CASE REPORT

# The Role of Non-Contrast CT in the Diagnosis of a Rare Cause of Small Bowel Obstruction Due to Bezoar

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## ABSTRACT

Contrast Enhanced CT Abdomen is usually used to investigate the source of the small bowel obstruction. A 13-year old girl presented with signs of small bowel obstruction and was complicated with acute renal injury. Non-contrast CT Abdomen showed findings consistent with bezoar, and the findings are similar to the features seen in a contrast study. This case shows that both the plain and the contrast CT abdomen give similar findings of bezoar, one not inferior to the other.
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## INTRODUCTION

Small bowel obstruction is a common feature of patients admitted to the Emergency Department. Most of these patients will undergo Contrast Enhanced Computed Tomography (CECT) to determine the cause(s) of the obstruction. The accurate diagnosis of the cause of the bowel obstruction will significantly assist the surgeon in pre-operative planning. However, not all patients are ready or suitable for a contrast study. Small bowel obstruction due to bezoar remains an uncommon diagnosis that presents a challenge in diagnosis and management. Several features of abdominal CECT can indicate a diagnosis of bezoar. However, there are hardly any institutions that perform a non-contrast CT of the abdomen to look for the cause(s) of small bowel obstruction, especially bezoar. This case study highlighted a patient who developed acute renal injury secondary to dehydration and was therefore considered an unsuitable candidate for a contrast study. We discussed the findings of bezoars on a non-contrast CT as seen in our patient.

## CASE REPORT

A 13-year old Malay girl presented to the Emergency Department with five days history of abdominal pain that was colicky in nature; and associated with vomiting. Clinically, patient was dehydrated and lethargic looking with sunken eyes. On examination, the abdomen was distended and tender over the epigastric region; however no guarding noted. Patient was tacyhcardic with heart rate ranging from 90bpm to 100bpm and blood pressure ranging from 110/70mmHg to 120/80mmHg. No fever was documented. Urgent blood investigation revealed raised serum creatinine of 415umol/L. The venous blood gas did not show any evidence of metabolic acidosis. Abdominal Xray showed dilated small bowels. The clinical diagnosis of severe dehydration with severe acute renal injury and small bowel obstruction were made. In view of the presence of acute renal injury, non-contrast CT (NCCT) Abdomen was ordered instead of contrast enhanced CT (CECT) Abdomen.

NCCT Abdomen showed dilated loops of small bowel with the transition zone at the left suprapubic region. There was well-encapsulated intraluminal debris with mottled appearance within at the transition zone (Figure 1,2 and 3).

This patient underwent exploratory laparotomy in which the intraoperative findings showed dilated proximal small bowel, approximately 170cm from proximal duodenal-jejunal (DJ) flexure. An indentable mass with the length of about 9cm was identified at the level of the transition zone. The mass was milked out from enterostomy site, and was revealed to be trichobezoar.

This patient was subsequently referred to child psychology

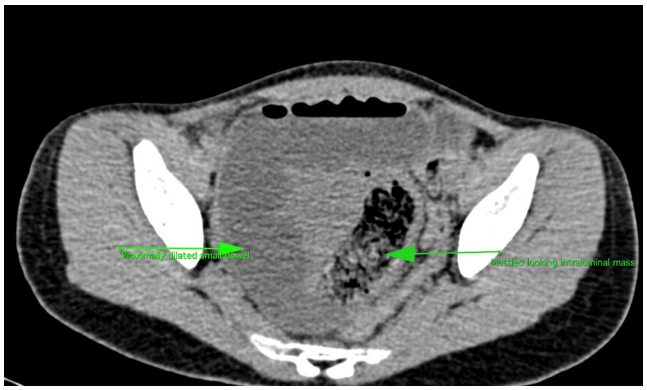


**Figure 1: Axial Image CT scan. Mottled looking intraluminal lesion located at the left suprapubic region. It also shows proximally dilated small bowel loops.**

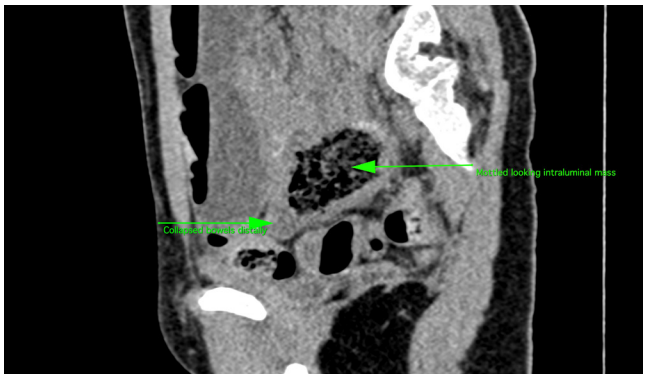


**Figure 2: Coronal image CT scan. Distal to the mottled looking intraluminal lesion, the bowel loops are collapsed.**

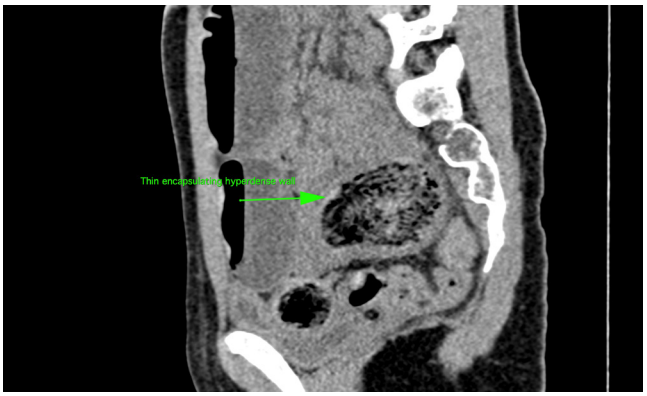


**Figure 3: Saggital image of CT scan. An ovoid shaped lesion with thin hyperdense encapsulating wall surrounding the intraluminal lesion can be outlined.**

for trichophagia likely due to trichotillomania. Upon discharge, the renal profile normalized and the final diagnosis of small bowel obstruction secondary to trichobezoar was made.

## DISCUSSION

Small bowel obstruction is one of the common clinical presentations of bezoars, even though bezoar is only accountable for less than 5% of all the causes of intestinal obstructions. In the current practice, there is an increasing role of CECT Abdomen as a pre-operative assessment to better define the level and the cause of bowel obstruction.

We will be discussing several imaging findings that are characteristics of bezoar, based on the literatures review and compared those to the findings identified in our case using a non-contrast CT Abdomen. Since our patient developed acute renal injury secondary to dehydration, she was therefore considered unsuitable candidate for a contrast study. Hence NCCT Abdomen was ordered instead of CECT Abdomen.

As reported in most of the literatures, the most characteristic findings of bezoar are intraluminal air bubbles with mottled appearance. However, it will be difficult to differentiate the imaging findings of bezoar from small bowel feces sign as both of these share relatively similar imaging findings. As described by FuchsjΔger MH small bowel feces sign is due to the slow down of the intestinal transit time which leads to the blending and mingling between the feculent material and the gas bubbles within the small bowels (1). This sign is present in patients with small bowel obstruction. As the feculent material mingled with the gas bubbles, it shares relatively similar mottled appearing lesion as seen in bezoar.

However, one characteristic to differentiate between bezoars and small bowel feces sign is the location of this intraluminal lesion. Delabrousse (2) discusses Zissin's article in which it was reported that bezoar was usually located at the transition zone between the dilated and collapsed loops of small bowel, whereas the small bowel feces sign was usually located within the dilated small bowel loops. In another case series of 17 patients, Ripolles et al described that 88 percent of the patients who were diagnosed with small bowel obstruction secondary to bezoar intraoperatively, their CECT Abdomen showed presence of dilated small bowel loops with the bezoar located close to the transition point (3). In our patient, using NCCT Abdomen, we can also similarly demonstrate the mottled appearing intraluminal lesion (Fig. 1). Corresponding to the findings by Rippolles et al, the bezoar is located at the transition point between the dilated small bowel loops proximally (Fig. 1) and collapsed bowel loops distally (Fig. 2). From the CT, the lesion was located within the small bowel at the left suprapubic region most likely the ileum. This corresponded to the intra-operative findings that showed the location of the bezoar within the ileum, approximately 170cm from the duodenal-jejunal flexure. Bezoar is more prone to stay within the ileum, as it correlates to the narrowest part of the small bowel (2).

Delabrousse et al reported that in three out of eight (38%) cases of bezoar, encapsulating wall surrounding the

bezoar was reported whereas none of the small bowel feces sign demonstrate this finding (2). Similarly in our case, even though it was a non-enhanced CT Abdomen, we can easily outlined a thin hyperdense encapsulating wall surrounding the intraluminal mass (Fig. 3).

Majority of the literatures described the length and the shape of the mass as one of the major differentiating factors between bezoars and small bowel feces sign (4). Bezoars is often described as an ovoid mass with a length approximately 5cm whereas small bowel feces sign is usually more tubular with longer length (4), with some literatures reported it to be longer than 10cm. The shape and the length of the intraluminal mass can be confidently delineated regardless whether the CT Abdomen is a contrasted or non-contrasted study. In our case, the CT shows an ovoid shaped intraluminal mass (Fig. 3) instead of a tubular lesion, with approximately 7cm in length from the CT scan. Nevertheless some authors did not agree with these findings, with one author reporting that bezoar was not found to be significantly shorter compared to small bowel feces (2).

Floating fat density debris sign is another clue to differentiate between bezoar and small bowel feces sign (2). Floating fat density debris indicates the presence of debris with fat density floating within proximally dilated bowel loops (2). Delabrousse et al reported that higher incidence of floating fat density debris was seen in patients with bezoar compared to those patients with small bowel feces sign (2). Concurrent finding of similarly mottled appearing lesion in the stomach is also common in bezoar whereas it is not ever reported in cases with small bowel feces sign (2). Even though both of these findings are not present in our case, both of the findings can be easily identified on a non-contrasted study. The floating fat density debris can be easily identified based on the measurement of the region of interest (ROI) with attenuation ranging from -50HU to to 150HU.

All the cases of bezoars will need surgical intervention whereas in some cases of intestinal obstruction with small bowel feces sign can be managed conservatively. Identifying bezoars as the cause of intestinal obstruction will lead to an earlier surgical intervention and thus better outcome for the patient.

## CONCLUSION

Bezoar is mainly identified from contrasted CT scan in all the reviewed literatures. However as this patient developed acute renal injury from dehydration on the time of CT, a non-contrast CT abdomen was ordered instead of a contrast scan. Despite this, similar findings of bezoar as described in other literatures can also be seen in our patient. Both the plain and the contrast CT abdomen give similar findings of bezoar, one not inferior to the other.

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