

# Alkaline Disc Battery Ingestion in Children: A special hazard

S H DAR M A SHEIKH

Department of Paediatric Surgery, K. E. Medical College/Mayo Hospital, Lahore

Correspondence to Dr. Sajid Hameed Dar, Assistant Professor Paediatric Surgery

Foreign body ingestion by a child is not an uncommon occurrence. Alkaline disc battery presents special hazards because of its small size, rounded shape and chemical composition. A total of 154 cases of foreign body ingestion were documented in five year long study. Out of these 9(5.85%) children had ingested alkaline disc batteries. One (1.12%) could be removed endoscopically from oesophagus. Two (22.23%) boys underwent laparotomy as the battery cases were broken. Rest of the 6(66.66%) could be treated conservatively. In two cases (22.23%) laxative use enhanced the process of recovery. Emphasis is made on the careful follow up approach for this benign but potentially dangerous condition in contrast to a more radical approach propagated by many.

**Key words:** Alkaline discbattery

Every child is curious by nature. Infants and toddlers evaluate their surroundings by tasting and then swallowing anything at hand. From the time the infant can manoeuvre his hand almost everything goes into the mouth. Eighty percent of all foreign body ingestion occurs in children. The peak incidence is between 6 months to 3 years, with carelessness being the main contributing factor<sup>1</sup>. In older children and adults foreign body ingestion is accidental most of the times except in mentally handicapped persons. Physicians have considerable clinical experience of patients of foreign body ingestion over the last many years. The development of alkaline disc batteries has added a new dimension to the whole problem. The strong alkali content has a corrosive action with its attendant problems. Some surgeons advocate an aggressive approach out of fear of perforation. Others maintain a careful follow up approach as is routinely done for foreign bodies of G.I. tract.

## Purpose of the study

The author wishes to share his experience of treating patients with disc battery ingestion. Judicious use of cathartics and barium enema is emphasized while adopting a watchful approach.

## Material and methods

All the cases of foreign body ingestion presenting in Accident & emergency or Outpatient Department were included in this study. A close liaison was kept with the ENT department for the management of oesophageal foreign bodies. The study was conducted in the department of Paediatric Surgery, Mayo Hospital, Lahore over a period of five years from 1995 to 1999. A total of 154 cases of foreign body ingestion were recorded. Out of these 9(5.85%) patients had ingested alkaline disc batteries. Every child with disc battery ingestion was admitted. X-ray studies were done in every case and management proceeded according to the location of disc battery and clinical condition of the child. A careful follow up plan was chalked out for every child.

## Results

One hundred and fifty four children were included in this study. Sex distribution is shown in Table 1.

Table 1. Gender assignment

Sex	n=	%age
Male	89	57.79
Female	65	42.21

Of the nine children with disc batteries ingestion 5(55.56%) were male and 4(44.44%) were female. Age distribution of patients with disc battery ingestion is shown in Table 2.

Table 2. Age distribution

Age	n=	%age
2-3 years	1	11.12
3-4 years	3	33.33
4-5 years	1	11.12
5-6 years	4	44.45

Presenting symptoms and signs are shown in Table 3.

Table 3. Symptoms and signs

Presenting signs/Symptoms	n=	%age
Arrested FB (failure of progression in GIT)	5	55.56
Localized peritonitis	2	22.23
Hemetemesis	2	22.23
Melena	1	11.12
Intestinal obstruction	1	11.12
Drooling	1	11.12
Asymptomatic	6	66.67

Table 4 depicts the localization of foreign body at the time of admission.

Table 4. Location of foreign body on admission

Location	n=	%age
Oesophagus	1	11.11
Stomach	6	66.67
Small intestine	2	22.22

The disc battery lodged in oesophagus was successfully removed by ENT specialist. The child was kept in close



follow up for possible development of oesophageal stenosis in the next 2-3 weeks. X-ray study was under taken in every patient to localize the foreign body and to assess whether the battery case is intact or broken.

Two patients with broken battery case underwent laparotomy. One had developed haemetemesis and malena while the second child showed sign of small bowel obstruction. Case I showed mucosal ulceration of the antral part of stomach while case II had almost full thickness necrosis of mid ilium which had been walled off by the coils of intestine and omentum. Both cases showed uneventful recovery after removal of foreign body and repair of affected part after excision of the devitalized portion of intestine.

In two cases (22.23%) battery did not show sign of progression in the area of ileocaecal valve for 4-6 days. Both children had their battery cases intact. A trial of laxative (milk of Magnesia) enhanced the transit speed and foreign body passed out uneventfully. Similarly in one case battery remained stuck in upper rectum for two days. Barium enema did the trick and foreign body could be retrieved on the third day.

Treatment modalities adopted in the management are shown in Table 5.

Table 5. Treatment modalities

Treatment option	n=	%age
Laparotomy	3	33.34
Oesophagoscopy	1	11.11
Careful follow up	5	55.55

There was no death in this series. One patient developed post operative ileus but correction of electrolyte imbalance settled the problem.

### Discussion

In general there are three classes of GI foreign bodies<sup>2</sup>.

1. Rounded and cuboidal objects with no sharp edges e.g. coins, marbles, closed safety pins. Once in the stomach they are of little concern.
2. Objects with sharp points e.g. needles, pins, hair pins, open safety pins and tacks. These need careful follow up.
3. Objects which are long, slender with blunt points. These produce complications because of the length.

In addition to physical properties of the foreign body, the chemical composition should be taken into account. Disc battery produces ulceration due to leakage of its contents. Reports of perforations within the G.I. system associated with leaked alkaline battery generated a lot of controversy<sup>3,4</sup>. An aggressive approach was advocated. However, slowly the scale has tipped in favour of conservatism with watchful follow up<sup>5,6</sup>. Only 3(33.34%)

of our cases needed intervention. Oesophageal foreign body was removed endoscopically<sup>7</sup>.

Both the children undergoing laparotomy presented late and battery cases were broken in both patients. Normally cathartics are avoided<sup>8</sup> but their judicious use is allowed in disc battery ingestion cases. Beyond 7 days laxative should be used to enhance transit speed. If it does not produce any response battery should be removed surgically. The only pre-condition to laxative use is an intact battery case. Similarly barium enema can be utilized to disentangle foreign body from colonic folds<sup>9</sup> as shown by one case in our series.

The rest of six (66.67%) cases could be treated conservatively. All the parents were advised to report immediately to the hospital if the child develops high grade fever, hemetemesis, melena and abdominal pain. They were taught to check every stool for passage of foreign body. X-rays were repeated after every 4 days. Treatment plan was revised according to the location of foreign body and condition of the child. In all the patients with intact disc battery prognosis was excellent.

### Conclusion

A conservative approach can be safely followed if the disc battery case is intact and facilities for careful follow up are available.

### References

1. Alexander WJ, Kadish JA, Dunbar JS. Ingested foreign bodies in children, in Kaufmann H.J. (ed): Progress in Paediatric Radiology, ed. 2. Chicago, Year Book Medical Publishers, 1969, pp. 256-85.
2. Benson DC, Mustard TW, Ravitch MM, Synder HW, Welch JK. Foreign bodies of the gastrointestinal tract in Paediatric Surgery. Vol 2, Year Book Medical Publishers 1962, pp.678-83.
3. Votteler TP, Nash JC, Rutledge JC. The hazard of ingested alkaline disc batteries in children. JAMA 1983; 249: 2504-2506.
4. Willis GA, How C. Perforation of a Meckel's diverticulum by an alkaline hearing aid battery. Can Med Assoc J 1982; 126: 497-98.
5. Litovitz TL. Button battery ingestions. JAMA 1983; 249: 2495-2500.
6. Rumack BH, Rumack CM. Disc battery ingestion. JAMA 1983; 249: 2509-11.
7. Webb WA. Management of foreign bodies of the upper gastrointestinal tract: update Gastrointest Endosc 1995; 41: 39.
8. Wyllie R. Foreign bodies and Bezoars, in Behrman ER, Kleigman MR, Jenson B. Hal., (eds) Nelson Textbook of Paediatrics 16<sup>th</sup> ed London W.B. Saunders Company 2000, pp. 1144.
9. Grekin TD, Musselman MM. The management of foreign bodies in the alimentary tract. Am Surg 1952; 135: 52