

# Button Cell Causing Septal Perforation in a Child

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## Abstract

A button battery inserted in the nose of children is an unusual foreign body which is capable of causing extensive tissue damage, resulting from electrical and chemical burns. We report a case of an ignored button battery in the nose of a 4 years old presenting with unilateral discharge and bleeding along with pain in the left nasal cavity. The foreign body was removed using endoscope but it had perforated the septum by the time. We report this case to emphasise the hazards of button battery impaction and the value of early diagnosis and treatment to prevent serious complications.

**Keywords:** Foreign body nose, Button battery, Septal perforation.

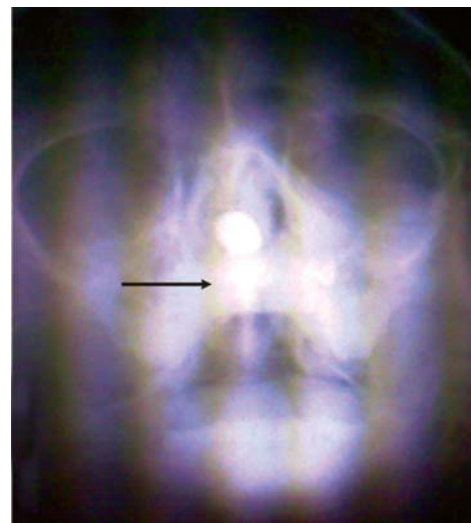
## INTRODUCTION

Otolaryngologists, primary care physicians and emergency room physicians encounter patients with nasal foreign bodies on regular basis. Physicians who treat patients with nasal problems are well aware of the dictum “unilateral rhinorrhea is a foreign body unless proven otherwise”. Button batteries have become an increasingly popular source of energy for many small electrical devices. These button batteries are part of toys and seem attractive to small children who have a tendency of exploring them by putting in their mouth and other orifices like nose, ears, etc. Button battery foreign bodies in the nose, gastrointestinal tract and ear pose a hazard to the patient and demand immediate medical attention.<sup>1</sup> A button battery in the nose of a child is an unusual foreign body which is capable of causing extensive tissue damage, resulting from chemical and electrical burns. The results are necrosis, scarring, septal perforations and cosmetic deformities in the nose and these problems pose a major challenge to long-term management.<sup>2,3</sup>

We present a case of a neglected button battery impaction in the nose to emphasize the hazards of button battery impaction and to emphasize the importance of early diagnosis and appropriate management in such cases to prevent complications.

## CASE REPORT

A 4-year-old male child was brought to the outpatient department of ENT with complaints of left sided nasal discharge, nasal bleeding with pain. An X-ray of paranasal sinuses occipitomenal view was done which revealed a rounded radiopaque shadow in midline in the nasal cavity (Fig. 1). The diagnosis of metallic nasal foreign body was



**Fig. 1:** X-ray PNS (occipito-mental view) showing foreign body in the nasal cavity

made and the child was taken up for nasal endoscopic evaluation under general anesthesia. The nasal cavity was decongested with 4% xylocaine with adrenaline packs (1:100000) and pediatric 2.7 mm rigid nasal endoscope was used to visualise the nasal cavity. The nasal cavity was full of blood stained mucopus along with dirty brown slough. The nasal cavity was narrow due to ulceration and edema of the nasal mucosa on left side which was decongested as the endoscope was advanced into the nasal cavity (Fig. 2). On removing the slough, a metallic button battery was seen entrapped between the left middle turbinate and septum and was buried in a layer of ulcerated and sloughed out mucosal debris with underlying septal perforation. The septal cartilage adjacent to the foreign body was necrosed and thus a circular piece of septal cartilage of the size of the battery along with necrosed perichondrium was delivered along with the battery (Fig. 2). After removal of foreign body the nasal cavity showed a large septal perforation with raw mucosa on either side (Figs 3 and 4). The nasal cavity was irrigated with saline and smeared with antibiotic ointment. A merocel

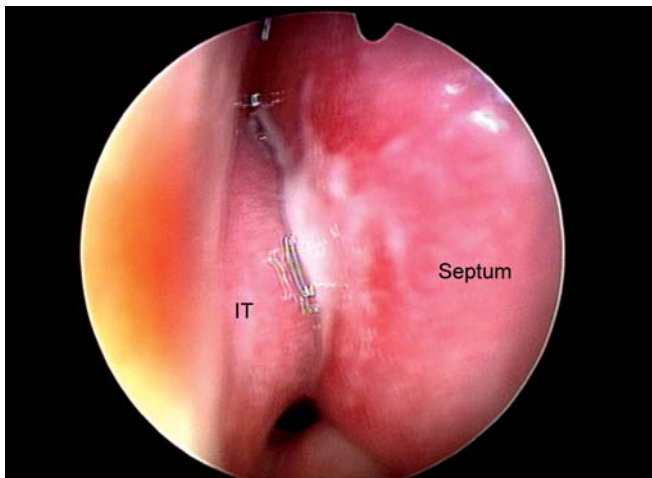


Fig. 2: Nasal endoscopic picture showing edema on right side

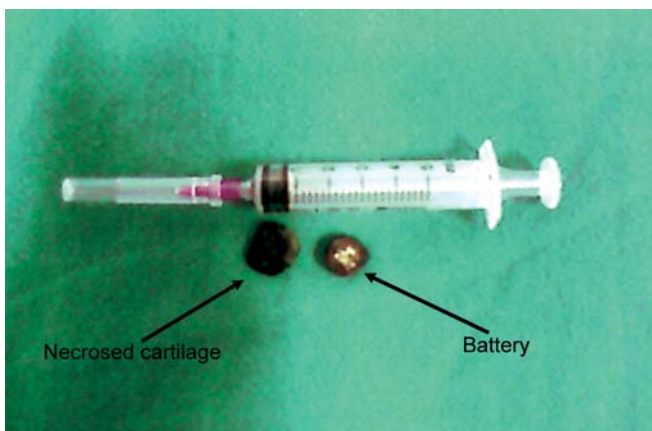


Fig 3: Necrosed cartilage and foreign body

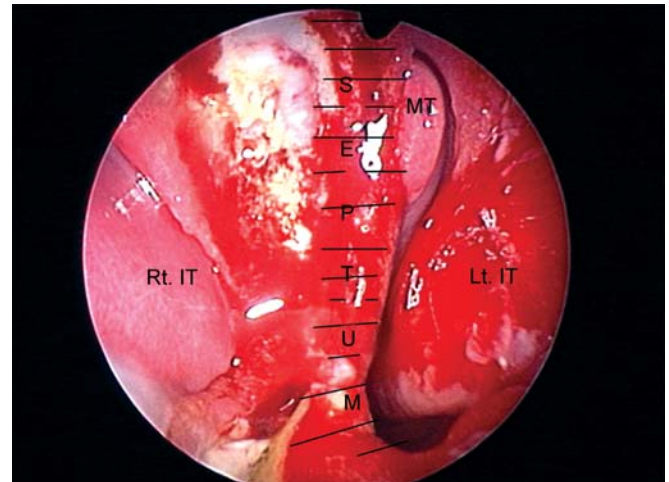


Fig. 4: Posterior nasal cavity showing the large septal perforation with raw mucosa. (IT: inferior turbinate, S: septum, Rt. IT: right inferior turbinate, MT: middle turbinate, Lt. IT: left turbinate)

pack was kept in the nasal cavity. The patient was started on broad spectrum antibiotics and decongestants. The postoperative period was uneventful. The patient was taken up for removal of the pack and endoscopic suction under general anesthesia as the child was not cooperative for examination on the 3rd postoperative day. The patient was discharged in satisfactory condition and has been asymptomatic on follow up till date.

## DISCUSSION

Nasal foreign bodies are common between the ages of two and five years. They may be inert, hygrophilic or corrosive. A patient with button battery impaction needs prompt attention. Since the first case there have been many cases of foreign bodies in digestive tract as well as external auditory canal. However, a few cases of button battery in the nasal cavity were reported.<sup>3</sup> The ingestion of button battery is known to be potentially fatal and impaction in esophagus is uniformly associated with severe morbidity. The peak incidence occurs at 1-2 years of age. In 33% cases the battery is from child's hearing aid. Small button batteries in nose can produce devastating tissue damage and necrosis including septal perforation in a short-time.<sup>4</sup> The close contact between the foreign bodies and mucosal surface will always result in tissue destruction. The electrolyte composition of button battery is potassium hydroxide, magnesium dioxide and either mercuric or silver oxide. The electrolyte is held within a metal container, the sides and bottom of which form the positive pole with the top forming the negative pole. The leakage of the electrolyte is prevented by a plastic seal, which separates the positive and negative poles. The seal is often the site of leakage. Possible

mechanisms of injury by these batteries to the mucosa have been proposed by Litovitz.<sup>5</sup>

1. Spontaneous electrolyte leakage, with liquefaction necrosis and cumulative tissue damage.
2. Corrosive effects of mercury oxide after leakage.
3. Pressure necrosis from the impacted foreign body.
4. The generation of an electric current causing electric burn. In the presence of an electrolyte solution, the current produces chlorine gas and sodium hydroxide resulting in the formation of precipitate.

The clinical presentation can be unilateral nasal discharge with or without features of secondary infection. The earlier the foreign body is removed, the lesser is the morbidity. The longer it stays in the nose, the more likely it results in necrosis of nasal mucosa, scarring, septal perforation, nasal synchia and nasal cavity stenosis. The differential diagnoses include unilateral choanal atresia, polyps, tumors, and sinusitis. In our case profuse and thick blood stained nasal discharge was noted and on examination thick brownish slough along with septal necrosis resulting in septal perforation was noted. Growth and maturation of nose may be effected by destructive structural damage to the cartilage and bone. The area of maximal damage is usually found in relation to the negative pole of the battery. If the negative pole is in contact with the nasal septum particularly for a longer duration, septal perforation is the likely result as in our case.

The possibility of inhalation into the tracheobronchial tree needs to be borne in mind when managing a child with a nasal foreign body. This is remarkably uncommon and probably only a significant risk in neurologically compromised child with a poor gag reflex. If a nasal foreign body slips back into the nasopharynx, it will usually be swallowed or expectorated. The management comprises of anterior rhinoscopy, radiographic assessment and nasal endoscopic evaluation with rigid endoscopes for safest removal of nasal foreign bodies with minimal mucosal trauma with or without anesthesia. It is recommended to use decongestion, so that endoscope as small as 2.7 mm can be used in the pediatric population.<sup>6</sup> The use of oral positive pressure techniques has now been shown to be an effective way of removing

anterior nasal foreign bodies. An oral ambu bag can be used but the "parent's kiss" where the carer blows into the open mouth of a child while occluding the contralateral nostril, is probably less traumatic for the child.<sup>7</sup>

In general the clinician has to make a clinical judgement as to what is going to be the best method for removal of a foreign body, bearing in mind that a child is unlikely to tolerate repeated manipulation and the doctor will only have one attempt at using a method that is going to cause any pain whatsoever.<sup>8</sup> Prevention is ideal, with increased education of parents on age appropriate foods and household objects and strict industry standards for toy part sizes and safe containers.

In this case we present a case of a neglected button battery in the nose of a 4 years old child resulting in extensive tissue necrosis and a septal perforation to emphasize the dangers of a button battery as a nasal foreign body in children and to stress on the role of parents, general practitioners and otolaryngologists in early detection and management of the same to prevent fatal complications.

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