 Prague Medical Report / Vol. 125 (2024) No. 2, p. 146–150

Unveiling a Silent Obstructor: Phytobezoar in the Third Duodenal Segment

Ana Fernanda Muñoz Durán[1], Juan Alberto Llanos Visbal[2], Leidy Vanessa Aguirre Carvajal[3], Juan Daniel Ayala Torres[4], Nicolás Álvarez Gärtner[5], Julián Andrés Muñoz Durán[6]

[1] Faculty of Medicine, Fundación Universitaria San Martin, Sabaneta, Antioquia, Colombia;
[2] Department of Surgery, Universidad de Cartagena, Clínica Panamericana, Apartadó, Antioquia, Colombia;
[3] Department of Emergencies, Universidad de Antioquia, Clínica Panamericana, Apartadó, Antioquia, Colombia;
[4] Department of Radiology, Universidad de Antioquia, Antioquia, Colombia;
[5] Department of Emergencies, Fundación Universitaria San Martin, Sabaneta, Clínica Soma, Antioquia, Colombia;
[6] Department of Radiology, Universidad CES, Clínica Panamericana, Apartadó, Antioquia, Colombia

Received January 9, 2024; Accepted May 7, 2024.

Key words: Bezoars – Intestinal obstruction – Abdomen – Acute – Tomography

Abstract: We present a case of obstruction in the third portion of the duodenum secondary to a phytobezoar in an adult patient with no surgical history and without a vegan diet. High intestinal obstruction due to a phytobezoar is rarely described in the literature, posing a diagnostic challenge when evaluating potential differentials in the emergency setting. Subsequently, we conduct a review focusing on tomographic findings and the surgical specimen, highlighting key points to consider when addressing such pathologies.

Mailing Address: Ana Fernanda Muñoz Durán, Faculty of Medicine, Fundación Universitaria San Martin, Calle 75 sur No. 34-50 vía la Doctora, Sabaneta, Antioquia, 055450, Colombia; e-mail: anamunozd@hotmail.com

https://doi.org/10.14712/23362936.2024.13

Introduction

Small bowel obstruction is a common condition, primarily attributed to intestinal adhesions and hernias; etiology secondary to bezoars is unusual, accounting for only 2–4% of reported cases (Aydin et al., 2022). Bezoars act as foreign bodies in the gastrointestinal tract, arising after the ingestion of undigested organic material, leading to intraluminal mechanical intestinal obstruction. Here, we present the case of a patient with no prior surgical history who experienced an episode of acute abdomen. Subsequently, an intestinal obstruction caused by a phytobezoar was identified at a tertiary care institution in Antioquia, Colombia. The presentation of this case is unusual compared to the current medical literature.

Case report

A 45-year-old male patient of mixed ethnicity, residing in an urban area, presented to the emergency department with chronic abdominal pain that escalated to acute over the preceding two weeks. The pain was localized in the epigastric region and was accompanied by vomiting of food content and oral intolerance. Physical examination revealed no remarkable findings. Laboratory studies revealed mild hypokalemia. Due to persistent symptoms and limited clinical improvement, a contrast-enhanced

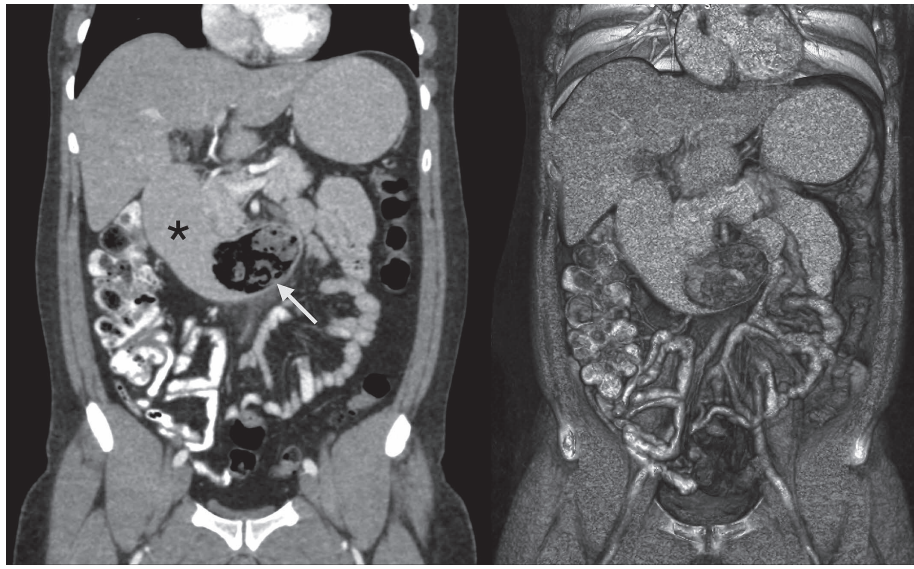

Figure 1 – Phytobezoar in the third portion of the duodenum. Coronal reconstruction of contrast-enhanced tomography and 3D rendered image, demonstrating a rounded foreign body with a density of –87 HU (Hounsfield units) consistent with a phytobezoar in the third portion of the duodenum (arrow). Note the proximal duodenal dilation (*) due to compressive effects.

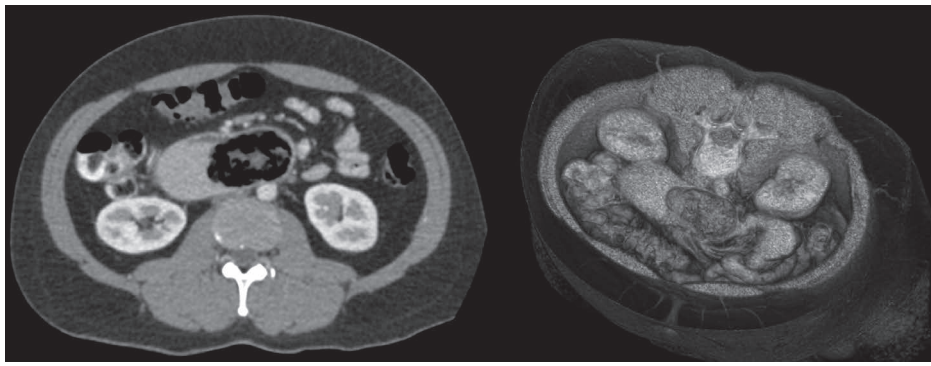

Figure 2 – Phytobezoar in the third portion of the duodenum. Axial section of contrast-enhanced tomography and 3D rendered image, illustrating the third portion of the duodenum and its anatomical relationships with the surrounding structures.

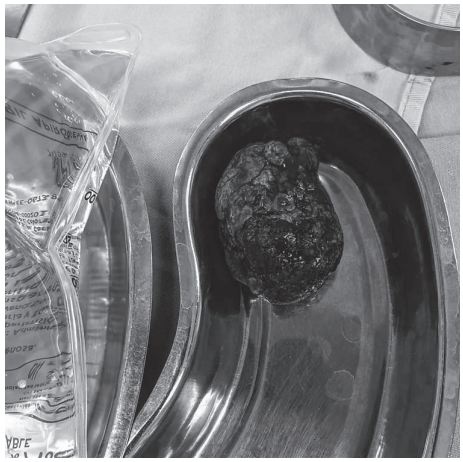

Figure 3 – Surgical specimen of duodenal phytobezoar.

abdominal tomography was performed, revealing the presence of an intraluminal foreign body in the third portion of the duodenum associated with proximal dilation (Figures 1 and 2).

Due to the persistence of symptoms and clinical deterioration despite instituted treatment, the patient underwent surgery. A gastrotomy and antrotomy were performed, successfully extracting the foreign body and confirming the diagnosis as indicated in imaging studies (Figure 3).

Discussion

Phytobezoar refers to the formation of a mass in the gastrointestinal tract due to the consumption of non-digestible substances such as fiber (Aydin et al., 2022). Foods with high cellulose, lignin, and tannin content, when exposed to the acidic stomach environment, polymerize and clump together, promoting the formation of a sticky substance to which other materials adhere, gradually hindering its transport through the digestive system. Rarely do they surpass the pyloric sphincter, settling in the gastric chamber (Manatakis et al., 2019). The seed bezoar is a subtype of phytobezoar, characterized by the accumulation of fruit or vegetable seeds in the intestinal lumen. Seeds in the intestinal lumen can navigate through narrow areas like the pylorus and ileocecal valve, slowly accumulating in a segment of the intestine and eventually causing obstruction (Manatakis et al., 2019). Clinically, the diagnosis is challenging due to presenting with generic symptoms such as abdominal pain, nausea, or vomiting, similar to other cases of intestinal obstruction. The preoperative diagnosis of intestinal obstruction due to phytobezoar is rarely established in the clinical context (Ko et al., 1997).

The formation of phytobezoars is commonly predisposed by various factors, such as gastric surgery, diabetes mellitus, mixed connective tissue disease, hypothyroidism, and end-stage renal disease with dialysis (Pergel et al., 2012; Yang et al., 2013). These conditions predispose to their formation (Ko et al., 1997), altering gastric emptying, which, combined with poor chewing technique and excess consumption of high-fiber foods, increases individuals' susceptibility to bezoar formation (Ko et al., 1997).

Phytobezoars located in the duodenum are extremely rare (Fan et al., 2016), with a reported incidence of less than 0.4% in the general population (Fan et al., 2016), and even rarer in the third portion of the duodenum (Yamagata et al., 2017).

In the absence of gastric surgery, phytobezoars in the small intestine are caused by massive intake of high-fiber foods (Verstandig et al., 1989). Imaging studies play a crucial role, especially computed tomography (CT), where the appearance of a phytobezoar is described as an intraluminal mass with bubbles around it, causing an abrupt change in the caliber of the intestine from dilation to collapsed lumen (normally, the small intestine has no luminal content). A focal, well-defined ovoid intraluminal mass with a speckled gas pattern inside, similar to the "faecal sign"

(Mayo-Smith et al., 1995), is observed, which is seen in high-grade small intestinal obstructions or in cystic fibrosis (Ko et al., 1997). Other findings include dilatation of the proximal digestive tract to the obstruction and collapse of the distal loops, signs not different from other types of intestinal obstruction. Specific findings suggestive of a phytobezoar include the identification of a high-grade obstruction in the absence of fat stranding and intraperitoneal fluid, a debris length of < 9.5 cm, and an average attenuation of < –11.75 Hounsfield units (HU) (Chen et al., 2015), which may or may not be accompanied by inflammatory changes in fat and intraperitoneal fluid.

Conclusion

Obstruction of the third portion of the duodenum secondary to a phytobezoar is a rare entity with limited documentation in the literature (Yamagata et al., 2017). Our case is noteworthy due to the site of obstruction and the absence of surgical history or exclusively vegetarian dietary patterns. Early identification of radiological signs guiding towards the diagnosis and the timely implementation of treatment, with a clear understanding of the etiology of the condition, are crucial to prevent delays in interventions and mitigate potential adverse outcomes.

References

Aydin, I., Sengul, I., Sengul, D. (2022) Phytobezoar: An unusual condition leading to small bowel obstruction. *Cureus* **14(4)**, e23885.

Chen, Y. C., Liu, C. H., Hsu, H. H., Yu, C. Y., Wang, H. H., Fan, H. L., Chen, R. C., Chang, W. C. (2015) Imaging differentiation of phytobezoar and small-bowel faeces: CT characteristics with quantitative analysis in patients with small-bowel obstruction. *Eur. Radiol.* **25(4)**, 922–931.

Fan, S., Wang, J., Li, Y. (2016) An unusual cause of duodenal obstruction: Persimmon phytobezoar. *Indian J. Surg.* **78(6)**, 502–504.

Ko, S., Lee, T., Ng, S. (1997) Small bowel obstruction due to phytobezoar: CT diagnosis. *Abdom. Imaging* **22(5)**, 471–473.

Manatakis, D. K., Acheimastos, V., Antonopoulou, M. I., Balalis, D., Korkolis, D. P. (2019) Gastrointestinal seed bezoars: A systematic review of case reports and case series. *Cureus* **11(5)**, e4686.

Mayo-Smith, W. W., Wittenberg, J., Bennett, G. L., Gervais, D. A., Gazelle, G. S., Mueller, P. R. (1995) The CT small bowel faeces sign: Description and clinical significance. *Clin. Radiol.* **50(11)**, 765–767.

Pergel, A., Yucel, A. F., Aydin, I., Sahin, D. A. (2012) Laparoscopic treatment of a phytobezoar in the duodenal diverticulum – Report of a case. *Int. J. Surg. Case Rep*. **3(8)**, 392–394.

Verstandig, A. G., Klin, B., Bloom, R. A., Hadas, I., Libson, E. (1989) Small bowel phytobezoars: Detection with radiography. *Radiology* **172(3)**, 705–707.

Yamagata, Y., Saito, K., Hirano, K., Kubota, Y., Yoshioka, R., Okuyama, T., Takeshita, E., Tagaya, N., Sameshima, S., Noie, T., Oya, M. (2017) Obstruction in the third portion of the duodenum due to a diospyrobezoar: A case report. *BMC Surg.* **17(1)**, 117.

Yang, J. E., Ahn, J. Y., Kim, G. A., Kim, G. H., Yoon, D. L., Jeon, S. J., Jung, H. Y., Kim, J. H. (2013) A large-sized phytobezoar located on the rare site of the gastrointestinal tract. *Clin. Endosc.* **46(4)**, 399–402.