Aspiration of a Superabsorbant Polymer Bead: A Case Report

Elliot Morse, MD MHS, Alison Maresh, MD

Abstract

INTRODUCTION – Superabsorbant polymer (SAP) beads are small, candy-appearing beads that are marketed to children as a sensory toy (Orbeez, 2022). They expand up to 200-fold placed in water (Fuger, 2018), and accidental ingestion can cause intestinal obstruction (Zamora, 2012). However, there has been only one report of aspiration of an SAP bead (Alharbi, 2020).

METHODS – This is a case of aspiration of a SAP bead in a pediatric patient.

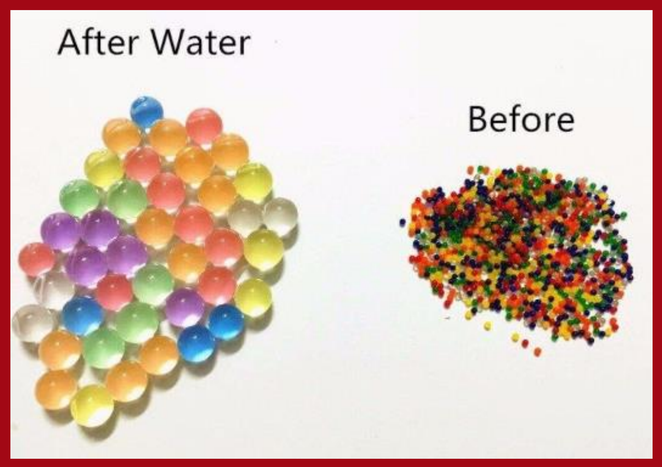
RESULTS – A previously healthy 28-month female presented to the emergency room with vomiting and coughing after SAP bead ingestion. She had multiple episodes of coughing after vomiting, with no voice changes or dyspnea. Physical examination and lateral decubitus films were not suspicious for foreign body. Due to the history of coughing and concern for the expansile nature of the potential airway foreign body, the patient was brought to the operating room, where rigid bronchoscopy revealed a 0.5 cm SAP bead firmly lodged in the left lower bronchiole. This was removed with optical forceps and suction. The child recovered well post-operatively from a respiratory perspective, though was kept inpatient for monitoring given potential for intestinal obstruction. She passed multiple beads and was discharged the following day after normal stooling.

CONCLUSION – SAP beads are easily aspirated. They are initially small but increase in size, which can cause aspiration into smaller airways where they can become lodged, or can completely obstruct larger airways if the bead is more proximal. Clinicians should be aware of the hazards of SAP bead aspiration and maintain a high index of suspicion.

Background

Pediatric foreign body aspiration is common, and accounts for approximately 7% of accidental deaths in children under 4 years of age (Brkic, 2018). Prompt recognition and retrieval is critical, both to avoid foreign body dislodgement with obstruction of the trachea or larynx, as well as to avoid the long-term airway damage that can result from prolonged retained foreign bodies in the airway. While history, physical exam, and imaging are critical for the diagnosis of airway foreign bodies, bronchoscopy remains the gold standard for diagnosis of an airway foreign body and also serves as a method of retrieval.

Superabsorbant polymer beads are small, candy-appearing beads that are marketed to children as sensory toys. They are capable of expanding to 200 times their size when placed in water (Fuger, 2018). They have been found to cause intestinal obstruction when ingested, as the beads can swell and get fixed in the intestine, requiring at times surgical removal (Zamora 2012). To our knowledge there is just one report of the consequences of aspiration of a superabsorbent polymer bead (Alharbi, 2020). Here, we report a case of aspiration of a superabsorbent polymer bead in a child.



Source: Orbeez

References

1. Brkic F, Umihanic S, Altumbabic H, Ramas A, Salkic A, Umihanic S, Mujic M, Softic L, Zulcic S. Death as a Consequence of Foreign Body Aspiration in Children. Med Arch. 2018 Jun;72(3):220-223. doi: 10.5455/medarh.2018.72.220-223. PMID: 30061771; PMCID: PMC6021165.
2. Fuger M, Desmoulins C, Khen Dunlop N, Gobbo F, Blakime P, Chéron G. Bowel obstruction due to ingestion of a water-absorbing bead. Arch Pediatr. 2018 Feb;25(2):136-138. doi: 10.1016/j.arcped.2017.12.004. Epub 2018 Feb 1. PMID: 29395882.Alharbi N, Dabbour M. Aspiration of superabsorbent polymer beads resulting in focal lung damage: a case report. BMC Pediatr. 2020 May 29;20(1):262. doi: 10.1186/s12887-020-02168-9. PMID: 32471401; PMCID: PMC7257448.
3. Zamora IJ, Vu LT, Larimer EL, Olutoye OO. Water-absorbing balls: a "growing" problem. Pediatrics. 2012 Oct;130(4):e1011-4. doi: 10.1542/peds.2011-3685. Epub 2012 Sep 17. PMID: 22987870.
4. Alharbi N, Dabbour M. Aspiration of superabsorbent polymer beads resulting in focal lung damage: a case report. BMC Pediatr. 2020 May 29;20(1):262. doi: 10.1186/s12887-020-02168-9. PMID: 32471401; PMCID: PMC7257448.

Case Presentation

A 28 month old female, previously healthy, presented to our emergency department with vomiting and coughing after accidental ingestion of superabsorbent polymer beads. Mom reported that she had 4 episodes of vomiting up water beads that night after which she began to cough, however the cough subsequently resolved while she was in the emergency room. On exam in the emergency room, she had no difficulty breathing, no stridor or wheezing, no desaturations, and was breathing comfortably. Parents denied any voice change or difficulty handling her secretions.

Bilateral decubitus x-rays were obtained which showed well-aerated and symmetric lungs, without any evidence of air-trapping or any visualization of a foreign body. A respiratory virus panel was also sent which showed non-COVID coronavirus.

Despite the normal imaging and physical exam, we were concerned about the history of coughing at the time of the initial event, and the potential for missing an object that is small but has the capability to expand, as a small bead lodged in a small airway that is coughed and expanded in a larger airway could become life-threatening. Therefore, a rigid bronchoscopy for diagnosis and treatment was suggested to the parents, who agreed. On evaluation, the trachea and mainstem bronchi appeared clear, however a green plastic-appearing object was noted in the left lower bronchiole. Optical graspers were used to retrieve the object, confirmed to be a superabsorbent polymer bead, which broke into pieces upon grasping. These pieces were removed with a combination of optical forceps and a large-bore suction, and repeat bronchoscopy confirmed no residual foreign bodies.

A post-operative chest x-ray was obtained which was within normal limits, and the patient was cleared for discharge from ENT, however remained admitted for observation given her water bead ingestion. On post-operative check and on rounds the following day, the patient was found to be breathing comfortably without stridor or wheezing, and tolerating her diet well. She was discharged post-operative day one.

Conclusions

In this abstract, we presented a case of superabsorbent polymer bead aspiration in a child that additionally had ingested many beads. At the time of evaluation the child was asymptomatic from an airway perspective and had normal imaging, however given the concerning symptom of coughing at the time of the event, a bronchoscopy was performed which ended up revealing a retained bead.

They are initially small but increase in size, which can cause aspiration into smaller airways where they can become lodged, or can completely obstruct larger airways if the bead is more proximal. Furthermore, the extremely small size of the beads prior to exposure to water makes the possibility of aspiration of multiple beads possible, which may create greater airway instability than was seen in this case. A prior case report has shown focal lung damage as a result of overlooked superabsorbent polymer bead (Alharbi, 2020), underscoring the importance of prompt recognition of superabsorbent polymer aspiration. Clinicians should be aware of the hazards of superabsorbent polymer bead aspiration and maintain a high index of suspicion given the fact that the findings in the case of aspiration can be subtle.