Case Report

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Caecocolic intussusception associated with a caecal polyp and concurrent hepatocellular carcinoma in a cat

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Abstract

Case summary A 17-year-old female neutered domestic shorthair cat presented for several days of reduced faecal volume and a rectal prolapse. Physical examination revealed a 2 cm rectal prolapse, hepatomegaly and a low body condition score of 3/9. Haematology and biochemistry revealed a mild non-regenerative anaemia (haematocrit 24.5%; reference interval [RI] 30.3–52.3%), a mild mature neutrophilia (16.21 × 10^9/l; RI 1.48–10.29 × 10^9/l) and a mild increase in alanine aminotransferase activity (222 IU/l; RI 12–130 IU/l). Abdominal radiographs identified hepatomegaly. The rectal prolapse was reduced under general anaesthesia. Abdominal ultrasound identified a caecocolic intussusception and a large hepatic mass. Thoracic radiographs were unremarkable. Hepatic fine-needle aspirate cytology revealed well-differentiated hepatocytes. A typhlectomy was performed and the quadrate liver lobe, with mass, was resected. Gross examination of the caecum identified a focal polyp; histopathology showed moderate plasmacytic–lymphocytic typhlitis and reactive mucosal-associated lymphoid tissue. The hepatic mass was diagnosed as a well-differentiated hepatocellular carcinoma. Six weeks postoperatively the cat had gained 0.5 kg, had an improved body condition score of 5/9 and resolution of clinical signs. The cat died acutely 1 year later from an unknown cause.

Relevance and novel information Caecocolic intussusception is rare in cats and uncommon in dogs. This is the third report in a cat and the first associated with a caecal polyp. As reported in dogs, the outcome following surgery was good. Hepatocellular carcinoma is a rarely reported feline neoplasm, which may have a good prognosis with surgical resection.

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Introduction

Caecocolic intussusception (caecal inversion) is rare in cats and uncommon in dogs. There are two reports of caecocolic intussusception with concurrent ileocolic intussusception in cats.[1,2] Both cats were female, and were aged 4 and 10 years, respectively. Clinical signs included short histories of tenesmus, diarrhoea, vomiting and lethargy. One cat had a 1 year history of recurrent gastrointestinal signs. The cause of the intussusceptions was not determined; however, both had histologically confirmed typhlitis and negative parasitic faecal analyses.[1,2] One had typhlectomy and enteroplication performed and the other had an ileocaecocolic

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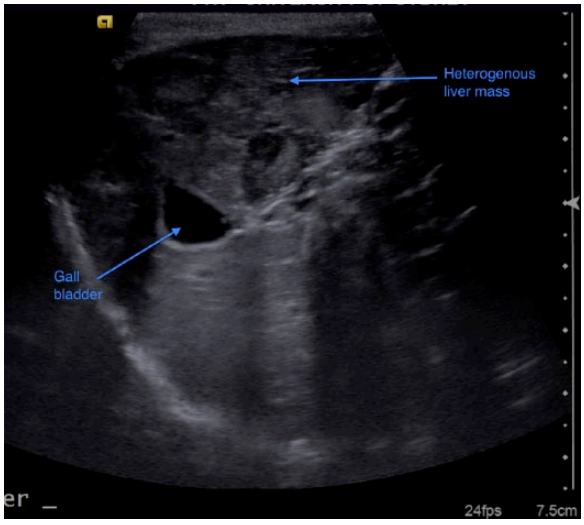

Figure 1 Ultrasound image of the heterogeneous liver mass with poorly demarcated borders producing a moderate mass effect over the gall bladder

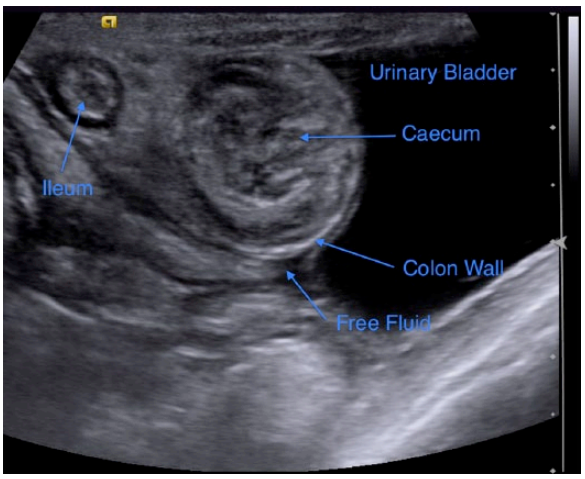

Figure 2 Transverse ultrasound image of the caecocolic intussusception. The caecum is contained within the boundaries of the colonic wall

junction (ICCJ) resection. Follow-up was available for one cat that had no further clinical signs 1 year postoperatively.[2]

Clinical signs of caecocolic intussusception in dogs include chronic intermittent haematochezia, diarrhoea, tenesmus, vomiting and weight loss.[3–9] Young, male, Weimaraner and large-breed dogs may be predisposed.[3–5,7–9] The aetiopathogenesis is unclear; however, chronic or acute typhlitis and parasitism (*Trichuris vulpis* and *Ancylostoma caninum* infections) have been suggested as causes, and typhlectomy is usually curative.[3–6,8]

Hepatocellular carcinoma is a rarely reported neoplasm in cats.[10–15] Affected cats are usually old and concurrent disease is common.[10,14] Optimal treatment is poorly defined; however, surgical resection alone can be associated with prolonged survival.[10]

This article describes the presentation, laboratory findings, diagnostic imaging and treatment of a cat with a caecocolic intussusception associated with a caecal polyp and concurrent hepatocellular carcinoma.

Case description

A 17-year-old female neutered domestic shorthair cat was presented with a 2 cm rectal prolapse. The owner reported that the cat had a normal appetite and had been passing smaller-than-usual amounts of faeces for several days. The cat was wormed monthly (Advocate; Bayer). Physical examination revealed a low body condition score (3/9) and hepatomegaly.

Haematology revealed a mild, non-regenerative anaemia (haematocrit 24.5%; reference interval [RI] 30.3–52.3%) and a mild, mature neutrophilia (16.21 $\times$ 10^9/l; RI 1.48–10.29 $\times$ 10^9/l). Multiple biochemical analyses revealed a mild increase in alanine aminotransferase activity (222 IU/l; RI 12–130 IU/l). All other parameters, including total thyroxine, were within the RIs. Urinalysis showed adequate renal-concentrating ability (urine specific gravity 1.050) and dipstick analysis was unremarkable.

Abdominal radiographs were unremarkable apart from the marked hepatomegaly. The rectal prolapse was manually reduced under general anaesthesia and an anal purse-string suture was placed. Supportive care included intravenous fluid therapy, metronidazole (10 mg/kg IV q12h), cefazolin (30 mg/kg IV q8h), buprenorphine (0.015 mg/kg IV q8h) and esomeprazole (1 mg/kg IV q24h).

The following day abdominal ultrasound confirmed marked hepatomegaly. The liver was lobulated with a complex heterogeneous echotexture and irregular margins (Figure 1). There were multifocal, well-defined, ovoid-to-circular regions within the hepatic parenchyma that contained echogenic fluid, which demonstrated an atypical echogenic swirling pattern. The intrahepatic bile ducts were enlarged. The gall bladder contained anechoic fluid with irregular wall thickening. The common bile duct was markedly distended with anechoic fluid from the level of the cystic duct to the duodenal papilla, with no evidence of intraluminal obstruction. There was a concentric ring pattern in the transverse plane at the level of the ICCJ with wall thickening suggestive of a caecocolic intussusception (Figures 2 and 3). There was a small volume of anechoic free peritoneal fluid. Abdominal ultrasound was otherwise unremarkable.

Coagulation times were within the RIs (prothrombin time 18 s [RI 15–22 s] and activated partial thromboplastin time 92 s [RI 65–119 s]). Thoracic radiographs were

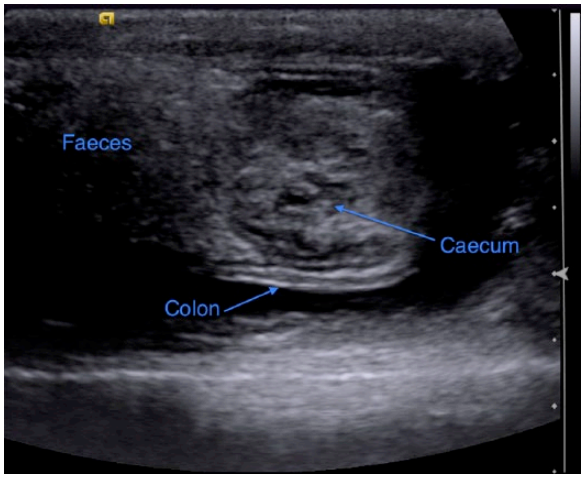

Figure 3 Longitudinal ultrasound image of the caecocolic intussusception. On the left the ascending colon is seen. The small intestine cannot be visualised in this image

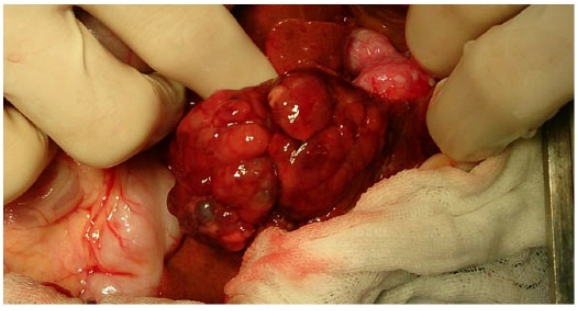

Figure 4 Intraoperative image of the quadrate lobe of the liver demonstrating a large multinodular mass

unremarkable. Hepatic mass fine-needle aspirate cytology identified well-differentiated hepatocytes.

The following day the purse-string suture was removed and colonoscopy under general anaesthesia revealed an abrupt end at the entrance to the caecum. Multiple endoscopic colonic biopsies were collected. Exploratory laparotomy was then performed via a ventral midline approach. There was a single 7 cm × 7 cm × 4 cm mass with an irregular nodular contour replacing the quadrate lobe of the liver (Figure 4). The remaining liver appeared enlarged with rounded margins and multiple scattered nodules. The common bile duct was markedly dilated. The quadrate lobe was resected using a 30 mm TA-stapler (TA autosuture; Covidien). The caecum was inverted into the colon and was unable to be reduced (Figure 5). An antimesenteric colotomy was performed adjacent to the caecal inversion and extended to include the circumference of the inverted section. The colotomy was closed and a typhlectomy was performed.

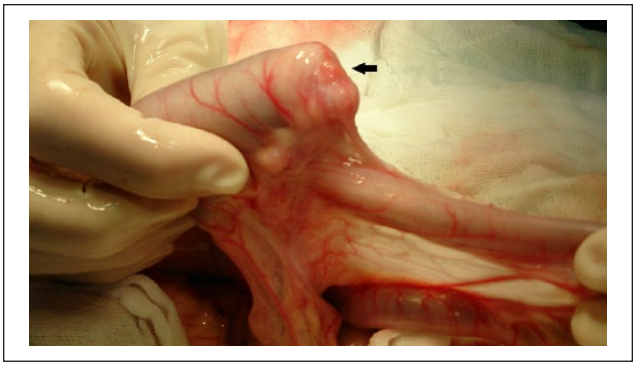

Figure 5 Intraoperative image of the ileocaecocolic junction demonstrating the caecocolic intussusception (arrow)

The base of the caecum was oversewn with 4-0 absorbable monofilament suture in a Parker-Kerr suture pattern to invert the edges. Abdominal wall closure was routine. Examination of the inverted caecum following resection revealed a distinct 1 cm × 1 cm focal, pedunculated mass arising from the mucosa and of the same colour as the mucosa. Postoperative analgesia was provided by a fentanyl continuous rate infusion (6 µg/kg/h for 24 h) followed by buprenorphine (0.015 mg/kg IV q8h for 48 h). The cat also received cefazolin (30 mg/kg IV q8h for 48 h) and amoxicillin–clavulanate (20 mg/kg PO q12h for 7 days) postoperatively.

Histopathology of the excised liver mass showed a proliferation of well-differentiated hepatocytes forming irregular plates of variable width, and lacking a defined lobular architecture or portal structures. Anisokaryosis was moderate with individual karyomegalic cells (diameter 2–3 times normal) having 1–2 large eosinophilic or basophilic nucleoli. Mitoses were present in low number (four per 10 high-powered × 40 fields). There was moderate multifocal cytoplasmic vacuolation (consistent with lipid and glycogen accumulation), and stromal tissue was inconspicuous. There was scattered individual cell death, multiple small necrotic foci, and acute and chronic haemorrhage (10% of the specimen). Tumour growth was nodular, although the margin with normal liver was irregular and infiltrative. Variably sized, sometimes blood-filled, cystic spaces were prominent and were lined by flattened endothelial cells (dilated vasculature and sinusoids) or by proliferating hepatocytes (in areas of necrosis). The changes were consistent with a well-differentiated hepatocellular carcinoma with a trabecular growth pattern and cystic foci (Figure 6).

Histopathology of the excised caecum included a pedunculated intraluminal polypoid mucosal projection with a submucosal stalk. Overlying mucosal epithelial cells were mildly hypertrophied, but significant dysplasia was not a feature. The regional mucosal-associated lymphoid tissue was reactive (enlarged, coalescing follicles, enlarged germinal centres), and of

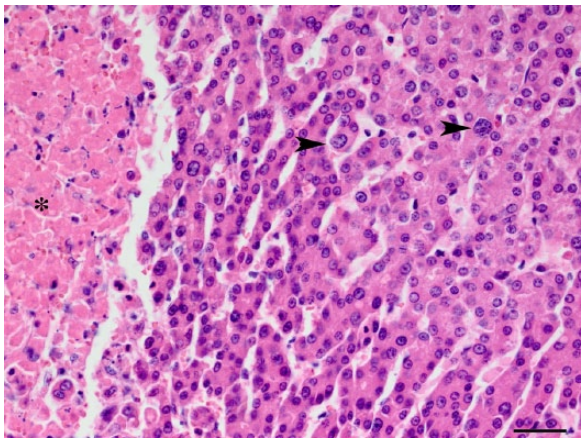

Figure 6 Histopathology of the well-differentiated hepatocellular carcinoma, including anisokaryosis (arrowheads) and necrosis (*). Haematoxylin and eosin stain (× 40 objective, bar = 65 µm)

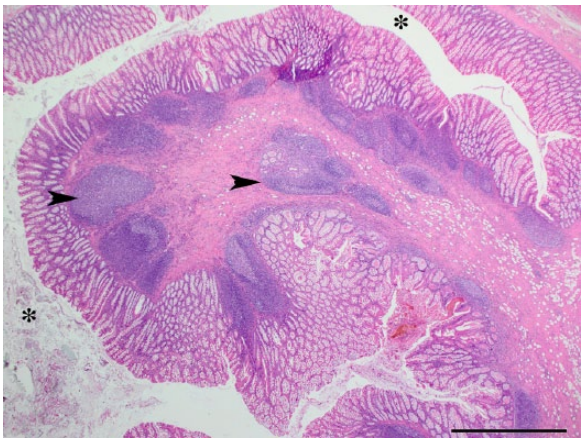

Figure 7 Histopathology of the caecal polyp with lymphoid follicles (arrowheads) and narrowing the caecal lumen (*). Haematoxylin and eosin stain (× 2 objective, bar = 1.3 mm)

increased density in the polyp. The mucosa of the polyp and adjacent caecum contained a moderate plasmacytic infiltrate, with fewer lymphocytes and occasional neutrophils. There was mild multifocal mucinous gland dilatation. A focus of caecal mucosal ulceration showed more intense inflammation and a neutrophilic serocellular crust. Adjacent tunica muscularis was attenuated, and overlying oedematous serosa expanded by a mild mononuclear inflammatory infiltrate, lymphoid aggregates, ectatic lymphatics and early fibroplasia. The changes were consistent with a hyperplastic inflammatory polyp, moderate chronic typhlitis and regional caecal wall degenerative changes with early repair (Figure 7). Histopathology of the colonic mucosal biopsies showed comparatively minor mucosal inflammation only.

The cat recovered well after surgery and was discharged 3 days later. Reassessment 6 weeks later revealed a 0.5 kg weight gain, a body condition score of 5/9 and resolution of clinical signs. Revisits every 3 months were recommended but not kept by the cat's owner. The cat died acutely 1 year later. The cause of death was not determined and necropsy was not performed. The owner reported that the cat had been well prior to its death.

Discussion

This is the first report of a caecocolic intussusception in a cat associated with a caecal polyp. Two previous reports of caecocolic intussusception in cats involved concurrent ileocolic intussusception but were also benign in origin.[1,2] Diseases involving the caecum of cats are considered rare and are poorly described.[16] Single or multiple, neoplastic (eg, adenomatous) or non-neoplastic (eg, inflammatory or hyperplastic) polyps of the stomach, duodenum, jejunum, ileum, colon and rectum have been occasionally reported in cats.[16–23] To our knowledge there is only one other report of a caecal polyp in a cat, with concurrent intestinal lymphoma.[23] The polyp in the current case was assessed as non-neoplastic owing to the lack of dysplasia within the proliferative epithelium. Microscopic features were suggestive of a hyperplastic inflammatory polyp, which included an increased density of reactive lymphoid tissue.

Isolated caecocolic intussusceptions in dogs are often not associated with abdominal pain or a palpable mass.[3–8] Diagnosis based on history and physical examination alone is difficult and in this case was confirmed by ultrasonography. Plain radiographs are unlikely to be diagnostic; however, double-contrast barium enema, ultrasound, CT scan, endoscopy or exploratory laparotomy are potential diagnostic methods.[1,3–9]

In common with other reported cases in cats and dogs, it is unclear if the typhlitis was a cause or effect of the caecocolic intussusception. Mass lesions have previously been identified as a potential predisposing factor for intussuception.[20] It is also unclear if the caecal polyp formed secondary to chronic typhlitis, although supportive of this is the increased regional lymphoid tissue. Histopathology revealed chronic plasmacytic–lymphocytic typhlitis. Two other reports in cats identified mild typhlitis and acute catarrhal enteritis associated with caecocolic intussusception.[1,2] Chronic or acute mixed neutrophilic and lymphocytic typhlitis is most often reported in dogs.[4–6] Manual reduction of caecocolic intussusceptions at surgery is often not possible, likely owing to chronicity.[1,3–8]

Colonic biopsies revealed minor inflammatory changes that were suspected to have been secondary to the adjacent rectal prolapse. The prolapse apparent at presentation was presumed to be rectal in origin, rather than the inverted caecum, based on rectal palpation during reduction and abdominal radiographs; however,

this was not definitively confirmed. Tenesmus was not described by the cat's owner in this case; however, tenesmus is commonly reported in caecocolic intussusception cases and could predispose to prolapse.[1–3] Demetriou and Welsh described rectal prolapse of an ileocaecal mass (lymphoma) and concurrent ileocolic intussusception in a cat.[24]

Faecal analysis, small intestinal biopsy or cobalamin measurement was not performed. Parasitic or small intestinal disease predisposing to typhlitis, intussusception or causing weight loss were not excluded. These diseases are unlikely given the weight gain following surgery. One report of caecocolic intussusception in a dog was associated with mild eosinophilic inflammation of the duodenum and ileum; however, the significance of this was unclear.[6] Intussusceptions in cats usually involve the small intestine and in older cats are more likely to be secondary to primary intestinal neoplasia.[25–27] Intussusceptions in dogs are more likely to involve the ileocolic junction and to be secondary to inflammatory intestinal disease.[25,26]

Primary hepatic neoplasia is rare in cats, and in contrast to dogs, bile duct neoplasia is reportedly more common than hepatocellular tumours.[10–15] Consistent with other reports, this cat was older and had concurrent disease.[10,14] Optimal treatment is poorly defined; however, surgical resection alone can be associated with prolonged survival in cats and dogs, as was found with this case.[10,28] In this case, complete resection of the neoplasm was not confirmed. The remaining liver had multiple scattered nodules that were not biopsied. These nodules may have represented local metastases, or have been due to a separate disease process such as hyperplasia or dilatation of vascular or biliary structures. Massive hepatocellular carcinomas in cats and dogs are reported to have a low rate of metastases which may be regional (ie, hepatic or regional lymph nodes) or distant (ie, pulmonary).[10,28,29] Intestinal metastases are rarely reported in humans.[30] In this case, during surgery, both primary hepatic neoplasia with caecal metastases or primary caecal neoplasia with hepatic metastases were considered but ultimately excluded by histopathology.

Clinical signs associated with hepatocellular carcinoma in cats include weight loss, inappetence, lethargy, vomiting and diarrhoea; however, concurrent disease is common and may contribute to the clinical signs.[10,14] In this case, the rectal prolapse and changes in faecal volume were likely related to the caecocolic intussusception. The weight loss may have been due to both the caecocolic intussusception and hepatocellular carcinoma, and these were likely two unrelated diseases. The poor body condition at presentation despite a normal appetite indicated a more chronic course of illness than the history suggested.

Mild abnormalities were identified on haematology and biochemistry. Hypoalbuminaemia has been reported in three dogs with caecocolic intussusception, but in most cases no significant abnormalities are present.[3] The increased alanine aminotransferase activity was likely related to the hepatocellular carcinoma, consistent with other reports.[10,25]

The ultrasonographic appearance of the hepatocellular carcinoma was consistent with other reports.[10] Fine-needle aspirate cytology is often not diagnostic, with histopathology required for definitive diagnosis – particularly with well-differentiated tumours.[10] The thickened gall bladder wall was not investigated further (eg, by bile culture) and concurrent bacterial cholecystitis cannot be excluded.

Conclusions

Caecocolic intussusception is rare and its aetiopathogenesis is often undetermined. This is the first report in a cat associated with a caecal polyp. Outcomes following typhlectomy are usually good. Hepatocellular carcinoma is a rare feline neoplasm and the prognosis may be good with surgical resection.

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