



## H100 Pediatric Cylindrical Battery Ingestion Causing Fatal Aorto-Esophageal and Pulmonic-Esophageal Fistulae

*Robin Moiseff, MD\**, Travis County Medical Examiner's Office, Austin, TX 78724; *Kendall V. Crowns, MD*, Travis County Medical Examiner's Office, Austin, TX 78724

**Learning Overview:** After attending this presentation, attendees will understand that both cylindrical and button batteries continue to pose a fatal ingestion risk to children. Attendees will appreciate how battery ingestion may cause delayed death secondary to fistulae formation between the esophagus and adjacent great vessels and how vascular anomalies in pediatric patients (such as those with DiGeorge Syndrome) may further complicate their clinical picture.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by illustrating the importance of correlating medical history, clinical imaging, autopsy, and scene investigation in establishing cause of death in fatal pediatric ingestions. This case also highlights the ongoing need for education regarding risks of battery ingestion to parents and caregivers.

Pediatric battery ingestion is a well-characterized cause of accidental injury and death. Due to their erosive properties, batteries can cause fistula formation between the esophagus and great vessels when ingested, leading to massive bleeding. The following case report demonstrates a fatal pediatric cylindrical battery ingestion in a child with DiGeorge Syndrome.

The case is that of a 4.5-year-old Hispanic male who reportedly swallowed an AAA battery at an unknown time at home. Two days prior to hospital presentation, his parents stated he was choking on something, given a drink of water, and appeared to no longer be in distress. The next day, the child had throat pain, dysphagia, fever, and vomiting and was brought to the hospital. A Computed Tomography (CT) scan was performed, showing a battery in the child's esophagus, which was subsequently removed. There was alkaline erosion noted. Following removal, he had multiple complications, including persistent nosebleeds and an influenza infection. Twenty days into his hospitalization, he developed bleeding of the oronasal cavity, went into cardiac arrest, and was unable to be resuscitated. Of note, the child had a history of DiGeorge Syndrome with associated overriding aortic arch and dysphagia, juvenile rheumatoid arthritis, and osteopenia.

Autopsy revealed two parallel transmural ulcerations of the mid-esophageal mucosa. One ulcer traversed the aortic wall creating an aorto-esophageal fistula, and the second ulcer formed an esophageal-pulmonic artery fistula. There was bilateral, geographic aspiration of blood into the lungs. There was 15 grams of clotted blood and 150cc of liquid blood in the stomach and duodenum. The kidneys were pale. The heart weighed 125 grams, and the aorta exhibited a right-sided aortic arch anomaly crossing over the right bronchus, then running posterior to the trachea and esophagus, and descending along the thoracic spine. Additionally, the left subclavian artery arose from the proximal descending portion of the thoracic aorta. Microscopic examination confirmed communicating esophageal fistulas between the aorta and pulmonic artery with surrounding granulation tissue, acute and chronic inflammation, and hemosiderin-laden macrophages.

Cause of death was esophageal fistulas of aorta and pulmonic artery due to battery ingestion. The manner of death was accident.

The literature reveals battery ingestion most frequently occurs accidentally in children and that button batteries are most commonly ingested. The poison control database cites 62 reported cases of fatal battery ingestions between 1977 and 2019, including the current case. This is the only reported case of dual aortic and pulmonic artery fistulae secondary to cylindrical battery ingestion. Combined with the patient's dysphagia, the patient having DiGeorge syndrome with a vascular malformation may have led to an increased risk of complications.

Pediatric cylindrical battery ingestion can cause delayed death in children by formation of esophageal-vascular fistulae, and while first described more than 40 years ago, it remains a preventable cause of death in children. Children at increased risk for this complication may include those with aberrant vascular anatomy and those with dysphagia. It is crucial for the medical examiner and investigators to gather all pertinent medical and scene history when an autopsy is requested in such a case.

---

### Battery Ingestion, Aorto-Esophageal Fistula, DiGeorge Syndrome