



Surgical Management of Intestinal Foreign Body Obstruction in an Dog

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Abstract

A two and half year-old female American Bully dog was presented to District Veterinary Centre, Ernakulam with a history of anorexia and vomiting and absence of defecation for the past seven days. Abdominal palpation revealed a hard intraabdominal mass, further transabdominal ultrasonography revealed hypoechoic area surrounded by anechoic area. Survey radiography of lateral abdomen revealed slightly radiopaque mass in the intestinal loops. Therefore, emergency enterotomy was performed and a foreign body was retrieved and it was rubber handle of vessel. The animal recovered uneventfully.

Keywords: Surgical; Intestinal; Foreign Body; Obstruction; Dog

Introduction

Intestinal foreign bodies are some of the most common causes of intestinal obstruction in dogs and cats. Dogs and cats may ingest foreign bodies, which is one of the most common disorders requiring emergency surgical treatment. Foreign bodies may lodge in any part of intestinal tract, obstruction most often develops in the small intestine when the luminal diameter becomes smaller. In dogs, non-linear foreign bodies often encountered include stones, plastics, fabrics, coins, rubber objects, food wrappings, toys, bottle caps, fishhooks, sewing needles, marbles, hairballs, bones etc. In cats, ingestion of non-linear foreign bodies is rare [1]. Due to indiscriminate eating habits, foreign bodies are more common in dogs and ingested foreign bodies may pass uneventfully through the gastrointestinal tract and results in variable symptoms [2].

Intestinal obstruction involves a complex interaction of local and systemic factors, which remain partly obscure because of fluid, acid-base and electrolyte imbalances, hypovolemia and toxemia [1].

Complete obstructions are more acute than partial obstructions, proximal obstructions are more acute than distal obstructions and strangulating obstructions are more severe than are simple obstructions. Common clinical signs include anorexia, dehydration, depression, abdominal pain or discomfort and vomiting [1].

A physical examination and blood tests can be performed to rule out other causes for the observed clinical signs. Abdominal palpation is important in the diagnosis of an obstruction, but advanced diagnostics are often required for confirmation. Abdominal radiographs are the most common diagnostic tests performed to visualize evidence of a foreign body. If radiographs are not diagnostic, often an abdominal ultrasound may be performed to aid in determining the cause for clinical signs.

To treat gastrointestinal obstruction, fluid and electrolyte abnormalities and acid-base deficits should be corrected before surgery if possible. Small, smooth foreign bodies may pass uneventfully through gastrointestinal tract, if so, monitoring with abdominal

radiographs is recommended. If foreign body is not moving, and if obstruction or worsening of clinical signs are apparent, intervention is required. In most cases, removal of detected foreign bodies via endoscopic or surgical retrieval is recommended because of the potential for obstruction or perforation [3].

Materials and Methods

Signalment and anamnesis

A 2.5 years old American Bully dog weighing 16.1 kg was presented with history of vomiting and anorexia for seven days. The animal had not defecated for last four days. It was treated in nearby hospital with antibiotics and other supportive medications. Owner reported that animal had a habit of indiscriminate eating.

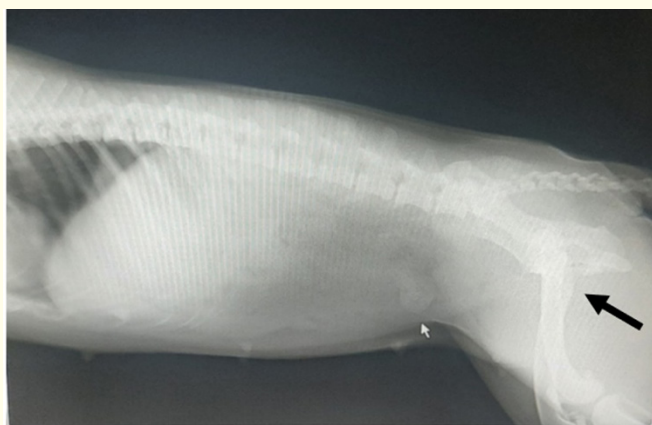


Figure 1: On plain radiography, slightly radiopaque object (arrow) could be observed in abdomen.

Observation

On general examination, animal was found to be depressed, but alert. The animal appeared to be in good body condition. Animal was having costal type of respiration and abdomen was tucked up but was having normal posture and gait.



Figure 2: On abdominal ultrasonography, hypoechoic area (arrow) surrounded by anechoic area could be observed.

General clinical examination

On examination all the physiological parameters were found to be within the normal physiological range. Physical examination of the abdomen revealed a hard mass in the intestine.

Diagnosis

Based on history, clinical signs, physical examination, diagnostic imaging and laboratory examination, the condition was tentatively diagnosed as intestinal foreign body obstruction.

Complete blood count		
Parameters	Result	Range
WBC	15.6*10 ⁹ /L	6.0-17.0
Lymphocyte	2.0*10 ⁹ /L	0.9-5.0
Lymphocyte %	13.3%	0.0-99.9
Monocyte	0.9*10 ⁹ /L	0.3-1.5
Monocyte %	5.8 %	0.0-99.9
Neutrophils	12.7*10 ⁹ /L	3.5-12.0
Neutrophils %	80.9 %	0.0-99.9
Eosinophils	0.0	0.1-1.5
Eosinophils %	0.0	0.1-99.9
Heamoglobin	17.6 g/dL	12.0-18.0
MCH	30.3 pg	19.5-25.5
MCHC	44.1 g/dL	32.0-38.5
RBC	5.81*10 ¹² /L	5.50-8.50
MCV	68.6 fL	60.0-72.0
HCT	39.9 %	37.0-55.0
RDWa	51.5 fL	35.0-65.0
RDW %	16.6 %	12.0-17.5
Platelet	646*10 ⁹ /L	200-500
MPV	6.6 fL	5.5-10.5
Serum biochemistry		
Parameters	Result	Range
Total protein	8.4 g/dL	5.4-7.1
BUN	24.1 mg/dL	10-28
Albumin	4.9 g/dL	3.1-4.0
Direct bilirubin	<0.1 mg/dL	
SGPT	95 U/L	21.0-102.0
SGOT	47 U/L	23.0-66.0
ALP	308 U/L	20.0-156.0
Total bilirubin	0.6 mg/dL	0.1-0.3

Table a

Treatment

Pre-operative management

Animal was stabilised with fluid and electrolyte therapy. Injection ringer lactate was administered at the rate of 10 ml/kg body weight intravenously, injection normal saline was administered at the rate of 10ml/kg body weight intravenously, injection ranitidine at the rate of 2mg/kg body weight intramuscularly.

Anaesthesia

As pre-anaesthetic medication injection atropine sulphate at the rate of 0.045 mg/kg was administered subcutaneously and the anaesthesia was induced with Inj. tiletamine and zolazepam at the rate of 15mg/kg intramuscularly.

Surgical procedure

Enterotomy was done to remove the foreign body. Surgical site was prepared aseptically from the umbilicus to pubis. After positioning the animal in dorsal recumbency, a linear ventral midline skin incision was made from the umbilicus, incising through subcutaneous tissue, Linea alba and peritoneum to reach the abdominal cavity. After locating the foreign body in the intestinal loop, the affected part of the intestine was exteriorised and it was packed away from the rest of the abdominal viscera. Enterotomy was performed in the anti-mesenteric border anterior to the obstruction (Figure 4) and the foreign body was recovered (Figure 5,6). Enterotomy incision was sutured by double layer Cushing's pattern with polyglactin 910 2-0, abdominal muscles and peritoneum sutured by continuous pattern polyglactin 910 1-0, and skin was closed with nylon in horizontal mattress pattern.

Post-operative management

Post-operatively injection amoxicillin sulbactam at the rate of 20mg/kg body weight and injection meloxicam at the rate of 0.3mg/kg body weight was given intravenously. Dog was kept on total off water and feed for two days and during this period it was maintained on given injection ringer lactate at the rate of 10 ml/kg, injection dextrose normal saline at the rate of 10 ml/kg, injection amoxicillin sulbactam at the rate of 20mg/kg, injection meloxicam at the rate of 0.3mg/kg body weight was administered intravenously for two days. Parenteral administration of antibiotics was continued for five days post-operative. After two days, dog was allowed liquids orally and from day four onwards it was maintained on semi-solid food on limited quantity days, and gradually turned to solid food seven days post-operative.

Result

Dog recovered uneventfully without any complications. The skin sutures were removed 10 days post-operative (Figure 3).

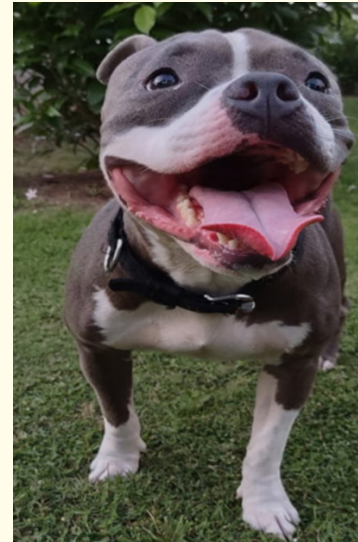


Figure 3: Recovered dog.

Discussion

Foreign bodies that transverse the oesophagus and stomach may lodge in the smaller diameter intestine. Some foreign bodies continue to move slowly through the intestine, whereas others become lodged in an intestinal segment where they cause complete or partial obstruction. Partial or incomplete obstruction allows limited passage of fluid and gas whereas complete obstruction does not allow fluid or gas to advance past the obstruction.

With complete intraluminal obstruction, intestine oral to the lesion distends with gas and fluid. The gas is a combination of swallowed air, carbon dioxide formed in the lumen by bicarbonate neutralisation and organic gases from fermentation. Fluid accumulation is caused both by retention of ingested fluid in the intestinal lumen and by secretion. Secretions increases and absorption decreases. During obstruction. Absorption is reduced because of lymphatic and venous congestion, increased intraluminal osmolality and decreased enterocyte turnover rate. After 24 hours of complete obstruction, distended bowel may lose its ability to absorb fluids and local hypersecretion occurs.

Intraluminal pressure proximal to obstruction gradually increases because of accumulation of fluid and gas. Lymphatic and capillary stasis occurs when intraluminal pressure reaches 30 mm Hg. Venous drainage is prevented when pressure reaches 50 mm Hg. The arterial supply is not affected and hydrostatic pressure increases at the capillary bed and causes intestinal wall oedema. Eventually fluid shift not only into the lumen, but also from serosa into peritoneal cavity. At a pressure of 44 mm Hg the intestinal seg-

ment maybe so compromised that the blood is shunted away from intestinal capillaries and into arteriovenous anastomosis. Circulation in the mucosa and submucosa is impaired, oxygen consumption decreases and arteriovenous shunting occurs and mucosa become ischemic. Full thickness wall necrosis may occur at the obstruction site. [4].

Small intestinal stasis leads to luminal bacterial growth, if normal mucosal barrier is impaired by distension and ischemia, permeability may increase, with bacterial migration and absorption of toxins into the systemic circulation or peritoneal cavity or both. Large foreign bodies apply pressure to intestinal wall. This may cause venous stasis, oedema followed by arterial flow compromise, ulceration, necrosis and perforation. More proximal and complete obstruction cause more acute and severe signs with increased likelihood of dehydration, electrolyte imbalance and shock. Proximal obstruction (Duodenum or proximal jejunum) causes persistent vomiting, loss of gastric secretion, electrolyte imbalance and dehydration. Distal obstruction (distal jejunum, ileum, ileocecal) causes varying degrees of metabolic acidosis, Clinical signs of distal and incomplete obstruction maybe insidious with vague, intermittent anorexia, lethargy, diarrhoea and occasional vomiting spanning several days or weeks. Signs are associated with maldigestion and malabsorption [4].

A number of objects can assume a linear configuration, including string, thread, dental floss, nylon, stockings, cloth, sack, ribbon, plastic (cassette tapes). Part of object lodges usually at the base of tongue or pylorus and remainder advances into intestine. As peristaltic waves attempt to advance the object, the intestine gathers around it, causing partial or complete obstruction. Continued peristalsis may cause the object to become taut, cut into the mucosa and then lacerate the mesenteric border of the intestine, causing peritonitis. Multiple perforation may occur and this is associated with high mortality. Some animals with linear foreign body have concurrent intussusception [4].

Clinical Presentation

Playful young animals seem more prone to foreign body ingestion. The presentation and clinical signs depend on the location, completeness and the duration of the obstruction and the vascular integrity of the involved segment. Acute onset of vomiting and anorexia are the most common presenting complaints. Depression, diarrhoea and abdominal pain are sometimes noticed. Occasionally the animal is seen swallowing the object, Profuse vomiting maybe seen with complete proximal obstruction, vomiting with partial distal obstruction is intermittent. Defecation maybe absent

or decreased in frequency and the stool is occasionally bloody. Diarrhoea is more common in animals with partial obstruction [4].

Physical examination findings

Physical exam may reveal abdominal distention, diarrhoea, abdominal pain, abnormal posture and or shock. Classically, animals with high obstruction tend to be severely dehydrated and those with low obstruction tend to be thin. Abdominal palpation may identify a corrugated feeling of bowel, an abnormal mass of banded intestines or may elicit pain. Linear foreign body may sometimes be visualized around the base of the tongue, but, sedation/anaesthesia maybe required. abdominal pain is common if linear foreign bodies have caused bunching of the intestines. Abdominal auscultation may detect noise from peristaltic activity or silence associated with ileus [4].

Diagnostic imaging

Survey radiography often reveals intestinal ileus resulting from a complete or near complete obstruction and may allow identification of the cause, especially if radiopaque foreign bodies are present. Radiolucent foreign bodies are sometimes seen if surrounded by gas. Obstructed intestinal loops often become distended with air, fluid and ingesta. Linear foreign bodies may cause the intestines to appear bunched or pleated together, with small gas bubbles in the lumen (comma shaped) or without gas- distended intestinal loops (Plication).

Ultrasonography can identify foreign bodies that cannot be seen radiographically, especially those with a hyperechoic margin with or without fluid accumulation. Ultrasound also allows assessment of motility and finding loops of hyper motile bowel filled with fluid is very suggestive of obstruction [4].

Endoscopy

It rarely diagnoses intestinal foreign bodies that were not detected radiographically or with ultrasonography. This is because the scope seldom can be advanced beyond the descending duodenum [4].

Laboratory findings

Fluid, electrolyte and acid-base abnormalities often are identified on CBC and biochemistry profiles. Leucocytosis with a left shift or degenerative leukopenia accompanied by septic abdominal effusion intestinal ischemia or perforation with peritonitis. Vomiting associated with duodenal and proximal jejunal obstruction maybe associated with mild metabolic acidosis and dehydration. Distal obstructions are more commonly associated with hypokalaemia and metabolic acidosis [4].

Differential diagnosis

Includes all other causes of intestinal obstruction- intussusception, intestinal volvulus/torsion, intestinal incarceration, adhesion, strictures, Abscess, granulomas, hematomas, neoplasia or congenital malformation [4].

Medical management

Some foreign bodies pass through the intestine without requiring therapy. Foreign body advancement maybe monitored radiographically unless vomiting is severe, debilitation occurs or incidence of peritonitis is seen. Administration of semi-solid petroleum-based laxatives can be tried [4].

Surgical management

Most foreign bodies can be removed by enterotomy rather than resection and anastomosis unless intestinal necrosis or perforation is present. If a linear object has been present for a long time, it may become embedded in the mucosa, requiring intestinal resection [4].

Making an incision through the Linea alba could be sufficient to allow complete exploration of the abdomen. Exploring the entire abdomen and gastrointestinal tract avoids overlooking concurrent abnormalities or multiple foreign bodies present in different parts of the gastrointestinal tract (Hayes, 2009). Once the foreign body was located, isolation of the loop of intestine from the remainder of the abdominal cavity with laparotomy pads or sterile towels is needed. Complete obstructions might cause the bowel to be severely distended and appear cyanotic; however, reserve determination of intestinal viability until the bowel has been decompressed and the foreign body could be removed by enterotomy. Bathing the intestine in warm saline for a few minutes helps to improve colour and peristalsis. Normally the appearance of the intestine improves rapidly after decompression. If the intestinal segment determined to be viable, closing the enterotomy with simple interrupted or continuous sutures is recommended [4].

Prognosis

Prognosis is good if peritonitis and extensive resections are avoided. Mortality is greater in animals with a longer duration of clinical signs, linear foreign body or need for more than one gastrointestinal invasion. The prognosis without surgery is guarded because animals may die from hypovolemic or endotoxic shock, septicaemia, peritonitis or starvation [4].

Summary and Conclusion

The present case study entitled Surgical management of intestinal foreign body obstruction in an dog was done in District Vet-

erinary Centre, Ernakulam. Following pre-operative evaluation and stabilization of the patient, it was subjected to enterotomy to remove the obstructing foreign body under general anaesthesia. Post operatively the patient was kept off fed for two days and during this period it was maintained on fluids following which the oral feeding started with fluids and thereafter semi-solid foods and later on shifted to solid food. Post-operatively the patient was maintained on antibiotics and other supportive medications for five days. The patient was reported to have recovered uneventfully.

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