Small bowel obstruction secondary to gastric balloon migration: A case report

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ABSTRACT

Introduction and importance: Obesity is a worldwide epidemic that carries significant morbidity and mortality. It is considered a major risk factor for many serious diseases. Therefore, different invasive and noninvasive therapeutic modalities are being used to help obese individuals return to a healthy life. One of the nonsurgical modalities is the use of intragastric balloons (IGB).

Case presentation: Our patient is a 17-years-old lady, with a body mass index of 48.8, medically and surgically free presented to the emergency with early signs of obstruction. CT abdomen showed small bowel obstruction secondary to IGB migration. Patient was admitted and operated on laparoscopically the same day of presentation. Patient recovered fully and was discharged in a stable condition.

Case discussion: There are different types of IGB that vary in their composition (material), volume and contents. Some balloons can be excreted via digestive tract, while some need to be removed endoscopically. Complications are very common and vary in severity such as nausea, vomiting or gastric ulceration or perforation. Management options include endoscopic retrieval of balloon, manual passage of balloon through the GI tract or open/laparoscopic surgery.

Conclusion: The initial approach to the treatment of migrated intragastric balloons causing small-bowel obstruction should be determined by the type of balloon used, location of impaction and degree of obstruction. Prompt and accurate treatment could prevent life-threatening complications.

1. Introduction

Obesity is one of the leading global health problems in the world today. It is considered a major risk factor for many serious diseases [1]. Different invasive and noninvasive therapeutic modalities are being used to help the individuals suffering from obesity return to a healthy life [2]. Among these modalities, intragastric balloons have been used as an invasive non-surgical treatment for obesity for over 30 years [3]. Intragastric balloons are devices that are placed endoscopically into the stomach and inflated with either air or saline [3]. The balloon is placed endoscopically with sedation then inflated under direct endoscopic visualization with either air, saline or methylene blue. After several hours, the patient is discharged and followed up as an outpatient for the following 6 months. Then, the balloon is removed using the same method [2]. Another noninvasive modality is a swallowable capsule that is filled with 550 mL of pH-titrated fluid through a catheter and converted to a balloon after plain X-ray confirms its position in the stomach. Thus, it does not require endoscopy or anesthesia during insertion or removal, and it is now commonly used due to it being ‘procedure less’.

After four months, a self-releasing valve is opened, and the thin wall of the balloon gradually deflates and is excreted through the gastrointestinal (GI) tract [4]. Although these strategies can greatly improve the patients’ quality of life, they can be associated with life-threatening complications [5]. Such complications include balloon migration, bowel obstruction, bowel ischemia and perforation. We report a case of small bowel obstruction secondary to intragastric balloon migration.

2. Case report

A 17-year-old lady, with no history of chronic medical conditions nor surgical history presented to the emergency department with a five-day history of severe abdominal pain that started suddenly after eating spicy food. It occurred mainly in the epigastric and paraumbilical area, didn't radiate elsewhere. It had no aggravating or relieving factors. It was associated with nausea, vomiting multiple times containing gastric juice and she had poor oral intake. She didn't pass bowel motion for four days. She last passed flatus a day prior to presenting to emergency department. Patient was post endoscopic intragastric balloon insertion which
was done six months prior to her presentation at another hospital and was scheduled to be removed a day following her presentation to the ED. Patient has no known allergies and never took any drugs. On examination, patient looked lethargic but not in pain or distress, her abdomen was mildly tender in the epigastric region. Her laboratory investigations were unremarkable. The CT scan showed mural thickening of the proximal/mid ileal loops with the presence of an intraluminal irregularly shaped density associated with mild surrounding fat stranding and collapsed small bowel loops distally (Figs. 1 & 2). There were no dilated bowel loops proximally. The right colon had apparent wall thickening with mild surrounding fat stranding. No pneumoperitoneum or loculated fluid collections were visualized except for a small pelvic free fluid which was thought to be physiological. There were no significant abdominopelvic enlarged lymph nodes. Management plan was discussed with the patient and her mother, they agreed and wanted to proceed as planned. Patient was admitted and immediately taken to operating room for diagnostic laparoscopy possible open for intragastric balloon removal. Spontaneous evacuation of balloon was considered however this balloon had a metallic valve that was seen in the CT hence, it would not be possible for the balloon to pass through the ileocecal valve. The procedure was performed by the Consultant surgeon, who as high expertise in those types of cases, as well as an associate consultant and a general surgery junior resident. Intraoperatively, an area of migrated IGB at mid of the small bowel was noted. A longitudinal enterotomy was made and the gastric balloon was pulled out (Figs. 3 & 4). A vicryl 3-0 was used to close the enterotomy by suturing transversely and taking 2 layers (Fig. 5). After that, the gastric balloon was placed in an endo bag and removed through the 12 mm port (Figs. 6 & 7). Irrigation and suction of the abdomen was done. The procedure was concluded without any immediate complications. Patient tolerated the procedure well and was shifted to recovery room in good condition. The patient was discharged home in a stable condition with a follow-up appointment in the OPD.

3. Discussion

Obesity is currently considered as a worldwide epidemic [5]. Different management methods are available to these patients, ranging from lifestyle and dietary modifications, bariatric procedures, and intragastric balloons. Intra-gastric balloons have been in practice since the 1980s when it was first introduced [1]. They could be placed endoscopically in the stomach and then filled with either air, saline solution, or methylene blue. Their mechanism of action promotes weight loss as they increase the perception of fullness [5]. The newer generations of balloons are filled with saline to induce more effective weight loss and methylene blue to stain the urine in case of balloon rupture or deflation, facilitating early detection by the patient [2].

There are different types of IGB that vary in their composition (material), volume and contents. Some are composed of silicone and contain saline. Others are composed of polyurethane and silicone. Some balloons can be excreted via digestive tract, while some need to be removed endoscopically [3].

Balloons can have adverse effects such as vomiting, electrolyte imbalances, abdominal pain, reflux symptoms, esophagitis and weight regain if no long-term lifestyle changes are adopted. Other severe complications, such as gastric ulceration and perforation have also been reported, but they are fortunately rare (2.2 %). Intestinal obstruction is a quite rare complication of intragastric balloons and has been described in few case reports throughout the literature. Most manufacturers recommend removal after six months because of the increased risk of
balloon deflation and migration. Bowel obstruction resulting from migrated intragastric balloons left in place for longer than six months account for most case reports. In six patients, the balloon had been placed more than one year prior to the emergency admission, with the longest reported period among all cases being four years [3]. The percentage of overall complications were documented in Lopez-Nava study which consisted of 714 patients reported an overall complication rate of 4.1 % or Genco in his study of 2515 patients reported an overall complication rate of 2.8% [2].

Due to the growing prevalence of obesity and the use of modalities such as intragastric balloons as well as their side effects, abdominal pain in an obese patient with a history of balloon insertion constitutes a diagnostic challenge because most of the reported complications, ranging from benign to life threatening, can present with abdominal pain and nausea or vomiting. The classical presentation of patients with
small bowel obstruction to the emergency department includes cramping and colicky abdominal pain often associated with nausea, vomiting and constipation (seven patients experienced abdominal pain without vomiting). The duration of symptoms prior to seeking medical assistance varied from as little as a few hours up to seven days [3]. In our case, patient's duration of symptoms was 4 days. Diagnosis mostly occurs in an emergency setting, where abdominal X-ray imaging is usually used to confirm the diagnosis, but CT scans are also a helpful tool, especially when complications arise. When the diagnosis is in doubt, performing an endoscopy and abdominal ultrasound imaging seems to be a reasonable step [2]. In all but one case, intragastric balloons became impacted in the small bowel from the first part of the duodenum to the terminal ileum with no single location particularly common. Kim et al. reported a case of an obstructing intragastric balloon in the sigmoid colon [3]. However, in our patient, the intragastric balloon was impacted in the terminal ileum, 10 cm away from the ileocecal valve. Another presenting symptom found in a literature review was the patient reporting urine discoloration 24 h after balloon placement [2].

After confirming the diagnosis of obstruction, conservative treatment and close observation may be a reasonable approach if the patient is stable and the balloon type was designed to pass through the bowel after its deflation (example of such is swallowable capsule, Elipse). Otherwise, surgical removal is recommended once bowel obstruction developed and the balloon formed transition point like in our case scenario. Laparoscopic or open approaches have been described with the same objective, to remove the foreign body without further injuring the bowel [5]. In our case, based on the type of balloon used, results of the CT scan and the clinical findings, surgery was decided, and the balloon was successfully extracted. Open surgery is a good option for managing bowel obstruction due to balloon migration, depending on surgeon's expertise and the available resources in the facility. Furthermore, all cases reported in the literature had excellent outcomes following enterotomy, balloon extraction, and primary closure [4].

There have been various open and minimally invasive techniques employed for retrieval of migrated intragastric balloons causing mechanical bowel obstruction. Approximately 70 % of published case reports were managed with open surgery. In two cases an intraoperative decision was made to convert laparoscopy to open (mini laparotomy). Justification in one of these cases was the concerns of peritoneal contamination when making an enterotomy during laparoscopy. In this case, we were able to remove the intragastric balloon laparoscopically. As seen in our case, there have been four successful laparoscopic retrievals of migrated intragastric balloons described in previous literature. In all four cases the balloon was retrieved from either the jejunal or the ileum without further complication. In three of these cases an intra-abdominal drain was placed following balloon extraction and in the fourth case there was no clarification on whether a drain was placed or not [3]. In the case we report here, it was decided not to place an intra-abdominal drain due to minimal peritoneal contamination. The length of postoperative stay in hospital for these cases was two, three, four, five and six days [3]. In our case, the patient's length of stay was three days post operation due to ileus.

4. Conclusion

Deflation and subsequent migration of intragastric balloons can occur any time after their insertion and is a potential complication of IGB. The initial approach to the treatment of migrated intragastric balloons causing small-bowel obstruction should be determined by the type of balloon used, location of impaction and degree of obstruction.

Migrated balloons causing obstruction in the duodenum are likely amenable to endoscopic retrieval whereas laparoscopy or open surgery is reserved for cases with IGB with obstruction distal to endoscopic reach [3]. Regular follow up and adherence to manufacturer and physician recommendations are recommended to prevent serious complications of intragastric balloon insertion [1]. Prompt and accurate treatment could prevent life-threatening complications [5].

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Author contribution
Sondous R. Ntyl: Concept and design of study, data collection, literature review, drafting, revision. Mishary M. Alshalhoub: revision, approval of final manuscript. Saeed S. AlShlwi: revision, approval of final manuscript.

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Declaration of competing interest
No conflict of interest.

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