



Mango Seed Causing Acute Intestinal Obstruction in Dogs: A Case Series

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ABSTRACT

A bowel obstruction is a common canine problem. This study records acute small intestinal obstruction caused by the ingestion of mango seeds in three dogs. Three adult dogs were admitted to the surgery clinic with a one-day history of colicky abdominal pain, sudden episodes of vomiting, lack of appetite, no defecation, and lethargy. A swollen abdomen and widespread pain, increased bowel sounds, abdominal pain and no fever were discovered during the physical examination. Complete blood count, electrolytes and creatinine were normal. Abdominal radiography revealed many dilated small intestinal loops filled with gases and an intraluminal radio-opaque foreign body. Based upon the clinical and radiological examinations, the dogs underwent exploratory laparotomies. During laparotomy, the duodenum in all dogs was collapsed up to the jejunum, where a firm intraluminal mass was sensed. The proximal small bowel was distended. There were no obvious bowel perforations, ischemia or necrosis. The attempt to break the mass using digital compression was futile. As a result, an enterotomy was performed. Mango seeds were extracted from all dogs. The dogs recovered without complications and were released three days following the operation. In conclusion, fresh mango seed can become lodged and create a possibly fatal intestinal obstruction in dogs. Early detection and treatment of these dogs can prevent fatal complications. This problem in dogs can be avoided by properly disposing of fallen and rotting mangoes and mango seeds in a rubbish bin rather than throwing them out in the open.

Case study:

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INTRODUCTION

Small intestinal foreign body blockage is prevalent in dogs, accounting for 80% of all bowel obstructions in canines. Acute intestinal obstruction in dogs is a life-threatening condition if not treated appropriately (Mullen *et al.*, 2020). There are numerous causes of intestinal obstruction in dogs, such as foreign bodies, tumours, strictures, intussusceptions, hernias, adhesions, enterolith, and heavy infestation with roundworm (Barrand, 2018; Malberg and Hespel, 2021; Miles *et al.*, 2021).

Intestinal obstruction can impair the blood supply of the involved part of the bowel, leading to severe complications such as necrosis and even perforation of the bowel, which is a fatal condition (Mullen *et al.*, 2020). As a result, early detection is critical to avoiding the consequences associated with intestinal obstruction.

Abdominal radiography is the initial line diagnostic technique in dogs with obstructed bowels

(Miles *et al.*, 2021). Dogs with obstructed bowels, particularly those with segmental dilation (less than 25% of the small intestines), have a small intestinal maximal diameter (SI_{max})/L5 vertebral body height ≥ 2.4 , SI_{max}/small intestinal minimal diameter (SI_{min}) ≥ 3.4 , and a SI_{max}/average of small intestinal diameters (SI_{ave}) ≥ 1.9 (Finck *et al.*, 2014).

Ultrasonography can also be used to diagnose intestinal blockages in dogs. There are characteristic sonographic findings for small intestine obstruction due to foreign bodies like dilated bowel with pendulous movement of the ingesta, intraluminal foreign bodies, non-uniform peristaltic movement of the dilated intestinal loop, or akinetic bowel (Manczur *et al.*, 1998).

To avoid intestinal perforation and the advancement of life-threatening electrolyte and acid-base imbalances caused by sequestration and emesis, dogs with tiny intestine obstructive foreign material should undergo emergency surgery. Depending on

the survivability of intestinal tissue, enterotomy, resection and anastomosis may be indicated to remove the obstructive item (Mullen *et al.*, 2020).

To the author's knowledge, mango seeds as a cause of acute small intestinal obstruction have not been published in the veterinary literature. This case series reports acute small intestinal obstruction in dogs due to ingestion of mango seeds.

OBSERVATIONS

Three-year-old male indoor German shepherds, five-year-old male outdoor German shepherds, and one-year-old Rottweiler female outdoor dogs were admitted to the surgery clinic with a single day of colicky gastrointestinal pain, vomiting, and abdominal distension. The owner of the indoor dog did admit to eating a lot of mango for the past two days, and the dog accidentally swallowed mango seed from the waste bin while the other outdoor dogs had an unknown history of swallowing foreign bodies. The outdoor dogs were used as guard dogs on a mango farm.

A swollen abdomen, widespread soreness with increased bowel sounds, normal body temperature, and abdominal pain were discovered during a physical examination of the dogs.

Complete blood count, electrolytes, and creatinine were all normal. Abdominal X-rays revealed many dilated small intestinal loops filled with gases and presence of an intraluminal radio-opaque foreign body that completely obstructed the small bowel (Fig. 1). All dogs had $SI_{max}/L5 \geq 2.4$, $SI_{max}/SI_{min} \geq 3.4$, and $SI_{max}/SI_{ave} \geq 1.9$.

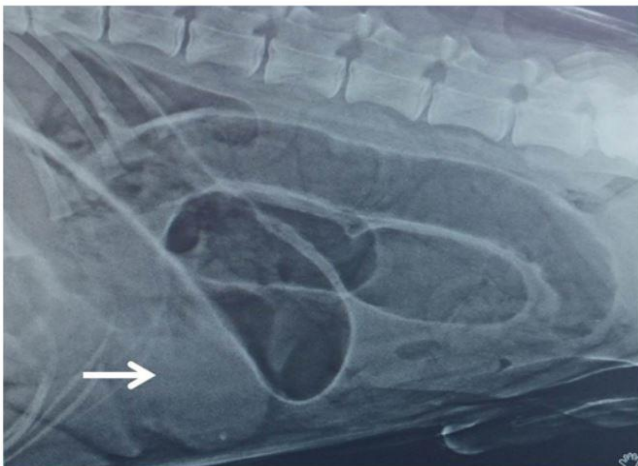


Fig. 1: Lateral radiograph of a 3-year-old German shepherd dog with complete small intestinal obstruction due to ingestion of a mango seed. Notice the dilated small intestinal loops filled with gases and presence of intraluminal radio-opaque foreign object (white arrow).

According to the clinical and radiological findings, the dog underwent exploratory laparotomy under general anesthesia. Each dog was premedicated with Atropine sulphate at a dose of 0.1 mg/kg given subcutaneously (Atropine 1%®, ADWIA, Egypt) and Xylazine HCl (Xylaject 2%®, ADWIA, Egypt) at a dose of 1 mg/kg given intravenously. General anaesthesia was induced by using Ketamine HCl (Ketalar®: JHP Pharmaceuticals, Michigan, USA) at a dose of 5 mg/kg given intravenously using a cannula fixed in the cephalic vein and then maintained by Thiopental sodium (Thiopental sodium®, EPICO, Egypt) at a dose of 25 mg/kg as a 2.5% solution given intravenously.

At laparotomy, several dilated intestinal loops were seen proximal to the site of obstruction, while the distal segments appeared empty and collapsed (Fig. 2).

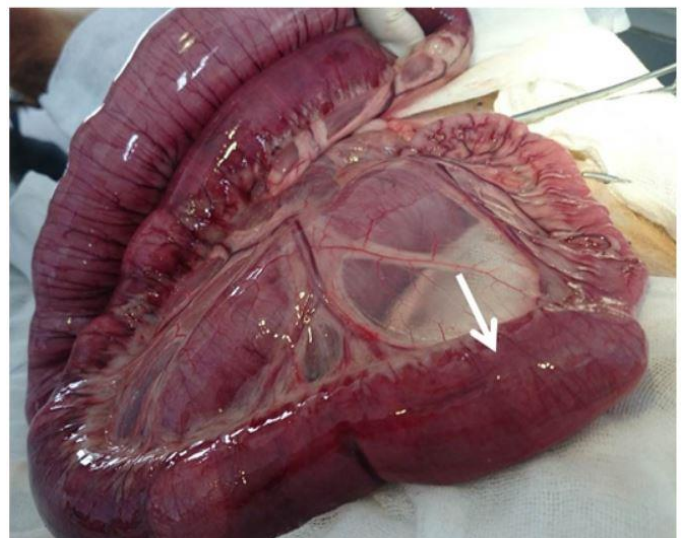


Fig. 2: Intra-operative photo of the same dog in figure 1 showing dilated proximal intestinal segment, presence of intraluminal foreign object causing complete obstruction (white arrow) and empty as well as contracted intestinal segment distal to the obstruction.

The site of obstruction was in the jejunum (two dogs) and the terminal ileum (one dog), where a firm intraluminal mass was sensed. There was no obvious bowel ischemia, necrosis or perforation. A failed attempt was made to break or pass the mass via digital compression. Hence, an enterotomy was performed. The removed mass was mango seeds in the three dogs (Fig. 3). The dogs had an uneventful recovery and were discharged after three days of surgery.

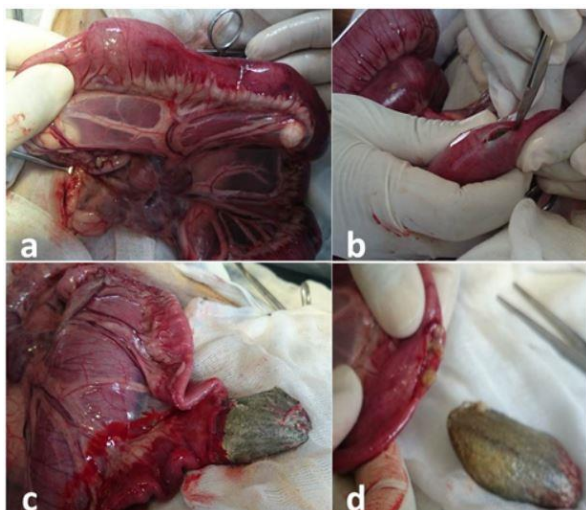


Fig. 3: Intra-operative photos of the same dog in figure 1 showing viable dilated small intestinal loops and presence of intraluminal foreign object causing complete obstruction of the bowel (a); the intestinal wound during enterotomy (b), removal of the intraluminal mango seed (c) and the mango seed after complete removal from the small intestines (d).

DISCUSSION

Foreign bodies are commonly seen within the canine gastrointestinal tract (Hayes, 2009). The present case series records an acute bowel obstruction in dogs caused by mango seeds, which indicates its significance for veterinary literature reporting. Other discarded food items usually swallowed by dogs when just discarded instead of disposed of properly are cooked bones, kebab sticks, corn cobs, and others. In addition, non-food items can be found and eaten, like toys, tennis balls, leather, sticks, pebbles, stones, plastic, needles, coins, string, and others (Barrand, 2018; Malberg and Hespel, 2021; Miles *et al.*, 2021).

During the summer, mango is a popular fruit, and its soft flesh is pleasant and sweet for dogs. However, not all sections of the mango are suitable for dog consumption. Mango skin may be difficult for some dogs to digest. Mango seed consumption can cause intestinal blockage, gastritis, enteritis, dental caries, and cyanide toxicity in dogs (Lebaka *et al.*, 2021). Dogs are attracted to mango because of its large, flat, and pleasantly chewable seed. Because fallen and decaying mangoes commonly litter the ground surrounding the trees, where their seeds are within easy reach of the dogs, additional care should be taken for outdoor dogs throughout the summer season, particularly canines present in or near mango fields.

The current cases had normal CBC and serum chemistry due to their acute onset and early diagnosis. Laboratory tests play a crucial role in the diagnosis of enteropathy in dogs, particularly in chronic cases (Allenspach, 2015).

Diagnostic imaging helps with the definitive diagnosis of the reported dogs. Abdominal X-rays showed a dilated small bowel, presence of intraluminal mango seeds, and a level of obstruction. All reported cases here had complete, small intestinal obstruction. Intestinal dilation is a valuable radiographic feature for the diagnosis of obstructive bowel in vomiting dogs (Graham *et al.*, 1998; Choi *et al.*, 2012). Both abdominal radiography and ultrasonography are effective for diagnosing small-intestinal obstruction in dogs, and either method can be used depending on availability and examiner preference (Sharma *et al.*, 2011). The author preferred X-rays as a diagnostic imaging tool for the present dogs due to their availability and accuracy. The three dogs had $SI_{max}/L5 \geq 2.4$, $SI_{max}/SI_{min} \geq 3.4$, and $SI_{max}/SI_{ave} \geq 1.9$. Similar findings were previously reported in dogs with intestinal obstruction (Finck *et al.*, 2014).

Based upon the positive clinical and radiographic findings, an exploratory laparotomy was performed, which revealed a hard mass in the small intestine of the examined dogs. Manual compression was applied to try to break or pass it, but it was ineffective; therefore, an enterotomy was performed. Manual compression should be used to try to pass these seeds; if this fails, enterotomy or intestinal resection and anastomosis should be performed, depending on the state of the intestinal tissues. To restore the alimentary tract's integrity, the least number of intestinal procedures should be carried out during surgery (Hayes, 2009).

Due to the low accuracy associated with surgeon judgment of color, peristalsis, pulsation, bleeding, and mural thickness alone (Sharma *et al.*, 2011), a number of subjective and objective parameters are used to determine the survivability of intestinal tissue. These factors may influence the surgeon's decision to do an enterotomy or resection and anastomosis (Mullen *et al.*, 2020). The recorded cases here were acute in nature; therefore, the intestinal tissue was viable, and enterotomy was the selected surgical intervention.

In the current study, all treated dogs recovered well without any complications due to their early diagnosis and treatment. A similar finding was reported by an earlier author (Hayes, 2009).

In this case series, all recorded mango seeds were present in the terminal ileum and in the jejunum due to their small luminal size. The nature of mango seed (long, hard, and rough) may obstruct the bowel obliquely while passing through the small intestines. In this respect, foreign bodies were detected at all places along the gastrointestinal tract in dogs, with the jejunum accounting for 63% of blockages (Hayes, 2009).

In the acute setting, dogs with obstructed bowels due to mango seed should be treated as similar cases of intestinal obstruction with good resuscitation, and a decision for surgical interference is based upon the clinical and imaging findings. Similarly, **Hayes (2009)** found that the result of gastrointestinal obstruction by foreign bodies is improved by prompt presentation, diagnosis, and surgical intervention.

In the current study, all dogs recovered without complications and were released three days following the operation. However, intraoperative spillage, wound dehiscence, or perforations in the lower small intestine or colon have been reported after gastrointestinal surgery in companion animals and linked to a greater death incidence (**Ellison, 2011**).

Some dogs are more indiscriminate eaters than others; thus, limited access for dogs to food or food waste is highly recommended (**Hayes, 2009**). Furthermore, safe disposal of decaying mango and mango seeds in a proper garbage bin is strongly suggested, since discarding them in the open may entice dogs to ingest them before their owners are even aware of it.

CONCLUSION

Mango seeds can cause an acute small intestine blockage in dogs and should be considered in the differential diagnosis of a dog exhibiting symptoms of bowel obstruction. Early detection and treatment of these animals can save their lives. Appropriate disposal of decaying mango and mango seeds can help dogs avoid this problem.

Conflict of interests

The author declares no conflict of interests

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