

The Jackfruit Conundrum: Case Series Studying Subacute Small Bowel Obstruction Secondary to Jackfruit Ingestion and its Management

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Abstract: *Food is not evil, gluttony is. As the saying goes, too much of anything is harmful. Jackfruits, a favourite seasonal fruit in India was found to be a culprit in causing (subacute) small bowel intestinal obstruction in patients who had earlier undergone abdominal surgeries. Considered to be a lesser known cause of bowel obstruction, (phyto) bezoars act by mechanically obstructing the path of digested food through the alimentary tract. In addition to the biological and chemical properties of phytobezoars, additional factors such as delayed gastric emptying/ gastric immotility, post operative status, comorbidities and sedentary lifestyle played a causal role. This study was conducted to show the causal relationship between jackfruit ingestion by patients who had previously undergone abdominal surgeries. The study was conducted during the first wave of COVID-19 in India. Demographic details along with management of each case was studied in a tertiary health care setting in suburban India.*

Keywords: Jackfruit, sub acute, small bowel, obstruction, conservative, covid-19, phytobezoar, post operative abdomen, intestinal obstruction, india, tertiary care centre

1. Introduction

Derived from the Persian word 'panzahar', loosely translated to antidote or counter poison is commonly used in the medical fraternity to label an indigestible intraluminal mass. Depending on the material by which they are formed, bezoars are of several types-trichobezoar (hair), lactobezoar (dairy), polybezoar (ingested foreign bodies), pharmacobezoar (medications) and phytobezoars (fruits, vegetables or plants). [1]

Though the incidence of trichobezoars is greater, phytobezoars have been more commonly associated with intestinal obstruction. Pharmacobezoars, commonly formed by drugs like kayexalate, antacids and cholestyramine are seen when these medications are taken in excess or in patients with added predisposing factors. [2] Lactobezoars are usually observed in infants taking baby formulas.

High fibre fruits such as persimmons, pumpkins, grape skins, pineapple and celery have been implicated in bezoar formation, at times even leading to subacute symptoms of intestinal obstruction. As documented in literature, persimmons among all other fruits have been known to cause obstructive symptoms. Persimmons like most high fibre fruits and vegetables are rich in tannins, lignins, hemicellulose and cellulose. [3] Persimmons in addition to the above are also formed by a compound leucoanthocyanins and catechins making them indigestible (especially when unripe).

On the other hand, *Artocarpus heterophyllus* colloquially referred to as jackfruit, belonging to Moraceae family is indigenous to Asia, Africa and commonly found in the Western Ghats of India. [4]



Figure 1: Jackfruit

Predisposing factors such as inadequate chewing/edentulous patients, history of previous gastric surgeries, abdominal surgeries, comorbidities such as diabetes, hypothyroidism and intraluminal or extraluminal causes of mechanical obstruction. [1]

Previous gastric surgeries increase the risk of phytobezoar formation by delaying gastric motility and reducing gastric acidity. As the food bolus is majorly broken down in the stomach both by chemical and mechanical action, any surgical intervention mitigating this function increases phytobezoar formation. Pyloroplasty and antrectomy surgeries are often reported in patients who present with phytobezoar gastric obstruction. [5]

Diabetes and hypothyroidism are comorbid conditions which also negatively affect gastric emptying. [2]

Diverticulae, strictures and intraluminal masses may act as mechanical obstruction causing gradual build up of indigestible material forming a bezoar. [6] Patients who have undergone abdominal surgeries are prone for post operative adhesions. These adhesions, if extensive, favour bowel obstruction. In the presence of mechanical factors like a phytobezoar, patients are found to be highly susceptible for gastrointestinal obstruction.

Ultrasonography may diagnosis bezoar induced ileus in 88-93% of individuals. This imaging modality is operator

dependent and may prove to be difficult in picking up bezoar induced ileus in patients with multiple bezoars. Bezoars form hyperechoic acoustic shadows on ultrasonography. Multiple air fluid levels have been found to obstruct visualisation of obstruction. [7]

Mechanical ileus can be picked up with a simple erect xray abdomen showcasing multiple air fluid levels. It does not however help in ruling out other causes of ileus. [8]

2. Materials and Methods

Over the year dating from January 2020 to January 2021, a series of patients who presented to a tertiary care hospital in South India with complaints of abdominal pain, constipation after ingestion of jackfruit were considered. Inclusion criteria also consisted of patients who had history of previous abdominal surgery. The time from surgery to the time of presentation of symptoms was not specified. Consent was obtained from all patients willing to participate.

On admission, patients were evaluated and initially treated conservatively with IV fluids, analgesics, prophylactic antibiotics and abdominal rest. Frequent clinical assessment was done. Accordingly, the patient was either continued on conservative management or surgical intervention was initiated.

3. Results

Over the course of the year from January 2020 to January 2021, 138 patients were admitted with complaints suggestive of intestinal obstruction. Out of the 138 patients, 84 were female and the remaining 54 were male. After evaluation, the primary cause for intestinal obstruction was primary carcinoma of GI tract in 59 patients. 12 patients had intestinal obstruction secondary to ingestion of jack fruit.



Figure 2: CT image of subacute obstruction in a middle aged female following jackfruit ingestion.

One patient was shifted to OT where an enterotomy was done and bezoar was milked through the tract and extracted. Enterotomy was primarily closed. Patient recovered with no

complications. Another patient who did not improve with conservative management underwent resection anastomosis and adhesiolysis in view of intraoperative findings. One patient underwent percutaneous catheter drainage on POD3 in view of peritoneal collection.

Eight of these patients were managed conservatively and improved symptomatically. Patients were asked to refrain from further jackfruit ingestion.

| | | Male | Female |
|--|----------------------------------|------|--------|
| Number of patients with obstruction due to | Primary Cause | 38 | 21 |
| | Secondary Cause | 16 | 63 |
| Mode of Treatment | Secondary to Jackfruit Ingestion | 4 | 8 |
| | Conservative | 3 | 5 |
| Complications | Operated | 1 | 3 |
| | Peritoneal Collection | 0 | 1 |

4. Discussion

Jackfruit is known to be high in dietary fibre, In Coronel, it has been reported that the fiber content of immature and ripe jackfruit is 2.6% and 0.8%, respectively. [9]

Dietary fiber present in jackfruit makes it a good bulk laxative. This decreases the exposure time and binds to cancer causing chemicals, as well as mineral and vitamins in the colon, and helps to protect the colon mucous membrane. High fiber content also maintains smooth bowel movements and prevents constipation.

Rahman et al. indicated that the total dietary fiber of the perianths was almost similar in soft and firm varieties, but in Hasan, the fiber content of the jackfruit flesh varied from 0.57 to 0.86%, depending on the variety and the season. [9]

Though dietary fibre is often considered to be protective against certain diseases, its high starch content, dietary fibre, tannins predispose the food to form a bezoar. Its excessive consumption coupled with a post operative abdomen increases the risk of intestinal obstruction.

In 1986, Krausz reported that, 91.2% of 113 patients with PBZs had a persimmon intake history. Historical literature also mentions pineapple and cherry laurel as ingestible products noted to cause intestinal obstruction. [10]

Treatment with enzymatic substances such as papain, cellulase, pancreatin and others like hydrochloric acid, sodium bicarbonate and cococola have all been described in treatment of gastric bezoars as a conservative treatment option. Endoscopy is often considered to follow if treatment failure occurs. [11]

As explained by Chisholm et al, migration of 'daughter' fragments after endoscopic fragmentation can lead to distal obstruction. Likewise it is not preferred as the only option for treatment is to perform an open laparotomy. [12]

Krauz et al pointed out that the ideal method of treatment for intestinal obstruction due to a phytobezoar was milking the bezoar into the large bowel without an enterotomy. [10] Another school of thought mentioned by Yakan et al prefer

enterotomy for removal of an intestinal phytobezoar since milking may cause disruption of intestinal mucosa. [6]

Management of such cases of intestinal obstruction stretch over a spectrum of conservative to emergency laparotomy. The decision to do either depends upon the patients presentation, vitals, laboratory reports and imaging.

Unstable patients in sepsis who present with acute and severe symptoms are to be taken up immediately for exploratory laparotomy. However, stable patients with features and supporting reports and imaging of subacute obstruction may undergo a trial of conservative treatment.

Surgical options include enterotomy, milking, resection anastomosis and concomitant adhesiolysis. Unlike gastric bezoars, endoscopy is not an option. Colonoscopy may be attempted, though often not practiced. Colonoscopy was not attempted in any of the patients.

5. Conclusion

Jackfruit is a high fibre fruit, rich in starch and with hygroscopic properties. In South India, it is a seasonal fruit found in many households. Patients with history of abdominal surgeries who ingest this fruit in excess have a high risk of enduring subacute or acute intestinal obstruction. Conservative management often proves effective though surgical intervention may often be required to relieve the patient of their symptoms.

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