



PRACTICAL APPROACH TO THE PATIENT THAT IN EMERGENCY DEPARTMENT, STATES HAD SWALLOWED A BATTERY (OR IF WE HAVE GREAT SUSPICION ABOUT IT).

Juan-Pablo Meza-Budani¹, Alexandra Mendes² and Domingo Ly-Pen^{2,3}

¹Consultant Emergency Department. Thames Hospital, 610 Mackay Street. Thames. Postcode 3500. New Zealand

²GP. Abbey House Medical Centre Abbey Road, Navan, Co Meath, Ireland

³Echography Unit. Emergency Department. University Hospital Ramón y Cajal. M-607 km. 9,100. 28034-Madrid, Spain

ARTICLE INFO

Article History:

Received 6th March, 2020

Received in revised form 15th

April, 2020

Accepted 12th May, 2020

Published online 28th June, 2020

ABSTRACT

A clinical case about a patient that swallowed cylindrical batteries is presented.

We make an updated bibliographic review, but in a practical way, of the algorithm of actuation in the emergency department.

This will save a lot of time when this not unusual situation presents in the emergency department

Key words:

Batteries; digestive tract; emergency department.

Copyright © 2020 **Juan-Pablo Meza-Budani, Alexandra Mendes and Domingo Ly-Pen**. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

A 17 years old girl attended with her mother, saying that probably ingested two batteries, three hours ago, with the intention of self-harm. Patient was able to eat and drink with no problems. Abdominal XRs were performed.

Battery ingestion is an emerging hazard, frequently seen in Emergency Department [1]. Button battery ingestions are the most dangerous foreign body ingestion, particularly in children.

Very severe complications from button batteries, (above all, 20 mm lithium cells), have been reported. These batteries should be removed as soon as possible, preferably within 2 hours. Delayed treatment may cause perforations, fistulas, strictures and even death [1]. For most of other batteries, the management can be expectant.

In this brief paper, we will only speak about the management of patients who arrive at the Emergency Department with possible ingestion of a battery, without another caustic or any other toxic ingestion.

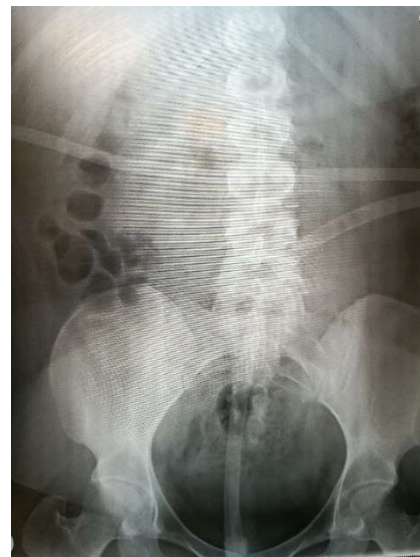


Figure 1 Bad quality plain abdominal XR (upper part not visible)

*Corresponding author: **Juan-Pablo Meza-Budani**

Consultant Emergency Department. Thames Hospital, 610 Mackay Street. Thames. Postcode 3500. New Zealand



Figure 2 Plain abdominal XR performed properly. Same patient than Figure 1, two cylindrical batteries clearly identified.

If a patient (even if a child) states that they have swallowed a battery, we should:

Document the time (if known). Always believe the patient or parents, giving the benefit of doubt. A negative XR is not a problem; however, if we miss a swallowed battery, there can be serious, even fatal consequences.

Request anteroposterior and lateral XRs of the neck, chest and abdomen. Never rely on symptomatology. Symptoms can be very varied, and the worst of all, completely asymptomatic. It is crucial that XRs should be done properly. In our patient, first plain abdominal XR was not done correctly (Figure 1), and batteries were missed. In a second abdominal XR, we could detect two cylindrical batteries (Figure 2).

Symptomatic?

Endoscopy should be performed in all symptomatic children.

Identify the **battery: button or cylindrical?**

Usually, unless broken or bitten, cylindrical batteries should be managed as normal foreign bodies. Therefore, they must be removed depending on their relative size (in children) and localization. In addition, we should be aware about the quality certification of the batteries.

Button batteries, mainly the **lithium** ones, and those bigger than 20 mm, should be considered the most dangerous ones. Never misinterpret as a coin, a button battery: a coin will not have a “halo rim” (like a ring of radiolucency, inside the edge) nor a central bulge (like a “step-off”)

Never try to induce vomiting, nor giving great amount of liquids nor alkalis or charcoal; all these measures have been demonstrated ineffective, when not harmful [2].

Where is the battery?

In esophagus. This is the worst place. The esophagus has a very weak peristalsis and narrow areas. If a battery is impacted, it is easier to damage mucosa. Experience has demonstrated that the most dangerous complications after battery ingestion, are in the esophagus.

If it is a button battery, endoscopy should be performed as soon as possible [2], better in the first 2 hours, above all if the battery is 20-mm lithium batteries or greater. We must never wait for symptoms to develop.

Surveillance of esophageal injury with MRI may be used to stratify the risk of severe hemorrhage and guide management decisions.[3]

In stomach. Endoscopy in asymptomatic button batteries are controversial.[3] They should be considered in high-risk patients (small children, big batteries). Endoscopy should be performed if: [2]

- ✓ symptomatic, or magnet co-ingestion
- ✓ lack of integrity
- ✓ has not been able to pass through pylorus after 48 hours
- ✓ any other clinical suspicion situation that emergency team considers

We should monitor with repeat radiographs.

In duodenum or lower. Usually no indication for endoscopy, if asymptomatic: they will come out by anus within 24 hours [4]. We should look in the stools for the battery, and not be afraid of repeating radiographs if necessary.

A very useful guide can be accessed in the algorithm available at: <https://www.poisson.org/battery/guideline>[5]. Nonetheless, a simpler and more practical algorithm is proposed in Figure 3:

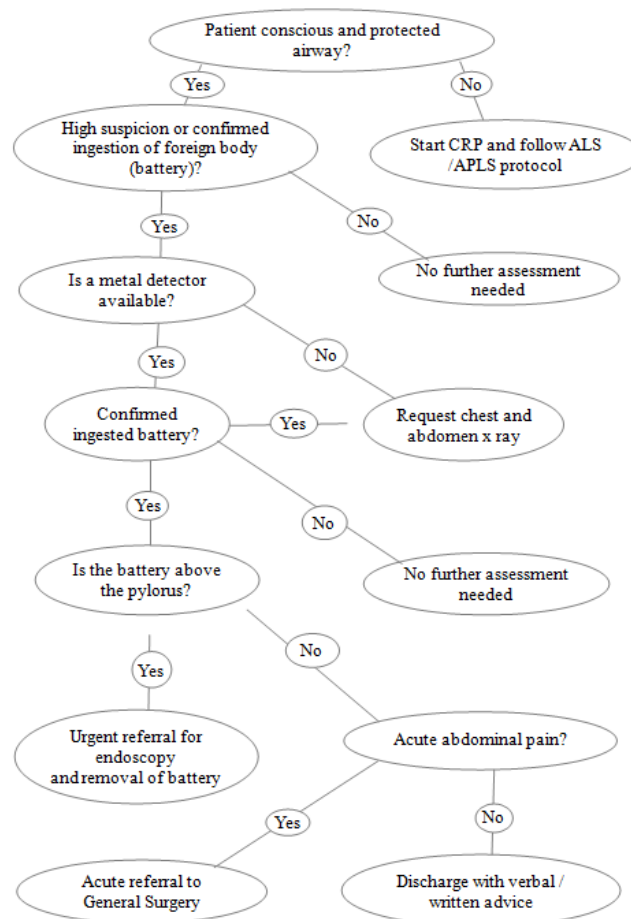


Figure 3 Algorithm of action in the Emergency Department, when a patient has swallowed batteries.

Follow-up. Prognosis

Even after disk battery removal from the esophagus, there is the risk of ongoing evolution of dangerous complications (perforation, fistula). [3] It has also been proposed delayed second endoscopy to assure no damage or early prevention of possible complications.

This part is not for emergency doctors and it should be emphasized that a coordinated, multidisciplinary (emergency medicine, pediatrics, pediatric surgery, anesthesia, otolaryngology, and –interventional– radiology) approach from the beginning is necessary to avoid further severe potentially lethal complications. [3]

Acknowledgements

The authors are indebted to Dr. Joseph Hogg, partner at Abbey House Medical Centre, for his careful English revision.

References

1. Litovitz T, Whitaker N, Clark L, White NC, Marsolek M. Emerging battery-ingestion hazard: clinical implications. *Pediatrics*. 2010;125 (6):1168-77. DOI: 10.1542/peds.2009-3037. Epub 2010 May 24. PMID: 20498173
2. Betalli P, Rossi A, Bini M, Bacis G, Borrelli O, Cutrone C *et al.*, “Update on Management of Caustic and Foreign Body Ingestion in Children,” *Diagnostic and Therapeutic Endoscopy*, vol. 2009, Article ID 969868, 8 pages, 2009. <https://doi.org/10.1155/2009/969868>.
3. Leinwand K, Brumbaugh DE, Kramer RE. Button Battery Ingestion in Children: A Paradigm for Management of Severe Pediatric Foreign Body Ingestions. *Gastrointest Endosc Clin N Am*. 2016;26 (1):99-118.
4. Litovitz TL, Klein-Schwartz W, Oderda GM, Matyunas NJ, Wiley S, Gorman RL. Ipecac administration in children younger than 1 year of age. *Pediatrics*. 1985;76 (5):761–764
5. Poison Control. National Capital Poison Center. Accessed on 1st/June/2020. <https://www.poison.org/battery/guideline>
