

# Pneumonectomy in a child - button battery ingestion complications

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## Abstract

Unperceived button battery ingestion in infants may be associated with significant morbidity, especially when medical assistance is restricted.

**Title:** Pneumonectomy in a child - button battery ingestion complications

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**Short title:** Pneumonectomy in a child post button battery ingestion

Unperceived button battery ingestion in infants may be associated with significant morbidity, especially when medical assistance is restricted.

To the Editor,

We report the case of a 3-year-old girl who was transported from a rural area of an African country for medical investigation. She reported a one-year history of recurrent vomiting, coughing, and growth arrest. On initial physical examination, she was normoxemic and presented with subcostal respiratory retraction and abundant purulent respiratory secretions. Pulmonary sounds were abolished in the left hemithorax, and there were crackles on the right side. The weight was below the third percentile for age.

The initial chest radiograph (Figure 1) revealed a circular radio-opaque foreign body in the medial chest with the typical double halo sign of button batteries. Mediastinal enlargement and heterogeneous generalized hypotransparency of the left lung were also visible. Chest computerized tomography (CT) (Figure 2A) confirmed a battery lodged in the proximal esophagus, associated with esophageal perforation and fistula to the left bronchus, extensive fibrous mediastinitis without collection, abscess, or pneumomediastinum, and partial consolidation of the inferior and medial lobes of the right lung. The left lung was severely destroyed, with main bronchus stenosis, multiple cystic and varicose bronchiectasis, and extensive parenchymal atelectasis, which conditioned the left mediastinal deviation.

Endoscopy was performed, but the extensive fibrosis and adhesion of the battery to the esophageal wall called for a surgical removal in a multidisciplinary procedure, during which the fistula was closed with a pericardial patch, and a gastrostomy was performed.

After recovery from surgery, the girl maintained nocturnal hypoventilation and abundant respiratory secretions. The right lung pneumonia resolved after three weeks of meropenem and vancomycin treatment. Esophageal post-procedural fistulae, stenosis, and dysmotility were excluded. Four months later, she gained weight with exclusive oral feeding, and the gastrostomy was closed.

Ten months after surgery, the left lung parenchyma on CT (figure 2B) showed no healing due to extensive necrosis. However, the right lung showed preserved parenchyma with moderate compensatory expansion.

A pneumonectomy was performed without any complications. Rapid recovery and improvement in respiratory hypersecretion were observed, and nocturnal non-invasive ventilation was suspended a week after the pneumonectomy. In the subsequent months, the girl showed consistent growth and weight gain in the 5th percentile, no pulmonary hypertension, infections, chest wall deformation (Figure 3), or other chest radiographic changes besides compensatory right lung expansion (Figure 4). The girl returned to her family and home country after 14 months.

Button batteries are commonly used in households. Toddlers are at risk of accidental ingestion. Exposure to the battery can lead to caustic mucosal injury within two hours, and severe, potentially life-threatening complications may arise from delayed removal. Ingestion is frequently unwitnessed, and early medical suspicion and intervention are crucial for preventing and reducing morbidity and mortality. In our patient,

unrecognized ingestion resulted in permanent left lung destruction, which is a severe and rarely described complication.

Chronic inflammatory lesion cause lung destruction. It is rare in children and is mostly caused by bronchiectasis, tuberculosis, and cystic fibrosis. When a single lung is affected, most patients exhibit minor symptoms in the basal state. However, this condition may complicate with massive hemoptysis, empyema, secondary fungal infections, secondary amyloidosis, septicemia, and pulmonary-systemic shunting.

Children can easily tolerate pneumonectomy, and the remaining lung expands to compensate for the resection. On long-term follow-up after pneumonectomy for destroyed lungs, children were reported to have good exercise tolerance, lung volumes, nutritional status, and quality of life without major skeletal deformation.

In conclusion, button battery ingestion is a risk to children's health. Clinicians should be aware of its potential complications to optimize management and reduce injury. Pneumonectomy is a complex and invasive procedure that improved our patient's quality of life and prevented lung damage complications.

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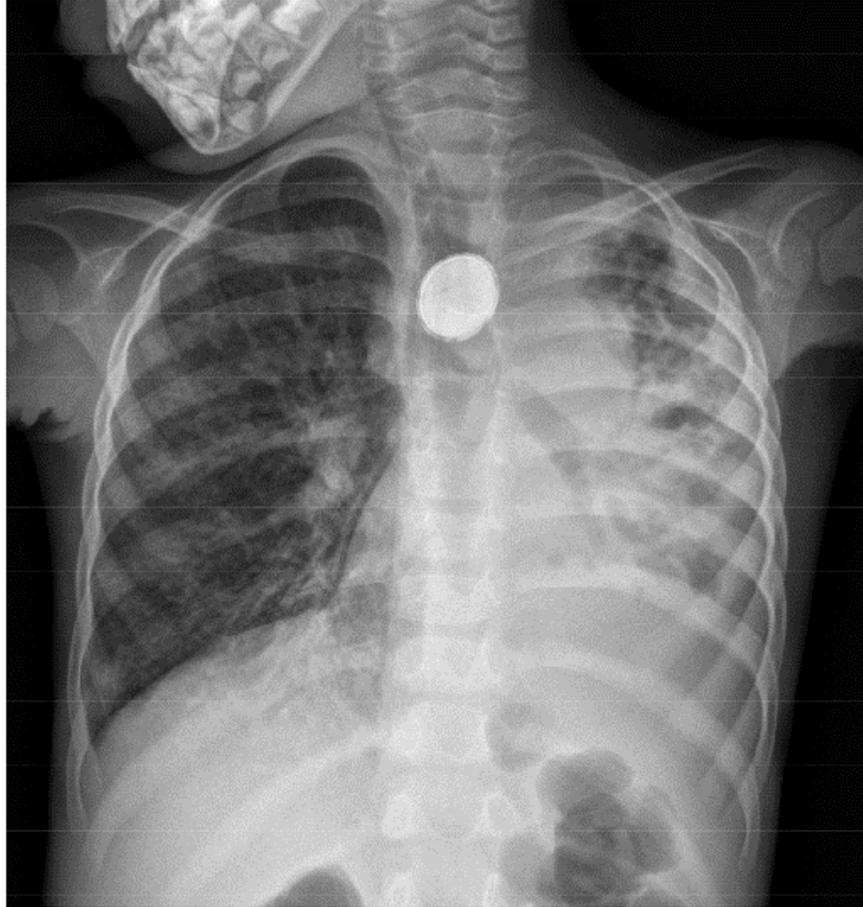


Figure 1: Initial radiograph showing medial radiopaque round foreign body with double halo sign (typical of button battery), mediastinum enlargement with left lung hypotransparency, and right lung granulomatous infiltrate.



2A)



2B)

Figure 2: Chest computerized tomography (CT) scans: 2A) initially revealing a 22-mm button battery lodged in the proximal esophagus associated with fistula to the left main bronchus; chronic mediastinitis; right lung consolidation of the medial and inferior lobes; left main bronchus stenosis, cystic and varicose bronchiectasis, and complete lung parenchyma atelectasis, conditioning left mediastinal deviation; and left nonfibrous pleural effusion. 2B) ten months after fistula closure, CT exhibiting persistent fibrosis of the left lung parenchyma, with multiple varicose bronchiectasis and left mediastinal deviation; a right lung with apparently preserved parenchyma and moderate expansion.



Figure 3: Chest wall without major deformities, three months post-pneumonectomy



Figure 4: Chest radiograph with residual pleural effusion on the left, four months post-pneumonectomy.