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Laparoscopic-assisted Colopexy by Two-Portal Access in a Dog with Recurrent Rectal Prolapse

Seung-Yong Lee, Se-Jin Park, Tae-Yeong Park, Hyun-Jin Kim, Jung-Hoon Kim, Seong-Hoon Seok, Young-Ki Kim*, Hee-Chun Lee and Seong-Chan Yeon[1]**

Laboratory of Veterinary Surgery & Behavior and Institute of Animal Medicine, College of Veterinary Medicine, Gyeongsang National University, Jinju 52828, Republic of Korea
**Haeundae Animal Medical Center, Busan 48111, Republic of Korea*
***Laboratory of Veterinary Medical Imaging, College of Veterinary Medicine, Gyeongsang National University, Jinju 52828, Republic of Korea*

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Abstract : A case of rectal prolapses in a one-year-old intact male mixed-breed dog, weighing 6.8 kg was presented with one-week history of protruded tubular pink mass through the anus along with mucosal necrosis. The prolapse was non-reducible, so rectal amputation and anal purse-string suture was performed. Prolapse recurred 9 days after the surgery, purse-string suture and conservative treatment were attempted with no-good results. Laparoscopic-assisted incisional colopexy technique was applied to treat the recurrent rectal prolapse, but failed 6 days after surgery. This was followed by non-incisional colopexy technique, which prevented recurrence during the 3 months of follow-up period. Despite the episode of recurrence, the laparoscopic-assisted colopexy technique treated rectal prolapse successfully. This is the first report in Korea, which describes laparoscopic-assisted colopexy in the dog.

Key words **:** *colopexy, dog, laparoscopic-assisted colopexy, rectal prolapse.*

Introduction

Rectal prolapse is the protrusion or eversion of the rectal mucosa through the anus (2). It can occur in patients secondary to tenesmus from urogenital or anorectal disease, including gastrointestinal parasitism, typhlitis, colitis, intestinal tumor, foreign bodies, dystocia, urolithiasis, constipation and prostatic disease (1). In animals with recurrent rectal prolapse unresponsive to manual reduction and a purse-string suture, colopexy should be considered as a more definitive treatment (5). Colopexy is a surgical technique to create a permanent adhesion between the colon and the abdominal wall, which is effective to prevent rectal prolapse (5).

Colopexy has been achieved through midline celiotomy (5). Recently, the application of laparoscopy has become more widespread as a viable alternative to traditional open procedures in veterinary medicine. Laparoscopic-assisted colopexy (LAC) (4,6-8) and laparoscopic colopexy (9) also has been reported in dogs and cats. LAC had reduced surgical trauma than open colopexy while had a similar pexy effect an open colopexy (8).

The present study describes a case of two-portal access LAC in a dog with recurrent rectal prolapse.

Case

A one-year-old intact male mixed-breed dog, weighing 6.8 kg was presented with one-week history of diarrhea, dyschezia, anorexia and protruded tubular pink mass through the anus. On physical examination, the protruded mass was non-reducible rectal prolapse, and mild necrotic change was observed. A complete blood count, electrolytes and serum biochemical analyses were performed. Neutrophilia with a count of 22.0×10^3 neutrophils/μl (normal range $6.0\text{-}17.0 \times 10^3$ neutrophils/μl) was the only abnormality found. Based on the results, rectal amputation and anastomosis were determined to treat.

Food and water were withheld for 24 hours and 12 hours, respectively, prior to surgery. The dog received premedication of 0.02 mg/kg acepromazine (Sedaject, Samu median, Korea), 0.2 mg/kg butorphanol (Butophan, Myungmoon pharm, Korea), 25 mg/kg cefazolin (Cefazolin, Chongkundang Pharm, Korea) and 4.4 mg/kg carprofen (Rimadyl, Pfizer, USA) intravenously. General anesthesia was induced with 3 mg/kg propofol (Provive, Myungmoon pharm, Korea) and maintained with isoflurane (Ifran, Hana Pharm, Korea) in 100% oxygen via endotracheal intubation in a circle rebreathing system. Lactated Ringer's solution was administered intravenously at a rate of 10 mL/kg/hr during the whole procedure. The dog was positioned in sternal recumbency on a flat surgical table, and the perineal region was prepared and draped.

Four full-thickness stay sutures were placed, and the prolapsed tissue including necrotic portion was amputated 2 cm from the anus. The two ends were anastomosed in a single layer of simple interrupted pattern with 3-0 polyglyconate (Maxon, Covidien, Ireland). The prolapse was reduced man-

[1]Corresponding author.
E-mail : scyeon@gnu.ac.kr

ually, and anal purse-string suture was left in place for 3 days.

The dog recovered uneventfully from the anesthesia. Postoperatively, oral administration of 22 mg/kg cefadroxil (Uricef, Sungwon Adcock pharm, Korea) and 10 mg/kg metronidazole (Flasiny, CJ Healthcare, Korea) every 12 hr for 7 days, and 4.4 mg/kg carprofen once a day for 3 days were prescribed. In addition, 3 ml/day lactulose (Duphalac, JW Pharmaceutical, Korea) as a laxatives and low-residual diet were provided.

Initially, the dog showed recovery and was discharged to the owner 3 days after surgery. However, the prolapse recurred after a period of 9 days after the surgery. It was managed with manual reduction and anal purse-string suture. Conservative treatment was tried with 0.2 mg/kg dicyclomine (Cyverine, Mirae Pharm, Korea) twice a day, laxative and low-residual diet for 20 days, but inefficient. Colopexy was opted as a more definitive treatment, and LAC was determined.

The dog was prepared for the surgery and anesthetized with same anesthetic protocol as used in the former surgery. He was positioned in dorsal recumbency and the abdomen was prepared for aseptic surgery. LAC was performed in a similar manner to the descriptions by Zhang *et al*. (8). Pneumoperitoneum was induced by a Veress needle inserted into the abdomen at the level of the umbilicus. Then, a 5-mm trocar-cannula assembly for a laparoscope (Panoview Plus, Richard Wolf GmbH, Germany) was placed 1 to 2 cm cranial to the umbilicus. Then, a 12-mm trocar-cannula assembly was placed ventral abdominal wall approximately 2.5 cm left lateral to the linea alba for laparoscopic grasping forceps. The anti-mesenteric section of descending colon was identified and grasped by a grasping forceps. The descending colon was exteriorized along with the cannula through the second portal site, which was enlarged to 2 cm of length. Two stay sutures of 3-0 polydioxanone suture (PDS II, Ethicon, USA) were placed in the colon. The seromuscular layers of the colon were incised on its antimesenteric surface (2 cm) between the stay sutures, carefully. Each edge of the seromuscular colonic incision was sutured to the corresponding edge of the abdominal musculature incision in a simple interrupted pattern with 3-0 polydioxanone suture, respectively (two rows). After completion of the colopexy, the abdominal cavity was reinflated to evaluate the attachment (Fig 1). Then the cannula was removed, the abdominal muscles were closed in a simple continuous pattern with 3-0 polydioxanone suture, and the subcutaneous and skin apposed in routinely.

Post-operative treatment was same with the prescription as used after the rectal amputation. During the hospitalization period, incisional LAC technique used to treat the recurrent rectal prolapse failed 6 days after the initial treatment. The pexy was disrupted by the tensile force of straining to defecate that it may be attributable to the weak adhesions between the colon and the abdominal wall. The rectal prolapse recurred again, and second LAC surgery was determined.

The dog was prepared for the surgery with same protocol as used in the former surgery. The surgical operation was performed in a similar manner with the former LAC, but modified. Instead of incisional technique, non-incisional technique was applied that the colonic surface was scarified with a blade. Then sutures were passed through the submucosal layer of the colon on the antimesenteric surface and secured to the bilateral edge of the abdominal musculature incision (one row), which was enlarged to 4 cm length of incision, in a simple interrupted pattern with 3-0 polydioxanone suture. Consequentially, the pexy length was extended to 4 cm (Fig 2).

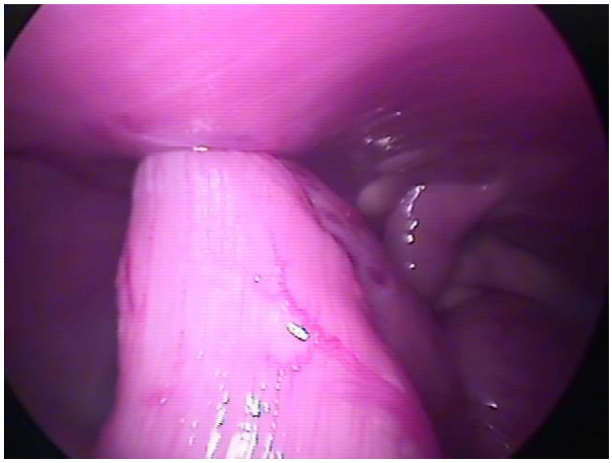

Fig 1. Laparoscopic view after completion of the colopexy. The colon was firmly attached to the body wall.

Fig 2. Surgical wounds after skin sutures. The 4 cm length of suture wound indicated the region where the colon was fixed.

Post-operative treatment was same with the prescription as used before. The dog showed recovery and there were no recurrences within the 3 months of postoperative observation. Furthermore, no episodes of intestinal dysfunction and post-operative complications were identified.

Discussion

Some believe that the incisional method would provide a

more permanent colopexy due to formation of firm adhesions between the colon and the abdominal wall (7). According to Popovitch *et al*. (5), however, both appeared to be equally effective in preventing rectal prolapse and there does not seem to be any difference in the long-term clinical outcome when comparing non-incisional and incisional colopexy techniques. The study of comparison between the two gastropexy techniques also supported the hypothesis that both the incisional and scarified gastropexy techniques produced a permanent adhesion between the stomach and the abdominal wall (3).

In the present case, the first surgical attempt to prevent recurrence was failed with the incisional technique, but successful with the non-incisional technique. It did not mean that the non-incisional method provided firmer adhesion between the colon and the abdominal wall, because the suture lengths of pexy were different between the incisional (2 cm) and non-incisional method (4 cm). In addition, according to the previous studies of colopexy (5) and gastropexty (3), the difference in adhesion capacity between the two surgical methods of colopexy seems insignificant. Thus, regardless of the surgical technique, the authors recommended that longer than 2 cm length of pexy would be appropriate in colopexy surgery.

Complication could be developed as a result of penetration of the colonic lumen by the suture material in the case of LAC technique (6), as with standard open colopexy techniques (5). This can result in infection at the colopexy site and failure to form an adhesion between the colon and the abdominal wall. Thus, care is necessary to place each suture penetrated only the serosal and muscularis layers of the colon to prevent contamination of the colopexy (5,9).

In conclusion, the LAC technique treated rectal prolapse successfully in a dog. Longer than 2 cm length of pexy would be recommended to reduce the complication of recurrence. The LAC technique minimized surgical trauma compared with conventional celiotomy in colopexy surgery. This is the first report of the LAC technique for treatment of a dog with rectal prolapse in Korea.

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