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ORIGINAL ARTICLE

Minimally invasive small intestinal exploration and targeted abdominal organ biopsy with a wound retraction device in 42 cats (2005-2015)

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Abstract

Objective: To describe the surgical technique and evaluate short-term outcome after minimally invasive small intestinal exploration and targeted organ biopsy with a wound retractor device (WRD) in cats.

Study design: Multi-institutional retrospective study.

Animals: Forty-two cats.

Methods: A wound retractor was inserted into the abdomen on the ventral midline through a 2-4 cm incision at the level of the umbilicus. Short segments (6-10 cm long) of intestinal tract were sequentially exteriorized and explored through the WRD. Full thickness, small intestinal biopsies were obtained extracorporeally via the WRD. A commercially available single-port device was inserted through the WRD for laparoscopic exploration of the abdomen.

Results: The majority of the small intestine could be exteriorized and explored through the WRD. In all cases, full thickness biopsies of the small intestine of diagnostic quality were obtained. The most common histological findings were inflammatory bowel disease (n = 16), intestinal lymphoma (n = 14), and eosinophilic enteritis (n = 7). Two cases required conversion to a traditional open laparotomy due to abdominal pathology diagnosed after placement of the WRD (abdominal adhesions and need for a splenectomy). Postoperative complications occurred in 4 of 39 cats (10.3%), leading to 2 deaths after discharge from the hospital.

Conclusions and clinical relevance: MISIETB with a WRD alone or combined with laparoscopy is a safe technique for small intestinal exploration and targeted abdominal organ biopsy in cats. Single-port laparoscopy can effectively be performed through the WRD for complete abdominal exploration and biopsy of abdominal organs.

Abbreviations: MISIETB, minimally invasive small intestinal exploration and targeted abdominal organ biopsy; WRD, wound retractor device.

1 | INTRODUCTION

Intestinal biopsies play an important role in diagnosing the cause of chronic infiltrative gastrointestinal disease in cats. Options for sample collection include mucosal biopsies obtained via endoscopy, and full thickness intestinal biopsies obtained via traditional open celiotomy or minimally invasive assisted abdominal surgery.[1-3] Endoscopic biopsy is minimally invasive, reduces anesthesia time, and allows lesion-targeted sampling. However, this technique does not sample wall layers beyond the mucosa, and is technically challenging in the jejunum and ileum, its success relying on good operator skills, and sample quality.[1,4,5] By contrast, open celiotomy provides access to the entire gastrointestinal tract and other abdominal organs, and facilitate the collection of multiple full-thickness biopsies from all sections of bowel. Additionally, full-thickness biopsies are the gold standard in differentiating between inflammatory bowel disease (IBD) and lymphoma.[6,7]

Minimally invasive organ biopsy (MIOB) has recently been described.[3,8] This approach accelerates recovery, reduces postoperative surgical pain and hospitalization time, all of which are especially advantageous in animals and humans with comorbidities.[9-13] The use of laparoscopic-assisted and finger-assisted techniques in small animals has gained rapid acceptance among surgeons due to their minimally invasive nature, relative ease of use, and operative adaptability.[14-16] In man, wound retraction devices (WRD) increase the exposure achieved through mini-incisions, while facilitating tactile sensation during laparoscopic-assisted and finger-assisted procedures.[17] WRD are designed to serve as a protective surgical wound barrier and allow 360-degree retraction of the incision.[17,18] Their use is well-described in humans and veterinary thoracic and abdominal surgeries.[8,15,18-21] The purpose of this study is to describe the use and effectiveness of a WRD for minimally invasive small intestinal exploration and targeted abdominal organ biopsy (MISIETB) using a WRD. We also intend to determine the diagnostic potential of this technique and document its short-term postoperative outcome. We hypothesize that a WRD can be used safely to facilitate MISIETB in feline patients.

2 | MATERIALS AND METHODS

2.1 | Case selection

Medical records of client-owned cats that underwent minimally invasive small intestinal exploration and targeted abdominal organ biopsies between January 2011 and January 2016 were reviewed.

2.2 | Medical record review

Demographic information, including signalment and previous medical history, was recorded. Operative data were collected, including procedure time (ie, time from initial skin incision to abdominal closure), location of abdominal incision, size of incision, type and size of wound retractor device used, if and when laparoscopy was utilized (before vs after intestinal biopsy), total number of ports used for laparoscopy, port type, port size, port location, presence of gross intra-abdominal pathology, intraoperative complications, need for conversion to an open laparotomy, and performance of other laparoscopic or extra-abdominal procedures during the same anesthesia. Any adverse intraoperative event recorded in the anesthesia record, surgical procedure report, patient record, or discharge summary was considered as complication. Intraoperative complications were defined as uncontrolled hemorrhage or iatrogenic damage to viscera during procedure. Postoperative short-term follow-up examination was performed at 14 days.

2.3 | Surgical technique

2.3.1 | Anesthetic and analgesic protocol

Cats were premedicated and general anesthesia was induced with various agents at the discretion of the attending anesthesiologist overseeing the case at each institution. General anesthesia was maintained with isoflurane or sevoflurane in 100% oxygen administered to effect. All patients were administered perioperative cefazolin sodium (22 mg/kg intravenously [IV]) 30 minutes prior to the first skin incision, then every 90 minutes until the patient was extubated as perioperative antimicrobial prophylaxis.

2.3.2 | Patient preparation

The ventral abdomen was clipped and prepared for aseptic standard laparotomy. All cats were placed in dorsal recumbency and secured on the operating table. The decision to perform a single-port or multiport laparoscopic procedure was made according to the preference of the primary surgeon.

2.3.3 | Placement of the wound retractor without laparoscopy

A 2.5-4 cm incision was made at the level of the umbilicus through the skin and linea alba. The WRD (Alexis Wound Retractor, Applied Medical, Rancho Santa Margarita, California) was then inserted through incision. The inner ring of the device was moistened with sterile saline and compressed to create an oval shape, allowing it to fit through the abdominal incision (Figure 1). The compressed ring was inserted and directed cranially toward the xiphoid until the entire ring was within the peritoneal cavity. The ring was then released to allow its re-expansion within the peritoneal cavity. To confirm the appropriate position, a moistened finger was used to palpate the space between the entire inner ring and

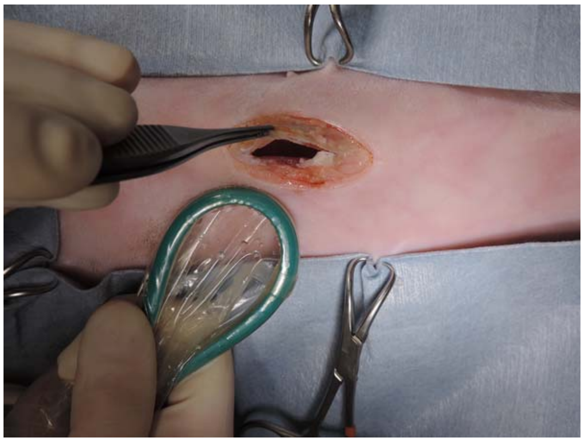

FIGURE 1 Compression of the inner ring of the wound retraction device prior to insertion through the abdominal incision

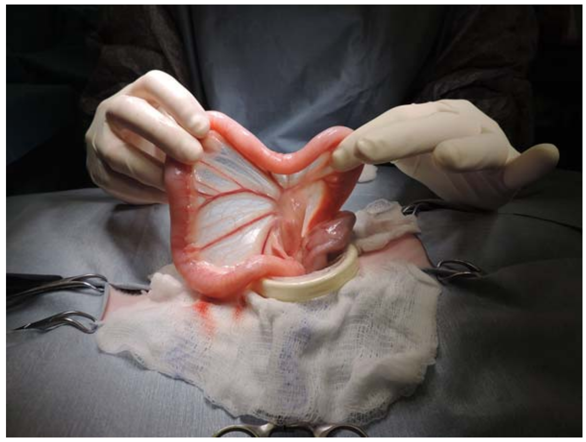

FIGURE 3 Exteriorization of a segment of small intestine through the wound retractor

the ventral abdominal wall. Ventral traction was applied to the outer external ring as it was rolled toward the inner abdominal ring, until the polyurethane sleeve was taut and the outer ring seated against the skin (Figure 2).

2.3.4 | Small intestinal exploration with intestinal biopsy

A moistened finger or an atraumatic Debakey forceps was inserted through the WRD stoma to exteriorize a segment of bowel. The duodenum, jejunum, ileum, and cecum were sequentially explored in a systematic manner. A 6-10 cm segment of small intestine was exteriorized at a time to avoid strangulation of bowel through the WRD. Each segment was replaced in the abdomen through the WRD immediately after evaluation, and prior exteriorization of the adjacent segment (Figure 3). The proximal duodenum, pyloric region of the stomach, and colon were evaluated by either digital palpation through the WRD or laparoscopic visualization facilitated by patient tilting. Stay sutures were placed on the greater curvature of the stomach to maximize its exteriorization, this was not successful in all cases. Intestinal biopsy techniques have been previously detailed elsewhere.[8,14,15,22] Briefly, full-thickness incisional biopsy samples were harvested from the antimesenteric border of the small intestinal tract with a #11 blade or a 4-mm punch biopsy instrument, and closed with a simple interrupted or modified Gambee suture pattern with 3-0 or 4-0 monofilament absorbable suture.

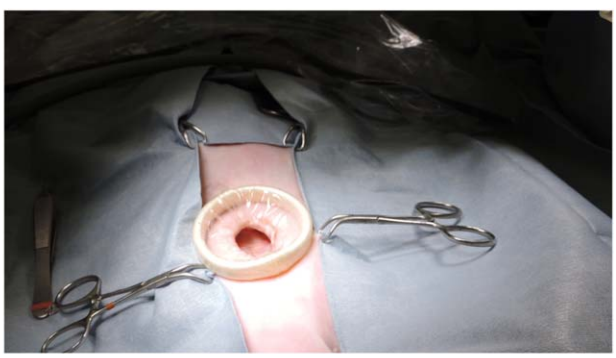

FIGURE 2 Proper placement of the wound retractor through the abdominal incision

2.3.5 | Single-port laparoscopy through the wound retractor device

In a subset of cases, a single-port device (SILS port, Covidien, New Haven, Connecticut) was inserted through the stoma of the WRD. The abdominal wall incision should be slightly smaller (2.5-3 cm) to maintain a seal around the single port device.[23] Insertion of the single-port device was accomplished by compressing the base of the port either manually or with curved Rochester Carmalt clamps and then directing the leading edge of the single-port device through the stoma of the WRD. Counter traction on the outer ring of the WRD is needed during the single-port insertion. Once inserted, the 3 5-mm cannulas supplied with the device were inserted through the corresponding channels. Insufflation tubing was attached to the port and a capnopneumoperitoneum created with a pressure regulating mechanical insufflator (Endoflator, Karl Storz Endoscopy, Goleta, California). The intra-abdominal pressure was maintained between 8 and 10 mm Hg. A 5-mm 30° telescope (Hopkins II, Karl Storz Endoscopy) was inserted into one of the 5-mm cannulas (Figure 4). Laparoscopic liver biopsy were obtained with a 5-mm laparoscopic biopsy cup forceps (5-mm biopsy cup forceps, Karl Storz Veterinary Endoscopy) through the single-port device.[24] Laparoscopic cholecystocentesis was performed after percutaneous insertion of a 20-gauge needle into the abdomen under direct laparoscopic guidance.[24] Laparoscopic kidney biopsies were collected with a true-cut biopsy device inserted percutaneously in the abdomen under

FIGURE 4 Placement of a single-port device through the wound retractor

direct laparoscopic guidance.[25] Laparoscopic pancreatic biopsies were harvested with a 5-mm laparoscopic biopsy cup forceps (Karl Storz Veterinary Endoscopy) inserted through a 5-mm laparoscopic port.[26]

2.3.6 | Placement of the wound retractor after multiport laparoscopy

Multiport laparoscopy was completed prior to placement of the WRD. Briefly, a 0.5 cm incision was made at, or immediately caudal to, the umbilicus to create the initial laparoscopic port. A modified Hasson technique was used to introduce a 6-mm trocar-cannula assembly (Karl Storz, Tuttlingen, Germany) for placement of a 5 mm 0° or 30° telescope (Hopkins II, Karl Storz Endoscopy). The abdomen was insufflated to 8-10 mm Hg with carbon dioxide using a pressure regulating mechanical insufflator (Endoflator, Karl Storz Endoscopy). A second 6-mm trocar-cannula assembly (Karl Storz) was then placed in 1 of 2 locations: 2 cm cranial to the initial port on midline or 3-5 cm lateral to the ventral midline in the left or right cranial abdominal quadrant. The second trocar-cannula assembly was percutaneously inserted through a sharp obturator or threaded screw-in tip port (Ternamian EndoTIP, Karl Storz) under direct laparoscopic guidance. After completion of the multiport laparoscopy, the umbilical incision was extended by 2-3 cm to insert the WRD.

2.3.7 | Removal of the wound retractor and wound closure

The WRD was removed by unrolling the outer ring until the polyurethane sleeve connecting the 2 rings was returned to its original loose starting position. The inner abdominal ring was then digitally grasped and pulled through the abdominal incision. The WRD incision was closed routinely in 3 layers: the linea alba was closed with a continuous appositional suture pattern with polydioxanone monofilament, and the subcutaneous and subcuticular layers were closed with a continuous appositional suture pattern with poliglecaprone 25 monofilament suture.

2.3.8 | Histopathological evaluations

Tissues obtained from the small intestinal tract and other biopsied organs were fixed in 10% neutral-buffered formalin at the time of initial collection, routinely processed, embedded in paraffin, cut at 3-5 μm, and stained with hematoxylin and eosin. All specimens collected were reviewed by a board-certified pathologist at each respective institution

2.4 | Statistical analysis

Baseline patient and procedural characteristics were examined and summary statistics were calculated. Categorical variables were expressed as numbers and percentages. Continuous variables were evaluated with the skewness and kurtosis test for normality and were expressed as median (range) or mean (SD). Independent *t* tests were used for 2-way comparisons of incision length and surgical time. One-way analysis of variance was used to compare surgical time across 3 different surgical approach groups (WRD only, multiple port laparoscope assisted, single-port laparoscope assisted). All tests were 2-sided and results were considered statistically significant if $P \leq .05$. Analysis was performed with the use of statistical software.

3 | RESULTS

Forty-two cases were eligible for inclusion in this study. Domestic shorthair was the most commonly represented breed with 34 (81.0%) cats; other cat breeds included domestic longhair (3; 7.1%), Tonkinese (1; 2.4%), Maine Coon (1; 2.4%), Devon Rex (1; 2.4%), Persian (1; 2.4%), and Bengal (1; 2.4%). Fifteen (35.7%) cats were spayed females, 26 (61.95%) were castrated males, and 1 (2.4%) cat was an intact male. Median age was 9.5 years old (range, 1.8-19.1). Median body weight was 4.1 kg (range, 2.2-9.2).

All cats exhibited clinical signs attributed to digestive tract abnormalities prior to surgery. Weight loss was the most commonly observed clinical sign, noted in 29 (69.1%) cats. Other reported clinical signs included vomiting (25; 59.5%), inappetence (20; 47.6%), diarrhea (9; 21.4%), and lethargy (9; 21.4%). A board-certified veterinary radiologist examined all cats via abdominal ultrasonography prior to surgery. Abnormal thickening of the small intestine was observed in 38 (90.5%) cats. In 27 (64.3%) cats, the muscularis layer was thickened, and in 11 (26.2%) all intestinal layers were diffusely thickened. Regional lymphadenopathy was observed in 27 (64.3%) cats, including 3 cats, without intestinal thickening. Scant peritoneal effusion was observed in 6 (14.3%) cats. A foreign material appeared to be present within the distal jejunum of one cat.

Surgical biopsies of digestive organs were obtained with the aid of a wound retractor in all cats. The wound retractor was used alone without laparoscopy in 5 (11.9%) cats. A laparoscopic-assisted technique was used in the majority of cases (37; 88.1%). Laparoscopic-assisted cases included a multiport technique in 15 (40.5%) cats and a single-port device with WRD technique in 22 (59.5%) cats. In one case, a sterile glove was placed over the WRD to allow abdominal insufflation. The incision created to place the wound retractor measured 3.4 cm in length (mean, SD 0.9, range, 2-6 cm). The incision was shorter ($P = .024$) among cats in which a laparoscope-assisted technique was used (3.2, SD 0.8) compared to cats in which the WRD was used alone (4.2, SD 1.1). The length of the incision did not differ ($P = .35$) between cats with laparoscopic-assisted procedures, whether single port (3.1 cm, SD 0.9) or multiple ports (3.4 cm, SD 0.6) were used.

Organs biopsied included jejunum (41; 97.6%), duodenum (38; 90.5%), ileum (37; 88.1%), liver (26; 61.9%), small intestinal mesenteric lymph node (21; 50.0%), stomach (13; 31.0%), spleen (1; 2.4%), pancreas (1; 2.4%), and kidney (1; 2.4%). Bile was obtained via cholecystocentesis in 9 (21.4%) cats, and splenic aspirates were obtained in 2 (4.8%) cats. The mean number of anatomic locations sampled was 4.5 (SD 1.2, median 5, range, 2-6). Nine (21.4%) cats underwent other surgical procedures in addition to biopsies: esophageal feeding tube placement (5), hernia repair (2), jejunal resection and anastomosis (1), and splenectomy (1). In the latter 2 cases, conversion to an open laparotomy was necessary to perform these procedures. In both cats, the initial approach did not include a laparoscopic-assisted approach but a WRD used alone. One cat underwent a splenectomy due to a splenic mass, and one cat underwent a jejunal resection and anastomosis due to obstructing foreign material. In the latter cat, the intestines could not be mobilized through the wound retractor orifice due to extensive tissue adhesions. Additional time was needed to break down adhesions and reduce the hernia prior to placing the WRD in one cat with a ventral midline hernia containing falciform fat and omentum. No other intraoperative complications were reported.

The duration of surgery was prolonged ($P = .002$) in 9 cats that underwent other surgical procedures in addition to biopsies and aspirates (113 ± 29.3 minutes) compared to 33 cats who underwent biopsies and aspirates only (80.2 minutes, SD 25.9). Duration of surgery did not differ ($P = .781$) among cats who underwent biopsies and aspirates only, whether a WRD alone (82.5 ± 0.6 minutes in 2 cats), multiple cannulas (84.2 ± 21.1 minutes in 12 cats), or a single-port device (77.4 ± 30.0 minutes in 19 cats) was used.

No immediate postoperative complications (prior to discharge) were observed and all cats survived to discharge. All surgeries resulted in digestive system biopsy samples of adequate diagnostic quality. Intestinal lymphoma was diagnosed in 14 (33.3%) cats, IBD was diagnosed in 16 (38.1%) cats, eosinophilic enteritis was diagnosed in 7 (16.7%) cats, normal bowel was diagnosed in 2 (4.8%) cats, intestinal fibrosis was diagnosed in 2 (4.8%) cats, and acute enteritis associated with obstructive foreign material was diagnosed in 1 (2.4%) cat.

Short-term follow-up information was available for 39 cats; 3 cats were lost to follow-up immediately after hospital discharge. Postoperative complications that required veterinary attention occurred within 2 weeks of surgery in 4 of 39 cats (10.3%). Two of these were serious complications resulting in death. One 6-year-old cat diagnosed with lymphoma in the liver and lymph nodes and severe intestinal IBD returned to the hospital 2 days postoperatively, was diagnosed with septic peritonitis, and died due to cardiac arrest. One 7-year-old cat diagnosed with hepatic lipidosis and mild IBD returned to the hospital 9 days postoperatively due to respiratory distress, and was diagnosed with chylothorax, pyothorax, and an incisional abscess. The pleural effusion did not resolve after 10 days of medical therapy, and the cat was euthanatized. One cat diagnosed with IBD was readmitted to the hospital 4 days postoperatively due to inappetence, which resolved with IV fluids and medical therapy. One cat diagnosed with normal intestines vomited and had diarrhea 8 days postoperatively; these signs resolved with outpatient medical therapy.

4 | DISCUSSION

Small intestinal biopsies were successfully obtained via MISIETB using a WRD in all 42 cats reported here. Patients were selected for MISIETB after thorough preoperative diagnostics, including abdominal imaging findings justifying full-thickness biopsies to diagnose intestinal disease(s). Biopsies of other organs, such as the liver, abdominal lymph nodes, and stomach were obtained at the discretion of the attending clinician. Chronic gastrointestinal disease can occur in any breed and commonly occurs in middle-age cats.[1,2] In the present study, patient signalment and clinical signs (vomiting, diarrhea, inappetence, and weight loss) were consistent with previous reports.[2,27]

Several studies in man have reported advantages of minimally invasive abdominal surgeries over traditional open abdominal approach, including decreased adhesion formation and blood loss, improved return of gastrointestinal function, and shorter hospitalization.[9,10,28-30] Although minimally invasive procedures may increase operative time and may have a higher financial impact to both the patient and hospital, there is no strong evidence that minimally invasive abdominal surgery has a negative effect on overall outcomes in humans.[10,29-31] The use of a WRD to facilitate minimally invasive abdominal procedures is gaining popularity in humans and animals due to its many reported benefits. The first reported use in animals involved a laparoscopic-assisted technique to remove discrete intestinal masses through a WRD.[15] Since this report, several other indications have been described in veterinary surgery, including splenectomy, cystotomy, and thoracotomy.[20,21,32] Placement of a WRD through a body wall incision facilitates retraction for both finger and instrument-assisted surgical procedures. Other benefits of this device include 360-degree hands-free wound retraction, minimized wound size with improved exposure, even distribution of force applied to the surgical wound, maintenance of moisture at the incision site, and reduction of surgical site infection.[33,34]

In the present study, placement of the WRD at the umbilicus through an average incision of 3.4 cm in length allowed tactile exploration and biopsy of tissues between the distal duodenum through the ileum, and in some cases the stomach (13, 31.0%). The authors recommend that only small segments of bowel (6-10 cm) be exteriorized through the WRD at a time to prevent constriction of the tissue and vascular compromise. The location of the WRD at the level of the umbilicus was selected by the authors because it approximates its position over the root of the mesentery and optimizes mobilization of the small intestines. Access to the entire stomach including pylorus and proximal duodenum was challenging from this location and full evaluation of this region was not always possible. The ability to exteriorize the greater curvature of the stomach for biopsy purposes was improved with the placement of gastric stay sutures. Mayhew et al evaluated the influence of the location of WRD on the ability to perform MIOB in cats.[3] Based on this study, a WRD could be placed halfway between the caudal margin of the xiphoid process and the umbilicus if finger-assisted biopsy samples of the stomach, small intestine, pancreas, mesenteric lymph nodes, and liver through a WRD are anticipated.[3]

The combination of MISIETB through a WRD with laparoscopy improved the visualization of nondigestive abdominal organs that were not easily exteriorized or sufficiently palpated during the digital exploration. It should, however, be noted that accurate evaluation of intra-abdominal structure under these circumstances relies on the proficiency of the clinician in laparoscopic abdominal exploration. Recently, single-port laparoscopy has gained popularity in veterinary medicine with a potential advantage of reducing operative time compared to a multiport technique.[35] Single-port laparoscopic procedures such as ovariectomies have been found feasible in cats.[36] The present study describes the novel use of the single-port device placed through a WRD in 21/37 cases of laparoscopy. This approach did not affect abdominal insufflation for laparoscopy due to loss of pneumoperitoneum between the device and the WRD. One should note that negative cardiopulmonary effects can occur in cats with prolonged CO_2 insufflation.[37] Based on those results,[37] if MISETB method is chosen, the laparoscopic explore should be both accurate and efficient. Once the laparoscopic portion of the procedure was complete, the single-port device was removed, and a finger-assisted intestinal exploration was performed through the WRD. The small size of the stoma was sufficient for extracorporeal intestinal biopsy and lavage of the enterotomy site.

Conversion to a celiotomy or extension of the initial WRD incision was required in 2 cases. In one patient, a splenic mass was identified after placement of the WRD. The initial incision was extended but still accommodated the WRD. A splenectomy was performed in a laparoscopic-assisted manner.[20] A second case required conversion due to extensive tissue adhesions preventing mobilization of the small intestine through the WRD. An intestinal foreign material was identified, requiring enterectomy and anastomosis. Previous publications document reasons for conversion during laparoscopic and laparoscopic-assisted procedures including intra-abdominal adhesions, inability to adequately exteriorize the desired bowel segment, and inability to exteriorize an intestinal mass due to size.[14,15,38] The potential need for conversion to open celiotomy should be discussed with the owner, and should always be done if minimally invasive surgery is not able to safely or adequately address the disease.

Postoperative complications resulted in the death of 2 patients in this study. One cat was diagnosed with septic peritonitis; dehiscence of the intestinal surgery site dehiscence was suspected, but was not confirmed with a necropsy. Dehiscence rates after enterotomy are reported to range from 3% to 12%.[39] MISIETB would not be expected to reduce the risk of intestinal dehiscence since the full-thickness intestinal biopsy technique used is the same as that used after celiotomy. We found no evidence to suggest that the MISETB technique increased the risk for complications typically associated with obtaining diagnostic quality surgical full-thickness intestinal biopsies. Further studies evaluating the differences between an open exploratory laparotomy and MISIETB using a WRD are warranted.

The main limitation of MISIETB is that the small abdominal incision limits the extent of the exploratory laparotomy. If a complete abdominal exploration is desired, MISIETB requires the surgeon to rely heavily on a laparoscopy since specific portions of the abdomen, including the pylorus and proximal duodenum cannot be sufficiently explored with the finger-assisted method alone. The surgeons performing MISIETB in this study are proficient in laparoscopic abdominal exploration. The results reported here may therefore not extrapolated to a surgeon without advanced training in laparoscopy. The majority of cases in this study underwent laparoscopy to ensure complete abdominal exploration. When laparoscopy was not performed, the assessment of nonpalpable and nonvisible regions of the abdomen relied on preoperative diagnostic imaging.

Another limitation of our study is that we did not evaluate the cost of MISIETB through a WRD was not evaluated. Both the WRD and the single-port device used for laparoscopy are manufactured as single-use devices in human surgery. This study followed these recommendations and further research is needed to determine if the increased cost associated with the WRD outweighs the benefit. Other limitations of this study are related to its retrospective nature. Such design does not eliminate potential selection bias when selecting candidates for MISIETB at each institution. The abdominal approach chosen by the surgeon (single port vs multiport vs no laparoscopy) and the postoperative follow-up were not standardized between institutions.

MISIETB with a WRD alone or combined with laparoscopy is an effective technique for abdominal exploration and small intestinal biopsy in cats. This study provides evidence of the feasibility of single-port laparoscopic exploration after placement of a WRD. This novel combination technique allows abdominal exploration and biopsy of intestinal and extra-intestinal sites. Surgeons undertaking MISIETB with a WRD should take into consideration their level of proficiency in laparoscopy for complete abdominal exploration, the positioning of the WRD based on desired biopsy sites, and the potential need for incisional enlargement or conversion to open celiotomy if challenges arise. Feline patients with chronic gastrointestinal disease in which full-thickness intestinal biopsies are indicated may benefit from having a MISIETB with a WRD.

CONFLICT OF INTEREST

The authors declare no conflict of interest related to this report.

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