

Trachea-o-esophageal Fistula following Button Battery Ingestion, Presenting One Month after the Event- A Rare Presentation

Rutaba Tariq, Iftikhar Ahmed Choudhary, Shanza Zaheer, Qaiser Naveed

ABSTRACT:

Trachea-o-oesophageal fistula (TEF) formation after battery ingestion is a fatal complication with severe consequences. Urgent removal of battery is necessary within few hours. Persistent oral intolerance, respiratory difficulty or clinical deterioration after removal of battery should raise a suspicion of oesophageal rupture/leak or TEF. We present case of a 3-year-old who ingested button battery, which was diagnosed immediately but due to delay in referral to the concerned specialty the battery was removed on the 2nd day followed by large oesophageal rupture. However initially the child improved after the repair, the development of TEF was presented much later which was a rare presentation. A large fistula which was not closed by conservative approach was successfully closed surgically. The child was recovered after the repair, and the confirmation of adequate repair by esophagoscopy was done. Button battery ingestion (BBI) should be considered a surgical emergency, requiring urgent removal and vigilant monitoring.

Key words: Button battery ingestion (BBI), case report, oesophageal rupture, trachea-esophageal fistula (TEF),

How to cite this Article:

Trachea-o-esophageal Fistula following Button Battery Ingestion, Presenting One Month after the Event- A Rare Presentation Rutaba Tariq, Iftikhar Ahmed Choudhary, Shanza Zaheer, Qaiser Naveed .J Bahria Uni Med Dental Coll. 2024;14(2): DOI: <https://doi.org/10.51985/JBUMDC2023228>

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non commercial use, distribution and reproduction in any medium, provided the original work is properly cited.

BACKGROUND:

As children grow and explore the world, the tendency of putting things in mouth increases. Most foreign bodies pass through the gastrointestinal tract without any intervention, but ingestion of chemicals, medicine and batteries impose a great risk of complications. Ingestion of batteries has been less publicized and taken lightly by both parents and health care providers. Button battery ingestion (BBI) is a predictor for severe morbidity presumably due to leakage of highly caustic potassium or sodium hydroxide contained in these electric cells.¹ A literature review of complications after paediatric BBI showed esophagus is the most common organ affected by BBI complications.² serious complications arise in cases with oesophageal impaction.³

CASE PRESENTATION:

A three-year-old previously healthy male child was brought to A&E department with history of BBI., while playing with his toys. The child was completely asymptomatic at that time. Initially, the parents visited a nearby hospital. On clinical examination there was no respiratory distress and child was vitally stable. The chest x-ray showed a radio opaque shadow at the level of neck. He was referred to tertiary care hospital where on arrival x-ray was repeated and urgent consultation was sought from the ENT department. Child was prepared for esophagoscopy. On endoscopic examination foreign body was found in the proximal oesophagus which was not retrieved and pushed into stomach, otherwise oesophagus was normal, the procedure was terminated, and Paediatric surgery opinion was sought. (fig1) The child who was initially stable had now developed high grade fever, and was not tolerating anything orally, he also started to deteriorate and was not able to maintain oxygen saturation on room air. On repeat chest and abdominal x-rays, the battery was found in stomach but by that time, the child had developed right sided Pneumothorax. On chest tube intubation purulent, foul-smelling pus was drained. We suspected oesophageal rupture. Gastrografin swallow was done which showed leak in distal 1/3rd of oesophagus. (fig2) Gastrostomy was done to remove foreign body and a feeding tube was placed. The child remained stable initially. He was observed for next 48 hours in intensive care for the clinical response. The child over the period did not improve and became septic. Repeat chest x-rays showed collapsed/trapped right lung with pyo-pneumothorax despite chest tube in place. Urgent thoracotomy was planned. It revealed empyema

Rutaba Tariq (Corresponding Author)
Resident, Department of Paediatric Surgery,
PNS Shifa Hospital, Karachi, Pakistan
Email: rrtabukhan@gmail.com

Iftikhar Ahmed Choudhary
Professor and Head of Department of Paediatric Surgery,
PNS Shifa Hospital, Karachi, Pakistan
Email: driffi968@gmail.com

Shanza Zaheer
House Officer, Department of Paediatric Surgery,
PNS Shifa Hospital, Karachi, Pakistan.
Email: shanzahzaheer42@gmail.com

Qaiser Naveed
Resident, Department of General Surgery,
PNS Shifa Hospital, Karachi, Pakistan.
Email: qaiser.haral@gmail.com

Received: 01-08-2023 1st Revision: 21-08-2023
Accepted: 01-01-2024 2nd Revision: 23-10-2023

and fibrous tissue causing entrapment of right lung for which decortication was done and fibrous exudates were sent for culture. A 3.5cm longitudinal perforation was found in lower oesophagus. The defect was closed in two layers with absorbable sutures (4/0 PDS Polydioxanone Suture) and secured with pleural flap. The chest tube was removed on the 5th post op day. Baby had a smooth post op recovery. Fever settled with antibiotic cover as per sensitivity. On 8th post op day gastrograffin study was repeated, it showed bilateral bronchogram but no leak throughout the oesophagus. There was no free leak in pleural cavity. Child was therefore allowed to begin with clear liquids orally. The parents complained that the child vomited and coughed every time they gave him water. The child was kept under observation and kept NPO as he was not tolerating anything orally. He gradually became septic and had multiple fever spikes. To ascertain any leakage, gastrograffin study was repeated after a week. It again showed bilateral bronchogram with a suspect of minor leak at the level of cricopharynx. Virtual bronchography and CECT chest (contrast enhanced CT scan) and Flexible esophagoscopy was done and it revealed a 2cm oesophageal fistulous connection with trachea around 16cm from incisors.^(fig3) These clinical squeals had taken a period of few weeks; the child was malnourished and

emaciated by that time. His chest infection had worsened and was septic. This entire scenario made the situation at high risk. Conservative management that took whole one month was a total failure and there was less chance of the fistula to close spontaneously. Surgery was planned. We successfully repaired the fistula with Oblique cervical approach and mini sternotomy. Esophageal and tracheal defects repaired separately with PDS 5/0, and a strap muscle flap placed in between.^(fig4) Our patient remained intubated for 2 days and was extubated on 3rd post op day. He had slow but smooth post op recovery. Baby was discharged 2.5 months later, and feeding was advised through gastrostomy tube. One month later, repeat esophagoscopy was performed which showed normal mucosa and the child was started gradually on oral feed.

DISCUSSION:

In our patient, a large tracheoesophageal fistula developed and was diagnosed almost after a month the ingested battery was retrieved from the stomach via gastrostomy. In this child, button battery was impacted initially for tissue damage to occur, the battery was removed on 2nd day of the initial event. The delay in removing the battery led to complications. Recently, the North American Society for Paediatric

Figure 1; initial position of battery B; Battery in stomach and rt sided pneumothorax C; after chest intubation

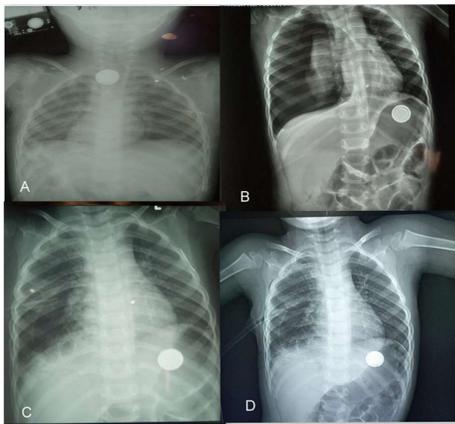


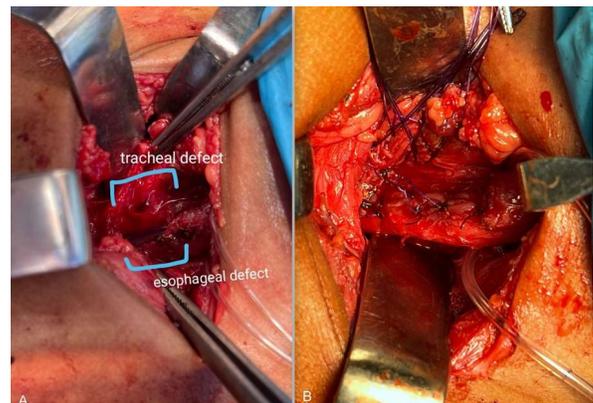
Figure 2: Gastrograffin study showing major esophageal rupture in lower 1/3rd



Figure 3: TEF identified on CECT Chest at the level of T3/4 in different positions A coronal section B sagittal section



Figure 4 Per-operative pictures of TEF (A) tracheal & esophageal defects (B) after repair



Gastroenterology, Hepatology, and Nutrition Endoscopy Committee revised the recommendations pertaining to the timing of endoscopic intervention. The presence of oesophageal button batteries mandates emergency removal within 2 hours regardless of the presence of symptoms.⁴ We conducted literature search in pub med to search for development of TEF followed by button battery ingestion from the year 2010-2022. A similar case report was reported from, India, in which a child of one year of age ingested the battery and due to delay in diagnosis large fistula developed which was repaired surgically in the same way.⁵ A case of 1 year old with BBI and was diagnosed on the 4th day was reported from UK. He developed TEF above the carina. Near total esophagectomy, cervical oesophagostomy and gastrostomy were performed with a patch repair of the trachea, followed by a bio-absorbable tracheal stent.⁶ Another case reported in 2020 from Japan in which a 16-month-old ingested lithium button battery, on day 8 after retrieval, endoscopy and fluoroscopy identified a (TEF), 6 mm in diameter. Conservative management was conducted with periodic follow-up endoscopies, which showed signs of healing in the esophagus.⁷ In all the above-mentioned cases the delay in the diagnosis lead to the devastating complications like oesophageal rupture and TEF formation. In our case the diagnosis was made immediately but due to delay in referral to the concerned specialty the battery was removed on 2nd day. However initially the child improved after the repair, the development of TEF was presented much later which was a rare presentation.

CONCLUSION:

Button batteries are the second most frequently ingested foreign bodies and can lead to serious clinical complications within hours of ingestion.^{8,9} In a study conducted in Birmingham they concluded the use of Trauma I activations for suspected button battery ingestions has led to more expedient evaluation and shortened time to removal of impacted oesophageal batteries.¹⁰ TEF induced by BBI is one of the most challenging issues for paediatric surgeons. Timely diagnosis, referral and intervention are important to avoid the complications. Once the complication has occurred; appropriate decision making, and timely decision making is necessary. If operated then vigilant post operative management, oesophageal rest with sufficient nutrition and after discharging careful and long follow-up are keys to success of management.

Authors Contributions:

Rutaba Tariq: Topic selection, study design, data collection, manuscript writing
Iftikhar Ahmed Chaudry: Study design, manuscript writing
proof reading
Shanza Zaheer: Sample collection, study design, methodology
Qaisar Naved: Sample collection, study design, methodology

REFERENCES:

1. Maves, M. D., Carithers, J. S., & Birck, H. G. (1984). Esophageal burns secondary to disc battery ingestion. *The Annals of otology, rhinology, and laryngology*, 93(4 Pt 1), 364–369.
2. Varga, Á., Kovács, T., & Saxena, A. K. (2018). Analysis of Complications After Button Battery Ingestion in Children. *Pediatric emergency care*, 34(6), 443–446.
3. Shafiq, S., Devarbhavi, H., Balaji, G., & Patil, M. (2021). Button battery ingestion in children: Experience from a tertiary center on 56 patients. *Indian journal of gastroenterology: official journal of the Indian Society of Gastroenterology*, 40(5), 463–469.
4. Kramer, R. E., Lerner, D. G., Lin, T., Manfredi, & North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition Endoscopy Committee (2015). Management of ingested foreign bodies in children: a clinical report of the NASPGHAN Endoscopy Committee. *Journal of pediatric gastroenterology and nutrition*, 60(4), 562–574. <https://doi.org/10.1097/MPG.0000000000000729>
5. Harjai, M. M., Ramalingam, W., Chitkara, G., & Katiyar, A. (2012). Corrosive tracheo-esophageal fistula following button battery ingestion. *Indian pediatrics*, 49(2), 145–146.
6. Chessman, R., Verkerk, M., Hewitt, R., & Eze, N. (2017). Delayed presentation of button battery ingestion: a devastating complication. *BMJ case reports*, 2017, bcr2017219331.
7. Shibuya, S., Azuma, T., Lane, G. J., Okawada, M., & Yamataka, A. (2020). Successful Strategy for the Conservative Management of Acquired Tracheoesophageal Fistula Due to Lithium Button Battery Ingestion. *European journal of pediatric surgery reports*, 8(1), e18–e22.
8. Jatana, K. R., Litovitz, T., Reilly, J. S., Koltai, P. J., Rider, G., & Jacobs, I. N. (2013). Pediatric button battery injuries: 2013 task force update. *International journal of pediatric otorhinolaryngology*, 77(9), 1392–1399.
9. Gao, Y., Wang, J., Ma, J., Gao, Y., Zhang, T., Lei, P., & Xiong, X. (2020). Management of button batteries in the upper gastrointestinal tract of children: A case-series study. *Medicine*, 99(42), e22681.
10. Russell, R. T., Griffin, R. L., Weinstein, E., & Billmire, D. F. (2014). Esophageal button battery ingestions: decreasing time to operative intervention by level I trauma activation. *Journal of pediatric surgery*, 49(9), 1360–1362.