

Button Battery with Magnet Ingestion in an Infant: Dual Peril – A Case Report

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Abstract

Foreign body ingestion is common among children between the ages of 6 months and 3 years. Nearly 80% will pass through uneventfully and 20% will require some intervention, mostly endoscopic removal. Button batteries and magnets are frequent components of children's toys and a potential hazard for the child. We are reporting such a case and the complications which followed, with a view to increasing public awareness.

Key words: Button battery ingestion, Foreign body ingestion, Magnet ingestion

INTRODUCTION

Foreign body ingestion is a common clinical situation encountered in children, usually between the ages of 6 months and 3 years.^[1] Nearly 80% of these objects pass through the gastrointestinal tract uneventfully and are spontaneously evacuated, thereby not requiring any intervention. The remaining 20% require intervention either in the form of endoscopic retrieval or surgical extraction.^[2] Magnets and button batteries are a common component in children's toys and gadgets and hence becoming a potential hazard for the child. Ingestion of more than one magnet, or a magnet and a magnetic object, can lead to serious complications in the gastrointestinal tract such as multiple perforations, enteroenteric fistulas, peritonitis, and intestinal obstruction.^[3] Ingestion of button batteries, usually high-voltage lithium batteries, is in itself a hazard caused by the high voltage which can cause ulceration and perforation.^[4]

In this report, we are describing the case of a 10-month-old female baby, with intestinal perforations and obstruction

caused by ingestion of a magnetic object and a button cell. This case report aims at creating awareness toward the hazards for children playing with magnetic toys, batteries, and small metallic objects.

CASE REPORT

A 10-month-old female infant was brought to the emergency department with complaints of abdominal distension, obstipation, and bilious vomiting for 4 days. She was apparently in good health until 4 days before presentation when she developed abdominal distension and vomiting. Abdominal distension was gradually progressive. Vomiting was bilious in nature and occurred after every attempt to feed the child. She was also not able to pass stools or flatus during the time. The child was being managed at a local hospital with a provisional diagnosis of subacute intestinal obstruction but was later referred to our tertiary care center for further management.

There was no history of foreign body ingestion. On physical examination, the child was dehydrated and had tachycardia. On examination, her abdomen was distended with tenderness, guarding, and rigidity. Bowel sounds were absent, and rectum was empty. After resuscitation, abdominal X-ray was taken in both erect and supine posture, which revealed the presence of two small radio-opaque objects adherent to each other in the region of the ileum.

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The small bowel loops were grossly dilated with multiple fluid levels. The colon could not be visualized, and there was absence of gas in the pelvis. There was absence of free gas under the domes of the diaphragm [Figure 1].

Once stabilized, the child was taken up for surgery. On exploration, a button battery and a small magnet were found in the distal ileum, approximately 20–25 cm from each other, [Figure 2] but adherent to each other due to the magnetic effect between the two objects. This ultimately resulted in the formation of a loop of bowel with a volvulus like effect, causing acute intestinal obstruction. The magnet as well the button battery had caused perforations in the antimesenteric side of respective bowel loops where they were present, with evidence of corrosion, [Figure 2] most likely due to high-voltage burn from the battery. The proximal bowel was grossly dilated, and the bowel distal to

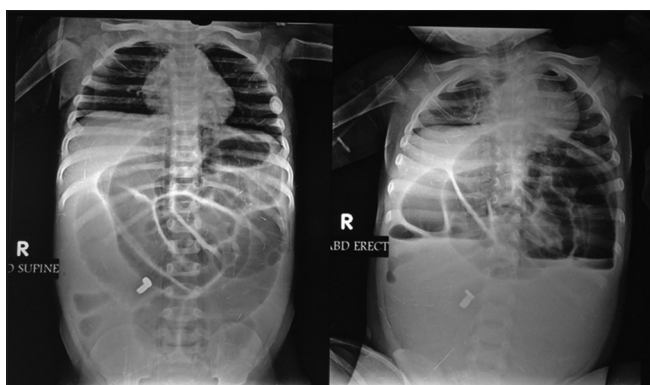


Figure 1: Abdominal X-rays showing grossly dilated small bowel loops with very little gas in the large bowel in the supine film and multiple fluid levels in the small bowel in the erect film. In both films, there are two small radio-opaque objects in the same position, right lower quadrant of the abdomen

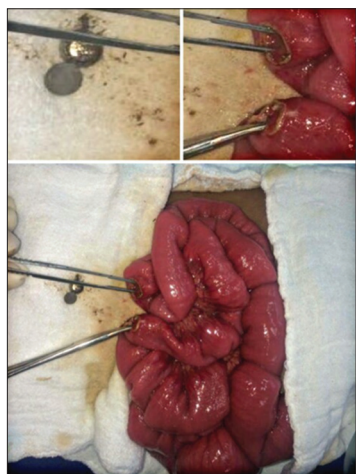


Figure 2: The button battery and magnet are seen with a view of the two perforations in the small bowel, about 20 to 25 cm apart. On closer look, the perforations show a necrotic yellow rim which is likely due to high-voltage burn while pressure necrosis would have also played a part

the volvulus caused by twisting of the loop was collapsed. Feculent peritonitis was present. The foreign bodies were removed, and the ileal perforations were debrided and repaired. Peritoneal lavage was done followed by closure.

Post-operatively, in the first 24 h, the baby had hypotension and hypokalemia which were corrected, following which she had an uneventful recovery and was discharged on the 6th post-operative day. At present, in more than a year of follow-up, the child has had no related complaints and is thriving well.

DISCUSSION

Foreign body ingestion is a common scenario in emergency departments. Infants and children are keen to explore their surroundings, and they do so by putting whatever objects they can find in their mouth. Commonly swallowed objects include small toys, coins, buttons, button-batteries, etc. Ingested foreign bodies usually pass through the gastrointestinal tract without causing any harm. Recently, there has been an increase in the incidence of children presenting with ingestion of magnets. This is likely due to the use of magnetic elements in substandard toys, which have not been scrutinized according to the safety standards.^[3] Complications caused by magnet ingestion were reported as early as 1989 and 1991, in Japanese literature, as reported by Honzumi *et al.*^[5] He has also reported the first case study in English literature of a 3-year-old with an intestinal fistula caused by ingestion of magnets.^[5]

Ingestion of a single magnet may not be harmful since they can pass through the alimentary canal like any other object, but more than one magnet or a magnet along with another magnetic metallic object can pose a serious threat. This is due to magnetic attraction between the two objects which may adhere to one another at two different lengths of intestine, resulting in tissue getting caught in between them. This tissue eventually becomes avascular and necrotic, causing intestinal perforation, enteroenteric fistulas, etc. Involvement of mesenteric vessels may result in extensive devascularization of the bowel or intraperitoneal hemorrhage. Ingestion of button batteries and coin batteries, to some extent, is fairly common. It was earlier thought that alkali which leaks from the battery was the major reason for perforations of the gut. Alkaline batteries have a voltage of approximately 1.5 Volts, whereas lithium batteries, which are longer lasting and are more commonly the button and coin batteries, have a higher voltage of approximately 3.0 Volts. Lee *et al.*^[5] studied the effects of different types of batteries on the intestine of the child, after ingestion and found that alkaline batteries were most

commonly passed out without incident whereas high-voltage lithium batteries posed a threat to the child and should be removed within 48 h from the small intestine if not spontaneously passed and immediately from the esophagus and stomach when noticed.

CONCLUSION

This case report is aimed at increasing awareness of the dangers of substandard toys which contain batteries and magnets, and the threat they pose for children mainly between the ages of 6 months and 3 years. High-voltage lithium batteries are a bigger hazard as compared to alkaline batteries. A single small magnet is not a threat, but when ingested along with another magnet or a metallic object, it can be life threatening.

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