

# Surgery of the Gastrointestinal Tract in Camelids—Part 2

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## Obstruction of the Intestine: Trichobezoar, Phytobezoar, and Enterolith

### Definition

Intraluminal obstruction of the intestinal tract is most commonly caused by a trichobezoar, phytobezoar, or enterolith.<sup>5,6</sup> These foreign bodies form in the forestomachs and may pass into the intestinal tract, where they become lodged within the small intestine or spiral colon. Hair balls (trichobezoar) are caused by frequent ingestion of hair. This is seen most commonly in camelids infested with lice or mange, or during the spring when shedding of the winter hair coat occurs. Phytobezoars and enteroliths form around undigested materials (e.g., nylon fibers, cotton fabric).

### Clinical Signs

Animals affected with bezoars may be observed to have decreased appetite, weight loss, decreased fecal production, lethargy, and apparent depression. Multiple bezoars present in the forestomachs may be found during transabdominal palpation or on abdominal radiographs. When an obstruction of the small intestine or spiral colon occurs, affected animals initially show clinical signs of abdominal pain (restlessness, kicking at the abdomen, lying down and getting up frequently, arching the back, stretching out of the legs while standing) and progress to recumbency and apparent depression. Progressive bloat or abdominal distention and lack of fecal production are noted.

### Clinical Pathology

Serum biochemistry analysis may reveal hypokalemic, hypochloremic, metabolic alkalosis or may be normal - the severity depends on the duration and location of the lesion. These changes are most severe with proximal intestinal obstruction and become more severe with increasing duration. If ischemic necrosis of the intestinal wall has occurred, an inflammatory leukogram with increased numbers of immature neutrophils may be seen. As peritonitis develops and organic acids are released into the blood stream, the serum biochemistry changes to a metabolic acidosis with relative hyperkalemia. These changes are consistent with a poor prognosis. Perforation of an abomasal ulcer or rupture

of the intestine and contamination of the abdomen with ingesta carries a poor to grave prognosis.

### Diagnosis

Serum biochemistry changes are consistent with intestinal obstruction. C1 chloride concentration may be elevated (rumen Cl > 50 mEq/l). The cause of intraluminal obstruction is rarely palpable per rectum, but small intestinal distention may be palpable. Ultrasonographic examination of the abdomen is useful. Intraluminal intestinal obstruction should be suspected in cattle with recurrent rumen tympanites which is transiently responsive to decompression and is associated with minimal fecal production. Differential diagnoses include intussusception, vagus indigestion syndrome, intestinal lymphosarcoma, fat necrosis, intestinal entrapment around anomalous fibrovascular bands, and volvulus of the jejunoileal flange.

### Treatment

Trichobezoars, phytobezoars, or enteroliths located within the rumen are unlikely to cause clinical signs unless the number and magnitude of the foreign bodies is severe (e.g., two sheep in which hair balls accounted for > 10% of the animals' body weight<sup>2-4,7</sup>). C1 foreign bodies are removed via a left paralumbar fossa celiotomy and rumenotomy (see traumatic reticuloperitonitis). We prefer to close the rumen with absorbable monofilament suture material (e.g., No 1 polydioxanone) using two layers of an inverting suture pattern (e.g., Cushing, Lembert patterns). C3 hair balls may cause pyloric obstruction which leads to rapid onset of abdominal distention. The authors prefer to perform a right paramedian or ventral paracostal laparotomy to exteriorize the C3. A gastrostomy is performed along the greater curvature of the C3, the foreign bodies removed, and the abomasum is closed with absorbable monofilament suture material (e.g., No 0 polydioxanone) using two layers of an inverting suture pattern. When obstruction of the duodenum, jejunum, or spiral colon is suspected, a right paralumbar fossa celiotomy or ventral midline celiotomy and exploration of the abdomen should be performed. The foreign body is found by exteriorizing a segment of normal, or distended, intestine and tracing this segment oral, or aboral respectively, until the obstruction is found. This segment of intestine is exteriorized from

the abdomen, isolated using moistened surgical towels, and an enterotomy performed. After removal of the foreign body, the enterotomy is closed with absorbable suture material (e.g., No 2-0 polydioxanone, polyglactin 910) using two lines of an inverting suture pattern. The enterotomy may be closed transversely to maximize the lumen of the affected segment of intestine and minimize the tension endured by the suture line during contraction of the intestinal wall. When the perceived economic value of the affected animal is high, surgery may be performed with the patient under general anesthesia. This will minimize the risk of ingesta contamination of the abdomen during surgery. Intravenous fluid therapy is based on the clinical estimate of dehydration, severity of intestinal lesions identified at surgery, and severity of serum biochemistry changes. We routinely add calcium (1 mL of 23% calcium gluconate/kg body weight) and dextrose (to create a 1.25% solution) to the IV fluids. Non-steroidal anti-inflammatory drugs (banamine, 1 mg/kg body weight, IV, q12hrs X three days) and antibiotics (for three to five days) also are administered.

#### Prognosis

The prognosis for return to productive use is based on the animal's body condition, severity of changes in serum biochemistry variables,<sup>1</sup> presence of visceral perforation or peritonitis, and ability to perform surgical removal of the foreign body without contaminating the

abdomen. Therefore, immediate surgical intervention is required for alleviation of clinical signs caused by intraluminal foreign bodies.

#### Prevention

Intraluminal obstruction of the intestinal tract occurs infrequently. The sporadic nature of the problem limits recommendations for prevention. Adequate dietary roughage should be made available at all times. Lice control strategies, particularly during the winter months, will prevent pruritus-associated ingestion of hair.

#### References

1. Anderson DE, Constable PD, St-Jean G, *et al*: Small-intestinal volvulus in cattle: 35 cases (1967-1992). *J Am Vet Med Assoc* 203:1178-1183, 1993.
2. Cockrill JM, Beasley JN, Selph RA: Trichobezoars in four Angus cows. *Vet Med Sm Anim Clin* 73:1441-1442, 1978.
3. Jelinski MD, Ribble CS, Campbell JR, *et al*: Investigating the relationship between abomasal hairballs and perforating abomasal ulcers in unweaned beef calves. *Can Vet J* 37:23-26, 1996.
4. Patel JH, Brace DM: Esophageal obstruction due to a trichobozoar in a cow. *Can Vet J* 36:774-775, 1995.
5. Pearson H, Pinsent PJN: Intestinal obstruction in cattle. *Vet Rec* 101:162-166, 1977.
6. Pearson H: The treatment of surgical disorders of the bovine abdomen. *Vet Rec* 92:245-254, 1973.
7. Ramadan RO: Massive formation of trichobezoars in sheep. *Agri-Prac* 16:26-28, 1995.