Water beads: keep them out of reach of children

Following several cases of intestinal obstruction in young children ingesting water beads, the French poison control centres and ANSES identified all calls related to this type of accident in children from 2009 to 2019. They took the opportunity to issue a reminder of current regulations and preventive measures.

Hazardous objects used or even sold as toys for children

Water beads (or water pearls) made of super-absorbent polymers are sold commercially for decorative use, for watering plants, as components of toys or even as toys in their own right. They can also be diverted from their main intended decorative function, to be used for creative purposes or as “playthings”. When immersed in water, these super-absorbent polymer beads can increase in volume, up to several hundred times (see photo 1). They are often multicoloured, making them attractive to young children, who may mistake them for sweets and swallow them. If they have not reached their maximum size by the time the child swallows them, they can continue to swell in the digestive tract and cause intestinal obstruction. In 2017, the health authorities in French Guiana alerted the public to the circulation, in a school, of bags of coloured beads known as Seven Color Crystal Balls and the risk of confusion with sweets [1].

In France in 2019, the death of a two-year-old child by intestinal occlusion was reported. Following this, in late December 2019, the Directorate General for Health (DGS), the Directorate General for Competition, Consumer Affairs and Fraud Control (DGCCRF) and ANSES alerted consumers of the hazards of these products [2]. This press release was sent to the National Union of Family Associations, the network of professionals in perinatal care and mother and child protection, and the national education system for dissemination to teaching staff in particular. A second severe case occurred in 2020, again in a very young child who had ingested a water bead. This fortunately had a more favourable outcome but at the price of major surgery of the small intestine.

A first French retrospective study

Cases of ingestion of super-absorbent polymer beads are not exceptional. They are in fact increasing with time, as shown by a retrospective study on the past 10 years carried out by the French poison control centres. This study analysed all cases of ingestion of super-absorbent polymer beads for which a French poison control centre had been called, between 1 January 2010 and 31 December 2019. There were 193 cases reported during the study period, with a marked increase over time (see Figure 1). Ninety per cent of the cases involved children. Among children under 15 y-o, half of them were under 36 months of age (see Figure 2). While in the vast majority of situations, the accident occurred at home, it is important to note that in more than one in 10 cases, the child had ingested the water bead at a nursery or at school. In a quarter of the 193 cases, the person who called the poison control centre stated that the water bead had been a toy (as opposed to being for decoration or plants or “no toy”).
Figure 1: Change over time in the number of cases of ingestion of super-absorbent polymer beads reported to poison control centres in France (2010-2019)

Figure 2: Distribution by age group of cases of exposure to super-absorbent polymer beads reported to poison control centres in France (2010-2019)

This word “toy” was also reported for ingestions involving children under 3 years of age, despite the fact that water beads should be kept out of reach of young children, even when sold as toys. This indicates a lack of awareness of the risks posed by these objects among some early-childhood professionals, since these objects had been left within reach of children as toys. In addition, three cases had occurred in infant schools.

A damaging delay in diagnosis

In most cases, these ingestions have had few consequences other than parental concern and, in some cases, medical supervision at home. In this serie and for the study period in question, only one case led to a child’s death. However, any delay in diagnosis can worsen the prognosis. The child's ingestion of the water bead may go unnoticed by the parents or adults present at the time. Symptoms occur a while after ingestion, when the volume of the bead has increased sufficiently to cause obstruction of the small intestine. For physicians, diagnosis of foreign body ingestion is all the more difficult as the beads cannot be seen on the X-ray. Ultrasound or CT scanning techniques are more appropriate for detecting these radiolucent foreign bodies.
Toxicovigilance

To avoid these dramatic accidents and in addition to preventive measures, it seems necessary to increase knowledge of this unusual cause of acute small bowel obstruction among emergency physicians, surgeons and paediatricians. When questioning, they should ask parents whether such objects may have been accessible to the child. Similarly, intestinal obstruction should be suspected in any child who has ingested super-absorbent polymer beads and has gastrointestinal disorders (such as nausea, vomiting, and later an inability to pass stools and gas). In the event of obstruction, surgery is necessary. On the other hand, dehydrated beads smaller than 2 mm do not appear to present a risk of intestinal obstruction [4].

What are the European regulations in this area?

In Europe, when marketed as decorative items or for plant use, these products are not governed by any sector-specific regulations other than general product safety.

When they are sold as toys or toy accessories, they must then comply with European Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009 on the safety of toys, and with standard NF EN 71-1 on the mechanical and physical properties of toys. In general terms, this Directive stipulates that “toys, which are clearly intended for use by children under 36 months, and their component parts and any of their detachable parts must be of such dimensions as to prevent their being swallowed or inhaled”. More specifically, Decree No. 2010-166 of 22 February 2010 and its implementing Order of 24 February 2010, which transposes into French law European Directive 2009/48/EC on the safety of toys, specify that small beads (diameter less than 44.5 mm [size E]) must be marked as “not suitable for children under 36 months”. On this basis, super-absorbent polymer beads are liable to be ingested and are therefore prohibited for sale in this age category. However, they can be marketed for children over 3 years of age in accordance with Directive 2009/48/EC. Outside of this regulatory framework, the use of water beads for creative purposes or as "playthings" constitutes misuse.

In conclusion, beads of super-absorbent polymers, commonly known as “water beads” or “water pearls”, should be kept out of reach of young children, who might mistake them for sweets and swallow them. Early-childhood professionals should keep them away from young children’s environments and not use them as toys.

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References