# Jejuno-jejunal intussusception in a guinea pig (*Cavia porcellus*)

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## Abstract

An approximately four-year-old male castrated guinea pig (*Cavia porcellus*) was presented for painful defecation with a 24-hour history of hyporexia and intermittent episodes of rolling behavior.  Upon presentation the patient was quiet, alert, and responsive, and mildly hypothermic.  Abdominal palpation revealed an approximately 2-cm long oblong mass within the caudal abdomen.  Abdominal radiographs revealed gastric dilation without volvulus and a peritoneal mass effect. The patient was euthanized following gastric reflux of brown malodorous fluid from his nares and oral cavity. A necropsy was performed and revealed a jejuno-jejunal intussusception causing mechanical gastrointestinal ileus, and gastric dilatation without volvulus. While non-obstructive gastrointestinal stasis is common and obstructive ileus is uncommon in guinea pigs, this report shows that intestinal intussusception is a differential in guinea pigs with ileus and gastric dilatation.

**Keywords:** Bloat, Colic, Gastric distention, Gastrointestinal tract, Rodent.
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## Introduction

Gastrointestinal disease, especially ileus and gastric dilatation, are common presentations in guinea pigs. Ileus is a multifactorial condition and can be associated with hyporexia or anorexia, dental disease, pain, stress or anxiety, gastroenteritis of various etiologies, certain drugs or medications, dysbiosis, fecal impactions, chronic disease, and neoplasia (DeCubellis and Graham, 2013). Presenting signs may include anorexia, decreased fecal production, bruxism, distended and painful abdomen, decreased borborgymi, gastric tympany, dehydration, dyspnea, and shock (DeCubellis and Graham, 2013).

History and physical examination may lead to a suspicion of gastrointestinal ileus, however, abdominal imaging is required for diagnosis. Intestinal intussusception in guinea pigs has been reported in a case series of 49 unspecified spontaneous small intestinal intussusceptions in young guinea pigs from a closed breeding colony (Schoenbaum *et al*., 1972). In addition, a case of ileocolic intussusception in a 5-month-old female guinea pig has been reported (Pellaz *et al*., 2012).

A reducible colo-colic intussusception has been reported in a 3-day-old guinea pig, suspected to be secondary to a colonic rupture leading to adhesions and fibrinous peritonitis (Rowles *et al*., 1993).

## Case Details

An approximately 4-year-old male castrated guinea pig (*Cavia porcellus*) was presented for painful defecation with a 1-day history of hyporexia, intermittent episodes of rolling behavior, and decreased urination.  The day prior to presentation the patient had been evaluated by another veterinarian for sneezing and ocular discharge. An upper respiratory infection was suspected and the animal was prescribed trimethoprim/sulphamethoxazole (17 mg/kg PO q12h) and a critical care nutritional supplemental diet. Syringe feedings were well tolerated. Urination was not witnessed within 24-hours prior to presentation.  Stools were firm and dry and there was tenesmus.  Intermittent rolling from side to side was noted as well.  Prior to presentation the patient had no previously reported significant medical or surgical history.   The diet consisted of commercial guinea pig pellets, timothy hay, dried fruits, and kale.

Upon presentation the patient was quiet, alert, and responsive. The body weight was 1.18 kg and the patient was found to have adequate muscling and body condition.   The patient was hypothermic (36.6°C, physiological range: 37.2 to 39.5°C) and mildly dehydrated, heart and respiratory rate were within normal limits. Moderate pelvic limb ataxia was noted and  conscious proprioception was absent in both pelvic limbs, but the remainder of his neurologic examination was normal. The abdomen was soft upon palpation with a large distended stomach and gas filled intestines appreciated.  An approximately 2-cm long oblong mass effect within the caudal abdomen was palpated. The remainder of the physical examination was within normal limits.

Differentials for the abdominal mass effect included a gastrointestinal mass of unknown etiology, firm ingesta, or a firm inexpressible urinary bladder. The

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patient was sedated with midazolam (0.5 mg/kg IM) and butorphanol (0.25 mg/kg IM), in order to facilitate manual restraint for diagnostic procedures. Sedation was marked and sufficient. Abdominal radiographs revealed a severely gas distended stomach, caudally displaced intestines and cecum, and decreased abdominal serosal detail (Fig. 1 and 2).



**Fig. 1.** Right lateral abdominal radiograph of a 4-year-old, male castrated guinea pig with gastric dilatation without volvulus and an abdominal mass effect. The stomach is severely dilated with primarily gas and a small amount of fluid. The intestines are displaced caudally.



**Fig. 2.** Ventrodorsal abdominal radiographs of a 4-year-old, male castrated guinea pig with gastric dilatation without volvulus and an abdominal mass effect. The stomach severely dilated with primarily gas and a small amount of fluid. The intestines are displaced caudally.

Supplemental heat was provided and the patient was administered 30 ml/kg of warm lactated Ringer's solution subcutaneously.

The patient's condition did not improve over the next hour and it began refluxing copious amounts of dark brown, malodorous, fluid from both nares and the mouth. Recommendations for gastric decompression and continued intensive monitoring and supportive care, with potential surgical exploratory laparotomy were discussed.

Due to poor prognosis, humane euthanasia was elected by the owner.

A necropsy was performed and confirmed a jejuno-jejunal intussusception causing mechanical intestinal obstruction, and gastric dilatation without volvulus. Upon dissection the stomach was grossly distended measuring 11x9x3 cm, and contained approximately 160 mL of dark greenish brown malodorous fluid with approximately 50 mL of air (Fig. 3).

An 8.5-cm jejuno-jejunal firm, hyperemic, red to black discolored intussusception was noted; 35-cm distal to the pylorus (Fig. 4).
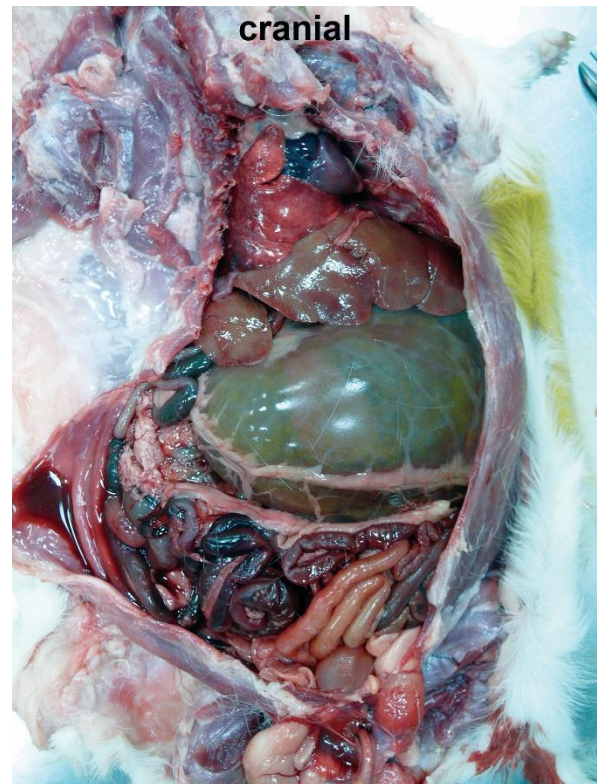


**Fig. 3.** Necropsy photograph of a 4-year-old, male castrated guinea pig diagnosed with gastric dilation without volvulus and a jejuno-jenjunal intussusception. The stomach is severely distended causing caudal displacement of the intestines. The duodenum and jejunum (right abdomen) are dilated, hyperemic, and dark red to black in appearance consistent with necrosis.
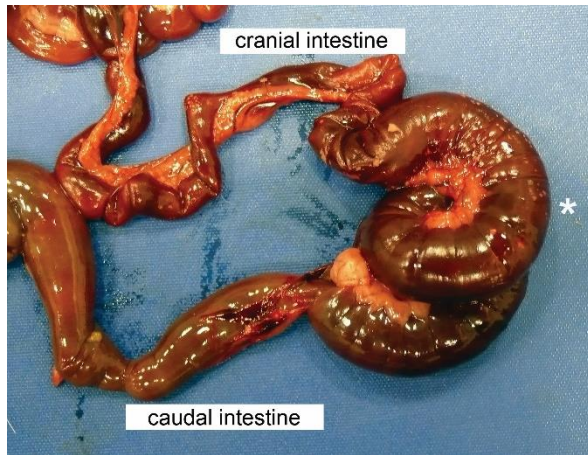
**Fig. 4.** Necropsy photograph of a 4-year-old, male castrated guinea pig diagnosed with an 8.5 cm jejuno-jenjunal intussusception. The intestines cranial to the intussusception (asterisk) are congested and hyperemic, with dilation and necrosis secondary to an outflow obstruction. The intestines caudal to the intussusception are normal in width and texture.

For 25-cm orad to the intussusception the jejunum and duodenum were grossly distended, congested, hyperemic, and friable. The intestines distal to the intussusception contained a scant amount of ingesta and air, but were normal in width and texture. No additional significant abnormalities were appreciated upon gross necropsy. Histopathology of the gastrointestinal tract revealed minimal multifocal enteritis. The final postmortem diagnosis was jejuno-jejunal intussuception without an identifiable primary underlying cause.

## Discussion

Intussusceptions are defined as a telescoping of one portion of the intestines (intussusceptum) into other portions of the intestinal tract (intusscepiens) (Levitt and Bauer, 1992). Reported causes of intussusceptions in various species include gastrointestinal parasites, gastroenteritis of various etiologies, intestinal masses or neoplasms, abdominal surgery, and may also be idiopathic (Applewhite *et al*., 2001; Burkitt *et al*., 2009). The underlyling cause for the intussuception was not identified in the case reported in this manuscript. There are reports of intussusceptions in various species including guinea pigs (Schoenbaum *et al*., 1972; Rowles *et al*., 1993; Pellaz *et al*., 2012). However, dogs are the most commonly reported species to have intestinal intussusceptions in the veterinary literature (Levitt and Bauer, 1992; Applewhite *et al*., 2001).

Intussusceptions are more common in younger animals and the most common location is at the ileocolic junction, although they may occur anywhere in the alimentary tract and in animals of any age (Constable *et al*., 1997; Burkitt *et al*., 2009). Clinical signs are variable but usually are associated with gastrointestinal

upset such as vomiting, diarrhea, decreased fecal output, anorexia, weight loss, tenesmus, colic, and abdominal distension in addition to vague signs such as depression or lethargy (Schoenbaum *et al*., 1972, Burkitt *et al*., 2009). Treatment is focused on aggressive intravenous fluid therapy, analgesics, correction of underlying cause if apparent, and ultimately surgical correction (Levitt and Bauer, 1992; Applewhite *et al*., 2001). Prognosis is dependent on various factors such as duration of signs prior to care, anatomic location, severity of the obstructive process, and any concurrent systemic disease (Burkitt *et al*., 2009). Survival rates in patients undergoing surgical correction reported in the veterinary literature for various species are 35%-80% (Levitt and Bauer, 1992; Constable *et al*., 1997; Burkitt *et al*., 2009) with recurrence rates as high as 20%-25% (Applewhite *et al*., 2001; Burkitt *et al*., 2009).

Intestinal intussusceptions are rare in guinea pigs. A case of ileocolic intussusception in a young female guinea pig has been reported (Pellaz *et al*., 2012). The patient presented with a 48-hour history of weakness and anorexia, and 24-hours of lack of fecal output despite syringe feeding a critical care formula. Physical examination revealed a soft mass in the abdominal cavity, which was confirmed by ultrasonography to be an intestinal intussusception. Surgical exploration revealed invagination of the ileum by 10-cm into the cecum. In addition, 5-cm proximal to the intussusception, an intraluminal mass was present in the jejunum, which was resected. The animal died four hours after surgery. Subacute necrotizing enteritis was diagnosed on histopathology of the resected intestinal mass. A complete necropsy was not performed (Pellaz *et al*., 2012).

A reducible colo-colic intussusception has been reported in a 3-day-old guinea pig, which was also diagnosed with congenital imperforate anus and secondary bowl rupture (Rowles *et al*., 1993). The authors assumed that the ruptured of the colon occurred first, leading to the development of a fibrinous peritonitis and adhesions, which may have subsequently led to the intussuception. The imperforate anus was not considered to be contributing to the rupture and intussusception of the colon, since the intestine distal to the intussusception was empty (Rowles *et al*., 1993).

In a case series of spontaneous small intestinal intussusception in 49 young guinea pigs from a closed breeding colony, the location of the small intestinal intussusceptions was not specified (Schoenbaum *et al*., 1972). While aflatoxicosis from contaminated wood shavings in the enclosure was a concurrent finding in some of the cases, the authors were unable to conclude that this was the definitive cause for the intussusceptions.

While *Eimeria caviae* oocysts and shizonts were identified from some of the initial cases of intussusception, the following successful treatment with a sulfonamide did eradicate the parasite, but further cases of intussusception occurred. Clinical signs included lethargy, abdominal pain on palpation, and acute death (Schoenbaum *et al*., 1972).

Gastric dilatation with or without volvulus is known to occur in guinea pigs and carries a grave prognosis (Mitchell *et al*., 2010; Dudley and Boivin, 2011; DeCubellis and Graham, 2013).

The pathogenesis of gastric dilatation and volvulus in guinea pigs is poorly understood and likely multifactorial. There is a reported higher incidence in breeding female guinea pigs (Dudley and Boivin, 2011).

Recognition of gastric dilatation with volvulus or gastric dilatation secondary to a small intestinal obstruction caused by an intussusception or other etiology, is critical. Standard therapy for gastrointestinal stasis, as discussed above, is not sufficient or even contraindicated (e.g. syringe feeding, prokinetics) for these cases and emergency surgery is warranted.

Gastric decompression via orogastric intubation or percutaneous needle puncture prior to surgical intervention has been described in the literature, but is considered controversial (DeCubellis and Graham, 2013).

Percutaneous needle decompression of the stomach is not recommended due to high risk of gastric rupture and subsequent peritonitis which may be fatal (Mitchell *et al*., 2010; DeCubellis and Graham, 2013). Decompression was discussed with the owners of the guinea pig reported here, but was not performed due to the high risks and the owner's decision for euthanasia.

While non-obstructive gastrointestinal stasis is common and obstructive ileus is uncommon in guinea pigs, this report shows that intestinal intussusception is a differential in guinea pigs with ileus and gastric dilatation. Intussusception, in addition to foreign bodies or masses, should be a differential in any patient with a palpable mass in the abdomen.

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