

Fatal outcome of perforating lower esophageal button battery in a child

Srikanth Kadyada Puttaiah

MD, DM (pediatric gastroenterology), Consultant Pediatric Gastroenterology, Manipal Hospitals, Bengaluru
Babu Ram Thapa,

MD, Professor, Division of Pediatric Gastroenterology, Department of Gastroenterology,

Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Haryana 133203, India

Corresponding Author : Dr Srikanth Kadyada Puttaiah (kpkantha@gmail.com)

Abstract

Impacted button battery (BB) in the esophagus can be fatal unless managed emergently. We encountered a 2-year-old male child with respiratory distress from three weeks. Chest-X-ray suggested a radiopaque foreign body, which was confirmed to be esophageal BB during esophagoscopy and subsequently removed. Corrosive nature of

BB had perforated the lower esophagus leading to pyopericardium and pyothorax. In spite of appropriate antibiotics and surgical drainage, child died of sepsis. High index of suspicion to identify esophageal BB in cases of unexplained cardio-respiratory symptoms can be helpful in early aggressive intervention.

Keywords : Button Battery, Perforation

Introduction

Foreign body (FB) in the form of Button battery (BB) ingestion is one of the important GI emergencies in children less than 5 years[1][2]. BB is lethal if not removed from the esophagus at the earliest. There are many instances of deaths reported in children after ingestion of BB. The cause of death due to BB ingestion in most of the patients is due to vascular complications such as erosion of aorta and massive exsanguination. Here we report an unusual complication of button battery with a fatal outcome.

Case report

A previously well, two-year old male child presented with 25 days' symptoms of vomiting, followed by fever and rapid breathing, who later developed dysphagia and drooling of saliva for which medical attention was sought. During evaluation, chest-X-ray (CXR) showed radiopaque round foreign body suggestive of button battery (figure 1) in the lower part of esophagus, with a retro-cardiac radiolucent shadow suggesting air in the pericardial sac. For these complaints child was referred to our center. On examination child was malnourished (weight of 10kgs [z-score of -1.75], height of

85cm [z-score of -0.89] with head circumference of 48cm), child was in respiratory distress (rate: 36/min, intercostal retractions and SpO₂ of 99% in room air), with normal cardiac examination (pulse rate 114/min, normal circulation and blood pressure of 94/60mmHg), but with an elevated jugular venous pressure. Child demonstrated micronutrient deficiencies in the form of pallor, hypopigmented hair and frontal bossing. Systemic evaluation revealed moderate hepatomegaly (span of 9cm), tachypnea, bilateral intercostal retractions and decreased air entry in the lower lung fields. Initial stabilization was done with nasal prong oxygen. In view of suspected FB (as reveal by initial CXR) in the esophagus, child underwent flexible esophagoscopy, where a metallic round FB suggestive of an impacted and partially disintegrated BB in the lower esophagus was identified (figure 2), which was removed using rat tooth foreign body forceps. After removal, a small rent suggestive of esophageal perforation at the site of impaction was noted (figure 3). In view of persistent respiratory distress and cardiomegaly on CXR, echocardiography was done, which was suggestive of pyopericardium (loculated collection of fluid). Contrast-enhanced

computed tomography was suggestive of pyopericardium and pyothorax (figure 4), due to esophageal perforation leading to esophago-pericardial and esophago-pleural fistula. Child was stabilized with antibiotics, intravenous fluids and nil per oral. In view of sepsis, worsening hemodynamics, requirement of inotropes a surgical drainage of the pyopericardium and pyothorax, with intercostal and pericardial drain was undertaken. However, in spite of drainage of pus, hemodynamics worsened due to uncontrolled systemic sepsis and cardiac dysfunction and child died of refractory shock after 4 days of removal of BB.

Discussion

This case highlights the lethal perforating complication of the neglected button battery in the esophagus in a young child. To best of our knowledge, this is the first case demonstrating esophageal leak leading to esophago-pericardial and pleural fistula leading to pyopericardium and pyothorax due to impacted BB.

The type of complication due to BB depends on the site of impaction in the GI lumen, duration and characteristics of the battery ingested. Similarly, the injury depends upon the type of battery ingested due to different mechanism of injury. Currently available BB are made up of either lithium, manganese dioxide, mercuric oxide, silver oxide or zinc based. Among these lithium batteries are the most lethal and unfortunately, they are more popular due to higher voltage and double the shelf life as compared to other batteries. They have a very high tissue damaging potential as compared to other chemical types. Their mechanism of injury is similar to an alkaline burn as lithium is able to generate a very high pH of upto 13 at the site of contact of mucosa within 15 minutes of impaction and deep burn upto muscular layer within 30 minutes[3]. Due to drastic shift towards lithium batteries, there is a parallel change in the epidemiology regarding the major effects of battery ingestion. A recent study has demonstrated an absolute rise in the incidence of deaths as against no mortality documented in a previous study from the same authors[2]. Reasons identified in this study for increased

mortality are shift in the cell type to lithium based and increase in the diameter of BB to 20 mm, which was also the case in our patient. The previously documented fatalities are due to tracheal injury (2 patients), 1 due to tension pneumothorax, and 10 were due to fatal haemorrhage secondary to vascular erosion (7: aortic esophageal fistula, 1 each: erosion of thyroid artery, subclavian artery and a major mediastinal vessel)[4]. We believe BB should be removed when it is within the reach of the endoscope and certain high risk factors such as young child, large sized battery and fully charged unusual battery are to be identified. Even though the NASPHAN guideline mentions removal of FB anywhere in the GI lumen if >20mm and age < 5 years, one has to individualize based on the risk factors, rather than just acting on the absolute cutoffs[5][6].

Our patient highlights the need to have a detailed clinical and radiological evaluation in a child with unexplained respiratory distress and one should also consider a complicated FB as an etiology. Limitations are that the exact chemical nature of BB could not be ascertained and unfortunately the patient succumbed to complications.

To summarize, this is the first documented patient with mediastinitis, pyopericardium and pyothorax leading to death due to prolonged impacted BB in the esophagus in a young child.

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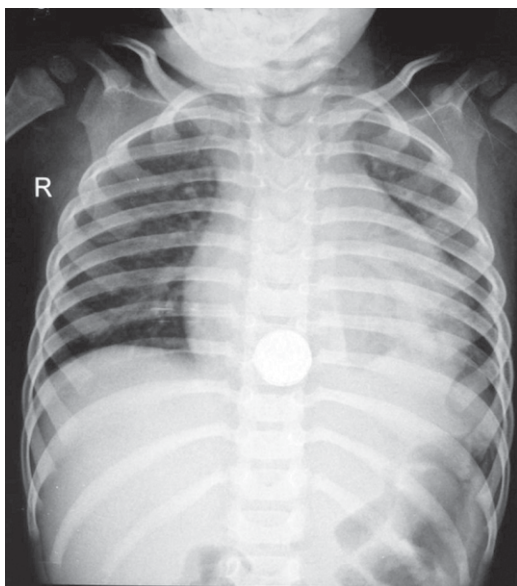


Figure 1: Chest X ray in anteroposterior view showing a radiopaque round foreign body in the lower esophagus.

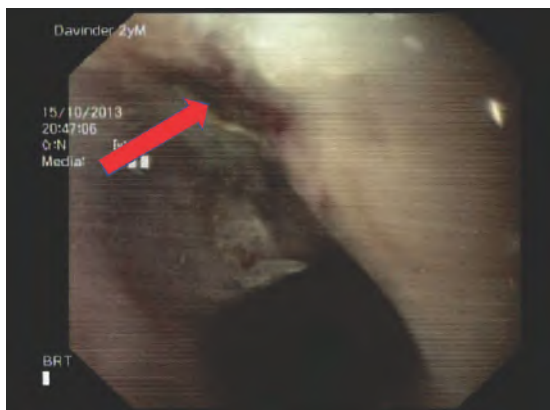


Figure 3: Esophagoscopy showing perforation in the lower esophagus (arrow)

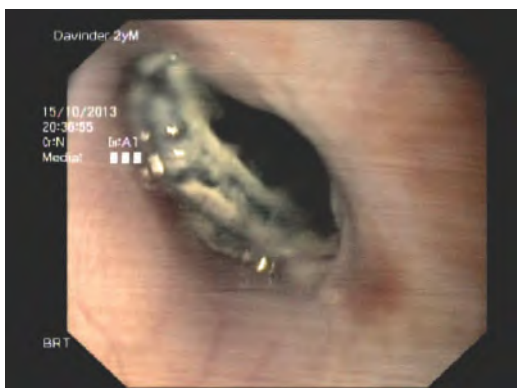


Figure 2: Esophagoscopy showing button battery

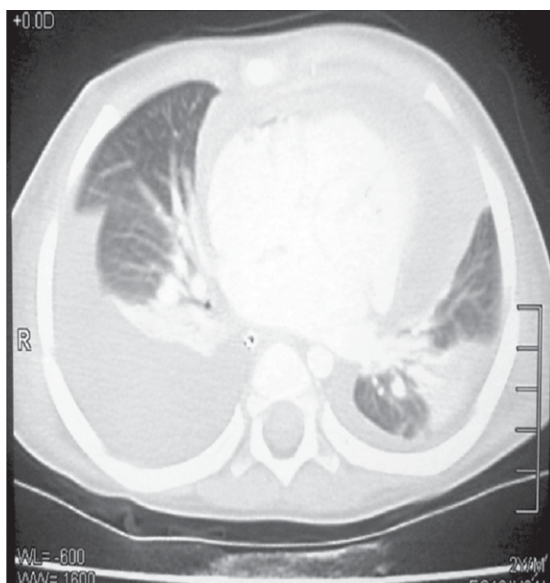


Figure 4: CECT chest showing pyopericardium and pyo-thorax