



CASE REPORT

PICA SYNDROME-ASSOCIATED BOWEL EMERGENCY IN A 1-YEAR-5-MONTH-OLD BOERBOEL DOG – A CASE REPORT

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Ethical considerations: When reporting experiments on animals Observation of the ARRIVE guidelines 2.0: Updated guidelines for reporting animal research, published on July 14, 2020 (DOI: 10.1371/journal.pbio.3000410), is applied. The authors ensure that all procedures were performed in compliance with the guidelines for animal care of their institutions or with national/international guidelines.

ABSTRACT

Dogs sometimes engage in unhealthy feeding habits, including the consumption of non-edible materials. This habit has been associated with mineral deficiency or boredom, resulting in behavioral and psychological disorders. Some ingested materials may pass through the gastrointestinal tract (GIT) without eliciting any clinical signs, while others may cause obstruction, leading to emergencies. Diagnosis may require history, physical examination, laboratory tests, and imaging modalities. Management could be conservative (endoscopy) or invasive (gastrotomy, enterotomy, or enterectomy). A 1-year-5-month-old male Boerboel dog was presented with a history of vomiting, anorexia, and reduced activities. The dog has been known to chew indiscriminately on non-edible materials. The dog was dull and recumbent, abdominal palpation revealed a hard mass at the mid-ventral abdomen, eliciting pain. A survey abdominal radiograph showed dilated, gas-filled intestinal loops with an intraluminal mass of varying radiopacity. Based on the diagnosis of intestinal obstruction, a laparo-enterotomy was performed under general anaesthesia, and foreign materials (sponges, rubber band, cloth material, woods and rope with metal materials) were evacuated from the jejunum. The dog's recovery was uneventful. Provision of commercial food with adequate mineral supplements, edible chewing materials, social environment, and routine walks for dogs, particularly kenneled dogs, are recommended to ease boredom and enrich their lives.

Keywords: boredom; endoscopy; foreign body; intestinal obstruction; laparo-enterotomy

INTRODUCTION

Allotriophagia, commonly known as pica, is the ingestion of non-nutritive substances [1]. It has been reported in both veterinary and human medical practices. Although pica is common in humans, it is relatively less common in animal species and is associated with psychological and behavioral conditions such as hypersensitivity–hyperactivity syndrome, impulsivity, obsessive-compulsive disorders, boredom, hunger, anxiety or attachment-related troubles, as well as deficiency of trace elements such as iron, zinc, cobalt, phosphorus, calcium, magnesium, copper, lead, cadmium, and manganese [2, 3]. Young dogs' inquisitive and playful nature, including indiscriminate feeding habits prone them to foreign body ingestion [4, 5, 6] when compared with adult dogs [7], resulting in gastrointestinal foreign body obstruction (complete or partial) or perforation [5, 8, 9]. Common materials ingested by dogs include toys, clothes, metallic and plastic objects, socks, stones, fish hooks, needles, latex teats, vegetables and grasses, plastic bags, coins, cotton swabs, hair clips, toilet brushes, wires, bottle caps, bones, and corn-cobs, among others [10, 11, 12, 8, 13].

Complete gastrointestinal obstruction is often associated with dramatic clinical signs and rapid deterioration, while partial obstruction is associated with more chronic signs of maldigestion and malabsorption [14]. Passage of a foreign body through the gastrointestinal tract (GIT) may lead to serious life-threatening complications due to acid-base and electrolyte imbalances from severe fluid loss or hypovolemia and toxemia [14, 15]. However, an ingested foreign body lodging within the GIT with no obstruction may not elicit any clinical sign of gastrointestinal foreign body syndrome [16, 17].

Diagnosis of intestinal foreign body obstruction could be by gentle abdominal palpation, abdominal auscultation to detect noise resulting from peristaltic rushes or silence in the case of adynamic ileus or peritonitis, laboratory examinations, and diagnostic imaging modalities [18, 14]. Clinical signs include vomiting, abdominal pain, anorexia, weight loss, absence of defecation, diarrhea, bloody stool (with or without mucus), dehydration, and depression [18]. Management could be conservative or surgical [9, 19]. Surgical removal of intestinal foreign bodies is a common procedure in veterinary practice. The composition, shape, integrity, sharpness of edges, and location of

the foreign body within the intestinal tract influence the choice of treatment and outcome [20].

CASE PRESENTATION

A 1-year-5-month-old (33kg) brindle-coloured Boerboel dog was presented to the Veterinary Teaching Hospital, University of Ibadan, Nigeria with the primary complaint of vomiting and anorexia. The dog had a history of chewing on and consuming foreign objects.

At presentation, the patient was dull and recumbent, with a rectal temperature of 38.9°C; heart and pulse rates of 92 beats per minute; respiratory rate of 24 breaths per minute; clear lung sound; pink mucous membrane and normal capillary refill time (CRT<2). Abdominal palpation revealed a hard mass at the mid-ventral abdomen, which elicited pain response upon palpation. Survey lateral and ventrodorsal abdominal radiographs showed dilated, gas-filled intestinal loops, with intraluminal objects of varying radiodensity suggestive of intestinal foreign bodies (Fig. 1).

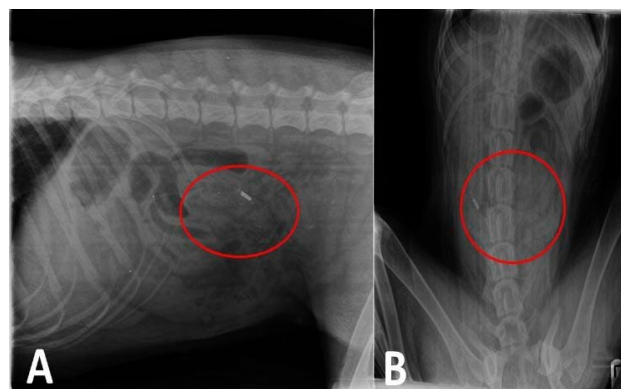


Fig. 1. Radiographs A (lateral view) and B (ventrodorsal view) showing dilated, gas-filled intestinal loops, with radiopaque intraluminal images (red circles) suggestive of intestinal foreign bodies

Haematology and biochemical analysis revealed mild band neutrophilia, inflammatory leucogram, mild hypokalemia, and no mineral deficiency. All the other haematological and blood chemistry values were within normal reference ranges.

Diagnosis of pica syndrome-associated intestinal obstruction was made, and the patient was prepared for emergency surgery.

Pre-operative protocol

Patient peri-operative stabilization process was achieved with lactated Ringer's solution (Ashmina Ltd, Nigeria) and antibiotic therapy (Amoxicillin, Philomox, CSPC Zhongnuo Pharmaceutical (Shijiazhuang) Co., LTD. Shijiazhuang, China) at 10 mg/kg administered intravenously via the cephalic vein through a pre-placed gauge 21 scalp vein set.

Aseptic protocol

The ventral abdomen was prepared for aseptic surgery by clipping, scrubbing, and sterilization with povidone-iodine, and the patient was draped for the procedure.

Anaesthesia and anesthetic care

The patient was premedicated with chlorpromazine hydrochloride (Taj Pharmaceuticals Ltd. India) and pentazocine (Lincoln Pharmaceuticals Ltd. Khatraj, Tal.-Kalol, India), administered via intramuscular injection, at doses of 4 mg/kg and 2 mg/kg, respectively. Anaesthetic induction was achieved with ketamine (Vital Healthcare PVT Limited, Shreyas, Santacruz (W), Mumbai, India) administered via intravenous injection at a dose of 10 mg/kg and maintained by half the induction dose. The dog was connected to a patient multi-parameter monitor for monitoring the vital parameters (heart rate, blood pressure, oxygen saturation (SpO₂), and body temperature) throughout the surgery.

Surgical procedure

Under general anaesthesia with chlorpromazine hydrochloride/pentazocaine premedication, induced and maintained with ketamine, the abdomen was accessed via a ventral midline abdominal incision from the umbilicus to the pelvic brim as previously described by Fossum [21], and the obstructed part of the intestinal loops was carefully exteriorized and examined (Fig. 2). Enterotomy was performed at the anti-mesenteric border of the jejunum at the site of the suspected foreign body obstruction, which revealed the presence of foreign materials consisting of sponges, rubber band, cloth material, woods and rope with metal materials (Figs. 3, 4, and 5). The intestinal foreign bodies were evacuated, then the enterotomy area was lavaged with warm normal saline, and the incision was closed by single-layer interrupted suture, followed by the Connell suture pattern using 2-0 polyglycolic acid (Covidien

Ireland Limited, USA) to prevent leakage of GIT content from the gastrointestinal tract into the peritoneal cavity through the incision and also to prevent compromised blood supply from tightening suture knots (Fig. 6). Leak test was performed to rule out leakage (Fig. 7). The intestinal loops were gently returned into the abdominal cavity. The abdominal cavity was copiously lavaged with warm normal saline, and the laparotomy incision was closed routinely in layers with 2-0 polyglycolic acid (Covidien Ireland Limited, USA) for the peritoneum and muscles; and subcutaneous layer; and size-1 Nylon sutures (Huaiyin Medical Instruments Co. Ltd, China) for the skin, as earlier described by Fossum [21] (Fig. 8). There was no anaesthetic emergency throughout the surgical procedure, and recovery from anaesthesia was uneventful.

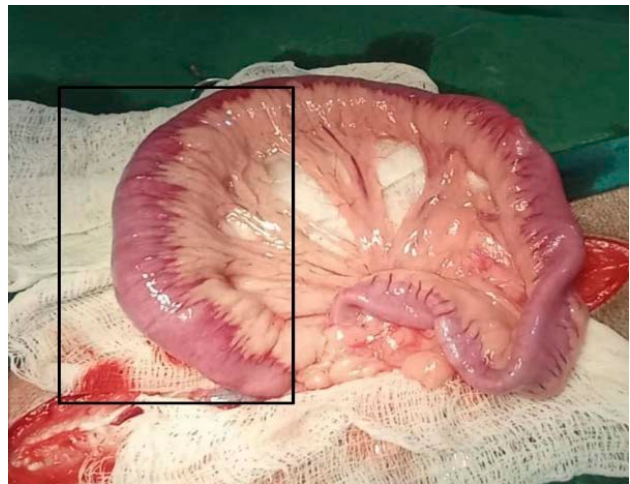


Fig. 2. The exteriorized intestinal loop, with the dilated hard intestinal portion (black box)

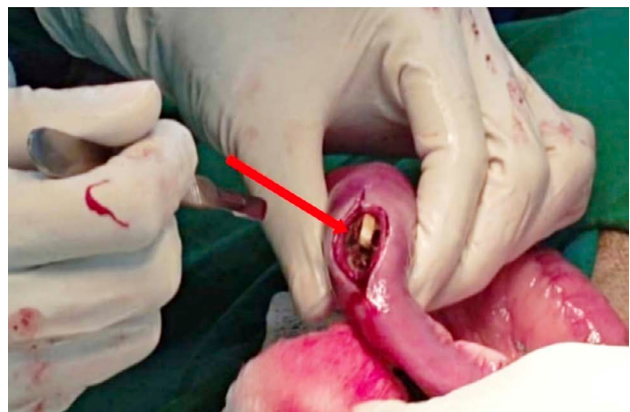


Fig. 3. Foreign materials within the intestinal lumen (red arrow)

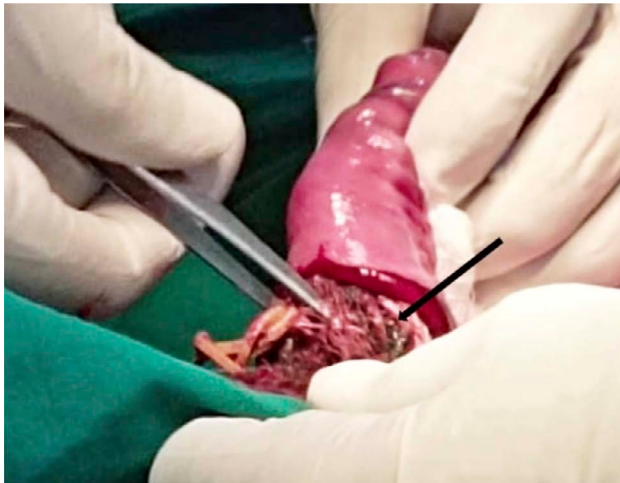


Fig. 4. Foreign materials being removed from the intestinal lumen (black arrow)



Fig. 5. Foreign materials (sponges, rubber band, cloth material, woods and rope with metal materials) evacuated from the intestine

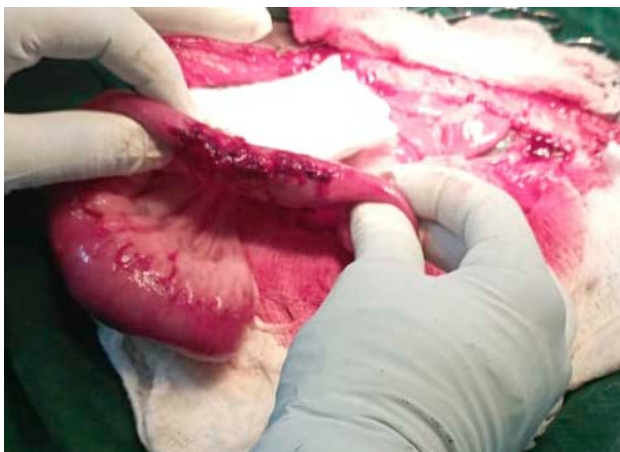


Fig. 6. The enterotomy site after closure

Post-operative care

Antibiotic therapy (Amoxicillin, Philomox, CSPC Zhongnuo Pharmaceutical (Shijiazhuang) Co., Ltd., Shijiazhuang, China) at 10 mg/kg, administered intravenously



Fig. 7. The leak test after enterotomy closure



Fig. 8. The laparotomy site after closure

post-surgery for 7 days, and analgesic (Pentazocine, Lincoln Pharmaceuticals Ltd., Khatraj, Tal.-Kalol, India), administered via intramuscular injection at a dose of 2 mg/kg for two days. Parenteral nutrition was adopted for the first three postoperative days, and oral feeding was introduced on day four with a bland diet and slowly graduated to semisolid and solid food eventually. Healing was uneventful, and sutures were removed eight days post-surgery.

DISCUSSION

Dogs and cats behavioral chewing patterns on different objects predispose them to life-threatening gastrointestinal emergencies [9]. Pica syndrome in dogs has been associated with deficiency of vitamins and minerals, especially trace elements such as iron, zinc, cobalt, and phosphorus; triggering cravings for non-food items [22]. Pica syn-

drome has also been linked with social life restriction as well as absence of a correct environmental enrichment [23, 24], resulting in anxiety, hypersensitivity–hyperactivity syndrome, and obsessive compulsive disorders. The dog in this case was raised in confinement, with no other dog within the vicinity for companionship. Such circumstances could have resulted in boredom. Dogs left alone tend to get bored easily and thus resort to chewing materials in their environment as a form of exploratory and destructive behavior to ease boredom and relieve stress [25, 26].

Suspicion for gastrointestinal obstruction is often raised following a history of habitual ingestion of non-edible materials and clinical signs of persistent retching, vomiting, constipation, anorexia, abdominal pain, dehydration, and depression [27, 28, 9]. In the presented case, there was vomiting, anorexia, and depression. Abdominal palpation revealed a hard mass at the mid-ventral abdomen, which elicited a pain response upon palpation. Abdominal palpation by itself is rarely diagnostic unless severe obstruction occurs. The lateral radiograph view revealed dilated, gas-filled intestinal loops, with intraluminal materials of varying radiopacity suggestive of intestinal foreign body obstruction [29]. Although smaller foreign bodies can easily pass through the GIT without getting stuck, larger pieces of these small materials may become lodged, resulting in a serious gastrointestinal emergency [30]. Sponges, rubber band, cloth materials, and rope with some metallic materials were entangled within the jejunum. Previous studies have established the jejunum as a common localization of such foreign bodies with associated complications and need for surgical intervention [30, 31, 32]. Surgical management to evacuate intestinal foreign bodies may present various intraoperative and postoperative complications such as adhesions, intestinal dehiscence, intraoperative perforations, spillage, bacterial peritonitis, and occlusion of mesenteric blood circulation resulting in tissue necrosis and even death [33, 34]. However, in the present case, no complications were encountered. The intestinal emergency was successfully managed with a laparo-enterotomy procedure. Healing was uneventful, and the dog returned to all normal activities, including eating, drinking, defecating, and playing. The dog was provided with a daily multivitamin multi-mineral supplement, and the owner was advised to get another pet to serve as a companion for the dog in this case, thus relieving loneliness and subsequently controlling pica.

Dogs should be provided vitamins and mineral supplements (micronutrients) in their appropriate quantity. The provision of chewing materials and toys that cannot be destroyed or swallowed is also recommended for dogs, particularly kenneled dogs. However, these toys should only be kept by dogs under supervision, as dogs could swallow them, potentiating life-threatening conditions, such as a swallowed foreign body, resulting in emergencies.

Provision of a social environment and routine walk should also be ensured as these help to ease boredom and relieve stress.

CASE LIMITATIONS

There were financial resource constraints on the part of the dog owner to carry out certain procedures pre- and post-surgery.

Authors' Contributions

All the authors participated in managing the case and also contributed to the writing and editing of the manuscript. All authors read and approved the final manuscript.

Generative AI Statement

The authors declare that no Generative AI was used in the creation of this manuscript.

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