

# Intestinal Mucinous Adenocarcinoma with Lymph Node Metastasis in a Cat

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**Abstract:** Intestinal adenocarcinoma is a malignant tumor. The most common clinical signs of gastrointestinal adenocarcinoma are depression, anorexia, loss of weight, vomiting, diarrhea or constipation due to obstruction. In cats, gastrointestinal adenocarcinomas are the most common non-hematopoietic gastrointestinal tumors and their frequency is higher in males. In this report, the case of an 8 year old male cat with adenocarcinoma that had metastasized to the lymph nodes is presented.

**Keywords:** Adenocarcinoma, Cat, Metastases

## Introduction

Intestinal tumours are uncommon in cats, accounting for about 1% of all malignant feline neoplasms. Adenocarcinomas are the most common type of feline intestinal neoplasm (52%), followed by lymphosarcoma (21%) (Rivers *et al.*, 1997).

Adenocarcinomas are malignant tumors of the glandular epithelium that differentiate from the crypts of Lieberkuhn and spread through the intramural or submucosallymphatics. These tumors are considered highly malignant, with frequent metastasis to the regional lymph nodes (Prater *et al.*, 1999; Theilen and Madewell, 1979).

Gastrointestinal adenocarcinomas are the most frequently detected nonhematopoietic gastrointestinal tumors in cats (Turk *et al.*, 1981). They can be seen in all segments of intestine but the ileum is the commonest site, where as adenocarcinoma is generally detected in the colon and duodenum of dogs (Patnaik *et al.*, 1976).

The most frequent symptoms of gastrointestinal adenocarcinoma are lethargy, anorexia, loss of weight from 5 days to 6 months, vomiting, diarrhea and constipation (Patnaik *et al.*, 1976).

Adenocarcinoma can cause partial or complete obstruction of the intestine (Head and Else, 1981). Obstructions can be seen in direct and indirect radiography after the administration of barium. A swollen, fluid-filled abdomen and palpable mass can occur as well (Patnaik *et al.*, 1976). The tumors are often firm and white at the cut surface (Head and Else, 1981).

The subject of this case report is an eight year old, male cat with intestinal mucinous adenocarcinoma that had metastasized to the regional lymph nodes.

## Description of Clinical Case

The eight year old, male cat was presented to our clinic with a constipation problem. The owner reported that a foreign body was diagnosed year earlier and the cat hadn't recovered after the treatment. Two weeks before presentation at our clinic, the owner observed anorexia, lethargy and weight loss. The cat was taken to a private veterinary clinic. Supportive treatment, which included fluid therapy, was administered for a week.

When the cat was brought to our faculty's clinic, a general examination was performed. The patient was severe dehydrated, the mucosal membranes were anemic and there was a brown nasal discharge. In the palpation, a relatively large, air and fluid filled structure was detected in the right lateral part of the abdomen. In addition, a solid mass of about 2 cm diameter was palpated in the abdomen. The body temperature was 36.5°C. Haematological analyses were performed and serum enzyme levels were checked. Direct and indirect radiography with barium sulphate were performed. The hematological analyses showed that the White Blood Cell count (WBC) ( $16.85 \times 10^9/L$ ) and neutrophil count (segmented) ( $14.38 \times 10^9/L$ ) were slightly elevated, the lymphocyte count ( $0.93 \times 10^9/L$ ) was slightly lower and the platelet count was much higher ( $1125 \times 10^9/L$ ). In addition, the serum urea level was more than two times higher ( $98.8 \text{ mg dL}^{-1}$ ) than the reference range and the creatinine level ( $2.3 \text{ mg dL}^{-1}$ ) was slightly higher than the reference range.

In the direct radiography, the stomach, duodenum and proximal part of jejunum were enlarged Fig. 1 and the intestine was empty. In the contrast radiography with barium sulphate, at 0, 15, 30, 45, 60, 120, 180 min and 24 h, the contrast substance had moved just into the duodenum but no further.

In the ultrasonographic examination, the stomach was enlarged and full of fluid. Although the fluid was moving from the stomach to the duodenum, it couldn't pass on to the other parts of the intestine. In addition, thickening of the intestinal wall was detected.

Surgical intervention was deemed necessary. Laparotomy was performed on the cat under general anesthesia. The air and fluid was removed from the stomach and the internal surface of the stomach and intestine were checked for blockage. A mass which was solid but flexible was detected in the proximal part of the jejunum. It was 2.5-3 cm in length Fig. 2a and 2b. After the mass was totally removed and the peripheral lymph nodes, endwise anastomosis was performed.

Despite the full routine of intensive therapy for three days post-surgery, the patient deceased.

The intestinal mass and mesenteric lymph nodes were fixed in 10% neutral buffered formalin, embedded in paraffin wax, sliced at 5 µm intervals and stained with Hematoxylin-Eosin (HE) and Toluidin Blue (TB).

Microscopically, the tumor mass composed of neoplastic cells characterized by small acini and solid groups that produced mucin and infiltrated throughout the intestinal wall. There were scattered single cells and small groups of tumor cells that were mostly cubical or columnar, but many signet ring cells were also visible. Large extracellular mucin lakes replaced the normal intestinal tissues, especially in the muscular layer and mesentery. Neoplastic cells showing signet ring characteristics had dark nuclei that were pushed to the cell periphery by mucin and showed many mitotic figures. Tumor cell emboli were seen in many lymphatic vessels and venules. There were necrotic changes in some areas of intestinal wall. The regional lymph node exhibited extensively metastasis showing microscopic features similar to those of the primary sites Fig. 3.

At the end of the pathological examination, adenocarcinoma was diagnosed in the mass and its peripheral lymph nodes.

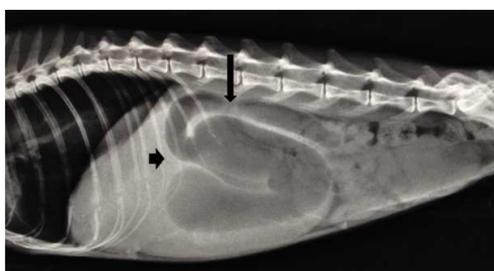
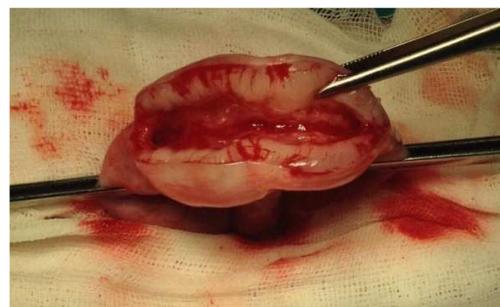


Fig. 1. Direct radiographic appearance, obstruction area (long arrow) in ileum and enlarged stomach (short arrow)



(a)



(b)

Fig. 2a and b Appearance of the mass which was detected in the proximal part of the jejunum

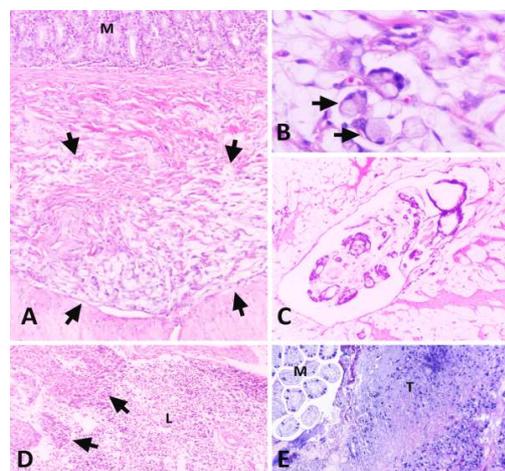


Fig. 3. Image 1 (A) Tumor cell infiltrations extending from the submucosa to the muscle layer (areas indicated by arrows) and normal intestinal mucosa (M). X 60, HE. (B) Neoplastic cells showing the typical "signet ring" feature with a dark-colored nucleus that was pushed to the periphery by the pressure of mucin in the cytoplasm between the muscle layers. X320, HE. (C) Embolism of the tumor cells in a lymphatic vessel. X60, HE. (D) Metastatic tumor cells in a mesenteric lymph node (arrows) and normal lymphoid follicles (L). X180, HE. (E) TB-positive tumor cells invading the intestinal wall (T) and goblet cells in normal intestinal mucosa. X60, TB stain

## Discussion and Conclusion

Intestinal adenocarcinoma occurs more rarely in cats than in humans and dogs. The frequency is higher in male cats than in females. Siamese and short hairdomestic cats are affected more than the other breeds. The mean age for the occurrence of intestinal adenocarcinoma is 11 years (5-17 years) (Patnaik *et al.*, 1976; Cribb, 1988). The cat in our case was eight year old, male and a short hairdomestic breed. These characteristics put our patient in the high risk category for adenocarcinoma.

Cats with adenocarcinoma have usually had a long history of non-specific gastrointestinal disease symptoms such as weight loss and vomiting (Cribb, 1988). According to the reported cases, weight loss, anorexia, lethargy, vomiting, diarrhea or constipation are the predominant clinical signs of intestinal adenocarcinoma (Patnaik *et al.*, 1976). The cat that is the subject of this case study had a number of these symptoms.

Abdominal radiography is helpful in diagnosing intestinal obstruction (Kosovsky *et al.*, 1988). In indirect radiography, the contrast substance moved as far as the duodenum. The obstruction was subsequently determined with ultrasonographic examination to be in the jejunum region.

After intestinal resection and anastomosis, median survival time was reported to be only 2.5 months in cats (range: 0-24 months) (Cribb, 1988). That description covers the presented case.

The distribution of adenocarcinomas in the gastrointestinal tract was reported as: Stomach (1%); small intestine (68%) (11% exact location not specified); duodenum (6%); jejunum (20%); ileum (31%); ileocolic junction (9%); cecum (2%); colon (13%); rectum (6%); and unknown (5%) (Cribb, 1988).

In this case study, the mass was detected in the proximal part of the jejunum. The small intestine seems to be the most frequent location of gastrointestinal adenocarcinoma in cats; the jejunum, ileum and ileocecolic junctions are the most commonly affected sites (Kosovsky *et al.*, 1988).

In cats, adenocarcinoma metastasised to the regional lymph nodes 45 and 50% of these occurred in the peritoneum or omentum; 8% were in the lungs; and 9% were in the abdominal organs, including the liver and spleen (Cribb, 1988). Metastasis to the regional lymph nodes also occurred in the cat in our study.

Adenocarcinomas can be classified into four histologically distinct groups, namely (1) carcinoma with solid groups of cells, (2) adenocarcinoma with solid and acinar cells, (3) papillary adenocarcinoma and (4) mucinous adenocarcinoma (Patnaik *et al.*, 1976). After

the histopathological evaluation of the mass in our case, it was identified as a mucinous adenocarcinoma.

In conclusion, differential diagnosis is very important in cats with non-specific gastrointestinal symptoms. Veterinary clinicians should consider adenocarcinoma in cats with a long history of chronic gastrointestinal complaints such as symptoms that can include anorexia, lethargy, weight loss, vomiting and constipation.

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## Author's Contributions

**Handan Hilal Arslan:** Participated in all clinical, stages, coordinated the data-analysis and contributed to the writing of the manuscript.

**Hatice Ozlem Nisbet:** Participated in all experiments, the data-analysis and contributed to the writing of the manuscript.

**Efe Karaca:** Contributed to the pathological investigation and writing of the manuscript.

**Birsen Deniz Özbakir:** Contributed to the clinical process.

**Ishtiaq Ahmed:** Contributed to the pathological investigation and writing of the manuscript.

**Emre Kulluk:** Contributed to the writing of the manuscript.

## Ethics

Ethics approval was not necessary. All recovery and evaluation process have done in routine clinical practice.

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