

Accidental Button Cell Ingestion Causing Perforation of Meckels Diverticulum - A Case Report and Review of Literature

Abstract

Accidental ingestion of button cells by children is quite common, majority of which passes out uneventfully. But button cell ingestion lodging inside a Meckel's diverticulum and causing perforation is extremely rare, with hardly 4 cases reported in world literature. A surgeon should always be wary of this possibility when an ingested button cell remains lodged in the intestine for a prolonged period of time even if the child is not symptomatic initially. We report a case where a 3-year-old child had perforated Meckel's diverticulum due to a button cell lodged inside it.

Keywords: Button cell; Meckel's diverticulum; Perforation

Case Report

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Rajesh Gupta^{1*}, Anjali Gupta² and Archika Gupta³

¹Department of surgery, B R Ambedkar University, India

²Consultant Radiologist, India

³Department of surgery, B R Ambedkar University, India

***Corresponding author:** Dr. Rajesh Gupta, Associate Professor of Surgery, Department of Surgery, S N Medical College, Agra, 501, Raj Apartment, Delhi gate, Agra 282002, UP, India, Tel; +919837021887; Email: rkg04@rediffmail.com

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Introduction

Button batteries are increasingly used in a variety of new electronic gadgets. Button cells may have a fatal outcome [1,2]. Conversely, they may result in little to no ill effect on the child [3]. The clinical course of a child with a button battery depends on several factors, including the location, duration of mucosal or exposure, remaining voltage in the battery, and chemical composition of the battery [1]. Perforation of a Meckel's diverticulum is known to be caused by a variety of foreign bodies like fish bones, needles etc [4], but its perforation by a button cell is very rare and hardly 4 cases have been reported so far to the best of our knowledge [5]. We report a case of a three-year-old child who had perforation of Meckel's diverticulum due to a button cell lodged inside it over three days.

Case Presentation

A three-year-old male child was brought to the emergency with complaints of pain in the abdomen for one day and non-passage of stools and flatus for 2 days. There was one episode of bile-tinged vomiting on the day of presentation to us. On examination, the child was sick-looking, with tachycardia and mild distension of the abdomen. The abdomen was guarded and tenderness present in the right para-umbilical region along with a vague lump on palpation. An ultrasound was advised which revealed bowel wall thickening with mesenteric lymphadenopathy in the right iliac fossa. The thickened bowel loops showed an angulated intraluminal focus - foreign body (Figure 1). A X-ray abdomen was done which showed an oval foreign body in the mid-abdomen overlying the spine (Figure 2). The attendants were enquired about the possibility of any foreign body ingestion and then they revealed that the child had ingested a button cell, 3 days back. In view of these findings and condition of the child, a decision to do a laparotomy was taken. Pre-operative routine investigations showed a leukocytosis with WBC counts of

15500 and polymorph count of 89%. Laparotomy was done under general anesthesia. There was a clump of bowel loops present in the right lumbar region at the site of a palpable lump on clinical examination. After adhesiolysis a contained leak of bowel contents along with a perforated Meckel's diverticulum was found. The perforated site was showing a charred circular patch which was stuck up to the adjacent mesentery, which also showed similar charred areas (Figure 3). On palpation of Meckel's diverticulum, a firm circular object was felt, which turned out to be a leaked button cell. This was lodged in the diverticulum, near its apex. The size of the button cell was 1 cm x 1 cm. A segmental resection of the Meckel's diverticulum was done with end-to-end anastomosis (Figure 4). The post-operative recovery was uneventful. The child was discharged on post-operative day 7. The child has been in follow-up for 2 years now and is doing well. The parents were advised to be careful with the button cells and keep the child away from them.

Discussion

Button cells are small coin-shaped batteries used to power small portable electronic devices [6]. Button batteries do not usually cause problems unless they become lodged in the GI tract. The most common place for button cells to become lodged in, and resulting in serious clinical sequelae, is the esophagus [7]. The mechanism of injury in these patients is liquefaction necrosis of the mucosa that occurs because sodium hydroxide is generated by the electrical current produced by the battery usually at the anode surface [8,9]. Most children who ingest a BB remain asymptomatic and pass the battery in their stool within 2-7 days. Button cells are most likely to lodge in the esophagus, but once they pass from it,

they are likely to pass through GI tract uneventfully [10-12]. Most accidents that have evolved to complications or death present the common factor that the diagnosis was delayed [13]. A simple x-ray examination is the preferred method in cases of suspicion of battery ingestion, whether the patients are symptomatic or not. Between 1990 and 2009, there were more than 65,000 accidents with batteries among individuals under the age of 18 years in the United States, with an increase from 4 to 7.4 cases/100,000 children over that period [14]. The first report of death resulting from ingestion of button batteries was in 1977, which occurred in the case of an infant who ingested a photographic camera battery [15]. Since then, numerous reports have been published in the medical literature, with 13 fatal cases identified in a recent review study [16]. Lithium batteries with their higher voltage and larger size are more liable to be impacted more, and cause more damage than conventional cells. Management of a button cell ingestion depends upon the location of lodgement. A button cell impacted in oesophagus should be removed immediately by endoscopy. While the cell which is lodged in stomach for more than 24 hours, should also be removed endoscopically [17].

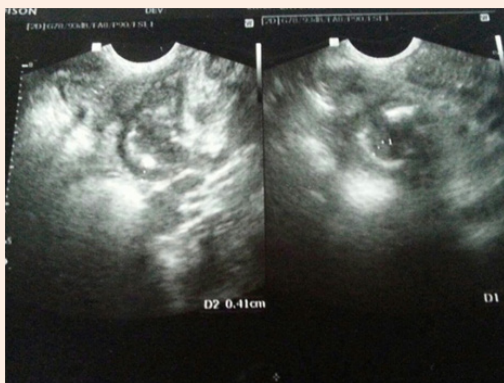


Figure 1: An ultrasound showing, bowel wall thickening with mesenteric lymphadenopathy in the right iliac fossa. The thickened bowel loops showing an angulated intraluminal focus? foreign body.



Figure 2: Plain Xray showing a button cell lodged in mid abdomen.

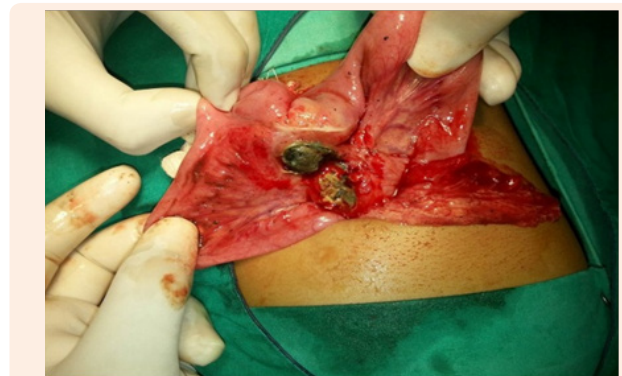


Figure 3: Intra op picture, showing meckels diverticulum with a button cell, causing charring and perforation.

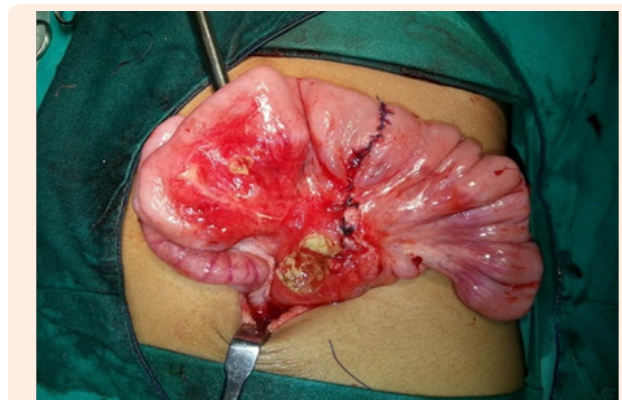


Figure 4: Segmental resection and anastomosis of perforated meckels diverticulum.

There are only 4 cases reported in world literature about a button cell, getting lodged inside a meckel's diverticulum, and causing its perforation [17,18]. Therefore, if there is history of its ingestion then a careful monitoring should be done, if xrays reveal a button cell. If the cell persists in intestine at a fixed place for few days and an exploration is warranted to prevent complications [5]. Abdominal tenderness, a static position of the foreign body on repeated plain abdominal radiographs and leukocytosis are worrying features. These factors were present in our case also [17,18].

In the case reported by Karaman et al. [19] the button battery perforated a Meckel's diverticulum which was adherent to the cecum and appendix. Willis and Ho [18] described an area of superficial necrosis in the ileum that probably represented a point of contact with the perforated Meckel's diverticulum. Bülent et al reported the case where the button cell was lodged in meckels, which was stuck to proximal ileum and rectum. In our case the perforated meckels with the button cell, was stuck up to adjacent mesentery, causing localized charring. Therefore its necessary to carefully examine the adjacent loops for any evidence of injury.

Conclusion

An ingested button cell or any alkaline battery is a recipe for disaster and cannot be taken lightly. All these children require a careful monitoring for symptoms and if they seem to stuck up in any segment of intestine for a prolonged period of time and if symptoms appear, then an exploration is indicated. Presence of Meckels diverticulum should be suspected if button cells appears lodged in mid abdomen.

References

1. Hamilton JM, Schraff SA, Notrica DM (2009) Severe injuries from coin cell battery ingestions: 2 case reports," J Pediatr Surg 44(3): 644-647.
2. Soerdjbalie-Maikoe V, van Rijn RR (2010) A case of fatal coin battery ingestion in a 2-year-old child. Forensic Sci Int 198(1-3): e19-22.
3. Litovitz TL (1985) Battery ingestions: product accessibility and clinical course. Pediatrics 75(3): 469-476.
4. Rosswick RP (1965) Perforation of Meckel's diverticulum by foreign bodies. Postgrad Med J 41(472): 105-107.
5. Ozokutan BH, Ceylan H, Yapıcı S, Sımsık S (2012) Perforation of Meckel's diverticulum by a button battery: Report of two cases. Ulus Travma Acil Cerrahi Derg 18(4): 358-360.
6. Hamawandi AMH, Baram A, Karboli TA, Anwar A (2015) Button Battery Ingestion in Children: Experience in Kurdistan Center for Gastroenterology and Hepatology. Pediatr Therapeut 5: 258.
7. Kramer RE, Lerner DG, Lin T, Manfredi M, Shah M, et al. (2015) Management of ingested foreign bodies in children: a clinical report of the NASPGHAN Endoscopy Committee. J Pediatr Gastroenterol Nutr 60(4): 562-574.
8. Yoshikawa T, Asai S, Takekawa Y, Kida A, Ishikawa K (1997) Experimental investigation of battery-induced esophageal burn injury in rabbits. Crit Care Med 25(12): 2039-2044.
9. Tanaka J, Yamashita M, Yamashita M, Kajigaya H (1998) Esophageal electrochemical burns due to button type lithium batteries in dogs. Vet Hum Toxicol 40(4): 193-196.
10. Barros D'Sa EA, Barros D'Sa AAB (1979) Mercury battery ingestion. Br Med J 1: 1218.
11. Reilly DT (1979) Mercury battery ingestion. Br Med J 1(6167): 859.
12. Litovitz T (1985) Battery ingestions: Product accessibility and clinical course. Pediatrics 75(3): 469-476.
13. Takesaki NA, Reis MC, Miranda ML, Baracat EC (2014) Hemorrhagic shock secondary to button battery ingestion. Sao Paulo Med J 132(3): 184-188.
14. Sharpe SJ, Rochette LM, Smith GA (2012) Pediatric battery-related emergency department visits in the United States, 1990-2009. Pediatrics 129(6): 1111-1117.
15. Blatnik DS, Toohill RJ, Lehman RH (1977) Fatal complication from an alkaline battery foreign body in the esophagus. Ann Otol Rhinol Laryngol 86(5 Pt 1): 611-615.
16. Brumbaugh DE, Colson SB, Sandoval JA, Karrer FM, Bealer JF, et al. Management of button battery-induced hemorrhage in children. J Pediatr Gastroenterol Nutr 52(5): 585-589.
17. Litovitz T, Whitaker N, Clark L, White NC, Marsolek M (2010) Emerging battery-ingestion hazard: clinical implications. Pediatrics 125(6): 1168-1177.
18. Willis GA, Ho WC (1982) Perforation of Meckel's diverticulum by an alkaline hearing aid battery. Can Med Assoc J 126(5): 497-498.
19. Karaman A, Karaman I, Erdoğan D, Cavuşoğlu YH, Aslan MK, et al. (2007) Perforation of Meckel's diverticulum by a button battery: report of a case. Surg Today 37(12): 1115-6.