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Maryland Poison Center
UNIVERSITY OF MARYLAND SCHOOL OF PHARMACY

May 2023 Poison Center Hotline: 1-800-222-1222

The Maryland Poison Center's Monthly Update: News, Advances, Information

Little to Large Problem: Danger of Water Beads

Water beads have many uses and come in a variety of different forms, with the most popular branded toy product for children being *Orbeez*®. They look like candy leading to many pediatric unintentional ingestions. They are non-toxic cross-linked hydrophilic polymers, originally used in farming to keep soil moist, that can retain up to several hundred times their dry weight if in contact with a water-containing liquid. Water beads pose a physical burden and have the potential of causing severe and fatal small bowel obstructions in the pediatric population.

Pediatric water bead ingestions are increasing. One study from 4 poison centers in France reported 1 obstruction in 487 exposures. Caré and colleagues performed a systematic review which was published in 2022 on all findable cases of pediatric obstructions caused by water beads *(Clin Toxicol (Phila). 2022 Feb;60(2):159-167).* They found 43 individual cases of obstruction have been published since 2011. All these cases involved children less than 4 years old. Symptoms of obstruction had a median onset of 1 day. Presenting symptoms were primarily constipation, diarrhea, and abdominal pain, with repeated vomiting being the biggest risk factor for seeking medical care. Seizures were reported in 3 patients probably secondary to emesis induced hyponatremia due to their small bowel obstruction (SBO).

All patients within this systematic review required medical intervention. Removal was either endoscopy (2 patients) or surgical intervention (41 patients), with 5 patients requiring bowel resections due to necrosis from bowel obstruction. During medical intervention a median of 1 bead was removed with diameters ranging from 25-65 mm in size. There were 2 fatalities linked to water bead ingestion complications, with both having significant delays in seeking care with 7 and 25 days after onset of gastrointestinal symptoms.

This systematic review highlighted many key points to consider with pediatric water bead ingestions. The major risk factors for obstruction were age < 4 years and ingestion of a dry bead that swells to at least 25 mm in diameter. The smallest product that led to obstruction was 25 mm. Additionally, water beads which are ingested while dry are more of a risk due to their ability to pass the pylorus, subsequently expand in the small intestine, and cause SBO. Fully hydrated beads would typically be unable to pass the pylorus and stay in the stomach, reducing the risk of SBO. At this time the number of beads ingested has not yet been determined to be a risk factor, due to the inability to bind together and form a large obstruction that could potentially put the patient at higher risk for SBO. Importantly, a major finding of this analysis was the poor outcomes from patients that had delays to evaluation after initial GI symptoms. Poison Centers should emphasize the need to seek urgent medical evaluation if GI symptoms occur as obstructions can be fatal.

As with all poisonings, we recommend consulting your local poison center at 1-800-222-1222 for questions or management guidance.

Did you know?

Water beads are radiolucent and not visualized well on abdominal radiographs.

An initial abdominal radiograph should be performed to rule out gastrointestinal perforation. Abdominal computed tomography has more utility in visualizing water beads but also misses 50% of cases of ingestion. The most useful imaging type studied is abdominal ultrasound, which recognizes water beads in 82% of cases. On ultrasound, beads will appear as round liquid masses since the density of water beads is identical to water. Lastly, the use of abdominal MRI is rarely reported in the literature, but this may be helpful due to a well-defined fluid intensity signal utilized.

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