



## CASE REPORT

### Successful Management of Recurrent Ileal Fecaloma and Sepsis in a Dog with Primary Hypothyroidism: A Case Report

Choi HJ<sup>1</sup> and Han HJ<sup>1,2\*</sup>

<sup>1</sup>Department of Veterinary Emergency and Critical Care, College of Veterinary Medicine, Konkuk University, Seoul, Republic of Korea; <sup>2</sup>KU Center for Animal Blood Medical Science, Konkuk University, Seoul, Republic of Korea

\*Corresponding author: ab1234@konkuk.ac.kr

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#### ABSTRACT

A 7-year-old spayed female Maltese dog was presented with recurrent gastrointestinal symptoms of ileal obstruction. Two weeks earlier, the dog underwent an initial exploratory laparotomy at a local clinic to remove an obstructive fecal mass containing hair from the ileum, temporarily relieving symptoms. Ten days later, anorexia and vomiting recurred, prompting referral to KU-VMTH. Physical examination revealed tachycardia (192bpm), 5% dehydration, and a systolic blood pressure of 145mmHg. Bloodwork indicated leukocytosis, anemia, and thrombocytosis, while serum chemistry analysis showed hypocalcemia, hypophosphatemia, and low total T<sub>4</sub>. Imaging suggested ileal obstruction, necessitating a second laparotomy at the Konkuk University Veterinary Medical Teaching Hospital (KU-VMTH), Seoul, Republic of Korea, for confirmatory diagnosis and treatment. Postoperatively, the dog developed hypotension and hypothermia, and septic shock was suspected, which was confirmed through *Enterobacter cloacae* isolation from blood culture. The dog received partial parenteral nutrition (5% dextrose, amino acids and lipids), gastrointestinal protectants (pantoprazole, almagate), prokinetics (metoclopramide), antibiotics (cefotaxime, enrofloxacin, and metronidazole), and an appetite stimulator (mirtazapine). Hypothyroidism was suspected as the underlying cause of impaired intestinal motility, and levothyroxine therapy was initiated. The dog gradually stabilized and fully recovered, with normalized thyroid levels and no gastrointestinal signs one year post-surgery.

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#### INTRODUCTION

Fecaloma is a severe form of fecal impaction characterized by the formation of a hard, desiccated mass resulting from prolonged fecal retention, which cannot be expelled spontaneously (Falcón *et al.*, 2016). While commonly reported in the cecum or colon, small intestine involvement is exceptionally rare in dogs, and its underlying pathophysiology remains poorly understood (Kim *et al.*, 2017; Hyun and Han, 2021). Reported etiologies in veterinary cases include gastrointestinal motility disorders, adhesions, and prostatic abscesses, though the exact pathophysiology remains poorly understood.

Hypothyroidism, a prevalent endocrine disorder in dogs, can impair gastrointestinal motility, potentially leading to complications such as constipation and fecaloma formation (Gori *et al.*, 2023). This case report describes the

successful management of recurrent ileal fecaloma and sepsis in a Maltese dog with primary hypothyroidism.

**Case history:** A 7-year-old spayed female Maltese dog, weighing 3.2kg, was presented with a three-week history of recurrent gastrointestinal symptoms, including vomiting, diarrhea, and anorexia. Initial clinical signs of acute projectile vomiting and diarrhea were observed two weeks earlier, along with owner-reported lethargy and hair loss. The dog had undergone an emergency exploratory laparotomy at a local clinic, where a firm fecal mass was surgically removed from the small intestine, resulting in temporary relief. Despite this, the clinical signs recurred 10 days post-surgery, prompting referral to the Emergency and Critical Care Department at the Konkuk University Veterinary Medical Teaching Hospital (KU-VMTH), Seoul, Republic of Korea.

**Clinical examination and preliminary diagnosis:** Upon admission to KU-VMTH, the physical examination revealed a low body condition score of 3/9, tachycardia with a heart rate of 192 beats per minute, and 5% dehydration which was subjectively estimated based on the presence of tacky oral mucous membranes, most likely due to persistent vomiting and diarrhea. Systolic blood pressure (SBP) measured by Doppler was 145mmHg. Hematological evaluation showed moderate anemia with a hematocrit of 29.5% (reference range: 37.3–61.7%), marked leukocytosis at  $27.82 \times 10^9/L$  (reference range:  $5.05\text{--}16.76 \times 10^9/L$ ) with a left shift, and thrombocytosis of  $504K/\mu L$  (reference range:  $148\text{--}484K/\mu L$ ). The dog scored 0/3 on the quick Sequential Organ Failure Assessment (qSOFA) and met 2 out of 4 criteria for systemic inflammatory response syndrome (SIRS), both widely accepted tools for evaluating the severity of sepsis and systemic inflammation in veterinary medicine (Donati *et al.*, 2022).

Serum chemistry analysis showed hyperglycemia at 159mg/dL (reference range: 74–143mg/dL), hypocalcemia at 7.2mg/dL (reference range: 7.9–12.0mg/dL) with decreased ionized calcium at 1.09mmol/L (reference range: 1.25–1.50mmol/L), and elevated C-reactive protein (CRP) at 1.5mg/dL (reference range: 0.0–1.0mg/dL). Total T<sub>4</sub> levels were undetectable ( $<0.5\mu g/dL$ ; reference range: 1.0–4.0 $\mu g/dL$ ), and a complete thyroid panel, including total T<sub>4</sub>, free T<sub>4</sub>, and cTSH, was requested.

Abdominal ultrasound examination, performed using a B-mode, linear array convex transducer with a frequency of 7.5MHz, revealed the presence of a heterogeneous, hyperechogenic, irregular material measuring 23.1x17.9mm, with acoustic shadowing in the ileum (Fig. 1A). The jejunum and ileum exhibited marked dilation anteriorly and posteriorly to the material (Fig. 1B). In addition, overall gastrointestinal tract motility was rarely observed. Computed tomography (CT) imaging under general anesthesia confirmed overall dilation of the small intestine, filled with fluid, and a small bowel feces sign (Fig. 2A), with a heterogeneous, hyperattenuating material measuring 48.0x19.4x21.5mm in the ileum (Fig. 2B). The dog was preliminarily diagnosed with ileal fecal impaction (fecaloma) causing mechanical obstruction, accompanied by functional ileus.

**Confirmatory diagnosis and treatment using laparotomy:** The second exploratory laparotomy was performed to confirm diagnosis and to address the mechanical obstruction of the ileum caused by a suspected fecaloma. Preoperative blood analysis revealed moderate anemia (hematocrit: 26.3%; reference range: 37.3–61.7%) and hypoalbuminemia (2.1g/dL; reference range: 2.3–4.0g/dL). During the surgery, extensive adhesions around the ileocolic junction (ICJ) were identified and carefully separated (Fig. 3A). A hard, palpable mass was located in the ileum segment just anterior to the ICJ, with the ileum dilated proximally and collapsed distally (Fig. 3B). The intestine proximal to the obstruction appeared enlarged and congested.

An enterotomy was performed to remove the obstructive fecaloma, which consisted of hard, dry feces interspersed with small irregular foreign bodies (Fig. 3C). To minimize the risk of postoperative adhesion recurrence, a peritoneal graft was applied to the damaged serosa (Fig.

3D). The fecal mass was classified with a fecal score of 1 out of 7, according to the Fecal Scoring Chart (Nestlé Purina® Company, St. Louis, Missouri, USA). This laparotomy confirmed the diagnosis of ileal obstruction caused by recurrent fecaloma, likely secondary to gastrointestinal dysmotility associated with hypothyroidism. The procedure successfully relieved the obstruction and provided a definitive diagnosis.

**Post-surgery follow-up and medication:** Postoperatively, the dog developed severe tachycardia (180bpm), hypotension (systolic blood pressure: 75mmHg), hypothermia (37.1°C), and hypoalbuminemia (1.4g/dL; reference range: 2.3–4.0g/dL). Resuscitation measures included oxygen therapy, repeated intravenous boluses of Plasmalyte A, and administration of turbo-starch. Persistent hypotension necessitated vasopressor support with norepinephrine, administered as a continuous rate infusion (CRI) at 0.05–2.0 $\mu g/kg/min$  and titrated based on blood pressure response to maintain adequate perfusion. Within two hours, systolic blood pressure improved to 112mmHg, although tachycardia and respiratory distress (42 breaths per minute) persisted.

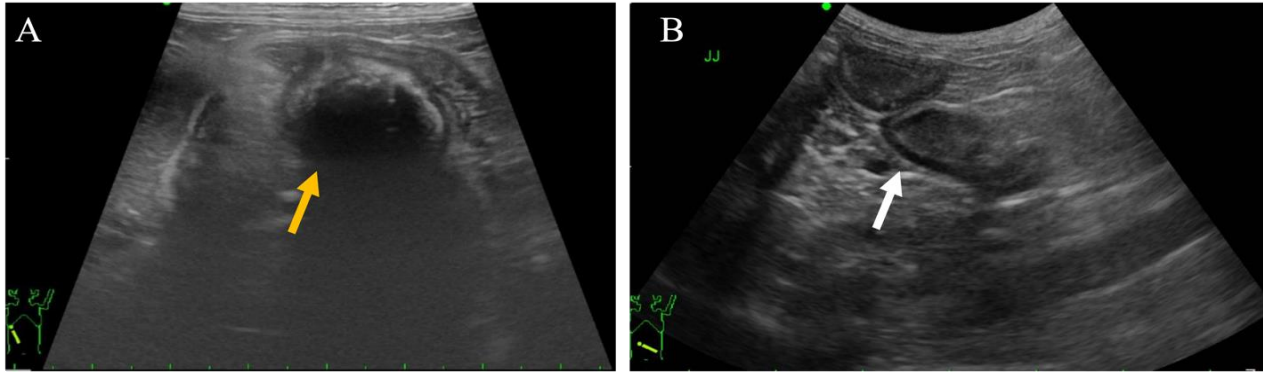
Postoperative blood analysis showed severe leukopenia with a degenerative left shift, thrombocytopenia, hypoproteinemia (3.1g/dL; reference range: 5.2–8.2g/dL), and hyperlactatemia (4.17mmol/L; reference range: 0.50–2.50mmol/L). The dog now scored 2/3 on the qSOFA and met 3 of 4 SIRS criteria, indicating septic shock, as described earlier (Donati *et al.*, 2022). Blood culture was performed, and the growth of *Enterobacter cloacae* was subsequently confirmed.

For the suspected septic shock, empirical broad-spectrum antibiotics—cefotaxime (80mg/kg TID), enrofloxacin (20mg/kg SID), and metronidazole (15mg/kg BID)—were promptly administered. To address hypoalbuminemia and provide colloidal support, fresh frozen plasma and human serum albumin transfusions were performed.

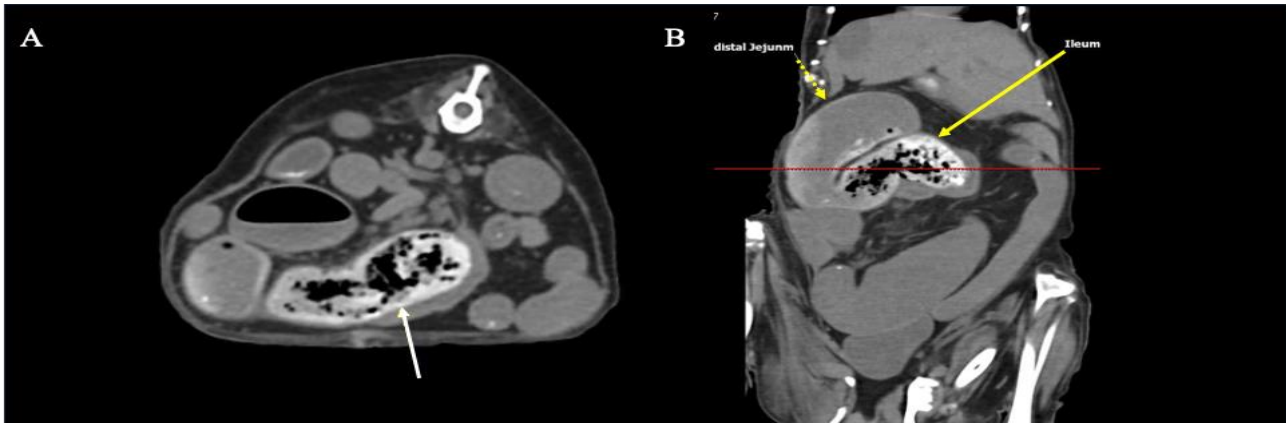
Supportive care included antiemetics (maropitant), prokinetics (metoclopramide), gastrointestinal protectants (pantoprazole, Almagate), and appetite stimulation with mirtazapine. Partial enteral nutrition consisting of 5% dextrose with amino acids and lipids was maintained to ensure adequate caloric intake.

By postoperative day (POD) 5, the patient demonstrated remarkable clinical improvement, with stable hemodynamics and a return of appetite. Levothyroxine was initiated on POD 6 at a dosage of 0.01mg/kg BID for therapeutic purposes. A comprehensive thyroid panel results confirmed severe hypothyroidism (total T<sub>4</sub>: 0.7 $\mu g/dL$ , free T<sub>4</sub>:  $<0.3ng/dL$ , cTSH: 0.02ng/mL).

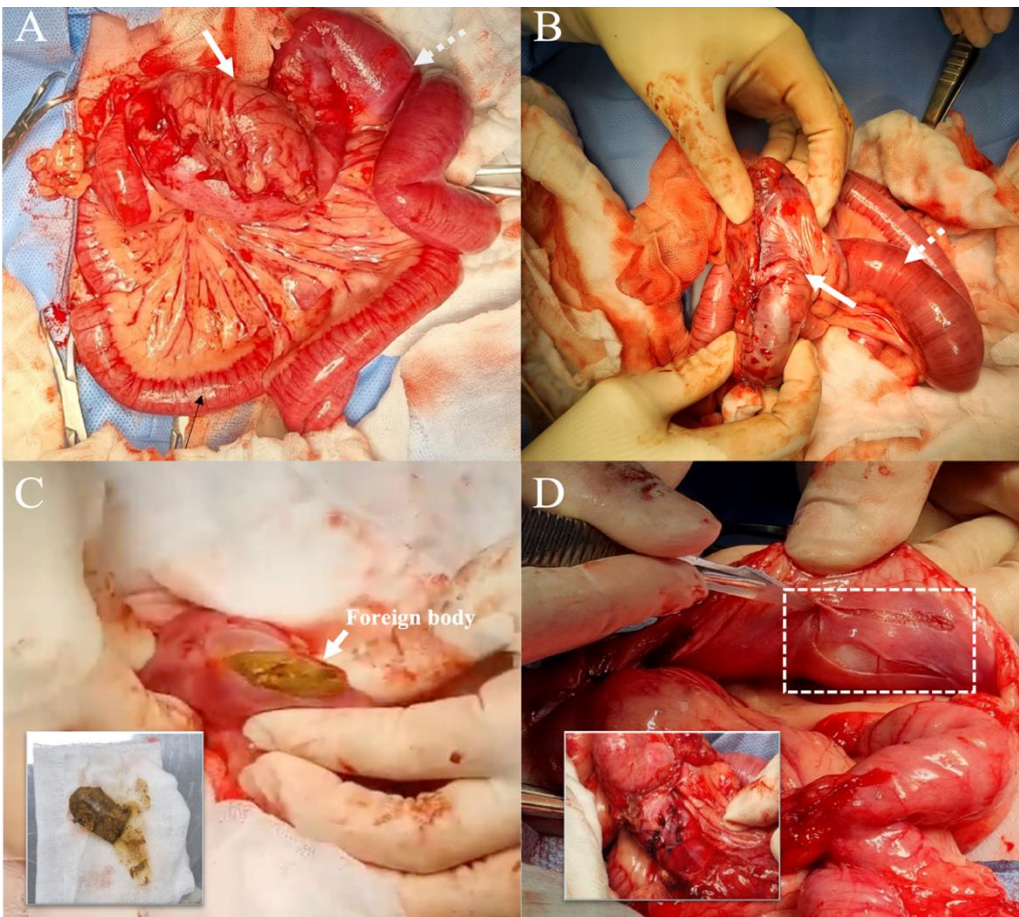
Antibiotics were discontinued on POD 7 based on favorable clinical and laboratory stabilization, including a decrease in CRP levels from 5.2mg/dL (POD 1) to 1.2mg/dL. A follow-up on POD 14 revealed negative blood culture results, improved gastrointestinal motility, and normalized hematological parameters, confirming resolution of the *Enterobacter cloacae* infection. At the one-year follow-up, the owner reported no recurrence of gastrointestinal symptoms, and hypothyroidism was effectively managed.



**Fig. 1:** Abdominal ultrasound images of ileum and jejunum. (A): A heterogenous hyperechogenic irregular material with acoustic shadowing (W\*H=23.1\*17.9mm) within ileal lumen (yellow arrow). (B): Dilation of jejunum anteriorly to the foreign material (white arrow).



**Fig. 2:** CT image of intestinal foreign body showing generalized small bowel dilation filled with fluid. (A): Small bowel feces sign observed at proximal ileum level (white arrow). (B): A heterogenous, hyperattenuating material including gas (48.0\*19.4\*21.5mm; yellow solid arrow) is identified. Severe jejunal dilation (yellow dotted-line arrow) is observed anteriorly, with a maximal dilation diameter of 27.8mm.



**Fig. 3:** Images from second exploratory laparotomy. (A): Gross appearance of the ileum (dashed arrow), ileocolic junction (ICJ; white arrow), and colon (black arrow) after separation of adhesion at ICJ. The bowel appeared dilated and congested anteriorly, and relatively collapsed posteriorly to the obstructed ileum. (B): An adherent ICJ (white arrow) was identified with a hard palpable foreign body in the ileum segment just anterior to the ileocolic junction. The intestine anterior to the foreign body is enlarged and congested (dashed arrow). (C): After carefully dissecting adherent intestines as much as possible, the foreign body (arrow) was removed after enterotomy of the obstructed ileum. The foreign body was confirmed to be firm fecal material. (D): A peritoneal graft was performed on the damaged serosa to prevent re-adhesion of the organs.

**Differential diagnosis:** The initial clinical signs including vomiting, diarrhea, anorexia, and lethargy warranted consideration of several differential diagnoses, such as gastrointestinal foreign body obstruction, postoperative adhesions, and functional ileus.

Diagnostic imaging including ultrasonography and CT revealed severely reduced gastrointestinal motility and hyperechogenic material within the ileum, raising suspicion of mechanical obstruction versus functional ileus. The small bowel feces sign observed on CT strongly supported a diagnosis of ileal fecal impaction, which was later confirmed as ileal fecaloma during laparotomy.

Functional ileus presents with reduced gastrointestinal motility and generalized intestinal dilation, which may resemble some imaging findings in this case. However, functional ileus typically lacks a visible obstructive mass. In this case, the diagnosis of hypothyroidism, as confirmed by a thyroid panel, indicated impaired motility secondary to an underlying endocrine disorder, further differentiating it from functional ileus.

Additionally, severe leukopenia, thrombocytopenia, hypoproteinemia, hyper-lactatemia, and a fulfillment of systemic inflammatory response syndrome (SIRS) criteria indicated a high likelihood of septic shock. This was confirmed by positive blood culture results for *Enterobacter cloacae*, guiding continued antibiotic therapy.

## DISCUSSION

Fecaloma represents a severe manifestation of fecal impaction, where retained fecal material solidifies into a discrete mass within the bowel, potentially causing complications such as intestinal obstruction, stercoral colitis, urinary retention, and pressure-induced damage (Falcón *et al.*, 2016). In human medicine, fecalomas frequently occur in the recto-sigmoid region, often associated with chronic constipation, Hirschsprung's disease, or inflammatory bowel disorders (Aiyappan *et al.*, 2012; Falcón *et al.*, 2016). Small bowel involvement is exceedingly rare, typically requiring surgical intervention. In veterinary cases, fecalomas are most commonly reported in the cecum or colon, with small bowel occurrences being even more uncommon (Kim *et al.*, 2017; Hyun and Han, 2021).

Hypothyroidism, a prevalent endocrine disorder in dogs, is known to significantly impair gastrointestinal function, resulting in decreased peristalsis and constipation (Yaylali *et al.*, 2009; Patil, 2014). Despite the absence of elevated cTSH levels, the constellation of clinical signs—lethargy, alopecia, low blood total T<sub>4</sub>, moderate anemia, and persistent gastrointestinal dysmotility—necessitated a therapeutic trial of levothyroxine. The subsequent resolution of clinical signs and normalization of thyroid parameters and thyroid panel results confirmed hypothyroidism as the underlying cause. Thus, this case underscores the critical impact of thyroid hormone deficiency on gastrointestinal motility and the risk of recurrent fecaloma formation.

Sepsis, defined as a dysregulated host response to infection, can escalate to septic shock, characterized by persistent hypotension and multi-organ dysfunction despite adequate fluid resuscitation (Hotchkiss *et al.*, 2016;

Summers *et al.*, 2020). In this case, postoperative septic shock was diagnosed based on SIRS criteria—hypothermia, tachycardia, and leukopenia—with *Enterobacter cloacae* isolated from blood culture. The therapeutic approach included aggressive fluid resuscitation, vasopressor support, and broad-spectrum antibiotics. Resolution of sepsis was confirmed by negative blood cultures on POD 14.

The pathogenesis of sepsis in this patient likely involved bacterial translocation (BT), a phenomenon where gut bacteria or endotoxins traverse the compromised intestinal barrier, especially under conditions of impaired intestinal motility and obstruction (Krentz and Allen, 2017). The presence of a fecaloma and resultant dysbiosis likely facilitated BT, contributing to systemic infection. This case highlights the dual pathogenic role of fecaloma, not only causing mechanical obstruction but also predisposing to sepsis through BT.

**Conclusions:** To the best of the authors' knowledge, this is the first reported case in veterinary literature describing recurrent ileal fecaloma and septic shock in a small breed dog with primary hypothyroidism. Successful management was achieved through timely surgical intervention, hormone replacement therapy, and aggressive sepsis management, emphasizing the necessity of recognizing endocrine disorders as potential contributors to severe gastrointestinal complications.

**Authors contribution:** HC performed the clinical examination, assisted the surgery, and followed up the patient after surgery. HH was the main surgeon for this case. HC and HH analyzed the case and drafted the manuscript. All authors read and approved the final version of the manuscript.

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