

CASE REPORT

A case of corrosive tracheoesophageal fistula: A complication of button battery ingestion

Kenneth Joseph Mlay^{1,2}  | Peter Ernest Kipiki² | Bernard Minja^{1,2} | Philibert Mtenga^{1,2} | Adnan Sadiq³ | Desderius Chussi^{1,2} 

¹Department of Otorhinolaryngology, Kilimanjaro Christian Medical University College, Moshi, Tanzania

²Department of Otorhinolaryngology, Kilimanjaro Christian Medical Centre, Moshi, Tanzania

³Department of Radiology and Imaging, Kilimanjaro Christian Medical University College, Moshi, Tanzania

Correspondence

Kenneth Joseph Mlay, Department of Otorhinolaryngology, Kilimanjaro Christian Medical University College, Moshi 3010, Tanzania.
Email: mlaykenneth43@gmail.com

Key Clinical Message

Button battery ingestion has been a common condition encountered by otorhinolaryngologists. Impaction in the esophagus can lead to serious and fatal complications such as tracheoesophageal fistula. Management involves a multidisciplinary team and varies from supportive therapy to surgical intervention.

Abstract

Ingestion of button batteries has been seen with increasing frequency over the past decade. In several small numbers of reported cases, their impaction in the esophagus has led to severe, sometimes fatal, complications. The management of these cases has varied from expectant, supportive therapy to early surgical intervention. We report a case of button battery ingestion that was diagnosed late and resulted in a complication of tracheoesophageal fistula with migration to the thorax which was managed by open surgery.

KEYWORDS

button battery, corrosive, foreign body ingestion, tracheoesophageal fistula

1 | INTRODUCTION

Corrosive burns of the esophagus are a major health threat to children. Patients at the highest risk of injury are under 5 years of age; the highest ingestion rates occur at 2 years. Button battery ingestion have grown at an alarming rate. National Capital Poison Center data show a 6.7-fold increase in the percentage of button battery ingestions from 1985 to 2009. This increase is related to the expanded use of button batteries in household products.¹

Button battery can cause several complications, and the risk of complications increases with delays in removal such complications include tracheoesophageal fistula, oesophageal perforation, mediastinitis, vocal cord paralysis,

tracheal stenosis or malacia, aspiration pneumonia, empyema, pneumothorax, and exsanguination from vessel perforation.

A high index of suspicion, clinical evaluation, and appropriate investigation are necessary to differentiate foreign body (FB) ingestion or aspiration from other upper gastrointestinal infections in children. Delayed or missed diagnosis of FB ingestion will prevent appropriate and emergency intervention in the event of ingestion of dangerous FBs such as batteries. In this report, we present a case of complications of a button battery ingestion and address the serious complication of tracheoesophageal fistula and the importance of a high index of suspicion for signs and symptoms of FB ingestion.

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2024 The Author(s). *Clinical Case Reports* published by John Wiley & Sons Ltd.

2 | CASE PRESENTATION

A 2-year-old female child with a 12-month history of difficult feeding, with several episodes of vomiting, has been treated for recurrent tonsillitis at a primary care facility where a decision was reached to do a tonsillectomy. Two days post tonsillectomy the child was noted to have developed difficulty in breathing. An urgent chest x-ray (PA and Lateral) (Figure 1) was ordered. A double-ring round opacification was seen in the esophagus at the level above the carina. Rigid esophagoscopy was then attempted. A metallic object was identified with failed initial attempts to remove it. The child was referred to our tertiary hospital. On arrival, the child was conscious, afebrile not dyspneic with stable vitals. Rigid esophagoscopy and retrieval of the FB was repeated but was unsuccessful, and FB was seen embedded in the deep submucosa with area of necrosis, no stenosis was visualized.

3 | METHODS

At our center baseline investigations such as FBC, blood grouping were done, also a chest x-ray (PA and Lateral) (Figure 1) was ordered. A double-ring round opacification was seen in the esophagus at the level above the carina.

A CT scan of the chest was ordered (Figure 2) which showed a round radio-opaque foreign body in the mid-esophagus and perforation of the mid-esophagus noted anterior to the lodged foreign body embedded in the deep mucosa with evidence of tracheal and esophageal communication.

The cardiothoracic team was consulted and a cardiothoracic surgical procedure was recommended. During surgery, through a posterolateral thoracotomy and right extrapleural approach, a FB was felt in the anterior portion of the esophageal wall adjacent to the carina and friable esophageal mucosa with necrotic areas circumferentially observed at the impact site.

An esophagectomy was performed and foreign body removal was accomplished. The fistula was successfully repaired by division and repair with nonabsorbable sutures, with interposition of the membranous muscles between the separated trachea and esophagus.

A nasogastric tube (NGT) was placed and the child was fed on a high-protein, low-fat diet, and a 14-gauge chest tube was inserted and secured. The patient was maintained on PPI (omeprazole 20 mg), intravenous antibiotics, and steroid injections, chest physical therapy was initiated and NGT was maintained for 6 weeks. On day 5, the chest tube was removed after a satisfactory control chest X-ray, then the patient was discharged a few days later. After 6 weeks, NGT was removed and oral feeds were started without episodes of aspiration. Complete recovery was ascertained after 3 months of close follow-up.

4 | DISCUSSION

Foreign body (FB) ingestion is more prevalent in children especially those below 5 years of age. This may be attributed to their tendency to explore the environment by placing objects in their natural orifices, playing with

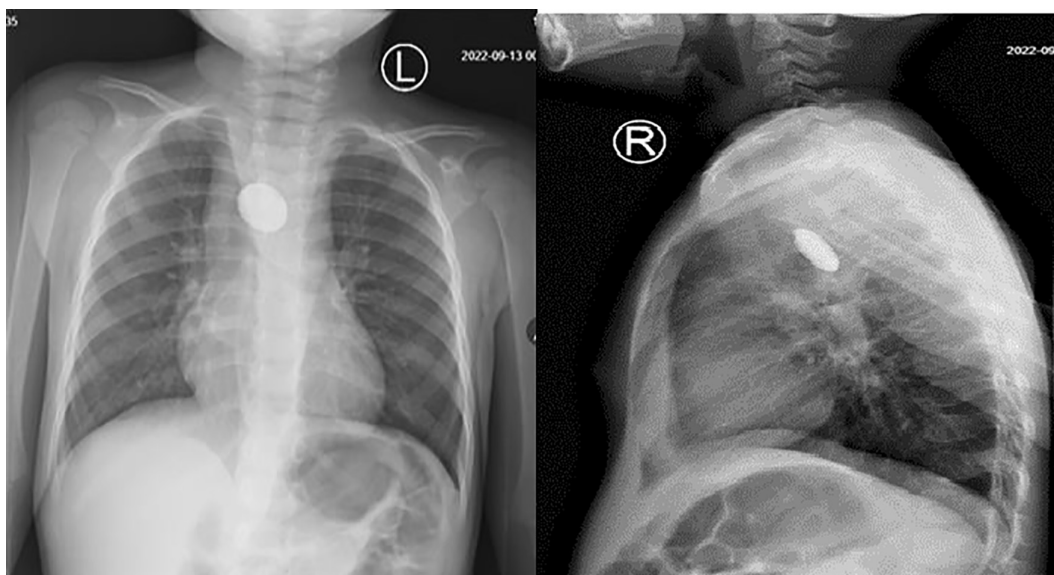


FIGURE 1 Chest x-ray (AP and lateral) views demonstrate a round radio-opaque foreign body in the mid esophagus shown by a blue arrow at the level above the carina.

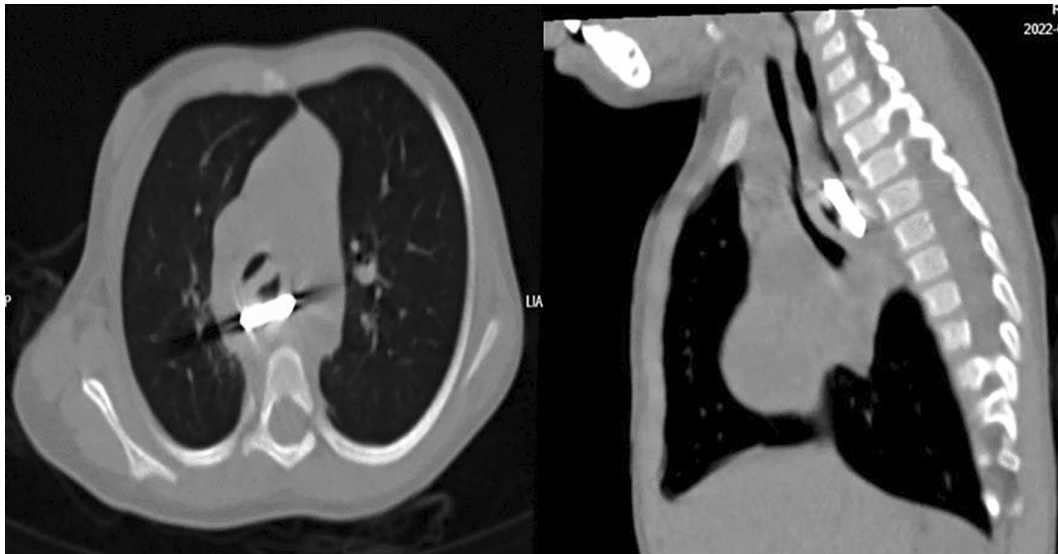


FIGURE 2 Noncontrast CT of the chest (axial and sagittal views) show a round radio-opaque foreign body in the mid esophagus. Trachea is shown by the blue arrow. Perforation of the mid esophagus noted anterior to the lodged foreign body as shows by red arrow, with evidence of trachea-esophageal fistula.

objects in their mouths, and less controlled coordination of swallowing.²

Button batteries account for less than 2% of ingested FB, however, this prevalence is on the rise as now button batteries are found in many children's toys, increasing their accessibility to children.³

Caustic lesions of the esophagus can be divided into three stages. In the early stages, corresponding to the first days of injury, inflammation, edema, and necrosis develop. In the second stage, over the next 3–4 weeks, esophageal debris gradually peels off and causes ulceration, making the esophagus susceptible to perforation, delayed resection, and more severe injuries increase the risk of tracheal and arterial fistulas. Reports of late identification and removal are often fatal due to increased contact time and thus more extensive injury.¹

Clinical presentation of a foreign body in the esophagus may be asymptomatic or symptomatic with gastrointestinal symptoms or with respiratory symptoms.^{4–6} At times, these symptoms produce a nonspecific picture such that a child might present with vomiting, fever, lethargy, poor appetite, irritability, cough, stridor, wheezing, and dehydration⁷ as noted in our case, which were thought to be common respiratory tract infection not responding well to treatment. Overall being asymptomatic, vomiting and drooling be the most predominant presenting symptoms in cases of ingested FB.⁴

Complication rates tend to increase with an extended duration of impaction.⁸ In the literature, the reported duration of the impaction has been mostly in the range of hours to 4 weeks.³ To our knowledge, there have not been cases reported with such a suspected long duration of

12 months of a button battery impaction in the esophagus given symptomatology. Factors such as location, duration of exposure, remaining voltage, and chemical composition all determine the clinical course or eventual complication.⁹ Initially, it was recommended that batteries should be removed as early as possible upon diagnosis, as perforation can occur as early as within 5 h.^{3,10} However, now it has been found that to attain an injury-free removal of an esophageal battery it should be done in less than 2 h.⁷

Endoscopic removal has been found to have the highest success rate compared to other modalities such as foley catheter extraction, esophageal bougienage, and extraction with McGill forceps and magnet catheters.⁴ Emergency esophagoscopy either flexible or rigid can be done. The efficacy of either approach has been found to be equal in the removal of oesophageal FB.^{11,12} Surgical intervention is warranted in cases of failure to retrieve the FB by endoscopic means, depending on the location of the FB, cervicotomy, thoracotomy, or gastrotomy might be done. Our index case was managed by a multidisciplinary approach with the involvement of a cardiothoracic team who performed thoracotomy with good success after failure of esophagoscopy and removal approach.

5 | CONCLUSION

Corrosive injuries in the upper gastrointestinal tract secondary to button battery require a multidisciplinary approach, mainly because of the associated multiple complications, and indeed late diagnosis and intervention may cause a high morbidity and mortality. Because of this

reason, doctors are advised to be very suspicious of FB ingestion or aspiration in children who have the symptoms of an upper aerodigestive tract.

AUTHOR CONTRIBUTIONS

Kenneth Joseph Mlay: Conceptualization; formal analysis; writing – original draft. **Peter Ernest Kipiki:** Data curation; supervision. **Bernard Minja:** Supervision. **Philibert Mtenga:** Supervision. **Adnan Sadiq:** Data curation; investigation. **Desderius Chussi:** Writing – review and editing.

ACKNOWLEDGMENTS

The authors would like to thank the patient for allowing us to use his medical information for academic purposes.

FUNDING INFORMATION

The author(s) received no financial support for the research, authorship, and/or publication of this article.

CONFLICT OF INTEREST STATEMENT

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

DATA AVAILABILITY STATEMENT

We have not shared patient's hospital records as they contain personal identification information.

ETHICS STATEMENT

Our institution does not require ethical approval for reporting individual cases or case series.

CONSENT

Written informed consent was obtained from the patient to publish this report per the journal's patient consent policy.

ORCID

Kenneth Joseph Mlay  <https://orcid.org/0000-0002-9577-5487>

Desderius Chussi  <https://orcid.org/0000-0002-3532-8378>

REFERENCES

- Wallace B, Landman MP, Prager J, Friedlander J, Kulungowski AM. Button battery ingestion complications. *J Pediatr Surg Case Rep.* 2017;1(19):1-3.
- Rybojad B, Niedzielski A, Niedzielska G, Rybojad P. Risk factors for otolaryngological foreign bodies in eastern Poland. *Otolaryngol Head Neck Surg.* 2012;147(5):889-893.
- Yardeni D, Yardeni H, Coran AG, Golladay ES. Severe esophageal damage due to button battery ingestion: can it be prevented? *Pediatr Surg Int.* 2004;20(7):496-501.
- Jayachandra S, Eslick GD. A systematic review of paediatric foreign body ingestion: presentation, complications, and management. *Int J Pediatr Otorhinolaryngol.* 2013;77(3):311-317.
- Cheng W, Tam PKH. Foreign-body ingestion in children: experience with 1,265 cases. *J Pediatr Surg.* 1999;34(10):1472-1476.
- Alam E, Mourad M, Akel S, Hadi U. A case of battery ingestion in a pediatric patient: what is its importance? *Case Rep Pediatr.* 2015;2015:345050.
- Litovitz T, Whitaker N, Clark L, White NC, Marsolek M. Emerging battery-ingestion hazard: clinical implications. *Pediatrics.* 2010;125(6):1168-1177.
- Sink JR, Kitsko DJ, Mehta DK, Georg MW, Simons JP. Diagnosis of pediatric foreign body ingestion: clinical presentation, physical examination, and radiologic findings. *Ann Otol Rhinol Laryngol.* 2016;125(4):342-350.
- Lin VYW, Daniel SJ, Papsin BC. Button batteries in the ear, nose and upper aerodigestive tract. *Int J Pediatr Otorhinolaryngol.* 2004;68(4):473-479.
- Chiang MC, Chen YS. Tracheoesophageal fistula secondary to disc battery ingestion. *Am J Otolaryngol - Head Neck Med Surg.* 2000;21(5):333-336.
- Kimball SJ, Park AH, Rollins MD, Grimmer JF, Muntz H. A review of esophageal disc battery ingestions and a protocol for management. *Arch Otolaryngol Head Neck Surg.* 2010;136(9):866-871.
- Popel J, El-Hakim H, El-Matary W. Esophageal foreign body extraction in children: flexible versus rigid endoscopy. *Surg Endosc.* 2011;25(3):919-922.

How to cite this article: Mlay KJ, Kipiki PE, Minja B, Mtenga P, Sadiq A, Chussi D. A case of corrosive tracheoesophageal fistula: A complication of button battery ingestion. *Clin Case Rep.* 2024;12:e8934. doi:[10.1002/ccr3.8934](https://doi.org/10.1002/ccr3.8934)