Dear Editor,

Bezoars and gallstones are unusual causes of small bowel obstruction, with well-described imaging features on CT. We present a case of intestinal obstruction caused by a laminated mass in the terminal ileum that resembled a gallstone on CT, but was surgically proven to be a durian seed phytobezoar. Ex vivo imaging confirmed that the 2 conditions share similar appearances on CT, and we described differentiating imaging features between the 2 entities.

Case Report

A 61-year-old man with no medical history of note, presented with severe abdominal pain of one day duration. Save for mild abdominal distension, clinical examination was unremarkable. Abdominal radiograph showed non-specific dilated small bowel loops. CT scan revealed that the cause of the obstruction was an intraluminal 2.1 cm x 2.1 cm mass in the terminal ileum, which was not seen on the abdominal radiograph. The mass was well-circumscribed and appeared laminated with 3 layers: a central low density nidus (66 HU) with a surrounding soft-tissue density body (129 HU) and a thin, high density, almost calcified outer rim (165 HU)(Fig. 1a). The average attenuation value was 122 HU. Given the presence of an obstructive, laminated high-density lesion, gallstone ileus was suspected. However, no stones were seen in the gallbladder, and no aerobilia was seen. On laparotomy, the obstructive lesion was found to be a durian seed (Durio spp).1

The durian is a large thorn-covered fruit with a distinctive smell. Each fruit typically weighs between 1 to 3 kilograms, and contains 10 to 20 ovoid fleshy seeds each weighing approximately 20 grams. It is widely known and consumed, particularly throughout Southeast Asia.2

Given the close resemblance in the CT appearances between the durian seed phytobezoar and a laminated gallstone, further ex vivo CT imaging of a representative durian seed of equivalent size was performed. This demonstrated a similar laminated appearance and attenuation values as the in vivo specimen. On sagittal reconstruction, however, the ‘nidus’ in a durian seed was eccentrically located (rather than central), and did not extend throughout the entire length of the seed (Fig. 1b).

Discussion

Swallowed foreign bodies as a cause of small bowel obstruction are rare, particularly in the absence of gastric outlet surgery or adhesions from prior abdominal surgery. This is because a foreign body that passes through the pylorus will usually transit the rest of the small bowel without any difficulty.

Gallstones have a varied appearance on CT, depending on their composition. Using a morphological analysis algorithm by Brink et al,3 a solitary ellipsoid radiolucent ‘stone’ of greater than 20 mm short axis diameter, such as the one seen in our study, would likely comprise a cholesterol core.
with calcium bilirubinate cover. On CT, such a stone would 
appear as a central low-density core surrounded by a rim of 
higher-density material. Mean CT numbers of 106 (range, 62 
to 303) HU have been quoted for such stones with calcified 
rims. The attenuation of 122 HU for the durian seed falls 
within the quoted range for rim-calci

cified gallstones.

In the case of the durian seed, the laminated appearance 
is a result of different attenuation of its 3 parts. The low-
density core consists of the embryo (which is made up 
mainly of loosely-packed cellulose), while the endosperm 
(which is made up of tightly-packed starch and protein) 
forms the bulk of the seed, and a thin, high-density seed 
coat forms the outermost layer.

Therefore, although structurally different, durian seeds and 
laminated gallstones can have similar CT appearances, both 
visually and quantitatively using attenuation measurements. 
While a history of recent seed ingestion would be the 
key to diagnosis, such history may not always be readily 
available. CT features, such as the presence of gallstones 
and pneumobilia may be useful in the diagnosis of gallstone 
ileus. Conversely, given that pneumobilia is seen in up to 
89% of cases of surgically proven gallstone ileus, its absence 
should raise suspicion of a cause other than gallstones, and 
prompt more detailed evaluation of the obstructive lesion.

Evaluation of the morphology of the obstructive lesion 
may also be helpful. Although both gallstones and seeds 
may be ovoid, one would expect the nidus in a laminated 
gallstone to be centrally-located due to the way in which 
additional layers are formed, while the seed embryo is 
typically peripheral. Also, a seed would demonstrate at 
most 3 layers whereas a gallstone may have more layers. 
While the current literature detailing CT appearance of other 
large seeds remains sparse, we believe that our findings are 
also likely applicable to intestinal obstruction caused by 
similarly-sized seeds other than the durian.

Differentiation of gallstone ileus from phytobezoars 
is important as surgical management differs. Briefly, 
gallstone ileus usually requires emergent operation whereas 
some forms of bezoars may be treated conservatively or 
fragmented and 'milked' to the caecum.

To conclude, phytobezoars and gallstones are distinct 
entities with classic appearances on CT. We present a case 
of small bowel obstruction due to a durian seed phytobezoar, 
which resembled a gallstone on imaging due to its laminated 
appearance. The distinguishing features included a history 
of seed ingestion, absence of aerobilia, and peripherally 
located low-density nidus.

Acknowledgements

The authors would like to thank Mr Zheng Xian Dong and Mr Lu Xiao Nan for their help with the ex-vivo images.

REFERENCES