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Case Report

Water-beads Ingestion with Intestinal Obstruction in Children: A Case Report

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Abstract:

Background: Foreign body ingestion often occurs in the pediatric population and can cause no symptoms or even cause complications due to swallowing the foreign body. The aim of this case report is to increase clinician knowledge of cases of foreign body ingestion which can cause complications.

***Case*:** We report a case of foreign body ingestion water beads with complications of intestinal obstruction in a 1 year 2-month-old girl. The patient came with complaints of vomiting more than ten times containing fluid accompanied by decreased intake. The patient was suspected of swallowing water beads. The patient came to the emergency room with no signs of acute abdomen and the results of plain abdominal radiograph showed no foreign objects. The patient began to show symptoms of obstruction, not being able to defecate and not being able to pass gas. Physical examination revealed abdominal distention accompanied by inaudible bowel sounds. Abdominal CT scan results showed ileal obstruction. An exploratory laparotomy was performed, and two water beads were found intraoperative, which were the cause of the obstruction. The foreign body was removed. After surgery, the patient experienced gradual clinical improvement until he was discharged ten days after the procedure.

Discussion: Foreign body ingestion in children is often not witnessed by anyone and may not cause symptoms until complications such as obstruction or peritonitis occur. Some foreign objects are radiolucent in plain radiographs. In emergency cases of foreign body ingestion, it is necessary to carry out emergency endoscopic procedures, even emergency surgical procedures in cases that cause complications.

***Conclusion*:** This case report increases clinician knowledge and awareness regarding the clinical approach in evaluating patients with suspected foreign body ingestion in children.

Keywords: children, foreign body ingestion, intestinal obstruction, water beads

Introduction

Foreign body ingestion often occurs in the pediatric population as an accidental event. Approximately 75% cases of foreign object swallowing occur in children under 4 years of age,[1] with the highest incidence in the age range of 6 months to 3 years.[2] As many as 50% of cases are asymptomatic.[3] In America, coins are the most frequently swallowed foreign object, whereas in other countries it is fish spines.[4] The death rate due to swallowing foreign objects is relatively low,[5] estimated at around 3%.[6] Swallowed foreign objects can cause complications if they block the digestive tract in parts that experience anatomical narrowing such as the upper and lower esophageal sphincter, pylorus, ileocaecal valve, and anus[7] so that it requires endoscopy and even surgery. The aim of this case report is to increase clinician awareness in establishing a diagnosis of foreign body ingestion, especially in foreign bodies that are not visualized radiologically so that appropriate treatment can be obtained.

Case

A girl aged 1 year 2 months, weight 8.2 kg, body length 75 cm, came to the emergency department (IGD) brought by her parents with complaints of vomiting more than 10 times containing liquid since one day before entering the hospital. The patient's food and drink intake decreases, accompanied by weakness and flatulence. The patient was suspected by his parents of swallowing water-beads before the symptoms appeared. The patient had his last bowel movement two days before entering the hospital and was still able to pass gas one day before entering the hospital. The patient came to the emergency room in moderate pain, compos mentis consciousness, tachycardia 120x/minute, sub-febrile (37.8°C). The initial physical examination in the emergency room did not reveal any signs of an acute abdomen, it looked slightly convex, soft to touch and bowel sounds were still heard. Laboratory examination results are within normal limits. A plain abdominal radiograph was performed, and the results showed dilatation of the small intestine in the left upper abdominal region which was suspected of partial obstruction (**Figure 1**). No foreign objects were seen on the plain abdominal radiograph. It is recommended that an abdominal CT scan be performed for a more detailed evaluation.

Then the patient was hospitalized and fasted, given medical therapy and an abdominal CT scan. The patient was also consulted to a pediatrician gastroenterologist and pediatric surgeon. In the first 24 hours of treatment, the patient's symptoms increased with the stomach appearing larger than before. Patients also tend to become increasingly weak with decreasing food and drink intake. The frequency of vomiting also increased to fifteen times in the last 24 hours accompanied by inability to pass gas. The patient's consciousness was somnolence-apathetic with a GCS of 14. The patient was given a 2 lpm nasal cannula, a decompression NGT was installed and transferred to the pediatric intensive care unit (PICU). Vital signs were still good,

physical examination of the abdomen revealed distention with an abdominal circumference of 48 cm and bowel sounds were not audible.

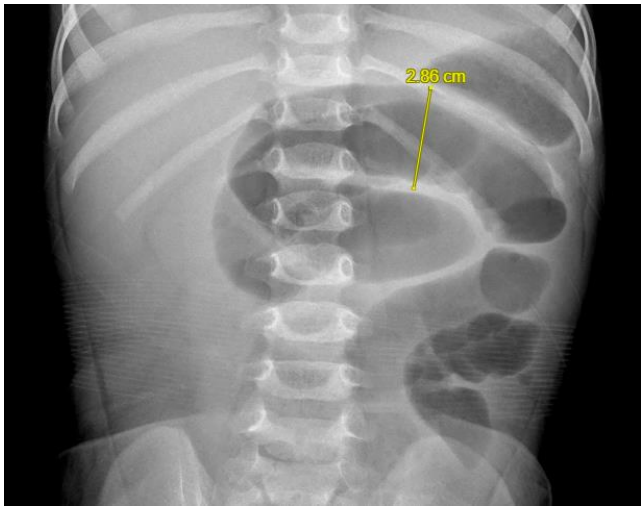

Figure 1. Plain abdominal radiograph shows intestinal dilatation (yellow line) with an estimated diameter of 2.86 cm caused by obstruction.

The results of an abdominal CT scan showed dilatation of the distal segment of the jejunum to the proximal segment of the ileum due to significant stenosis accompanied by multiple air fluid levels. This picture is consistent with total obstructive ileus. Other findings from the CT scan were ascites and multiple lymphadenopathy in the mesentery. There were no visible foreign objects on the CT-scan image. (**Figure 2 and Figure 3**)

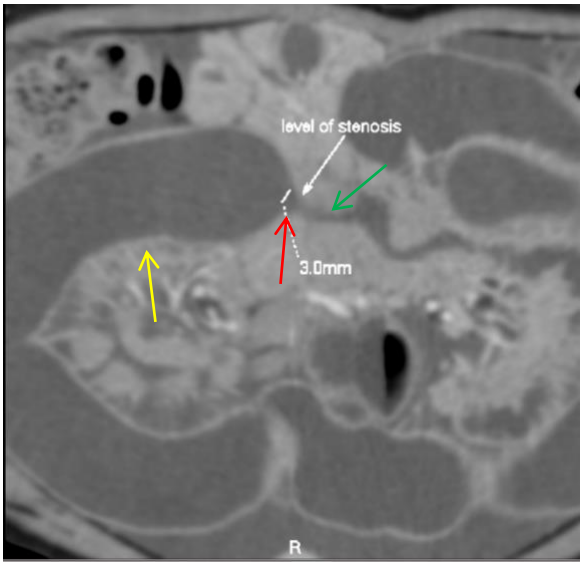

Figure 2. CT-scan of the abdomen without coronal contrast shows obstruction of the ileum (red arrow) with dilatation in the proximal segment (yellow arrow) and collapse in the distal segment (green arrow) of the obstruction.

Figure 3. Abdominal CT scan without contrast sagittal section shows intestinal dilatation with a diameter of 23.9 - 27.1 mm (white line).

Emergency exploratory laparotomy was performed. Intraoperatively, it was found that the ileum was dilated and appeared to have collapsed, including two round cystic masses (children's ball toys) that could not be pushed distally. It was suspected that the toy was causing obstruction and evacuation of the corpus alienum was carried out. (**Figure 4**) Resection-anastomosis was not performed because the intestinal organs were still vital/viable.

Figure 4. Intraoperative findings showed two water-bead foreign bodies (black arrows/circles) colored red and yellow which were the cause of obstruction.

After surgery, the patient continued treatment in the PICU with medication and a gradual diet plan. The patient's condition slowly improved, and the patient was discharged ten days after surgery.

Discussion

Foreign body ingestion often occurs in children, especially in the age group 6 months to 3 years. Various foreign objects can be found with the most frequency, namely coins, batteries, magnets, fish bones, and even children's toys. Water-beads are spherical gelatin toys with a size of 2-3 mm which can expand when exposed to water, especially at alkaline pH.[8] This children's toy contains superabsorbent polymer material which has increased in popularity recently. Beads expand quickly on varying scales so that marble-sized dry beads can easily expand and cause obstruction in the digestive tract.[9] Studies show that the diameter of water beads can increase from 2 to 9.5 mm and from 7.5 to 40 mm if exposed to water for 12 hours, so swallowed water beads will clog the small intestine which only has a diameter of 25-30 mm.[10,11] Children will be interested in swallowing the toy because it looks like candy with attractive bright colors. So far, there have only been four publications reported and one resulted in death.[12] Our patient was 1 year 2 months old who was in the group susceptible to swallowing foreign objects, namely under 3 years of age. Based on the anamnesis, the foreign object suspected of being swallowed by the patient was a child's water-bead toy. This toy has the potential to cause gastrointestinal obstruction because it expands easily.

The diagnostic approach that can be taken is a thorough history taking regarding the type, quantity, when the foreign object was swallowed by the child, whether the child vomited the foreign object or whether the foreign object was excreted in the feces. Symptoms resulting from foreign body ingestion may vary, ranging from no symptoms to severe symptoms that require immediate action. Symptoms that usually appear are nausea, vomiting, and refusal to eat. Vomiting blood and coughing may also occur. If a foreign object has passed through the stomach or intestines, symptoms of abdominal pain, vomiting and bloody bowel movements may appear.[5] Foreign objects that have passed through the gastro-esophageal junction or have reached the distal gastrointestinal tract can cause symptoms of obstruction or perforation such as abdominal pain, fever, nausea, and peritonitis. Impaction, perforation and obstruction often appear in areas of narrowing such as the area at the level of the cricopharyngeal muscle and ileocecal valve.[7] Other areas that are also of concern because of the risk of blockage are the pylorus and the C-loop form of the duodenum.[6] Assessing the general condition, vital signs, whether there is an emergency, as well as the airway and breathing must be the main focus. The physical examination is continued by assessing whether there are signs of obstruction, acute abdomen, and peritonitis. The initial symptoms found in our patient were vomiting, decreased oral intake and weakness.

There were no signs of acute abdomen at baseline. As time progresses, signs of gastrointestinal obstruction caused by the water beads begin to appear, which may be related to the passage of the water beads through the esophagus, stomach and into the intestines. The patient's consciousness tends to decrease even though the hemodynamics is still stable. The patient's abdomen became increasingly distended, followed by inability to defecate or pass gas and showed signs of an acute abdomen.

The first radiological examination carried out is plain abdominal radiograph. Metallic foreign objects such as coins and batteries will be clearly visible on a pop-up photo, but radiolucent foreign objects may not be visible. Beads are radiolucent and difficult to detect on plain radiographs,10 so swallowing water beads carries the risk of delaying diagnosis and causing obstruction. Our patient had a plain abdominal radiograph done and no foreign objects were found. This is in accordance with the nature of water beads which are radiolucent, so they are not visible on plain photographs. The initial radiological finding in our patient was abdominal dilatation. Imaging was continued with an abdominal CT scan without contrast. From the results of the CT scan, it was found that there was obstruction, but the cause was not known for certain and there was no visible foreign object.

Around 90% of foreign bodies in the esophagus can pass spontaneously without causing complications, but some cannot pass through the pylorus, duodenum and ileocaecal valve so that around 10% of swallowed foreign bodies still remain in the digestive tract.[13] As many as 10-20% of cases of foreign body ingestion require emergency endoscopic intervention and only 1% require surgical intervention.[6,14] Management of superabsorbent polymer foreign bodies is challenging because they are radiolucent and usually pass through the proximal gastrointestinal tract easily until their size increases causing obstruction. In cases of beads swallowing, emergency endoscopic evacuation is required immediately. If upper gastrointestinal endoscopy fails to find the foreign body, then it is reasonable to suspect that the beads have reached the distal part of the intestine and are at risk of causing obstruction. If this happens, then surgery needs to be considered.[9]

A literature review reported forty-three cases of intestinal obstruction caused by superabsorbent polymer-made product ingestion (beads).[15] The patient's characteristics are in the age range from 6 to 36 months, with the beads always located in the small intestine between the duodenum and the terminal ileum. Endoscopic procedures for removal of the beads were performed in two cases and operative procedures were performed in the other forty-one cases, including enterotomy in thirty six cases and resection in five cases.

A case report reported two cases of water beads ingestion.[16] The first case was a 15-month-old-boy with well-defined anechoic cystic lesion within the dilated proximal jejunum underwent an exploratory laparotomy. Intra operative, a large jelly ball measuring 3x3cm in diameter was found. Post operative, NGT output was quite significant, producing 450mL of greenish fluid. Abdominal USG was repeated on the fourth day after surgery and revealed two round anechoic structures measuring 3x3cm in jejunum. A second laparotomy was performed and two expandable jelly balls in the jejunum removed. The second case was 18-month-old boy with two well defined cystic structures measuring 3x3.7cm in the terminal ileum underwent an exploratory laparotomy and found three gel balls in the jejunum. The patient was discharged on 4th day after surgery.

In another case report, a 6-month-old male infant swallowed one water bead had to be operated because it caused obstruction.[12] The first operation was enterotomy. However, on the 6th postoperative day, the patient developed burst abdomen and was re-operated. At exploration anastomotic leak was found. The anastomosis was revised. The patient developed septicemia and died two days after the second operation.

Our patient was 1 year 2 months old, included in vulnerable age that prone to beads ingestion. From plain abdominal radiograph and abdominal CT scan only found dilatation and obstruction, no foreign object was detected. In our patient, surgery was performed because the patient showed signs of acute abdomen and obstructive ileus. Because it was not known for certain what the cause was, an exploratory laparotomy was carried out and it turned out that two water bead foreign objects were found which were the cause of the obstruction. Our patient did not undergo endoscopy because of suspicion of obstruction in the lower gastrointestinal tract and he already showed signs of obstruction which is a strong indication for operative treatment. An exploratory laparotomy was performed to evacuate the foreign body and no resection-anastomosis was performed because the intestine was still vital and viable. After successful evacuation of the foreign body, our patient experienced gradual clinical improvement until discharge.

Conclusion

Incidences of foreign objects being swallowed by children are quite common in the vulnerable age group between 6 months and 3 years. Patients who swallow foreign objects may not cause symptoms until they cause complications such as obstruction, peritonitis depending on the type and nature of the foreign object, the duration of the swallowing, and the location of the foreign object. A careful history can direct suspicion towards swallowing a foreign object, especially information from parents or witnesses who saw the patient swallow a foreign object is very important to know.

The physical examination includes monitoring hemodynamics, generalist status, and specifically paying attention to signs of obstruction or peritonitis. The first radiological imaging performed is a plain radiograph but remember that not all foreign objects can be seen. Emergency endoscopic procedures are sometimes needed in emergency cases if the foreign body is still in the upper gastrointestinal tract and operative measures are needed for cases complicated by obstruction or peritonitis.

Conflict of Interest

None declared

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