Stopping progression of tissue injury after button battery ingestion

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Button battery injuries in children have been increasingly severe—resulting in devastating injuries and even death. Button batteries damage esophageal tissue through isothermic hydrolysis reactions, resulting in alkaline caustic injury, which leads to tissue necrosis. Prompt removal of the battery is critical to minimizing damage. However, when children swallow a button battery, the injury can progress even after it is removed.

In a recent study from surgeon-researchers at Nationwide Children's Hospital, esophageal irrigation in the operating suite with dilute sterile vinegar, 0.25% acetic acid, after button battery removal was safe and improved mucosal appearance. Household cooking vinegar is typically a 5% concentration.

"Progression of esophageal tissue damage after removal is a hallmark of button battery injury," says Kris Jatana, MD, director of Pediatric Otolaryngology Quality Improvement at Nationwide Children's and lead author of the study publication. "Complications may be delayed up to 9 days for tracheoesophageal fistulas and up to 28 days for aortoesophageal fistulas."

The study, published in *The Laryngoscope*, followed data from six consecutive patients aged 19 months to 10 years who had a 3V lithium button battery lodged in the esophagus for 2 to 18 hours. Surgeons irrigated the injury site with sterile 0.25% acetic acid after removal.

"When we looked at the tissue in the OR, we could see that it was visually improved after the irrigation," says Dr. Jatana, who is also an associate professor in the Department of Otolaryngology—Head and Neck Surgery at The Ohio State University. "And none of these patients showed immediate or delayed esophageal complications."

The National Capital Poison Center Button Battery Guidelines currently recommends this new irrigation with 0.25% acetic acid during button battery removal. This is the first case series published in pediatric patients, using this initial concept that began at Nationwide Children's. It is now being performed around the world after esophageal button battery removal.

"This study highlights the importance of rapid endoscopic removal and the need for additional strategies to neutralize the injury site. Rapid neutralization of esophageal tissue pH as soon as possible after button battery removal may prevent the continued tissue injury associated with a prolonged alkaline environment and reduce long-term complications," concludes Dr. Jatana, who is also a Co-Chair of the National Button Battery Task Force, affiliated with the American Academy of Pediatrics and American Broncho-Esophagological Association. "This is something that all surgeons can consider to improve outcomes after esophageal button battery injury."

More information: Kris R. Jatana et al, Initial clinical application of tissue pH neutralization after

esophageal button battery removal in children, *The Laryngoscope* (2019). DOI: 10.1002/lary.27904

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