

Water Beads – Exploratory Learning or Exploratory Laparotomy?

Alexandra Van Horn, MD, Gloria Sanin, MD, Heidi Roeber, MD, John Petty, MD
Department of General Surgery, Wake Forest University School of Medicine

INTRODUCTION

- Small brightly colored water beads have become increasingly popular toys in the pediatric population, marketed specifically for sensory exploration and learning.
- Unfortunately, the water-absorbing polymer which gives these toys their ability to grow also serves as means of obstruction if ingested.
- These gelatinous toys are advertised to expand from 10-12mm to 4-5cm in 24-36 hours [1], as seen in figure 1.
- Furthermore, the radiolucent nature of these polymers makes them difficult to detect on plain radiographs, which can lead to delayed diagnosis and disease progression. Such obstruction carries high morbidity if not identified and treated early.
- We report a case of a pediatric patient presenting with small bowel obstruction following the ingestion of a water bead.

CASE REPORT

- 2 yo male without significant past medical history
- Presented with nausea and multiple episodes of emesis approx. 24hr after ingesting water bead, poor oral intake but continued having bowel function
- Physical exam: mildly distended but nontender to palpation
- Plain film with air-fluid levels in the stomach and small bowel (Figure 2)
- CT with a transition point within the small bowel, but no foreign body was appreciated (Figure 3)
- Taken to OR for diagnostic laparoscopy, found to have a transition point at the site of the foreign body with small bowel dilation proximally and decompression distally
- The umbilical incision was extended, an enterotomy was created longitudinally, the foreign object was delivered (figure 4), the enterotomy was closed in Heineke-Mikulicz's fashion
- Patient was discharged home on post-op day 1 without complication

Figure 1: Water bead expansion over time



Figure 2: Air-fluid levels on KUB

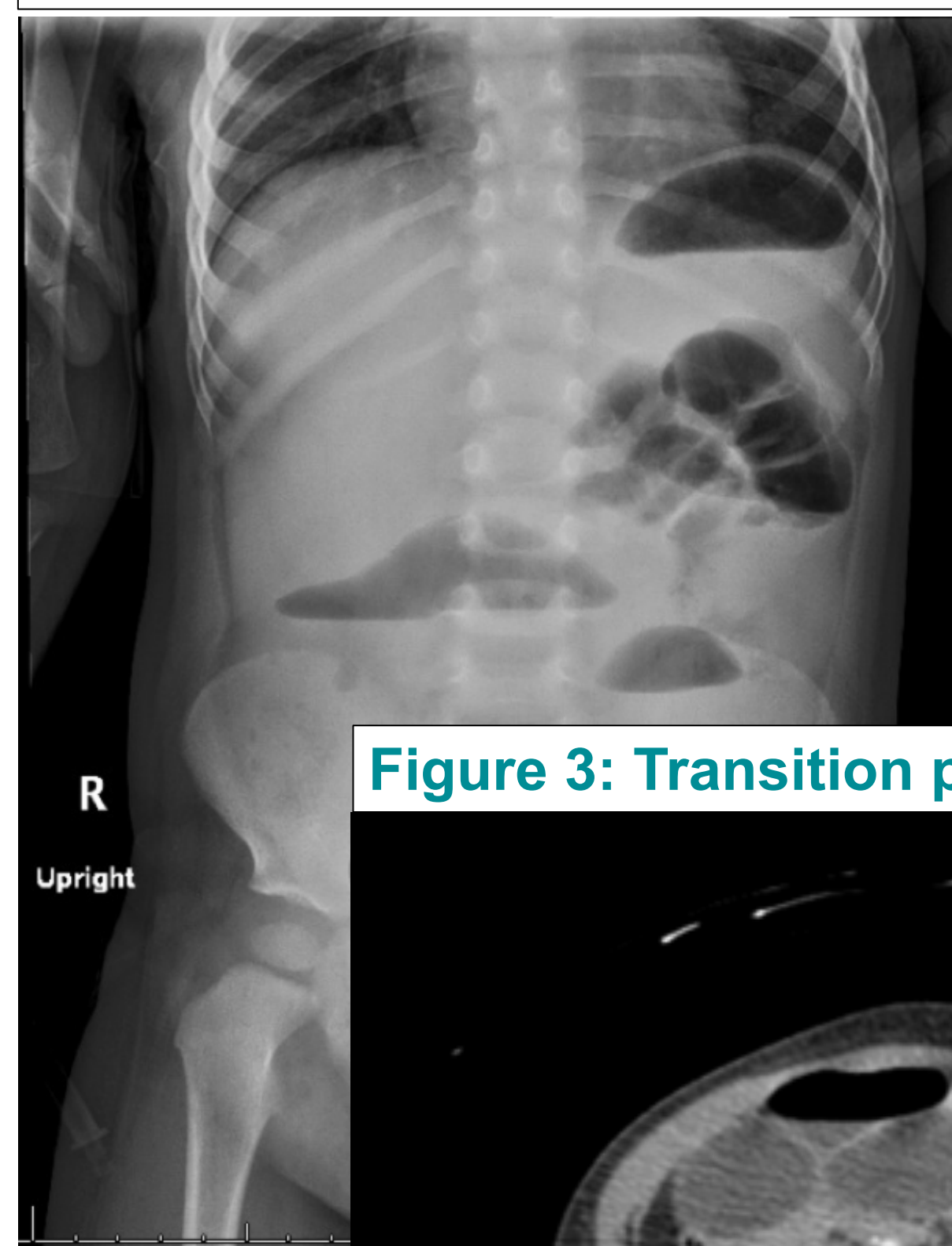
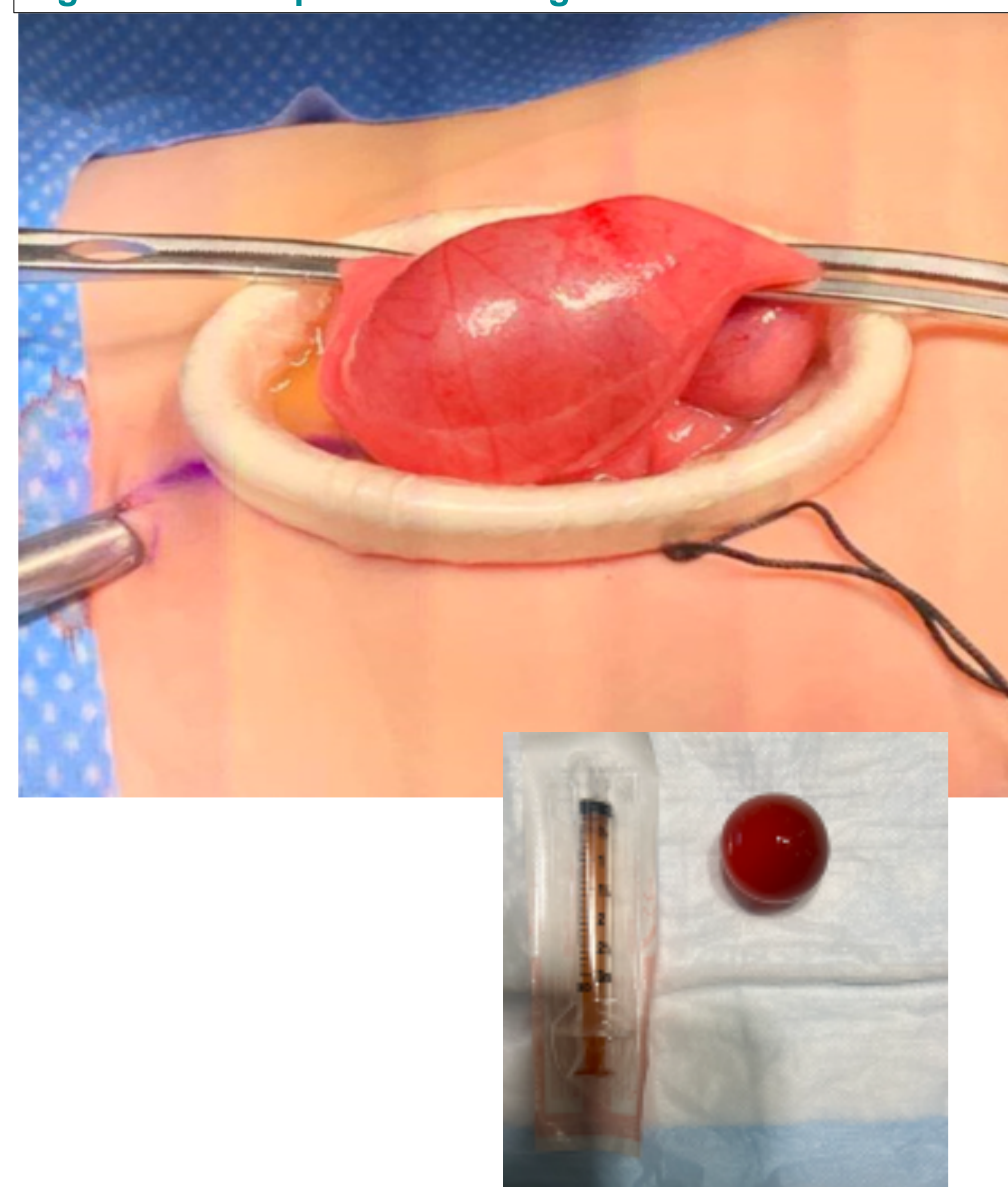


Figure 3: Transition point on CT



Figure 4: Intraoperative findings and ex vivo water bead



DISCUSSION

- Small bowel obstruction can be partial or complete in nature, with complete obstruction carrying increased risk of morbidity and mortality as such obstruction is more likely to lead to necrosis, perforation, sepsis, and ultimately death.
- Within the pediatric population, complete bowel obstruction secondary to foreign body ingestion is rare, as many foreign bodies will pass naturally [2].
- However, objects made of sodium polyacrylate or other super-absorbent polymers begin small enough to swallow and pass through the length of the gastrointestinal tract easily until they swell in size leading to an obstruction.
- Some of these water beads may not reveal themselves on imaging or may appear to mimic other pathologies; as such, history is of the utmost importance and definitive diagnosis may not be determined until visualization in the operating room.
- In a similar case, a 10-month-old female presented with concern for small bowel obstruction. She had findings consistent with duplication cyst on both ultrasound and CT imaging; however, it was upon exploratory laparotomy that two super-absorbent polymer toys known as Orbeez were identified [3].
- With an increase in incidence of water bead ingestion [4], more and more cases of these water beads causing bowel obstructions are being reported in the literature.
- Notably, these toys carry no warning of the possible obstruction they can cause, only the usual choking hazard associated with all small toys [1].
- Additionally, they are being used for sensory learning especially for special needs children, who are often already at a higher risk of foreign object ingestion.

CONCLUSION

- Water beads are a dangerous cause of small bowel obstruction that can lead to bowel necrosis, sepsis, and death if not discovered and managed expeditiously.
- It is essential that parents, guardians, therapists, and teachers be aware of the toys and learning tools available should children knowingly ingest these objects and/or begin experiencing any signs or symptoms of obstruction.

REFERENCES

1. Jangstor large water gel beads 11 ounces (300pcs) gaint water jelly ... <https://www.amazon.com/Jangstor-Water-Jelly-Pearls-Decoration/dp/B071SKSTRM>. Accessed September 25, 2022.
2. Connors G, Mohseni M. Pediatric foreign body ingestion - statpearls - NCBI BOOKSHELF. National Library of Medicine. <https://www.ncbi.nlm.nih.gov/books/NBK430915/>. Published June 21, 2022. Accessed September 25, 2022.
3. Mullens CL, Coleman KC, Parrish DW, Vaughan R. Orbeez ingestion can mimic duplication cysts as a cause of pediatric small bowel obstruction. *Journal of Pediatric Surgery Case Reports*. 2021;64:101711. doi:10.1016/j.epsc.2020.101711
4. Conroy J. Parents, know the dangers of water beads. Cincinnati Children's Blog. <https://blog.cincinnatichildrens.org/safety-and-prevention/parents-know-the-dangers-of-water-beads/#:~:text=Over%20the%20past%20year%2C%20there,an%20intestinal%20blockage%20requiring%20surgery>. Published December 13, 2022. Accessed January 5, 2023.