

# Conservative Management of Button Battery Ingestion Using Honey in a Paediatric Patient

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## Abstract

Button battery ingestion is a form of foreign-body ingestion usually seen among children. Its ingestion could be symptom free and sometimes fatal. The interval between swallowing and final destination of the button battery has some clinical importance to its management. This is a case report of an eight-year-old boy, who ingested a 25 mm-sized button battery which was detected in the lower esophagus by a plain X-ray, managed conservatively with honey, and was later passed out of stool after 36 h.

**Keywords:** Button battery ingestion, foreign-body ingestion, honey therapy

## INTRODUCTION

Technological advancement in the area of powering electronic devices with button batteries of a longer life span is in vogue. Consequent to this, there is an increase in the ingestion of the battery by children.<sup>[1]</sup> Various children toys and household items such as remote control now use button battery, making it very accessible to the children. Although its ingestion is common among toddlers, older children are not exempted.<sup>[2,3]</sup> The sizes are variable, but the small size makes it easier to slip through the orifices, especially the mouth, through to the gastrointestinal tract.<sup>[2]</sup> Clinical manifestation of button battery ingestion can range from asymptomatic, symptomatic such as vomiting, abdominal pain, and choking, to fatal manifestations such as esophageal perforation and stricture.<sup>[4]</sup>

Button battery ingestion is of clinical importance because, upon ingestion and coming in contact with saliva and the walls of the digestive tract, electric current passes through the mucosa, reacts with the tissues, and forms a heavy hydroxide alkaline solution that causes liquefaction necrosis and possible erosion.<sup>[2,4-6]</sup> The duration of entrapment is very important, as the longer it stays entrapped in the esophagus, the worse the symptoms get.<sup>[7]</sup> If the battery gets below the esophagus, the outcome is better. Some ingested batteries naturally transit the gut and get excreted without causing any harm. This also depends on the size of the battery. Sizes <12 mm can easily go down below the esophagus, while

those >12 mm are at risk of esophageal impaction, requiring endoscopic removal, which must be done as soon as possible, usually within 2 h.<sup>[2,5,8]</sup>

The National Button Battery Investigation Study has recommended that most button battery ingestion is usually benign and thus, requires conservative management.<sup>[9]</sup> If a child is suspected to have swallowed a button battery, the child should be brought to the hospital, the location in the gut determined by an X-ray, thus informing the next step. The child is either managed conservatively with oral agents such as honey and sucralfate that forms a protective coat on the battery and neutralizes the alkalinity of the battery with follow-up observation or admitted for endoscopy and surgical removal.<sup>[5,6]</sup> It is recommended that caregivers should give honey as the child is brought to the hospital, which can be repeated in the hospital.<sup>[6]</sup> The aim of this report is to describe a school-aged child who swallowed a button battery, had no symptoms, and was managed with honey and regular monitoring of passage of stool.

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**How to cite this article:** Onyire NB, Nwokeji-Onwe LN, Ikegwuonu CI, Orji ML. Conservative management of button battery ingestion using honey in a paediatric patient. *Niger J Med* 2022;31:219-21.

**Submitted:** 17-Nov-2021

**Revised:** 10-Feb-2022

**Accepted:** 12-Feb-2022

**Published:** 29-Apr-2022

### Access this article online

Quick Response Code:



**Website:**  
www.njmonline.org

**DOI:**  
10.4103/NJM.NJM\_193\_21

## CASE REPORT

We report a case of an eight-year-old boy who accidentally swallowed a button battery. He presented to the hospital two hours post ingestion with no symptoms. He could talk and provide his history. He could also take orally. There were no vomiting, no abnormal breathing, and no cough. He was calm with stable vitals. There was no significant finding on physical examination. A plain X-ray was done at the 12<sup>th</sup> hr post ingestion. The X-ray showed the location of the battery, which was at the lower esophagus [Figure 1], measured about an inch (25 mm) [Figure 2a and b]. He was given honey, about 10 ml every 10 min for one hour, and kept for observation. The vitals and bowel movements were monitored. The mother was told to provide a potty where the subsequent stools were passed, and each was examined thoroughly by the mother for the presence of the button battery. The button battery was passed out at the fourth stool, and vital signs remained stable all through. An esophagram was not done due to nonavailability, but the clinical condition did not change nor worsen. The duration from the ingestion to the excretion of the battery lasted for 36 h. He was later discharged home and booked for follow-up clinic visit. He was lost to follow-up.

## DISCUSSION

The majority of button batteries that are swallowed transit through the gastrointestinal tract without causing injury; nevertheless, those that become impacted do so in the upper esophagus, causing harm.<sup>[3]</sup> The size of the swallowed foreign body also matters as smaller-sized objects are not usually impacted compared to the large ones. The treatment guideline by National Capital Poison Centre recommended endoscopy and surgery for button battery >12 mm and X-ray and honey for those lesser.<sup>[5]</sup> However, in this case report, the patient swallowed a button battery of about 25 mm, which was large enough to cause an obstruction or get entrapped in the gastrointestinal tract; however, this was not the case. Early presentation and intervention could have contributed

to this. He had no endoscopy removal; rather, he received honey which has been documented to be an effective oral agent for the conservative management of button battery ingestion.<sup>[6]</sup> The decision to initially commence conservative management (regardless of the presence of the battery at the lower esophagus at the 12<sup>th</sup> hr) was not only because of the nonavailability of the endoscopic procedure but was borne out of the fact that the child was clinically stable and it has also been documented that majority of impactions occur in the upper esophagus.<sup>[3]</sup> Activated charcoal is not recommended for the management of button battery ingestion.<sup>[3,6]</sup> In an attempt to mitigate the injurious effect of button battery on the tissues, *Anfang et al.*<sup>[6]</sup> tested several viscous fluids, weakly acidic household beverages, apple juice, orange juice, Gatorade, Powerade, pure honey, pure maple syrup, and sucralfate and recommended that honey and sucralfate had the most protective effect and ability to neutralize the alkaline environment caused by the button battery.

Honey has been recommended as a palatable viscous liquid that forms a protective layer between the battery and the tissue and also neutralizes the alkalinity of the button battery,<sup>[6]</sup> thus ensuring that the button battery is dislodged without causing injury to the digestive tract. Honey is not recommended in children less than a year old because of the risk of botulinum toxins. It is recommended that honey be administered 10 ml every 10 min within the first 12 h of ingestion.<sup>[5,6]</sup>

Button battery ingestion is common among children less than five years old due to their inability to coordinate swallowing appropriately and exploration of the environment.<sup>[2,3]</sup> This index patient is an eight-year-old boy who possibly knows how to coordinate swallowing, but boys, being known for their inquisitiveness and ability to try new things, may have mistakenly ingested the battery. This emphasizes the need for button batteries to be kept out of the reach of every child, and a more secure way of ensuring the safety of the play toys and household items should be considered by the manufacturers.

Despite the patient swallowing a large button battery which would have been detrimental to his health, early hospital presentation and early commencement of the honey might have contributed to the favorable outcome. Although large-sized button batteries can still transit the gastrointestinal tract the natural way without causing harm, the honey might have added an extra protective



**Figure 1:** Chest X-ray showing the Button Battery in the lower Esophagus



**Figure 2:** (a) The excreted button battery from the stool (Cathode surface), (b) The excreted button battery from the stool (Anode surface)

layer and provided a neutral pH environment mitigating against the development or progression of tissue injury.

## CONCLUSION

The use of honey is an effective conservative management of button battery ingestion in children. More studies to collaborate its effectiveness and dose in the management of button battery ingestion need to be explored.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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