Durian Seed Masquerading as Gallstone Ileus on Computed Tomography

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]

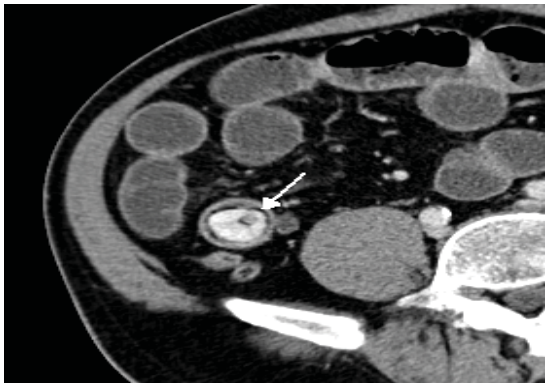

Fig. 1a. Axial CT shows a laminated intra-luminal obstructive mass with a low-density central nidus and a thin high-density rim.

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).

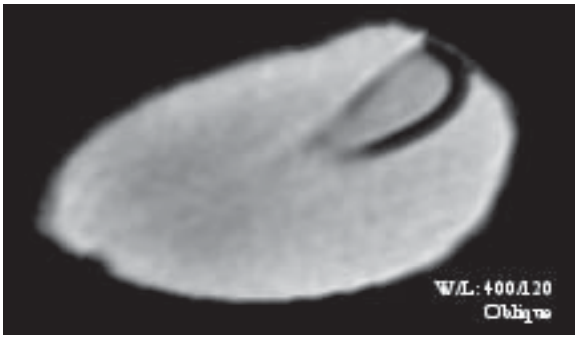

Fig. 1b. Ex vivo sagittal CT of a similar seed confirms the laminated nature, but demonstrates a peripherally located nidus that does not extend through the length of the seed.

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.[4] The attenuation of 122 HU for the durian seed falls within the quoted range for rim-calcified 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.[5]

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.[6]

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.

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