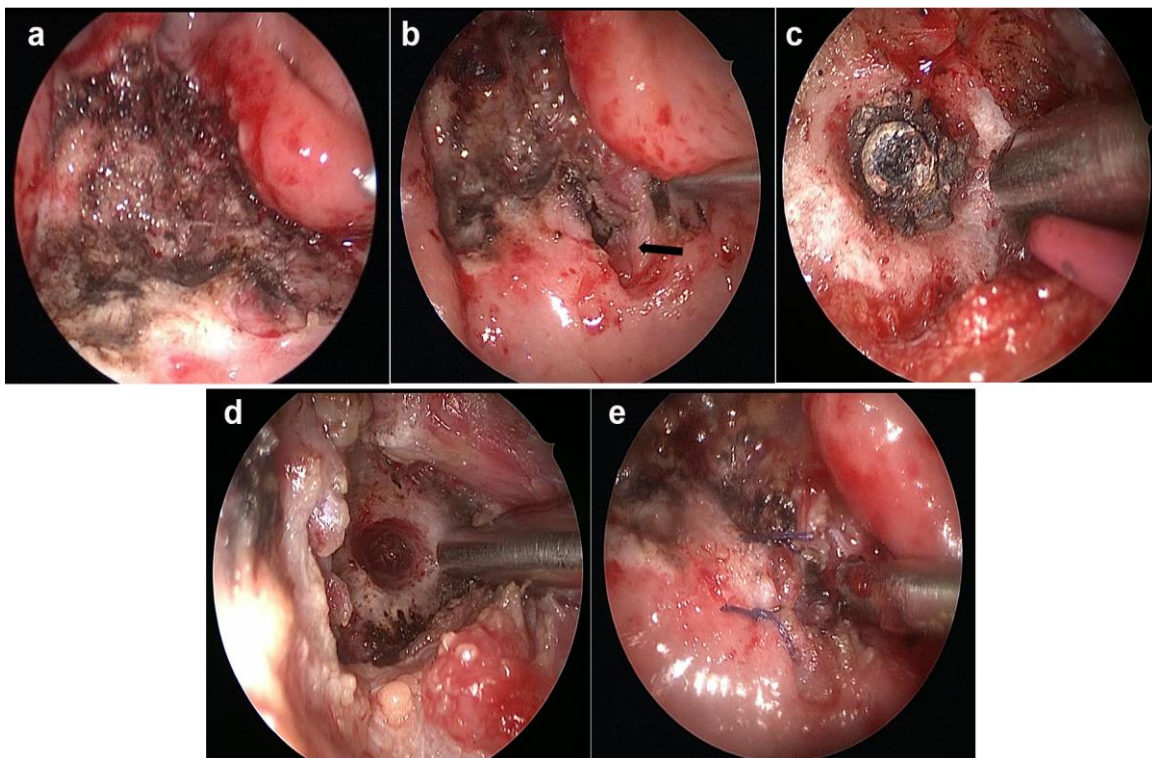


Figure 3: The surgical procedure. a, A picture after adenoidectomy. b, Incision (arrow) under the guidance of the intra-operative navigation system. c, A picture of exposure of the foreign body. d, A picture after the foreign object removed. e, A picture after the incision sutured up.

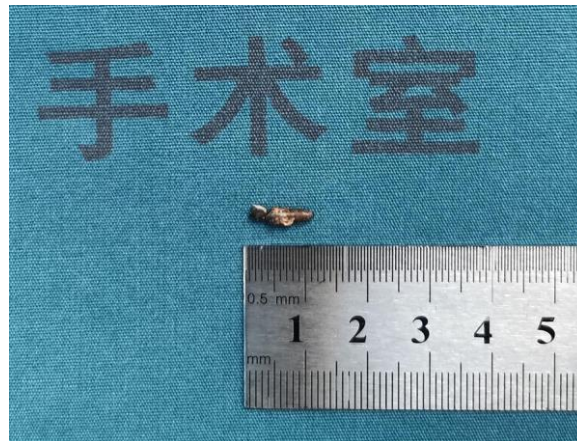


Figure 4: A photograph of the foreign object after its surgical removal.

DISCUSSION

In pediatric patients, foreign bodies are typically inhaled, ingested, or manually inserted.^[3] Penetrating trauma to the soft palate, nasopharynx, and occipital clivus and leading to long-term foreign object retention is rare. Foreign objects reported in craniofacial penetrating injuries include ballpoint pens,^[2,4] chopsticks,^[5,6] pencils,^[7,8] and wood splinter or branches,^[1,9] and metal.^[10] Craniofacial penetrating injuries are often challenging and even life-threatening. It is important to rule out the possibility of the nervous system or vascular involvement. Careful evaluation should be done before an attempt to remove it. Usually, after careful evaluation, penetrating injuries and foreign bodies can be managed in the first stage, sometimes requiring multidisciplinary collaboration.^[11] In this case, despite a clear history of trauma and medical treatment, the ballpoint pen tip was not detected and removed in time but retained in the body for over two years. Traditional ENT or endoscopic examination cannot always show the presence of foreign bodies. Thus, imaging examinations such as plain radiographs, ultrasound, CT scans, or MRIs are crucial depending on the chemical composition of the possible foreign body and its presumed anatomical location. Experienced doctors and skillful radiologists who are knowledgeable in imaging the feature of foreign bodies also help successful detection.

As for this case, it is highly hazardous because it is very close to the brain stem. In addition, although the foreign object caused no symptom currently, tips of ballpoint pens may not usually be an inert alloy, and long-term retention in the body may undergo chemical changes, which may result in a significant granulation reaction.^[12] It would be beneficial for this patient if the foreign body could be removed by surgery as long as there is no significant injury or complications to the kid. Furthermore, simultaneous adenoidectomy could relieve airway blockage and improve snoring and sleeping quality. CT angiography was performed preoperatively, and no critical blood vessels or vital adjacent structures were involved. In order to reduce injury and accurately locate the foreign body intraoperatively, minimally invasive surgery guided by the navigation system is the best choice for this case.

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