The Journal of Laryngology and Otology
July 1994, Vol. **108**, pp. 589–590

Intranasal button battery causing septal perforation: a case report

COLIN R. S. BROWN, M.B., CH.B.

Abstract
A child presenting with fever, unilateral nasal discharge and sinusitis was found to have an alkaline disk button battery in the right nostril causing severe mucosal damage and septal perforation. The case is presented and mechanisms of injury discussed.

Key words: Foreign bodies; Nose

Introduction

Disk batteries are in common usage in many small electronic appliances. The batteries are shiny and an attactive size for small children to insert into their mouths or other orifices. Whilst extraction of foreign bodies is commonplace in otolarynglogical practice, only three cases of button battery foreign body in the nose have been described in the recent literature. A further case is presented, and more serious sequelae described.

Case report

A five-year-old male child was brought to the emergency department with the complaints of general malaise, fever, right unilateral purulent nasal discharge and cheek erythema. Symptoms had been worsening for five days. Radiographs of the paranasal sinuses were obtained. These showed an opaque intranasal foreign body (Figure 1).

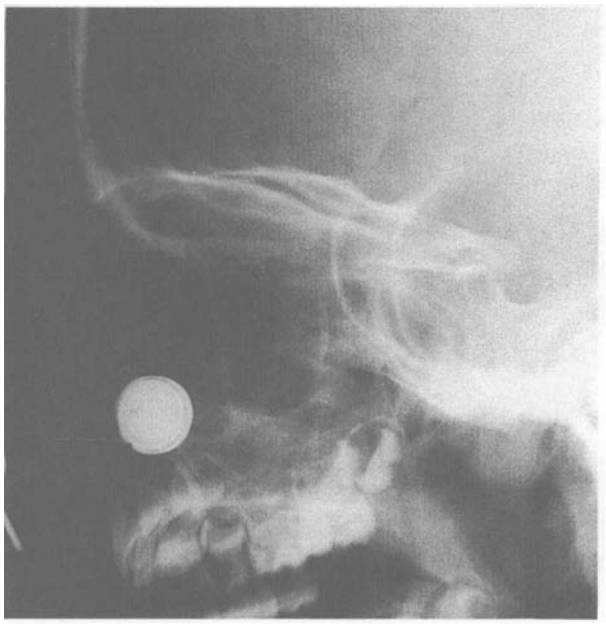

FIG. 1
Lateral view radiograph demonstrating intranasal battery.

Clinical examination showed the child to be febrile (38.3°C), but only mildly unwell. There was profuse purulent right nasal discharge and mild cheek erythema but no frank cellulitis and no orbital signs.

Under a general anaesthetic a button battery was found wedged between the inferior turbinate and the nasal septum, the presenting end being approximately 5 mm from the caudal septal border. The battery was surrounded by black mucoid debris, and upon its removal the nasal mucosa was seen to be either absent or necrotic circumferentially. The battery casing was cracked. A black disc, initially thought to be a part of the battery wrapper was a necrotic disc of septal mucosa (Figure 2). The underlying septal cartilage was grey, but not necrotic, and was conserved. The mucosa opposite this in the left nostril looked ischaemic. The right inferior tubinate was subtotally destroyed, leaving a posterior nubbin only. There was exposed bone over a 1 cm wide strip of the lateral nasal wall, and the rest of the nasal mucosa was grossly inflamed.

After thorough nasal toilette, a silastic sheet was sutured to the

FIG. 2
Corroded and split button battery with corresponding necrotic septal mucoperichondrium.

From the Department of Otolaryngology, Head and Neck Surgery, Dunedin Hospital, Dunedin, New Zealand.
Accepted for publication: 17 February 1994.

caudal septum for two weeks. The child was able to be discharged well, after a further 24 hours of intravenous antibiotics. He continued oral antibiotic therapy for three weeks. Six weeks post-operatively, his nasal mucosa had healed, but he had developed a full thickness septal perforation corresponding to the size of the battery. There was a rim of quadrangular cartilage 5 mm wide dorsally and caudally which appeared adequate for tip support. There was significant crusting around the perforation and his mother stated that the sound of his breathing had changed. Subsequent enquiry revealed the battery to have originated from a children's electronic game.

Discussion

Alkaline button batteries are in widespread usage in many small electronic devices, including hearing aids, calculators, watches, cameras and electronic games.

The dangers of alkaline button batteries in the lower aerodigestive tract are well recognized (Kulig *et al.*, 1983; Litovitz, 1983; Rumack and Rumack, 1983; Votteler *et al.*, 1983; Kuhns and Dire, 1989; Lavelle-Jones *et al.*, 1992). Recently, reports have been made of their intra-aural destructiveness (Capo and Lucente, 1986; Premachandra and McRae, 1990).

The batteries are capable of rapid tissue destruction on contact with moisture, as a result of leakage from the battery seal. They consist of a metal anode (generally zinc) and a metal oxide cathode (mercury oxide, silver oxide or manganese dioxide) separated by a strong alkaline solution of 45 per cent potassium hydroxide or sodium hydroxide. Leakage of the alkali may occur circumferentially at the seal or the battery may split or crack. Most of the tissue damage is thought secondary to this (Votteler *et al.*, 1983), although it is also possible that some results from electric current which is generated when the battery is in a suitable medium. Other tissue damaging effects may result from direct pressure.

This case further illustrates the danger of button batteries when in contact with human tissues. There have been three previously described cases of intranasal button batteries and all have suffered mucosal burns (Capo and Lucente, 1986; Fernando, 1987; McCombe and Ramadan, 1992). Fernando (1987) describes a small septal perforation in a four-year-old male with the presence of a button battery for only 24 hours.

Consideration should always be given to the possibility of ingestion of more than one battery. Expeditious removal is recommended, as is the use of silastic sheeting to prevent synechiae and nasal stenosis.

Acknowledgement

I am grateful to Mr I. A. Stewart, F.R.C.S., F.R.A.C.S., for his advice.

References

Capo, J., Lucente, F. (1986) Alkaline foreign bodies of the ear and nose. *Archives of Otolaryngology, Head and Neck Surgery* **112:** 562–563.

Fernando, P. (1987) Perforation of the nasal septum due to button-battery lodging in the nose. *British Medical Journal* **294:** 742–743.

Kuhns, D., Dire, D. (1989) Button battery ingestions. *Annals of Emergency Medicine* **18:** 293–300.

Kulig, K., Rumack C., Rumack, B., Duffy, J. (1983) Disk battery ingestion: elevated urine mercury levels and enema removal of battery fragments. *Journal of the American Medical Association* **249:** 2502–2504.

Lavelle-Jones, M., Lyall, M, McCollum, P., Cuschieri, A. (1992) Disk battery ingestion: a review and management plan. *Journal of the Royal College of Surgeons, Edinburgh* **37:** 120–122.

Litovitz, T. (1983) Button battery ingestions: a review of 56 cases. *Journal of the American Medical Association* **249:** 2495–2500.

McCombe, A., Ramadan, M. (1992) Nasal button battery. *Otolaryngology–Head and Neck Surgery* **106:** 317.

Premachandra, D., McRae, D. (1990) Severe tissue destruction in the ear caused by alkaline button batteries. *Postgraduate Medicine* **66:** 52–53.

Rumack, B., Rumack, C. (1983) Disk battery ingestion. *Journal of the American Medical Association* **249:** 2509–2511.

Votteler, T,, Nash, J., Rutledge, J. (1983) The hazard of ingested alkaline disk batteries in children. *Journal of the American Medical Association* **249:** 2504–2506.

Address for correspondence:
Colin R. S. Brown,
Dept Otolaryngology, Head and Neck Surgery,
Greenlane Hospital,
Private Bag,
Greenlane,
Auckland,
New Zealand.

Fax: 09–631–0770.