

Ingestion of cylindrical batteries: a case report and literature review

Battery ingestion: complications and management

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Abstract

Ingestion of cylindrical batteries is an uncommon medical presentation that can lead to serious complications. We discuss the case of a 17-year-old female who presented after swallowing 3 cylindrical batteries. Her past medical history included depression and previous battery ingestion that required laparoscopic surgical removal. These batteries were subsequently removed by esophagogastroduodenoscopy and ileocolonoscopy. This paper discusses the complications and management of cylindrical battery ingestion.

Key words: battery ingestion, endoscopy

Core tip: Ingestion of cylindrical batteries can pose serious risks and complications to the gastrointestinal tract. This case report demonstrates how prompt endoscopic intervention can be used to avoid these complications. .

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Introduction

Foreign body ingestion is a common presentation to the accident and emergency department^[1]. The ingestion of a wide range of objects have been previously reported including coins and ashes^[2]. Whereas the majority of foreign objects pass through the gastrointestinal tract and are egested without complication^[1] the ingestion of specific foreign bodies will confer variable risks and complications. Management therefore needs to be adjusted on a case by case basis according to the particular foreign body ingested and the patient characteristics. We describe the case a patient who ingested 3 cylindrical batteries, her subsequent management and a review of the current literature.

Case presentation

A 17-year-old female presented to the accident and emergency department with abdominal pain. The history revealed that she had ingested three

cylindrical batteries 14 hours previously (2AA and 1 AAA). She denied that the act was a deliberate attempt to self-harm; She stated that foreign object ingestion had become a habit of hers.

Her past medical history included being registered as deaf since birth. Recently she had a recent inpatient admission to a psychiatry unit for a psychiatric episode. Furthermore, she also recently presented with a mixed overdose of paracetamol and alcohol, which required treatment with N-acetyl cysteine. Within the last year she presented with another episode of battery ingestion. Following small bowel ileus the battery was removed laproscopically. Her current medications included citalopram 30mg once daily and risperidone 1mg twice daily. She had no known drug allergies.

Her baseline observations were as follows: heart rate 82/minute, blood pressure 110/70 mmHg, respiratory rate 16/minute, oxygen saturations 98% on room air and temperature was 37.2°C. On examination, there was a small transverse scar on her abdomen in the right iliac fossa. The abdomen was soft and non-tender with no masses and bowel sounds were normal. Digital rectal examination was not remarkable.

Investigations

Routine bloods revealed: haemoglobin 137g/L, white cell count 6.3×10^9 /L and platelets 257×10^9 /L. Her urea and electrolytes, liver function tests and clotting were normal and her C reactive protein was <4mg/L. An erect chest radiograph did not show any evidence of free sub-diaphragmatic air. An abdominal radiograph (figure 1) confirmed the presence of 3 radio-opaque structures (2 in the epigastric area and 1 in the right iliac fossa) compatible with cylindrical batteries. There was no evidence of obstruction or perforation.

Treatment

Given that her previous episode of battery ingestion required surgical removal we proceeded to urgent esophagogastroduodenoscopy under general anaesthesia with the intent of removing the two batteries from the stomach. An AA and AAA battery were successfully removed from the stomach using a Roth retrieval net. Of note, both ends of the batteries had eroded (figure 2) and there was evidence of significant gastric ulceration and gastritis in the stomach due to caustic acid damage. The esophagus and duodenum were normal. The remaining battery in the distal bowel was initially monitored conservatively with laxatives and daily abdominal radiographs.

After a further 2 days, the serial abdominal films confirmed that the remaining battery in the right iliac fossa, suggesting impaction at the ileocaecal valve (figure 3). As the patient previously required surgical intervention to remove a battery from the small bowel, we proceeded to ileocolonoscopy (figure 4). At ileocolonoscopy the final AA battery was actually found in the proximal right colon and was also successfully removed using a Roth retrieval net. The patient remained stable post ileocolonoscopy and was discharged later that day.

Discussion

Ingestion of batteries is well documented in medical literature with button batteries being most common type of battery ingested^[1,3]. Whilst most cases follow a benign course, serious complications can occur including perforation, strictures, fistulas, exsanguination and even death^[4].

Ingestion of AA or AAA batteries in adults is unusual and most commonly occurs in psychiatric patients or prison inmates^[5]. This may be an act of deliberate self harm and cases of patients biting the ends of the battery to increase toxicity have also been reported^[6]. Our patient in this case report had a background of psychiatric illness which would fit with previous cases

described. However, she denied removing or biting the ends of the batteries yet they had eroded in her stomach.

Guidelines produced by the American Society for Gastrointestinal Endoscopy have suggested that foreign body ingestion with signs of airway compromise and esophageal obstruction should be removed emergently. Furthermore, cylindrical batteries remaining in the stomach for over 48 hours should be removed^[7]. However, our case highlights that within 24 hours of ingestion significant gastric ulceration can already occur which can lead to visceral perforation.

Moreover, the contents of alkaline batteries include zinc, manganese, mercury and lithium. Although rare, these can cause poisoning with mercury toxicity being previously reported^[3]. If toxicity is suspected, the National Poisons Information Service should be consulted using TOXBASE (<https://www.toxbase.org/>).

Ingestion of batteries is being increasingly reported and thereby refining our management of them. Extra caution should be taken with psychiatric patients who are at risk of biting them to increase the toxicity induced. This also demonstrates the importance of obtaining a detailed history, clinical examination and appropriate imaging.

The most feared complications following battery ingestion are gastrointestinal perforation and obstruction which normally occurs at the ileocaecal valve^[8]. Our case highlights that these complications can be avoided by timely endoscopic intervention. It must be emphasized that formal airway protection is mandatory prior to the removal of foreign bodies from the upper gastrointestinal tract to avoid inadvertent migration into the respiratory tract.

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