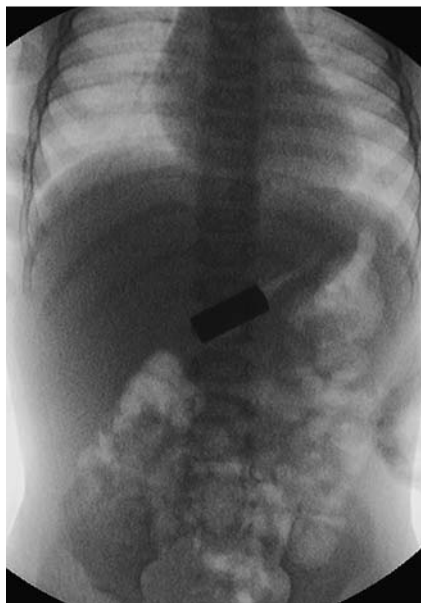


## Cylindrical battery ingested by a 1-year-old baby – does the voltage matter?



**Fig. 1** Radiograph showing a cylindrical battery in the stomach of a 1-year-old child.



**Fig. 2** Endoscopic images of the two ulcers found on the front and back walls of the stomach.

The ingestion of a button-type battery cell by a child is an indication for urgent extraction (within 2 hours) if it has impacted in the esophagus because of the risks of major or even fatal complications, such as perforation and bleeding. In contrast, the ingestion of a cylindrical-type battery that passes into the stomach is not an indication for acute extraction as long as it is not causing symptoms. A follow-up radiograph after a 4-day interval is considered to be sufficient [1,2].

We were asked to extract a cylindrical battery from the stomach of a 12-month-old asymptomatic girl approximately 26 hours after she had been witnessed ingesting it (• **Fig. 1**). The procedure was performed with the patient under general anesthesia, using a gastroscope (GIF Q180; Olympus Optical Co., Tokyo, Japan) with a polypectomy snare. During the endoscopy, two ulcers, approximately 10–15 mm in diameter, were found on the front and back walls of the stomach (• **Fig. 2**), together with several small erosions on the greater curvature (• **Video 1**). The battery was identified as a type A23.

A proton pump inhibitor was prescribed and ampicillin/sulbactam was added for complicating nasopharyngitis; otherwise the child's subsequent course was uneventful.

The supposed mechanism of battery-induced injury consists of (in order of importance): generation of an external electrolytic current that hydrolyses tissue fluids and produces hydroxide at the negative pole; leakage of alkaline electrolyte; and physical pressure [3].

A type-A23 battery consists of eight button alkaline cells (based on a manganese dioxide chemical system) bound together to form a cylinder that is 10 mm in diameter and 28 mm long and gives off a voltage as high as 12V, as opposed to 1.5V in more common and similar sized micro-batteries (type AAA; 10×44 mm) [4].

We propose that in terms of the indication and timing of an endoscopic extraction of a cylindrical battery ingested by a child, the particular type and voltage of the battery should be considered, with particular regard being paid to the higher voltage types, such as A23 or A27. Potentially dangerous gastrointestinal tract damage could therefore be prevented.

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**Competing interests:** None

### Video 1

Endoscopic extraction of a cylindrical battery. Ulcers and erosions were observed in the stomach and a type-A23 battery was extracted using a polypectomy snare.

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