

Case Report: Transmural Migration of a Gossypiboma into the Descending Colon and Concurrent Abdominal Wall Abscess Formation in a Dog

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Case Report

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Abstract

Background: Gossypiboma is a retained surgical sponge or gauze that is unintentionally left in the body during surgery. Previously, transmural migration has been reported in a limited number of cases involving the jejunum, ileum, cecum, and urinary bladder in veterinary medicine. However, no cases of colonic transmural migration have been described in veterinary patients to date.

Case presentation: A 15-year-old spayed female Shih Tzu presented with chronic acute hemorrhagic diarrhea. The dog had undergone ovariohysterectomy 10 months before presentation. Radiography, ultrasonography, and computed tomography revealed two caudal abdominal masses. One mass was located adjacent to the distal jejunum and exhibited a spongiform pattern containing gas. The other mass was associated with the descending colon and extended into the abdominal wall, causing disruption of the colonic wall and leakage of fecal-like contents. Exploratory laparotomy revealed a 4 × 4 surgical sponge retained within the encapsulated mass adjacent to the distal jejunum. Another 4 × 4 surgical sponge was found within the resected descending colonic segment, which firmly adhered to the abdominal wall. Histopathological findings were consistent with transmural migration. The colonic wall was destroyed through its full thickness and perforated with a textile-like foreign body surrounded by pyogranulomatous inflammation. Inflammation was more severe along the serosal aspect than along the mucosa. A culture of the abdominal wall abscess yielded *Escherichia coli* and *Enterococcus faecalis*. The dog recovered without complications.

Conclusion: To the best of our knowledge, this is the first veterinary clinical report of the transmural migration of a gossypiboma into the descending colon with concurrent abdominal wall abscess formation in a dog.

Background

A gossypiboma is a retained surgical sponge or gauze that is unintentionally left in the body during surgery (1, 2). The onset of clinical signs and time of diagnosis vary widely, ranging from immediately after surgery to 8 years later (3–6). The most commonly reported clinical signs are nonspecific symptoms, including pyrexia, lethargy, anorexia, vomiting, and diarrhea, which can also be identified incidentally without symptoms (6–9). Although diagnostic imaging modalities such as radiography, ultrasonography, computed tomography (CT), and magnetic resonance imaging can be used, gossypiboma is easily misdiagnosed as ingesta, feces, or tumors (2, 8, 10, 11). Therefore, exploratory laparotomy is often required for a definitive diagnosis (5, 11, 12).

Gossypiboma causes two major inflammatory responses: aseptic fibrinous and exudative (1). In rare cases, persistent inflammation and physical pressure can result in transmural migration of the retained surgical sponge into the hollow viscera (1, 13). Transmural migration has been reported in a limited number of cases involving the jejunum, ileum, cecum, and urinary bladder (8, 9, 12, 14, 15).

To the best of our knowledge, this is the first report of the transmural migration of a gossypiboma into the descending colon with concurrent abdominal wall abscess formation in a dog. This case is also notable because the two retained surgical sponges showed distinct predominant pathological features.

Case presentation

A 15-year-old spayed female Shih Tzu weighing 3.35 kg with a body condition score of 3/9 presented with a 1-month history of chronic diarrhea and a 1-day history of acute-onset hemorrhagic diarrhea and lethargy. Approximately 10 months before the onset of clinical signs, the patient had a history of ovariohysterectomy (OHE) for uterine herniation. One day before referral, the patient was diagnosed with fecaloma at a local animal hospital and received two enemas. This procedure immediately resulted in severe hemorrhagic diarrhea and lethargy, requiring emergency referral to our hospital.

On physical examination, the patient's vital signs, such as heart rate, respiratory rate, and body temperature, were unremarkable. A complete blood count revealed increased white blood cells (WBC, 30.97 K/ μ L; reference range [RR]: 5–16.7) and decreased neutrophils (21.62 K/ μ L; RR: 2.9–11.64). Severe non-regenerative anemia with a hematocrit of 19.2% (RR: 37.3–61.7) and reticulocytopenia (7.2 K/ μ L; RR: 10–110) were also identified. Serum biochemical analysis revealed a severely increased C-reactive protein concentration (> 200 mg/L; RR: 0–20). Furthermore, a D-dimer concentration of 0.6 mg/L (RR: 0–0.3) and thromboelastography findings indicated a distinct hypercoagulable state.

Abdominal radiography (Fig. 1A) revealed two irregular, round, and dense soft tissue masses in the caudal peritoneal space. The left mass contained multiple gas opacities, while the right mass was filled with fecal-like material and surrounded by the adjacent small intestine. The serosal detail around the right mass was generally decreased.

Ultrasonography revealed a right mass with strong acoustic shadowing adjacent to the distal jejunum (Fig. 1B). Communication between the mass and adjacent small intestine was unclear. The adjacent jejunal segment had lost its normal course and exhibited thickened muscularis layers with prominent hyperechoic changes in the surrounding mesentery (Fig. 1C). In contrast, in the descending colon, focal loss of wall layering was observed (defect size, 7.4 mm). An irregular abnormal structure containing multiple hyperechoic shadowing foci extended through the abdominal wall musculature, suggestive of extraluminal fecal material. Adjacent focal peritoneal thickening and a heterogeneous hyperechoic appearance of the surrounding subcutaneous and abdominal wall fat were also observed. These findings indicated regional inflammatory changes (Fig. 1D).

Post-contrast CT revealed that the distal jejunal mass (21 mm × 22 mm × 23 mm) had a spongiform pattern containing gas bubbles (Fig. 2A, B). The wall of the mass showed contrast enhancement and compressed the adjacent distal jejunal segment with irregular mural layering. The caudal side of the mass was in close contact with the urinary bladder, and anechoic fluid was identified cranial to the mass. The differential diagnoses included fecaloma, gossypiboma, neoplasia, and peritoneal abscess. Adjacent to the mass, the descending colon showed complete loss of wall continuity at its mid-ventrolateral

aspect. From this defect, luminal contents with fecal-like attenuation and morphology extended beyond the peritoneum (Figs. 2C, D). Thickening and contrast enhancement of the adjacent abdominal wall musculature and the surrounding fat stranding were also identified. Colonic perforation with marked regional inflammation and adjacent abdominal wall involvement were suspected.

Blood transfusion was performed to correct anemia. Once the hematocrit reached 24%, exploratory laparotomy was performed. The patient was premedicated for general anesthesia using intravenous butorphanol (Myungmoon Pharmaceutical, Seoul, Korea) 0.2 mg/kg, midazolam (Bukwang Pharm, Seoul, Korea) 0.2 mg/kg, and cefazolin (Chong Kun Dang Pharmaceutical Corp., Seoul, Korea) 22 mg/kg. Following preoxygenation, anesthesia was induced with propofol (Hana Pharm, Seoul, Korea) and maintained with isoflurane (Hana Pharm, Seoul, Korea). Cefazolin (22 mg/kg) was administered every 90 min during surgery.

A ventral midline approach was used with the patient in dorsal recumbency. Severe mesenteric inflammation and adhesions involving the bladder, duodenum, and jejunum were observed around the distal jejunal mass (Fig. 3A). Mild fluctuations were noted on palpation of the mass. Subsequently, a small volume of transparent fluid was aspirated and subjected to bacterial culture and antimicrobial susceptibility testing. Following the incision of the mass, a retained 4 × 4 surgical sponge was identified and removed (Fig. 3B). To minimize tissue trauma, limited capsule trimming was performed (Fig. 3C) and leakage testing confirmed the integrity of the jejunal wall.

The descending colon was firmly adhered to the abdominal wall (Fig. 3D), and purulent fluid was aspirated from the abdominal wall adjacent to the mass. The portion of the abdominal wall adhering to the affected colon was completely resected and reconstructed (Fig. 3E). The affected colonic segment was resected and end-to-end anastomosis was performed. Another 4 × 4 surgical sponge was observed within the resected colonic segment (Fig. 3F). Leakage testing confirmed intact closure of the colon. The abdominal cavity was copiously lavaged with normal saline solution. Subsequently, a closed suction drain (Barovac®, Sewoon Medical, Cheonan, Korea) was placed. The abdominal wall was routinely closed. The external aspect of the abdominal wall adhering to the descending colon was approached via blunt subcutaneous dissection. The necrotic tissue was trimmed, and a passive drain (Penrose drain®, Sewoon Medical, Cheonan, Korea) was placed. The subcutaneous tissues and skin were closed routinely. Recovery from anesthesia was uneventful.

Following surgical removal of the chronic inflammatory lesions, severe preoperative inflammation, secondary hypercoagulability, and nonregenerative anemia resolved spontaneously. At the 1-month follow-up, all hematologic and inflammatory parameters had returned to within the reference ranges, including WBC (10.03 K/ μ L), neutrophils (8.17 K/ μ L), c-reactive protein (< 10 mg/L), hematocrit (41.2%), and reticulocytes (14.08 K/ μ L). Postoperative ultrasonography confirmed a favorable recovery without complications, and the patient maintained a normal voluntary appetite without any clinical signs.

Histopathological examination of the descending colon revealed that inflammation and necrosis destroyed the structure of the colonic wall, resulting in serosal ulceration and perforation toward the

abdominal wall adhesion site (Fig. 4A). Severe transmural necrotization and suppurative inflammation involving the entire colonic wall were also observed (Fig. 4B). The inflammatory changes were more prominent in the serosal and mesenteric aspects than in the mucosa. The lesions were infiltrated by abundant degenerate neutrophils, macrophages, lymphocytes, and plasma cells. A textile-like foreign body surrounded by macrophages, multinucleated giant cells, and prominent granulomatous inflammation was observed within the lesion (Fig. 4C, D). Hematopoietic cells were also identified. The surrounding serosal and mesenteric tissues exhibited fibrosis and chronic inflammation.

Discussion and conclusions

According to veterinary literature, gossypibomas mostly occur in the abdominal cavity (92.9%, 13/14) (3), and most reported cases are associated with abdominal surgery (3, 8). Although OHE is generally considered a routine procedure in veterinary practice, it is reported to be the most common surgery associated with gossypiboma (57–64.3%) (3, 5, 6, 8, 10). This may be due to the high frequency of the OHE procedure, but may also be related to the common practice of packing a surgical sponge deep beneath the ovary to improve visualization and control hemorrhage from the ovarian pedicle, significantly increasing the risk of leaving the surgical sponge behind (3). In the present case, the patient also had a typical clinical background, with surgical sponges suspected to have been inadvertently retained in the abdominal cavity during an OHE performed 10 months before presentation.

On histopathological examination, a gossypiboma located near the distal jejunum showed a typical aseptic fibrinous response (16). A well-formed capsule firmly adhered to the surrounding organs and bacterial culture of the fluid within the capsule yielded no bacterial growth (9). In contrast, histopathological examination of gossypibomas in the descending colon revealed a mixture of chronic granulomatous and acute purulent inflammation. Culture of the fluid aspirated from the abdominal wall abscess yielded *Escherichia coli* and *Enterococcus faecalis*, which are normal intestinal flora. These findings suggest that the surgical sponge caused suppurative inflammation secondary to infection, which can be explained by the mechanism of transmural migration of gossypiboma (2, 17). According to this mechanism, the surgical sponge initially adhered firmly to the external serosa and exerts continuous physical compression on the colonic wall, leading to ischemic necrosis and perforation (1, 12, 18). Following this mural defect, leakage of intestinal bacteria causes a secondary infection, resulting in purulent inflammation and formation of an abdominal wall abscess (6, 19). Subsequently, the peristaltic movement of the intestinal tract likely pulls the gossypiboma toward the lumen, leading to progressive transmural migration (2, 20).

In the present case, the surgical sponge had migrated into the lumen of the descending colon; however, complete mechanical obstruction did not develop. According to the human literature, 67% (42/64) of transmural migrations occur in the small intestine and are usually associated with acute intestinal obstruction and severe vomiting (1, 2, 21). However, when migration occurs in the large intestine, the incidence of obstruction is significantly lower (9%, 9/64) (1), and spontaneous passage through defecation has been reported (2, 16). The absence of complete obstruction in this case was likely

because the descending colon has a wider luminal diameter and greater distensibility of the muscular wall than the small intestine, allowing a physical gap for feces to pass between the surgical sponge and the intestinal wall (22, 23). Consequently, the patient presented with clinical signs of chronic diarrhea rather than acute obstruction.

This atypical clinical presentation may complicate the interpretation of surgical sponges within the intestinal lumen. Therefore, distinguishing a simple ingested foreign body from a transmurally migrated gossypiboma is important to evaluate the surgical extent, risk of complications, and prognosis. A simple ingested foreign body can usually be removed via enterotomy or colotomy (21). In contrast, transmurally migrated gossypibomas may be associated with severe adhesions to adjacent organs owing to chronic inflammation, and more extensive and complex surgery may be required (6, 24, 25). In addition, intestinal wall damage and secondary infections during the migration process can increase the risk of serious complications such as septic peritonitis, fistula formation, and postoperative anastomotic dehiscence (8, 26).

In the present case, several findings supported the diagnosis of a transmurally migrated gossypiboma rather than a simple ingested foreign body. First, the dog had no clinical history suggestive of pica or foreign body ingestion, whereas a history of ovariohysterectomy performed 10 months earlier provided a plausible source of the intra-abdominal retained surgical sponge. Second, the location of the foreign material was atypical for ingested foreign textile bodies. In dogs, ingested foreign bodies generally remain within the stomach or lodge within the relatively narrow lumen of the small intestine, resulting in mechanical obstruction. By contrast, localization within the descending colon is uncommon (21, 22, 27). Furthermore, CT revealed a loss of normal colonic wall layering, a penetrating tract extending into the lumen, and fistulous communication with the abdominal wall. These findings are more consistent with progressive penetration of the colonic wall from an extraintestinal source than with a foreign body confined to the intestinal lumen. Ingested foreign bodies typically cause mucosal injury, beginning at the luminal surface, and tend to remain confined to the lumen, resulting in obstruction or mucosal erosion (22). In contrast, the transmural migration of gossypibomas is characterized by penetration from the serosal side toward the lumen (1, 20). Histopathological examination provided additional evidence of transmural migration. Textile-like foreign bodies are associated with full-thickness colonic wall destruction, perforation, and the extension of inflammation beyond the serosa. Inflammatory changes were more severe along the serosal aspect than in the mucosa. This pattern supports penetration from the serosal surface toward the intestinal lumen rather than mucosal injury caused by an ingested foreign body. Most importantly, the presence of another encapsulated sterile surgical sponge adjacent to the distal jejunum strongly supported the conclusion that both foreign bodies were iatrogenically retained surgical sponges from the previous OHE.

Gossypibomas without a radiopaque marker are extremely difficult to diagnose preoperatively even with advanced imaging modalities (5, 12). On CT examination, gossypibomas may appear as a heterogeneous low-attenuation mass or show a spongiform pattern containing gas bubbles; however, these findings can be mistaken for fecalomas, abscesses, hematomas, or neoplasias (2, 12). In the

present case, the lesion adjacent to the distal jejunum showed a spongiform gas pattern on CT and acoustic shadowing on ultrasonography. Although these findings were suggestive of gossypiboma, they were not sufficiently specific to allow for a definitive preoperative diagnosis. This is consistent with previous veterinary reports stating that imaging alone rarely confirms gossypiboma (5, 8).

Descending colonic lesions were more difficult to interpret than jejunal lesions. The imaging findings suggested colonic wall disruption, fecal leakage, and an abdominal wall abscess. Therefore, colonic perforation with secondary inflammation is more likely to occur before surgery. Retrospectively, these findings were compatible with transmural migration of the gossypiboma into the colonic lumen.

These findings suggest that gossypibomas should remain a differential diagnosis for gas-containing abdominal masses near the gastrointestinal tract, especially in patients with a history of abdominal surgery. Although ultrasonography and CT are useful for evaluating intestinal wall defects and associated complications, exploratory laparotomy may be required for a definitive diagnosis and definitive treatment.

Gossypiboma is a preventable but potentially serious iatrogenic complication (6, 24). In human literature, it has been reported that 88.2% (30/34) of retained foreign body incidents occurred despite the surgical team's belief that manual counts were correct (28). In contrast, according to a veterinarian survey, surgical sponge count records were absent in 82.4% (14/17) of reported gossypiboma cases, and 88.2% (15/17) involved the use of surgical sponges without radiopaque markers (3). Based on the present case and previous literature, the establishment of standardized preventive protocols is essential to prevent iatrogenic complications. These protocols should include standardizing the use of radiopaque sponges, performing and documenting perioperative sponge counts, and implementing surgical safety checklists (3, 6, 14).

In conclusion, this report describes the first case of transmural migration of a retained surgical sponge into the descending colon with concurrent abdominal wall abscess formation following ovariohysterectomy in a dog. The diagnosis was supported by characteristic imaging findings, histopathological evidence of serosa-to-lumen penetration, and the concurrent presence of a second retained surgical sponge within the abdominal cavity. This case highlights that gossypiboma should be considered as a differential diagnosis for chronic inflammatory abdominal masses and intestinal wall defects in patients with a history of abdominal surgery. Furthermore, it emphasizes the potential of retained surgical sponges to cause severe complications through transmural migration and demonstrates the importance of careful surgical sponge accounting and standardized preventive protocols to avoid iatrogenic complications.

Abbreviations

CT
Computed tomography
OHE

Ovariohysterectomy

RR

Reference range

Declarations

Ethics approval and consent to participate

No animals were harmed for the purposes of this study. Samples were collected during routine clinical examinations, and informed owner consent was obtained.

Consent for publication

Not applicable.

Competing interests

All the authors approved the final manuscript and they have no competing interests to declare.

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Author Contribution

H.S. performed the clinical examination, collected clinical data, and wrote the original draft of the manuscript. H.L. conducted the clinical pathology and pathological investigations. D.N. performed and interpreted the imaging studies. J.K. and H.W. contributed to manuscript review and editing. K.K. performed the surgery and contributed to manuscript review and editing. All authors read, revised, and approved the final manuscript.

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Nothing to declare.

Data Availability

The data generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Figures

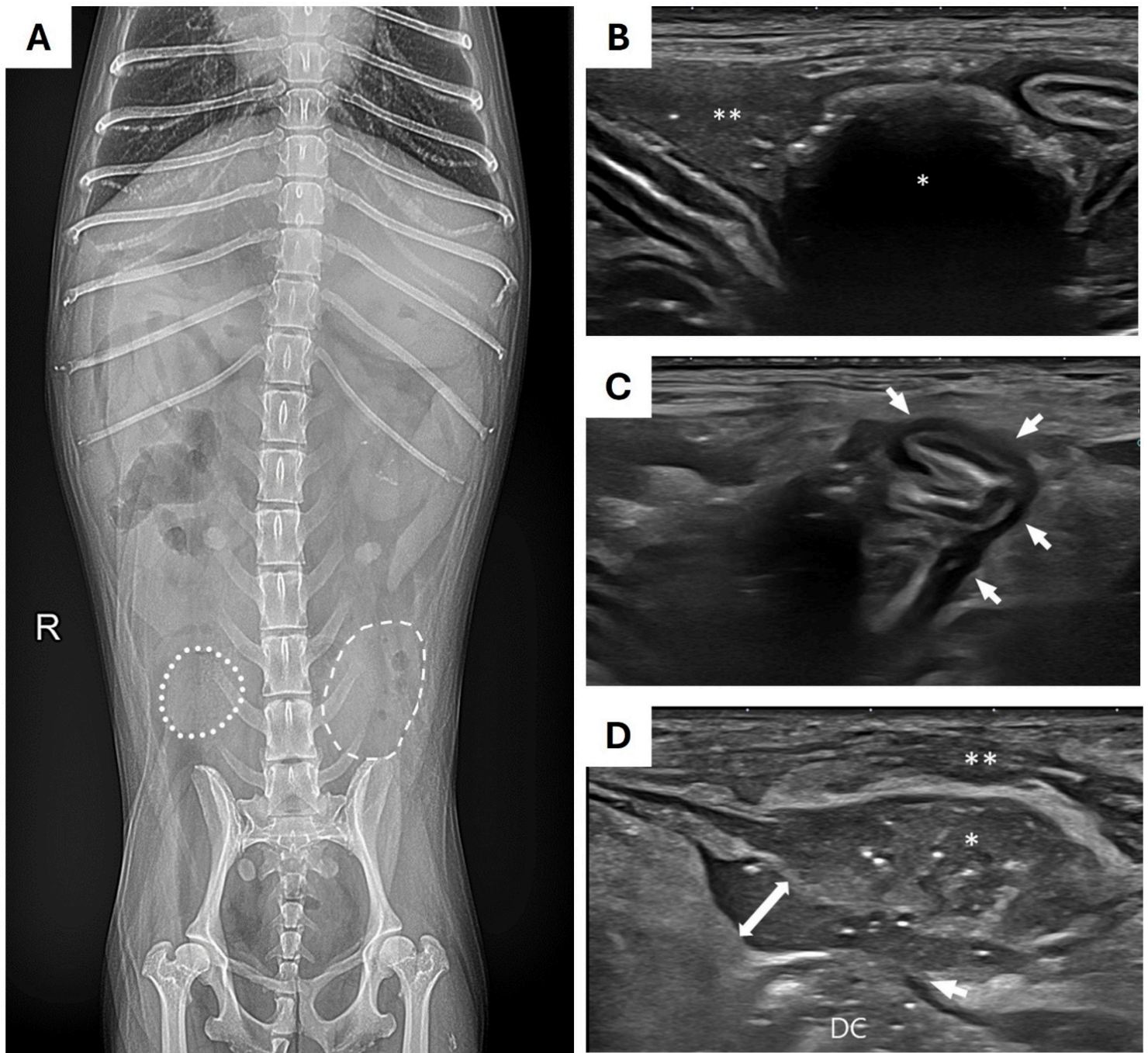


Figure 1

Radiographic and ultrasonographic findings. (A) Ventrodorsal radiograph showing two irregular round soft tissue opacity masses in the caudal abdomen: a gas-containing mass (white dotted line, left) and a fecal-like mass (white dashed line, right). (B, C) Ultrasonographic image of the distal jejunum. (B) A mass with acoustic shadowing(asterisk) and compartmentalized free fluid (double asterisk). (C) The adjacent small intestinal segment exhibiting thickened muscularis layers(arrows). (D) Ultrasonographic image of the descending colon (DC). Note the focal loss of wall layering (arrow) and an abnormal structure extending through the abdominal wall musculature (asterisk). Hyperechoic foci with acoustic

shadowing, adjacent peritoneal thickening (double-headed arrow), and marbled appearance of the surrounding fat (double asterisk) are also noted.

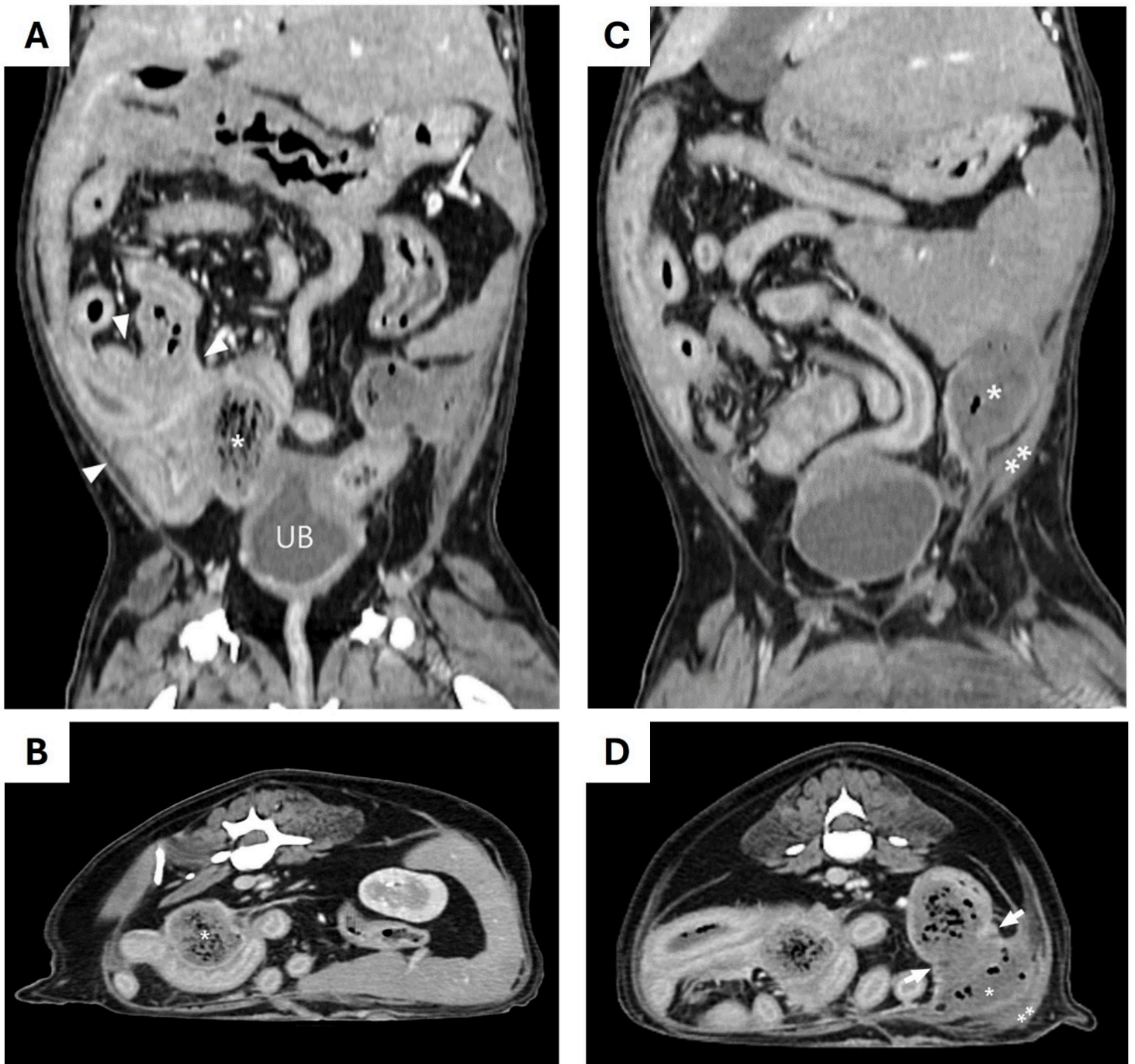


Figure 2

Contrast-enhanced CT findings of the abdomen. (A, B) A round mass with a spongiform pattern (asterisk) closely contacting the urinary bladder (UB) caudally. (C, D) Loss of wall continuity at the mid-descending colon (arrows) with material extending into the extraperitoneal region through the defect

(asterisk). Thickening and contrast enhancement of the adjacent abdominal wall musculature contacting the material are also noted (double asterisk).

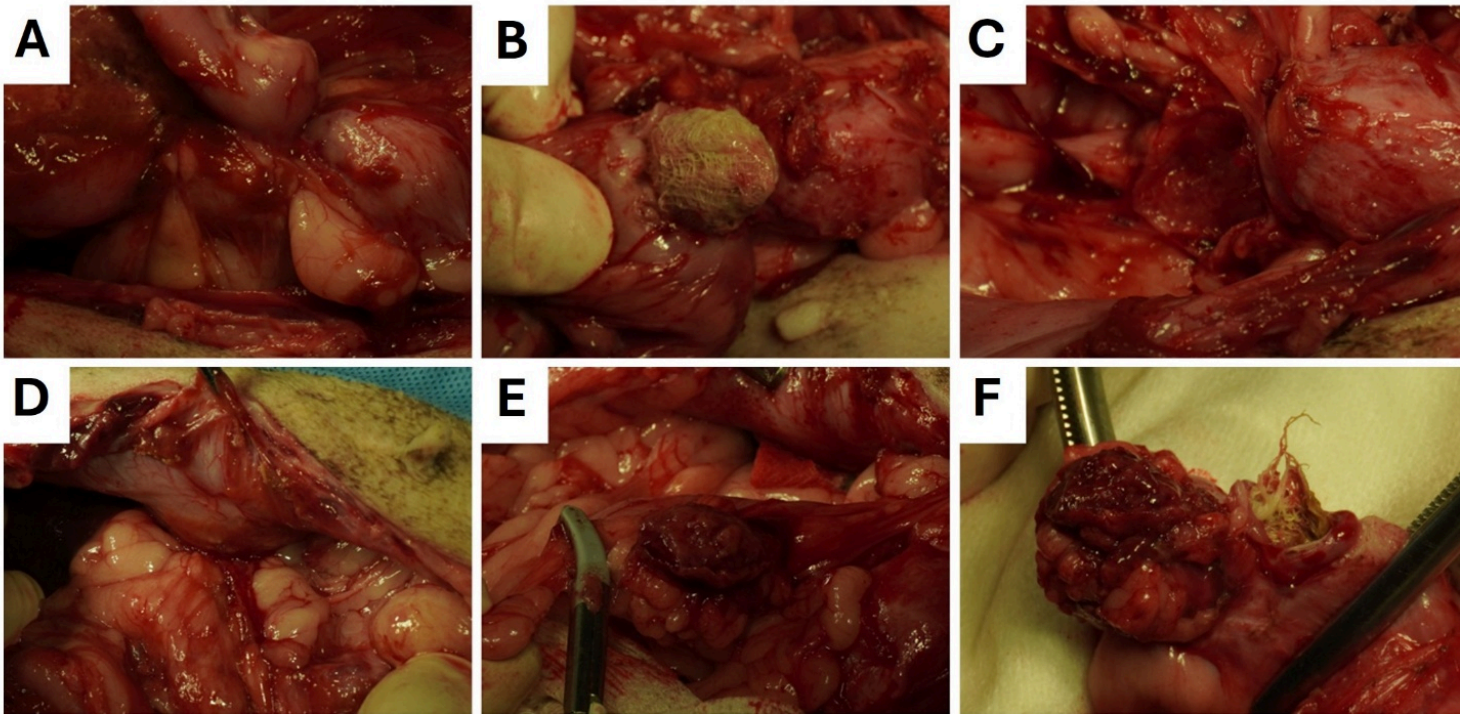


Figure 3

Intraoperative findings of the two retained surgical sponges. (A) Distal jejunal mass with severe adhesions to the surrounding tissues. (B) A 4 × 4 surgical sponge removed from the jejunal mass. (C) Residual capsule after sponge removal. (D) Descending colon firmly adhered to the abdominal wall. (E) Resected descending colon with the adhered abdominal wall tissue. (F) Another 4 × 4 surgical sponge identified within the resected colon lesion.

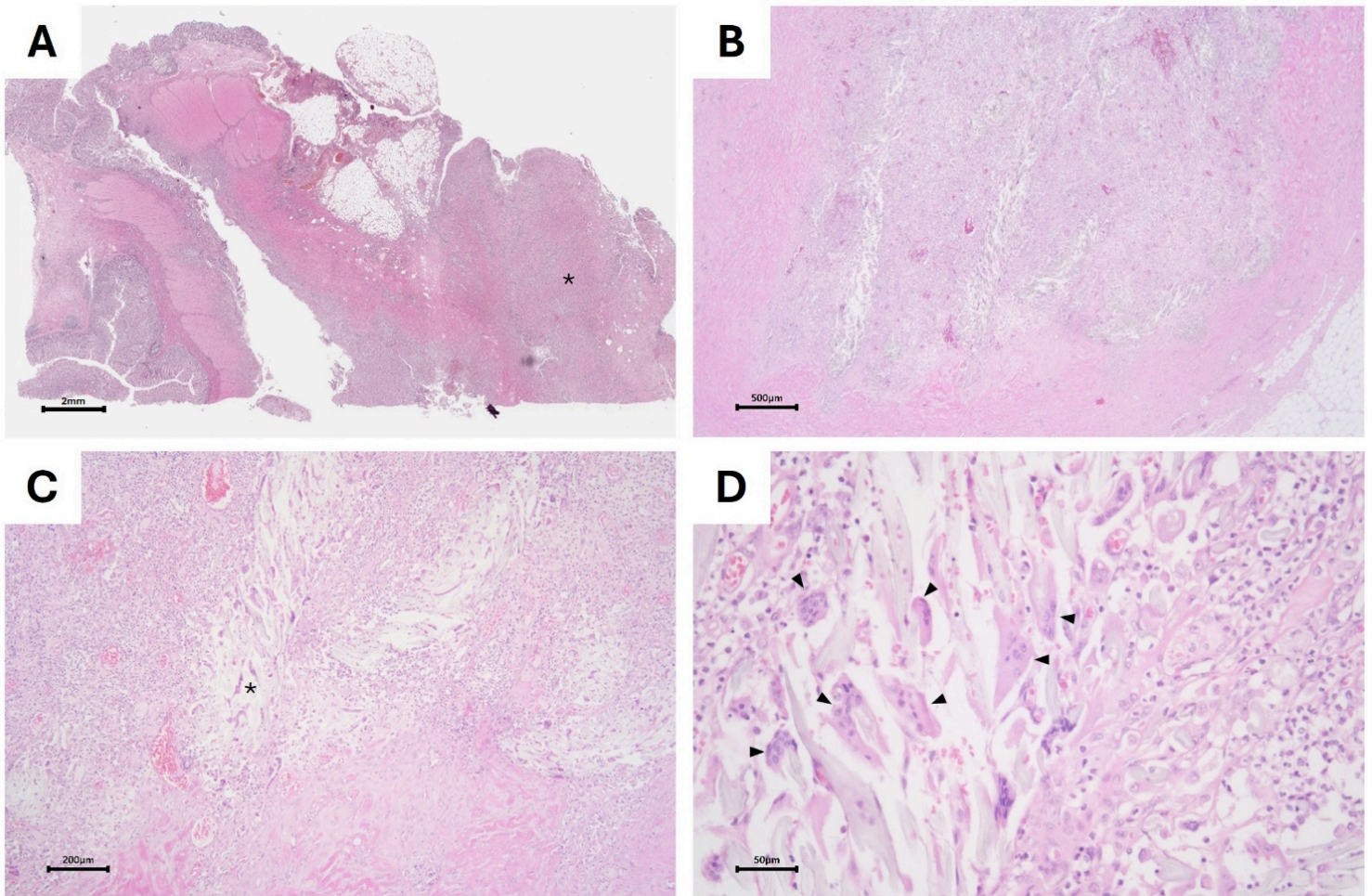


Figure 4

Histopathologic findings of the descending colonic lesion. (A) Subgross section showing colonic wall destruction and perforation toward the abdominal wall adhesion site(asterisk). (B) Severe transmural necrotizing and suppurative inflammation with loss of the normal colonic wall architecture. (C) Textile-like foreign material (asterisk) surrounded by pyogranulomatous inflammation. (D) Mixed inflammatory infiltrates and multinucleated giant cells (arrowhead) adjacent to the foreign material. Hematoxylin and eosin stain.