International Surgery Journal
Povananthiran SM et al. Int Surg J. 2025 Dec;12(12):2171-2174
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20253847

Case Report

Inferior thyroid artery pseudoaneurysm following button battery ingestion in a 9-month-old infant: a rare vascular complication

Sharmaine Marie Povananthiran[1,2]*, Christina Loo Poh Sim[2], Gomalaadevee Rajaram[2], Mohd Yusran Bin Othman[2], Hafatin Fairos Tamaddun[2], Salinawati Binti Bakin[3], Abd Al-Rhman Hikmet Shaker Al-Azawi[1]

[1]Department of Surgery, Universiti Putra Malaysia, Selangor, Malaysia
[2]Department of Paediatric Surgery, Hospital Tunku Azizah, Kuala Lumpur, Malaysia
[3]Department of Radiology, Hospital Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

Received: 12 September 2025
Revised: 16 October 2025
Accepted: 04 November 2025

***Correspondence:**
Dr. Sharmaine Marie Povananthiran,
E-mail: spoovi87@gmail.com

ABSTRACT

Button battery (BB) ingestion poses a significant pediatric surgical emergency, with increasing global incidence and serious morbidity in young children. Vascular complications, particularly involving the inferior thyroid artery, are extremely rare but potentially fatal. We report a case of a 9-month-old, with unwitnessed BB ingestion, presented with a history of hemoptysis and noisy breathing. Two weeks after the incident, the child developed complications of a right inferior thyroid artery pseudoaneurysm secondary to delayed diagnosis of esophageal BB impaction. The case was further complicated by bacteremia, esophageal stricture, and nutritional compromise, necessitating a multidisciplinary approach including endoscopic removal, endovascular embolization, jejunostomy, and eventual gastrostomy. This case highlights the importance of early recognition, vascular imaging, and structured follow-up in the management of severe BB ingestion.

Keywords: Button battery, Inferior thyroid artery, Pseudoaneurysm

INTRODUCTION

Button battery (BB) ingestion is a life-threatening pediatric emergency with increasing incidence globally, particularly affecting children under six years old due to their exploratory behaviour and the availability of BB-powered devices.[1-3] Between 1999 and 2019, data from the US National Poison Data System (NPDS) and National Battery Ingestion Hotline (NBIH) documented a 66.7% rise in BB ingestion and a tenfold increase in severe outcomes in children under 6 years- most under age 4.[4,5]

Ingested BBs can cause severe injury to the esophagus and adjacent structures within hours, primarily through the generation of hydroxide ions at the negative pole, resulting in rapid liquefactive necrosis.[6,7] Complications such as esophageal perforation, strictures, tracheoesophageal or aorto-esophageal fistulas, and vascular pseudoaneurysms may occur over time.[8,9] Severe outcomes, including fatal hemorrhage and complex airway or mediastinal complications, have also been reported in multiple pediatric series.[10] Delayed recognition and retrieval, especially in unwitnessed ingestions, significantly increase the risk of these outcomes.[11]

Current guidelines by the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) emphasize emergent endoscopic removal within 2 hours if the BB is lodged in the esophagus.[12] In cases where ingestion exceeds 12 hours, pre-removal CT angiography

is advised to detect possible vascular erosion. Post-removal, ongoing surveillance is critical to detect delayed complications such as strictures, infections, or vascular injuries.[12-14]

This case describes a rare instance of inferior thyroid artery pseudoaneurysm following BB ingestion, emphasizing vascular involvement, early imaging, endovascular management, and nutritional rehabilitation.

CASE REPORT

A 9-month-old boy presented to a district emergency department with a two-hour history of hemoptysis and noisy breathing, following one day of non-specific illness. The mother reported no witnessed ingestion of a foreign body, noting that the child had been playing with his cousins prior to the onset of decreased activity and reduced oral intake. On examination, the child was alert but had inspiratory stridor with prolonged expiratory phase. Chest X-ray revealed a foreign body with a "Halo sign or double ring sign" in the upper esophagus suggestive of a button battery ingestion (Figure 1).

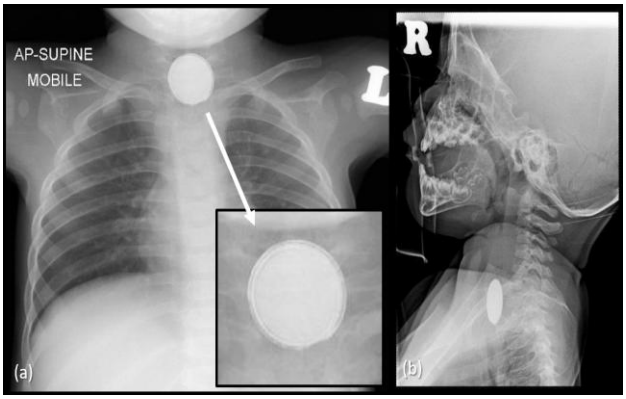

Figure 1: (a) Chest radiograph (antero-posterior view) with enlarged image of the foreign body in the upper oesophagus with a 'Halo sign or double ring sign'; and (b) its lateral view.

He was referred late to a tertiary care centre (approximately 10-12 hours post onset of symptoms), leading to a delay in endoscopic removal of the button battery. An esophagogastroduodenoscopy (OGDS) and direct laryngoscopy under general anesthesia (24 hours post onset of symptoms) revealed a button battery impacted about 10 cm from the incisors over the anterolateral wall of the esophagus, which was successfully removed using endoscopic grasper and Magill forceps. Endoscopic findings post-removal included mucosal sloughing and esophageal wall indentation without overt perforation (Figure 2). A nasogastric tube was inserted under direct vision, and rigid bronchoscopy revealed no tracheoesophageal fistula. Blood cultures and tracheal aspirate cultures obtained during admission grew *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*, respectively, and the infection was treated based on antimicrobial susceptibility.

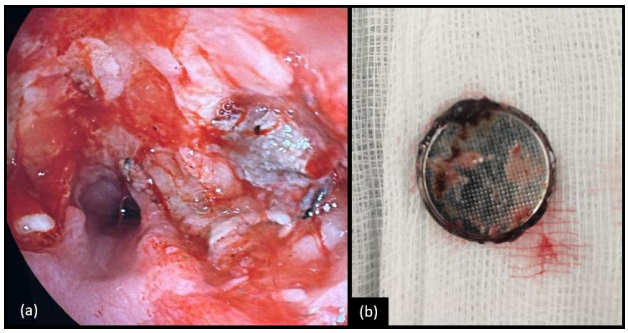

Figure 2: (a) OGDS findings after the removal of the button battery; and (b) noted erosion, and indentation at lateral aspect of oesophageal with slough.

A reassessment OGDS and bronchoscopy was done a week later which showed that the previous raw area is healing, with mucosal indentation at the previous impaction site but no fistula or perforation seen. A trans-gastric trans-pyloric jejunostomy tube was placed via laparotomy for feeding access in the same setting.

The child was initially improving, but on day 15 post ingestion, he developed melenic stools and significant hemoglobin drop from 13.8 to 5.9 g/dL. Computed tomography angiography (CTA) was requested to rule out an aortoesophageal fistula but images revealed a pseudoaneurysm arising from a branch of the right thyrocervical trunk, likely to be the right inferior thyroid artery. The CTA findings was confirmed from the angiographic assessment done prior to embolization, which was performed by the interventional radiologist. Boston Scientific Interlock ® coiling device (size 2 mm×6 cm) (Figure 3) was successfully deployed within the pseudoaneurysm and its proximal feeding branch.

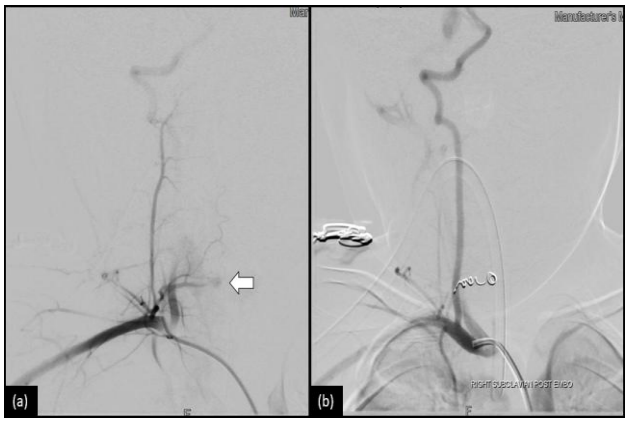

Figure 3: (a) Pseudoaneurysm arising from a branch of the right thyrocervical trunk which courses medically (white arrow), likely represents an inferior thyroid artery; and (b) the coiling device used to devascularize the target vessel.

On day 26 post-ingestion, endoscopic reassessment demonstrated an esophageal stricture located 10 cm from the incisors, which prevented further advancement of the pediatric scope. Dilatation was done using Savary-Gilliard dilators size 7 and 9Fr under an image-intensifier (II) guidance. Post-dilation, the pediatric endoscope could subsequently pass through the stricture and the trans-gastric trans-pyloric jejunostomy tube was then replaced with a gastrostomy tube.

The patient remained clinically stable, tolerating gastrostomy feeding and was discharged on day 28 post-ingestion. A reassessment OGDS was done 4 weeks from discharge which showed no evidence of esophageal stricture or fistula. An outpatient thyroid ultrasonography was also planned.

DISCUSSION

BB ingestion is increasingly recognized as a high-risk emergency in pediatrics, particularly for its rapid and extensive local tissue damage.[6] Delayed diagnosis, as in this case, substantially increases the risk of deep tissue injury and vascular erosion.[9,11] The mechanism of injury begins with hydroxide ion production at the negative battery pole, which leads to localized alkaline necrosis.[6,7]

Vascular injury is one of the most catastrophic complications of BB ingestion. While rare, when present, it is often fatal. In a comprehensive systematic review by Akinkugbe et al 14% of children with severe BB-related complications had vascular injuries. The majority of these involved the aorta (75%), followed by the subclavian (6%), carotid (4%), and thyroid arteries (2%).[9] Although the thyroid arteries were among the least commonly affected, their involvement, particularly the inferior thyroid artery (ITA), warrants careful consideration due to anatomical proximity to the esophagus.

The inferior thyroid artery, a branch of the thyrocervical trunk, ascends posterior to the carotid sheath and supplies the thyroid gland, trachea, esophagus, and parathyroids. Its intimate anatomical relationship with the cervical esophagus places it at risk of injury, particularly when a BB becomes impacted at the thoracic inlet or upper esophagus. In anteriorly positioned batteries- where the negative pole is directed posteriorly toward the esophageal wall and adjacent vascular structures- alkaline necrosis can erode toward the ITA, as was observed in our case.

Cases involving the ITA are sparsely reported in the literature. Akinkugbe et al identified thyroid artery injury in only 2% of vascular injury cases related to BB ingestion, a finding that underscores both the rarity and the diagnostic challenge.[9] Due to limited data, awareness among clinicians regarding this complication remains low. However, the consequences of such an injury can be severe, including pseudoaneurysm formation or massive hemorrhage. In our case, the delayed presentation likely permitted transmural esophageal necrosis and eventual erosion into the adjacent right ITA, leading to the formation of a pseudoaneurysm. This was diagnosed via contrast-enhanced CT angiography and successfully managed through endovascular coil embolization. A similar diagnostic and interventional approach was described by Alreheili et al., where a novel use of a vascular plug device was employed to temporarily control an aorto-esophageal fistula, underscoring the importance of timely vascular imaging in suspected vascular injuries.[8]

Although the ITA is a small-caliber vessel compared to the aorta or carotid arteries, its injury can still result in significant clinical consequences. In addition to hemorrhagic complications, extravasation or hematoma formation in the confined cervical or mediastinal spaces can compromise the airway and esophageal lumen, worsening dysphagia or stridor. Moreover, pseudoaneurysms can act as a nidus for infection, particularly in a setting of mucosal breach and bacterial translocation, as reflected in our patient who developed ESBL *Klebsiella pneumoniae* bacteremia.[11]

This case emphasizes the need for high clinical suspicion of vascular complications, even when classic signs like hematemesis or hemodynamic instability are absent. Early CT angiography is advised to be performed in delayed BB ingestion cases, particularly if the battery has been lodged for more than 12 hours or if symptoms suggest possible vascular erosion.[12] While aortoesophageal and tracheoesophageal fistulas are more widely reported and feared, clinicians must be equally vigilant about injuries to smaller but functionally significant vessels like the ITA.

Finally, the rarity of ITA injury should not discount its relevance. This complication remains underrecognized due to its infrequent reporting, but as more centers adopt routine CT angiography in delayed or complex BB ingestion, its true incidence may become more apparent.[9] Awareness and preparedness for managing such vascular injuries, including access to pediatric interventional radiology and endovascular services, are critical to improving survival and reducing morbidity.

CONCLUSION

This case illustrates the severe complications that can arise from delayed diagnosis and removal of a button battery lodged in the esophagus, including rare but life-threatening complication of inferior thyroid artery pseudoaneurysm. Vascular pseudoaneurysms, while uncommon, warrant a high index of suspicion and early imaging to prevent life-threatening hemorrhage. The successful outcome in this case hinged on early multidisciplinary collaboration involving endoscopy, radiology, surgery and intensive care. Importantly, nutritional support through a transgastric-transpyloric jejunostomy, followed by gastrostomy after esophageal dilatation, enabled mucosal healing and long-term recovery, a practice echoed in limited but supportive literature. With the increasing prevalence of BB ingestion, clinicians must adopt a

proactive, guideline-driven approach including timely imaging, structured follow-up, and family education to prevent delays in care. This case reinforces the importance of public awareness and systematic management protocols to improve outcomes in pediatric BB ingestion.

ACKNOWLEDGEMENTS

Authors would like to express sincere appreciation to the Paediatric Surgeons at Hospital Tunku Azizah, Kuala Lumpur, for their invaluable guidance and insightful suggestions throughout the preparation of this case report.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Litovitz T, Whitaker N, Clark L, White NC, Marsolek M. Emerging battery-ingestion hazard: clinical implications. Pediatrics. 2010;125(6):1168-77.
2. Jatana KR, Litovitz T, Reilly JS, Koltai PJ, Rider G, Jacobs IN. Pediatric button battery injuries: 2013 task force update. Int J Pediatr Otorhinolaryngol. 2013;77(9):1392-9.
3. Leinwand K, Brumbaugh DE, Kramer RE. Button Battery Ingestion in Children: A Paradigm for Management of Severe Pediatric Foreign Body Ingestions. Gastrointest Endosc Clin N Am. 2016;26(1):99-118.
4. National Capital Poison. Button Battery Ingestion Statistics, 2025. Available at: www.poison.org/battery/stats. Accessed on 02 September 2025.
5. Poison. Fatal Button Battery Ingestions: 71 Reported Cases, 2025. Available at: https://www.poison.org/battery/fatalcases. Accessed on 02 September 2025.
6. Völker J, Völker C, Schendzielorz P, Schraven SP, Radeloff A, Mlynski R, et al. Pathophysiology of esophageal impairment due to button battery ingestion. Int J Pediatr Otorhinolaryngol. 2017;100:77-85
7. World Federation of Societies of Anaesthesiologists. Button battery ingestion in children. ATOTW 519, 2023. Available at: https://resources.wfsahq.org/atotw/buttonbatteryingestion-in-children/. Accessed on 02 September 2025.
8. Alreheili KM, Almutairi M, Alsaadi A, Ahmed G, Alhejili A, AlKhatrawi T. A 2-Year-Old Boy Who Developed an Aortoesophageal Fistula After Swallowing a Button Battery, Managed Using a Novel Procedure with Vascular Plug Device as a Bridge to Definitive Surgical Repair. Am J Case Rep. 2021;22:e931013.
9. Akinkugbe O, James AK, Ostrow O, Everett T, Wolter NE, McKinnon NK. Vascular Complications in Children Following Button Battery Ingestions: A Systematic Review. Pediatrics. 2022;150(3):e2022057477.
10. Krom H, Visser M, Hulst JM, Wolters VM, Van den Neucker AM, de Meij T, et al. Serious complications after button battery ingestion in children. Eur J Pediatr. 2018;177(7):1063-70.
11. Eldalal M, Hibberd O, Kanaris C. Management of Button Battery Ingestion, Don't Forget the Bubbles, Human Physio. 2024.
12. Mubarak A, Benninga MA, Broekaert I, Dolinsek J, Homan M, Mas E, et al. Diagnosis, Management, and Prevention of Button Battery Ingestion in Childhood: A European Society for Paediatric Gastroenterology Hepatology and Nutrition Position Paper. J Pediatr Gastroenterol Nutr. 2021;73(1):129-36.
13. Sethia R, Gibbs H, Jacobs IN, Reilly JS, Rhoades K, Jatana KR. Current management of button battery injuries. Laryngoscope Investig Otolaryngol. 2021;6(3):549-63.
14. Zipursky AR, Ratnapalan S. Button battery ingestions in children. CMAJ. 2021;193:E1498.

Cite this article as: Povananthiran SM, Loo CPS, Rajaram G, Othman MY, Tamaddun HF, Bakin SB, et al. Inferior thyroid artery pseudoaneurysm following button battery ingestion in a 9-month-old infant: a rare vascular complication. Int Surg J 2025;12:2171-4.