

Exploratory surgery as an invaluable diagnostic and therapeutic tool in the management of gastric obstruction in the dog: A case report

Chinedu A. Eze¹, Aruh O. Anaga², Rita I. Udegbumam¹, Chiagoziem C. Eze¹, Esther N. Njoku¹, Nmesoma Dimelu¹, Ubasinachi E. Okpe¹, Kelechi S. Ezenwa¹, Ibro E. Nya¹, Melody C. Abraham¹ and Donatus C. Duhu^{1*}

¹ Department of Veterinary Surgery and Radiology, Faculty of Veterinary Medicine, University of Nigeria, Nsukka.

² Department of Veterinary Physiology and Pharmacology, Faculty of Veterinary Medicine, University of Nigeria, Nsukka.

=====

Abstract

Gastric obstruction is a common surgical emergency in small animal veterinary practice. Foreign bodies are the most common cause of bowel obstruction in small animals. All dogs are at risk of swallowing objects such as clothes, metal objects and even unchewed food materials. A case is reported of gastric obstruction in a one-year-old male dog presented at the Veterinary Teaching Hospital, University of Nigeria, Nsukka, with a primary complaint of vomiting and anorexia. On physical examination, the dog showed signs of abdominal pain on palpation. Other signs noticed on physical examination included dehydration, pale mucous membrane and normal lymph nodes. Initial diagnostic approach was blood analysis and plain radiograph. None of them yielded relevant diagnostic information, hence the need for exploratory surgery. During the surgery, a triangular mass was located at the pylorus of the stomach. The mass was confirmed to be an uncooked piece of yam weighing 123.4 g. After removal of the foreign object, the stomach and the abdominal muscles were sutured using Lembert and simple continuous suture pattern, respectively. The skin was closed using horizontal mattress suture pattern. The procedure was uneventful and the dog made a full recovery from anaesthesia. Post-operative antibiotic (penicillin and ciprofloxacin) therapy was administered to the dog to prevent secondary bacterial infection. This case report described the clinical presentation, diagnostic workup, surgical procedure, and post-operative care in the management of gastric obstruction in a dog, and highlights the important role of exploratory surgery as a diagnostic and therapeutic tool in the management of a canine patient presenting with gastric obstruction.

Keywords: Gastric obstruction; Surgery; Foreign body in stomach; Exploratory surgery; Dog.

***Correspondence:** Donatus C. Duhu; E-mail: duhudon@gmail.com; Phone: +2347036267444

Article History: Initial submission received: December 21, 2023; Final revised form received: March 05, 2024;

Accepted for publication: March 11, 2024; Published: March 18, 2024.

Introduction

Small animals frequently present with obstruction of the gastrointestinal tract (GIT) by swallowed foreign bodies, which can have a negative impact on hydration, mentation, acid/base and electrolyte balance (Aronson *et al.*, 2000; Bebchuk, 2002; Macphail, 2002; Boag *et al.*, 2005; Hayes, 2009; Hobday *et al.*, 2014; Maxwell *et al.*, 2021). The location of the foreign body, the kind of obstruction (full versus partial obstruction), the presence or absence of a linear component, and the duration of obstruction may jointly commonly determine when clinical signs of the obstruction first appear (Evans *et al.*, 1994; Aronson *et al.*, 2000; Bebchuk, 2002; Macphail, 2002; Papazoglou and Rallis, 2003; Hobday *et al.*, 2014). Vomiting, regurgitation, lethargy, anorexia or hyporexia, weight loss and abdominal discomfort are the most typical clinical signs, and these can appear hours after intake, and last for weeks if ignored (Aronson *et al.*, 2000; Bebchuk, 2002; Macphail, 2002; Hayes, 2009; Hobday *et al.*, 2014). Obstruction of the gastrointestinal tract with foreign bodies can affect gastrointestinal thickness and the microvasculature of the GIT. In more severe situations of tissue devitalization, gastrointestinal thickness may decrease (Mullen *et al.*, 2020).

Clinical signs, radiography, ultrasound and endoscopy can all be used to diagnose gastric obstruction. Radiography can be very useful in identifying the presence of an object in a specific part of the GIT. Unfortunately, plain radiographs sometimes do not provide a definitive diagnosis and are just suggestive of a condition. Smaller objects might not be visible in thicker body parts. Therefore, additional testing such as contrast radiography or ultrasounds may be necessary. Ultrasound is particularly effective at finding malignancies in internal organs and foreign bodies; however, ultrasound may be obstructed by gut gas and may produce false-positive results. Although not frequently available, especially in

developing country settings, computerized tomography (CT) scans are also used. Abdominal exploratory surgery can be both a diagnostic and therapeutic procedure. The major reasons for exploratory surgery into the abdomen may include investigation of ingested foreign body, cancer, intussusception, bloat, collection of biopsy and presence of abscess. This case report describes an exploratory surgery procedure in a one-year-old Caucasian dog presented at the Veterinary Teaching Hospital, University of Nigeria, Nsukka, with gastric obstruction.

Case Description

A one-year-old male Caucasian dog weighing 17 kg was presented at the Veterinary Teaching Hospital, University of Nigeria Nsukka on 20th July, 2023, with a primary complaint of vomiting after eating. The dog was noticed to be vomiting immediately after drinking water and eating food. It was reported that the dog eventually went off feed for about 5 days and showed severe generalized body weakness. The dog was routinely kept in a kennel and comes out to walk around and exercise in a fenced compound. It is fed on household foods including meat and bones. It was due for re-vaccination with both anti-rabies vaccination and DHLPP vaccination since March 14, 2023 and May 13, 2023, respectively. The dog was observed to have rough hair coat and the skin remained tented when pinched due to dehydration. The eyes were sunken. The dog has tucked in abdomen and felt pain on abdominal palpation. The mucus membrane was pale. The pre-scapula lymph nodes were observed to be normal. It was noticed that the last fecal dropping was hard and mixed with polythene material. Its vital clinical parameters included: Heart rate – 160/minute, Respiratory rate – 36/minute, and Rectal temperature – 31.8 °C.

Upon presentation, diagnostic procedures deployed immediately included blood and fecal analysis and radiographic examination. Immediate fluid infusion and administration of broad-spectrum antibiotics was initiated. Tentative diagnosis included gastric obstruction, pyloric stenosis, and worm infestation. Results of the laboratory analysis of the blood were: Packed cell volume – 39%, Total leukocyte count – $24.8 \times 10^3/\mu\text{l}$, Lymphocyte count – 20% ($4.96 \times 10^3/\mu\text{l}$), and Neutrophil count – 78% ($19.34 \times 10^3/\mu\text{l}$). The plain radiograph did not reveal any foreign body in the stomach. Initial fluid therapy (5% dextrose saline) with antibiotic injection of oxytetracycline did not bring any relief to the condition of the patient. Exploratory surgery option was then recommended.

Surgical Procedure

Pre-operatively, the patient was liberally shaved at the ventral abdomen from the xiphoid cartilage to the pubis up to last costal rib area. The anaesthesia was induced with xylazine and ketamine at a stat dose 0.5 mg/kg (intramuscular) and 10 mg/kg (intravenous), respectively. Paracetamol at 50 mg/kg (intramuscular) was also administered.

About 5 cm incision was made through the linea-alba. The skin was penetrated, followed by the sub-cutis and all the abdominal muscles as well as the peritoneum to access the abdominal cavity (Figure 1). The stomach and the intestine were exteriorized (Figures 2 and 3). A triangular mass was located in the stomach. Mild congestion of the vessels close to the mass was observed. Incision of the stomach was done on the body using the less vascularized areas of the stomach (Figure 3). The incision was about 2 cm in length. The mass (Figure 4), which was an uncooked triangular shaped piece of yam weighing 123.4 gram was found and removed. The mass was located at the pylorus where it was obstructing the flow of gastric content into the

small intestine. The surgical site was vigorously mopped of fluid using sterile fluid to ensure surrounding tissues were not contaminated. The stomach was closed using Lembert suture pattern with size 3/0 chromic catgut (Figures 5a and 5b). A simple continuous suture pattern was run over the incision to anchor the Lembert suture pattern to avoid stomach content spillage into the peritoneum. The peritoneum was sutured using simple interrupted pattern with size 2/0 chromic catgut. The muscle was stitched using simple continuous suture pattern. The subcutis was apposed using simple interrupted pattern, while the skin was sutured using horizontal mattress pattern using silk, size 2/0.

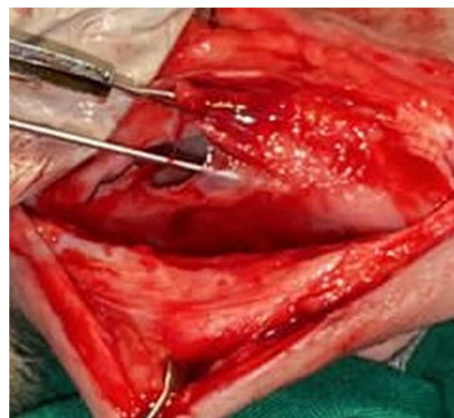


Figure 1. Surgical opening of the abdominal muscles and the peritoneum of the dog that had gastric obstruction.



Figure 2. Exteriorized stomach of the dog that had gastric obstruction.

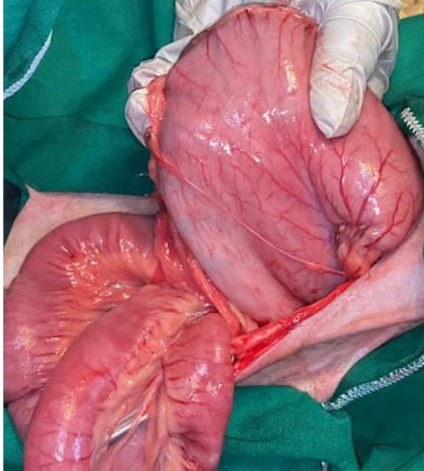


Figure 3. Exteriozied stomach and the intestine of the dog that had gastric obstruction.

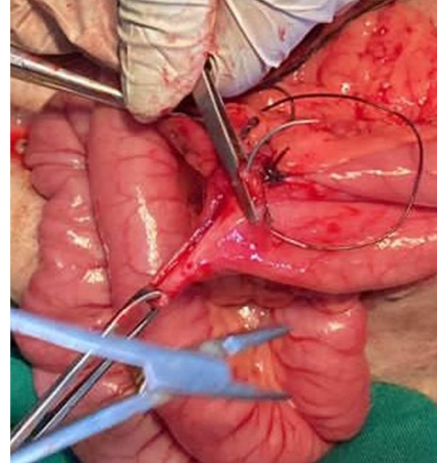


Figure 5b. Stitching of the stomach incision of the dog that had gastric obstruction.



Figure 4. Obstructing mass (piece of uncooked yam) found in the pylorus (stomach) of the dog that had gastric obstruction.

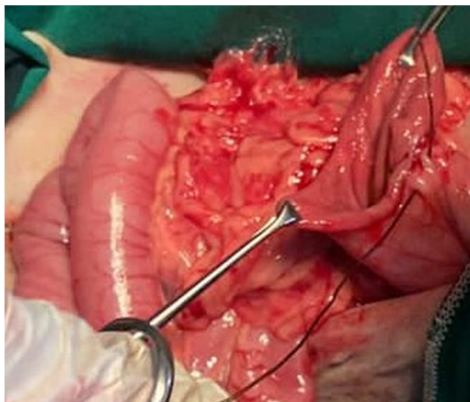


Figure 5a. Stitching of the stomach incision of the dog that had gastric obstruction.

Post-surgical care

Procaine penicillin mixed in a ratio of 0.1 ml: 20 ml of streptomycin was given intraperitoneally immediately after surgery to obviate post-surgical peritonitis. This was followed with the intravenous infusion of ciprofloxacin 10 mg/kg for 5 days post-surgery. Injection of 10% iron dextran was given once. Liquid food (pap, mixed with milk) was introduced 12 hours post-surgery. Post-operative care was successful and the dog recovered fully without complications.

Discussion

Foreign bodies are the most common cause of bowel obstruction (Kim *et al.*, 2017). Gastrointestinal obstruction can be difficult to diagnose (Li, *et al.*, 2014) because it presents with a wide range of signs that are common with other problems related to the gastrointestinal tract. Symptoms such as vomiting, anorexia, weakness and abdominal pains may not necessarily point directly towards this condition. As seen in this case, patients may not have any history of foreign body ingestion which further complicates the diagnosis process. In this report, the common signs presented for the bowel blockage

included abdominal pain, weakness, loss of appetite, nausea and severe vomiting, the consequences of which can be life threatening and possibly include electrolyte and the acid-base disturbances and dehydration. Depending on the underlying cause of the obstruction, the site can undergo tissue deterioration resulting in perforation, endotoxemia, and hypovolemic shock (Nicolodi *et al.*, 2016). Therefore, gastrointestinal obstruction should be treated as an emergency.

The haemoconcentration recorded in this case is believed to be due to fluid loss arising from the severe vomiting by the patient. The leukocytosis in the blood picture may also be due to the haemoconcentration. The neutrophilia recorded in the haematology may be due to stress and possibly infection as there are chances that the alterations in the GIT may have caused changes in the growth of normal bacteria flora.

Diagnostic imaging provides a straightforward diagnosis in gastrointestinal obstruction cases (Jaan and Mulita, 2023), particularly when the object is made of metal, bone, or mineral. The conventional diagnostic method, plain radiograph, could not detect the obstruction. Exploratory surgery was used in this case to confirm the diagnosis. This case showed that exploratory surgery is an indispensable diagnostic tool in detecting gastric obstruction. It also showed that exploratory surgery can serve as a therapeutic tool, as the cause of the obstruction in this case was identified and removed at the same time.

Conclusion

The case reported shows that exploratory surgery can be used to diagnose and treat GIT obstruction successfully in the dog. It is recommended that in cases where there is a strong suspicion of GIT obstruction, exploratory surgery should be deployed, as it can provide quick and accurate diagnosis, and

also lead to prompt treatment and a better chance of recovery for the patient.

Conflict of Interest

The authors declare no potential conflict of interest with respect to the research, authorship and publication of this article.

References

- Aronson LR, Brockman D J and Brown DC (2000). Gastrointestinal emergencies. *Veterinary Clinics of North America: Small Animal Practice*, 30: 555 – 579. [https://doi.org/10.1016/s0195-5616\(00\)50039-4](https://doi.org/10.1016/s0195-5616(00)50039-4)
- Bebchuk TN (2002). Feline gastrointestinal foreign bodies. *Veterinary Clinics of North America: Small Animal Practice*, 32: 861 – 880. [https://doi.org/10.1016/s0195-5616\(02\)00030-x](https://doi.org/10.1016/s0195-5616(02)00030-x)
- Boag AK, Coe RJ, Martinez TA and Hughes D (2005). Acid-base and electrolyte abnormalities in dogs with gastrointestinal foreign bodies. *Journal of Veterinary Internal Medicine*, 19: 816 – 821. [https://doi.org/10.1892/0891-6640\(2005\)19\[816:aaeaid\]2.0.co;2](https://doi.org/10.1892/0891-6640(2005)19[816:aaeaid]2.0.co;2)
- Evans KL, Smeak DD and Biller DS (1994). Gastrointestinal linear foreign bodies in 32 dogs: A retrospective evaluation and feline comparison. *Journal of the American Animal Hospital Association*, 30: 445 – 450.
- Hayes G (2009). Gastrointestinal foreign bodies in dogs and cats: A retrospective study of 208 cases. *Journal of Small Animal Practice*, 50: 576 – 583. <https://doi.org/10.1111/j.1748-5827.2009.00783.x>
- Hobday MM, Pachtinger GE, Drobatz KJ and Syring RS (2014). Linear versus non-

- linear gastrointestinal foreign bodies in 499 dogs: Clinical presentation, management and short-term outcome. *Journal of Small Animal Practice*, 55: 560 – 565.
- Jaan A and Mulita F (2023). Small Intestine Perforation due to Foreign Body: Case Report. *Dubai Medical Journal*, 6: 57 – 60.
- Kim SI, Lee KM, Choi YH and Lee DH (2017). Predictive parameters of retained foreign body presence after foreign body swallowing. *American Journal of Emergency Medicine*, 35(8): 1090 – 1094.
<https://doi.org/10.1016/j.ajem.2017.03.002>
- Li N, Zhu W, Li Y, Gong J, Gu L, Li M and Li J (2014). Surgical treatment and perioperative management of idiopathic abdominal cocoon: Single-center review of 65 cases. *World Journal of Surgery*, 38(7): 1860 – 1867.
<https://doi.org/10.1007/s00268-014-2458-6>
- Macphail C (2002). Gastrointestinal obstruction. *Clinical Techniques in Small Animal Practice*, 17: 178 – 183.
<https://doi.org/10.1053/svms.2002.36606>
- Maxwell EA, Dugat DR and Waltenburg M (2021). Outcomes of dogs undergoing immediate or delayed surgical treatment for gastrointestinal foreign body obstruction: A retrospective study by the Society of Veterinary Soft Tissue Surgery. *Veterinary Surgery*, 50: 177 – 185.
<https://doi.org/10.1111/vsu.13520>
- Mullen KM, Regier PJ, Ellison G and Londono L (2020). A review of normal intestinal healing, intestinal anastomosis, and the pathophysiology and treatment of intestinal dehiscence in foreign body obstructions in dogs. *Topics in Companion Animal Medicine*, 41: 100 – 457.
<https://doi.org/10.1016/j.tcam.2020.100457>
- Nicolodi GC, Trippia CR, Caboclo MF, Castro FG, Miller WP, Lima RR, Tazima L and Geraldo J (2016). Intestinal perforation by an ingested foreign body. *Radiologia Brasileira*, 49(5): 295 – 299.
<https://doi.org/10.1590/0100-3984.2015.0127>
- Papazoglou L and Rallis T (2003). Intestinal foreign bodies in dogs and cats. *Compendium: Continuing Education for Veterinarians*, 25: 830 – 843.