Case Report

Disc battery in the pediatric oesophagus

Manish Munjal¹*, Nitika Tuli¹, Porshia Rishi¹, Harjinder Singh¹, Shubham Munjal²

¹Department of ENT, ²Department of Anatomy, Dayanand Medical College Ludhiana, Punjab, India

Received: 08 May 2020
Accepted: 01 June 2020

*Correspondence:
Dr. Manish Munjal,
E-mail: manishmunjaldr@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

The wide usage of disc batteries in toys, in the late seventies presented a new problem. In the form of accidental lodgements in the pediatric aerodigestive tract. The physico-chemical nature of the disc battery necessitates an early removal, so as to avoid a fatal outcome if missed and retained for a long duration. Management of one such case is reported with radiographic documentation.

Keywords: Disc battery, Rigid oesophagoscopy, Squeeze toys

INTRODUCTION

There are available a variety of toys in the Indian market which produce different types of sounds, that catch the attention of the child. Especially with the availability of made in China, toys, almost every child can boast of owning one. These toys are powered by single or multiple disc type batteries or by pencil cells.

The disc batteries, are removed from the compartment at the base of the toy and the child inserts them in his mouth. The battery may pass through the gastrointestinal tract and through the stools, but sometimes it may get impacted at the natural constrictions with consequent complications. Smooth foreign bodies more than 2.5 cm in diameter and 5 cm in length are less likely to less likely to traverse the adult gut without impaction and necessitate intervention.¹

In 1896 Killan removed the first foreign body and in 1930 Chevalier Jackson gave the rigid endoscopes with good illumination. A case of oesophageal lodgement with excellent radiographic documentation and its management is being reported.

CASE REPORT

A 6 year old boy was admitted in the casualty of the Otorhinolaryngology services, Dayanand Medical College and hospital, Ludhiana with mild bleed per os. The parents gave a vague complaint of foreign body ingestion a fortnight back. The elder sibling gave a history of the child having put something in his mouth hurriedly thumping on the back and digital probing did not detect any thing.

A plain radiograph chest PA view (Figure 1) and lateral view (Figure 2) exhibited a disc shaped radio-opaque shadow at the level of the aortic arch. The child was taken up for rigid oesophagoscopy under general anaesthesia. A shining foreign body was noticed in the middle oesophagus. It was surrounded by granulation tissue which bled on touch. The foreign body was extracted with an alligator forceps and was identified by the parents as the disc battery of the “squeeze toy”, which was missing for a fortnight. The battery casing and joints, were intact on naked eye examination and on meticulous inspection of the battery under magnification, bite marks and corrosion of the casing at the joints was noted. The
battery casing could not be prised out and a charge of 5 millivolts was recorded to be still present in the battery.

Figure 1: Radiopaque shadow of the disc battery on the anteroposterior projection of the chest.

Figure 2: Radiopaque shadow of the disc battery on lateral projection of the chest.

The charge was measured using Kusmeco make digital multimeter. Serial recordings of the pH of a known solution, in which battery was submerged, ruled out the likelihood of leakage of the alkali contents of the battery. 10 cc of distilled water was used and the recordings were done every 15 minutes for the next 5 hours. The Voteler et al, normal saline immersion method even could not detect any change in the pH. Bubbling and a rise in, the battery temperature observed when a live battery is immersed in normal saline were conspicuous by their absence. The post operative period was uneventful, child was kept overnight in the hospital under observation and was discharged the next day after getting a chest x ray.

DISCUSSION

The pediatric age group is notorious for presenting with ingestion of foreign bodies to the pediatrician or the pediatric otorhinolaryngologist.2 Lerche in a study of 104 patients with foreign body esophagus reported undetected foreign body for a period of 4 years. Prognosis of untreated foreign bodies in the esophagus appears catastrophic because of the likelihood of possible complications like cervical or mediastinal abscesses, mediastinitis, empyema, oesophago-tracheal fistula and septicemia. Cohen has emphasised endoscopic assessment within 24-36 hours, in all patients presenting with a positive history of foreign body ingestion even though clinical and radiological examination is negative.3

In the pediatric age group toys and coins outnumber all types of swallowed foreign bodies. Perforation is rarely noted in esophageal impaction in the child, unless it is missed for a long period.5 Incidence of perforation in missed foreign bodies is 1 in 100 cases and 1 in 3000 after instrumentation.7

The otorhinolaryngologist, pediatric surgeon or the thoracic surgeon depending upon the medical center may be called upon to undertake rigid oesophagoscopy to remove the foreign bodies from the pediatric esophagus with the introduction of fine atraumatic oesophagoscopes with excellent illumination systems and better training facilities the mortality has dropped below 0.2% during removal of esophageal foreign bodies.8

Children with disc batteries in the aero digestive tract may present to the Pediatric Otorhinolaryngologist with a history of recent insertion or impaction of long duration.

Impacted disc battery in the nose, Bronchus, and alimentary tract have been reported in the available medical literature.913

Disc batteries in an air tight metallic casing contain a mixture of Zinc Oxide, Mercuric Oxide, Cadmium Oxide or Lithium Oxide. The mercury disc battery additionally contains, 26oh Io 45o/o Sodium or Potassium hydroxide.

The disc battery impacted for a long duration may incite a local tissue reaction leading to oedema and foreign body granulation tissue formation, which may be the cause of bleed per os. Pressure necrosis may result in fistulous communications. The battery may even heat up if placed in a conducting media further aggravating the damage. Residual low voltage direct current may even fulgrate the tissues.14 Sometimes leakage of the battery contents may occur due to absence of biologic sealing of the battery. Potassium hydroxide causes alkali burns while Mercuric oxide is corrosive.15 Stricture formation maybe the late
Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Paperella MM, Shunnrick DA, Glucman A, Meyerhoff HL. Otolaryngology. 33rd ed. Philadelphia: WB Saunders Co; 1991:2412.
2. Webb WA. Management of foreign bodies of the upper gastro-intestinal tract. Gastroenterol. 1988;94(1):204-16.
3. Jackson C. In: Diseases of Nose Throat and Ear. 2nd ed. Philadelphia: WB Saunders Co; 1957:842-855.
4. Holsinger JW, Fuson RL, Sealy WC. Oesophageal perforation following meat impaction and papain ingestion. J Am Med Assoc. 1968;204(8):734.
5. Wilson RT, Dean PJ, Lewis M. Aorto-Oesopfrieat fistula due to a foreign body. Gastrointest Endosc. 1987;33(6):448-50.
6. Brossard E, Ollyo JB, Monnier P. Foreign bodies in the oesophagus: diagnosis and treatment. Acta Endoscop. 1991;21(5):655-64.
7. Remsen K, Biller HF, Lawson W, Som ML. Unusual presentation of penetrating foreign bodies of upper aerodigestive tract. Ann Otol, Rhinol Laryngol. 1983 Jul;92(4_suppl):32-44.
8. Peyrula C, Senechalt JP, Hazan A. Corps etrangere le I oesophag (abstr). Encycle Med Chir Otorhinolaryngol. 1991;419:20835.
9. Babu KN. An unusual foreign body in the nose. The J Laryngol Otol. 1981;95:961-2.
10. Gadre AK, Juvekar RV, Gadre KC. ‘Silent’ disc battery in the bronchus. Indian J Otolaryngol. 1988 Sep;40(3):112-4.
11. Maves MD, Carithers JS, Birck HG. Esophageal burns secondary to disc battery ingestion. Ann Otol, Rhinol Laryngol. 1984 Jul;93(4):364-9.
12. Blatnik DS, Tooohill RJ, Lehman RH. Fatal complication from an alkaline battery foreign body in the esophagus. Ann Otol Rhinol Laryngol. 1977 Sep;86(5):611-5.
13. Temple DM, McNeese MC. Hazards of battery ingestion. Pediatr. 1983 Jan;71(1):100-3.
14. Leeming MN, Ray C, Howland WS. Low-voltage, direct-current burns. JAMA. 1970 Nov 30;214(9):1681-4.
15. Votteler TP, Nash JC, Rutledge JC. The hazard of ingested alkaline disk batteries in children. JAMA. 1983 May 13;249(18):2504-6.
16. Kulig K, Rumack CM, Rumack BH, Duffy JP. Disk battery ingestion: Elevated urine mercury levels and enema removal of battery fragments. JAMA. 1983 May 13;249(18):2502-4.

Cite this article as: Munjal M, Tuli N, Rishi P, Singh H. Munjal S. Disc battery in the pediatric oesophagus. Int J Contemp Pediatri 2020;7:1648-50.