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**Research Article****Small bowel obstruction due to dried fruit and vegetable bezoars in paediatric patients of northern India.**

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**Abstract:**

**Introduction:** Many foods have been implicated in bezoar obstruction especially sun dried apricots, peaches, and prunes. Dried fruits and vegetable being hygroscopic imbibe water, swell in size and cause mechanical small bowel obstruction. We hereby submit our experience of dealing with patients who presented with acute small bowel obstruction (ASBO) due to dried phytobezoars.

**Materials and methods:** This was a retrospective study which was conducted from March 2017 to March 2012. Operative records of the patients with ASBO due to phytobezoars were retrieved from Hospital Records Section. The clinical details, investigative work up, operative findings and intervention and type of bezoars were noted.

**Results:** Over the period of 5 years, 12 patients of phytobezoars were admitted in the department. The mean age of the patients was 1.85 years with 7(58.3%) males and 5 females (41.6.5%). Vomiting was most common and was present in all the patients, bilious in 11 (91.7%). The other features included abdominal pain in 10 (83.3%), abdominal distension in 8 (66.7%), failure to pass stools in 9 (75%), failure to pass flatus in 9 (75%), diarrhoea 16 (25%), bleeding per rectum 2 (16.6% patients). All the patients were operated in emergency settings within the period of 8 ± 3 hours of admission. There were no significant operative complications and average hospital stay was 5.2±1 days.

**Conclusion:** Dry fruits and vegetables like apricot, turnip and peach can lead to bezoar formation which subsequently leads to acute small bowel obstruction in these infants and young children. We also want to impress upon the treating physicians to keep in mind the probability of phytobezoars obstruction in patients presenting with mechanical ASBO especially in patients from Himalayan regions.

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**Keywords :** Phytobezoars, dried fruit, ASBO, children.

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**Introduction**

Small bowel obstruction is a common paediatric surgical emergency (1). Other than the congenital causes of small bowel obstruction there are acquired causes which include intussusception, perforated appendix, obstructed hernia, adhesion obstruction and malrotation with volvulus (1). In our region the worm bolus obstruction due to *Ascaris lumbricoides* is very common (2). Although well documented, bezoars are rare cause of acute small bowel obstruction in pediatric patients. Bezoars are conglomerate of undigested foreign body which lead to intestinal obstruction (3, 4). There are four major types of bezoars: trichobezoars, phytobezoars, pharmacobezoars and lactobezoars.. The most common types of bezoars are the phytobezoars which have a plant source (5). Many foods have been implicated in bezoar obstruction including grapefruit, mango, green figs, pickled fruits and vegetables, brussels sprouts dried fruits such as apricots, peaches, and prunes (6). Bezoars lead to obstruction due to mechanically obstructing the intestinal lumen of the small bowel.

Sun drying of fruits and vegetables is the oldest form of preservation technique known to the people of northern Himalayan regions and is still practiced on a large scale (7, 8).

Apricot and other fruits and vegetables like figs, peaches & turnips are also sun dried before being consumed (9, 10). Dried fruits and vegetable are hygroscopic and imbibe water on transition from stomach to small intestines and swell and increase in size. This makes their passage through the small calibre intestines of paediatric patients difficult which eventually leads to impaction and obstruction. We hereby submit our experience of dealing with patients who presented with ASBO due to dried phytobezoars.

**Materials and methods**

This was a retrospective study which was conducted from March 2017 to March 2012. Operative records of the patients with ASBO due to phytobezoars were retrieved from Hospital Records Section. The clinical details, investigative work up, operative findings and intervention and type of bezoars were noted.

**Results**

Over the period of 5 years, 12 patients of phytobezoars were admitted in the department. The mean age of the patients was 1.85 years. There were 7(58.3%) males and 5 females (41.6.5%). Patients presented with features of mechanical

small bowel obstruction. The average time for presentation was 1.6 days from the initiation of first symptoms. Vomiting was most common and was present in all the patients of ASBO due to phytobezoars. Vomiting was bilious in 11 (91.7%). The other features included abdominal pain in 10 (83.3%), abdominal distension in 8 (66.7%), failure to pass stools in 9 (75%), failure to pass flatus in 9 (75%), diarrhoea 16 (25%), bleeding per rectum 2 (16.6% patients). On examination 8 (66.7%) patients had abdominal tenderness. Two patients presented with frank peritonitis on arrival. X-Ray abdomen was the primary investigation and it revealed obstructive pattern in all the patients. Patients with peritonitis had pneumoperitoneum on plane radiographs. Computed tomography scan was done in 6 patients. All the patients were operated in emergency settings within the period of  $8 \pm 3$  hours of admission. In 7 patients apricot bezoars were retrieved and in 2 turnip bezoars were present. Two other patients had bezoars due to ingestion of dried peach. Another case was due to the ingestion of *Carissa Opaca* (Garna) fruits. In one patient the type of bezoar couldn't be ascertained. In two patients finger-fracturing of the bezoar was done and in another two patients resection anastomosis was required as the intestine had perforated proximal to the obstruction. Four bezoars were milked into the large bowel and rest 4 patients were managed by enterotomy and retrieval of the bezoar. There were no significant operative complications and average hospital stay was  $5.2 \pm 1$  days. Seven patients were evaluated on follow up. Among the seven 1 had recurrence of symptoms due to adhesions 9 months after the primary surgery and was managed conservatively. Other 6 patients were symptom-free doing well.

## Discussion

Phytobezoars are rare causes of intestinal obstruction but over a period of few years we have witnessed quite a number of patients who presented with ASBO due to phytobezoars. All these patients hailed from a particular region of our state and that made us to investigate the records of these patients. As has been mentioned earlier the food habits of Northern Himalayan region are different than the rest of country due to it being the cold arid zone located in the rain shadow of Himalayas. It is also one of the driest regions in the world (9). Sun drying of apricot fruit (*Prunus armeniaca* L.) and other fruits and vegetable is carried out on a large scale in these areas. Smaller children, due their developmental behaviour, put huge variety of objects into their mouth during teething and also as a method to explore their environment (11). This is called mouthing and is considered as a natural, developmental behaviour which is impossible to stop in these young children (11). While mouthing, these children swallow the easily accessible & available dry fruits and vegetable. Older children accidentally swallow them as these fruits are usually dry, hard and difficult to chew. While moving through the stomach and small bowel these fruits and vegetable being hygroscopic imbibe lot of water and grow considerably in size making their transit difficult through the narrow parts of small bowel (6). This leads to obstruction and sequelae arising therefrom.

The features of obstruction are same as that of small bowel obstruction due to any mechanical cause. In our series most predominant symptom was vomiting which was bilious in 11 (91.7%). Other features were abdominal pain in 10 (83.3%), abdominal distension in 8 (66.7%), failure to pass stools in 9 (75%). Similar clinical picture has been reported in patients of phytobezoars obstruction by other studies (12-14).

In 6 patients, sonography revealed intraluminal mass with acoustic shadow in addition to features like dilated bowel loops. In two patients diagnosis of acute appendicitis with intraluminal fecolith was made. These findings are in concordance with other studies (15). CT scan was done in 6 patients and it revealed bezoar in four patients. Although CT did not reveal bezoar in two other patients, however it helped in diagnosis of small bowel obstruction with a significant transition in the calibre of gut in all 6 cases. In one case CT also correctly picked up the pneumoperitoneum and free abdominal fluid. The sensitivity and specificity of CT scan in diagnosing the bezoars has been reported to be 90% and 57%, respectively (16, 17). In one study CT scan correctly diagnosed obstruction due to phytobezoars in 50% of the patients while rest were diagnosed on water soluble contrast study and laparotomy (18). It was also noted that CT scan correctly identified the site of obstruction in the 4 patients with bezoars which was ileal in 3 and jejunal in 1 patient.

In our study the history of intake of dry fruit or dry vegetables was present in only 5 (41.7%) patients which is contradiction with the findings by Zafar et, al (19) probably due less awareness and educational levels in our study population.

The location of bezoars in our study was 8 ileal, 3 jejunal and one at the ileocaecal region. In a study by Garnel et al the commonest site of impaction of bezoar was narrowest part of ileum followed by Jejunum (20). However duodenal (14) and gastric bezoars (21) are also reported in literature.

## Conclusion

We conclude that dry fruits and vegetables like apricot, turnip and peach can lead to bezoar formation which subsequently leads to acute small bowel obstruction in these infants and young children. Due the mouthing behaviour of infants these items are potentially hazardous when swallowed without being properly cooked or mashed hence should be kept out of reach of children.

We also want to impress upon the attending physicians and clinicians to keep in mind the probability of phytobezoars obstruction in patients presenting with mechanical ASBO especially in patients from Himalayan regions. The history and clinical examination may not always suggest the diagnosis of bezoar obstruction but a strong suspicion and a CT Scan may help in reaching the diagnosis.

## References

1. Maheshwari M, Tanwani R, Patel M, Joshi A, Jain R, Praneeth E. Intestinal Obstruction in Pediatric Age Group: A Clinico-Pathological Study. 2016.
2. Baba AA, Ahmad SM, Sheikh KA. Intestinal ascariasis: the commonest cause of bowel obstruction in children at a tertiary care center in Kashmir. *Pediatric surgery international*. 2009;25(12):1099.
3. Bingham JR, Causey MW, Haque MI. Phytobezoar within Meckel's diverticulum: an unusual cause of intestinal obstruction. *The American Surgeon*. 2014;80(3):E94.
4. Şenol M, Özdemir ZÜ, Şahiner İT, Özdemir H. Intestinal obstruction due to colonic lithobezoar: A case report and a review of the literature. *Case reports in pediatrics*. 2013;2013.
5. Kuo J, Mo L, Tsai C, Yueh S, Lin R, Hwang M.

- Endoscopic fragmentation of gastric phytobezoar by electrohydraulic lithotripsy. *Gastrointestinal endoscopy*. 1993;39(5):706-8.
6. Puckett Y, Nathan J, Dissanaik S. Intussusception caused by dried apricot: A case report. *International journal of surgery case reports*. 2014;5(12):1254-7.
7. Hussain A, Dawa S, Akbar PI. Solar apricot dryers and drying processes in the high-altitude cold-arid Ladakh region of India. *International Journal of Ambient Energy*. 2014;35(4):180-5.
8. Rather NA, Lone PA, Reshi AA, Mir MM. An analytical study on production and export of fresh and dry fruits in Jammu and Kashmir. *International Journal of Scientific and Research Publications*. 2013;3(2):1-7.
9. Bhatt R, Raghuvanshi M, Kalia RK. Achieving Sustainable Livelihood in Cold Arid Regions of India through Multienterprise Options. *Annals of Arid Zone*. 2015;54(3&4):1-12.
10. Angchok D, Dwivedi S, Ahmed Z. Traditional foods and beverages of Ladakh. 2009.
11. Norris B, Smith S. Research into the mouthing behaviour of children up to 5 years old. Report URN. 2002;2:748.
12. Frazzini Jr VI, English WJ, Bashist B, Moore E. Case report. Small bowel obstruction due to phytobezoar formation within Meckel diverticulum: CT findings. *Journal of computer assisted tomography*. 1996;20(3):390-2.
13. Lorimer J, Allen M, Tao H, Burns B. Small-bowel carcinoid presenting in association with a phytobezoar. *Canadian journal of surgery Journal canadien de chirurgie*. 1991;34(4):331-3.
14. Chao H-C, Chang K-W, Wang C-J. Intestinal obstruction caused by potato bezoar in infancy: a report of three cases. *Pediatrics & Neonatology*. 2012;53(2):151-3.
15. Tennenhouse JE, Wilson SR. Sonographic detection of a small-bowel bezoar. *Journal of ultrasound in medicine*. 1990;9(10):603-5.
16. Gayer G, Jonas T, Apter S, Zissin R, Katz M, Katz R, et al. Bezoars in the stomach and small bowel—CT appearance. *Clinical radiology*. 1999;54(4):228-32.
17. Balthazar EJ, George W. Holmes Lecture. CT of small-bowel obstruction. *AJR American journal of roentgenology*. 1994;162(2):255-61.
18. Oh SH, Namgung H, Park MH, Park D-G. Bezoar-induced small bowel obstruction. *Journal of the Korean Society of Coloproctology*. 2012;28(2):89-93.
19. Zafar A, Ahmad S, Ghafoor A, Turabi M. Small bowel obstruction in children due to persimmon phytobezoars. *Journal of the College of Physicians and Surgeons--Pakistan: JCPSP*. 2003;13(8):443-5.
20. Granel B, Serratrice J, Disdier P, Laugier R, Weiller P. Asymptomatic gastric phytobezoar and anaemia due to iron deficiency revealing an autoimmune gastritis. *Presse medicale (Paris, France)*. 2004;33(17):1180-2.
21. Escamilla C, Robles-Campos R, Parrilla-Paricio P, Lujan-Mompean J, Liron-Ruiz R, Torralba-Martinez J. Intestinal obstruction and bezoars. *Journal of the American College of Surgeons*. 1994;179(3):285-8.