Comparison of a Biofragmentable Intestinal Anastomosis Ring With Appositional Suturing for Subtotal Colectomy in Normal Cats

BRIAN T. HUSS, DVM, MS, JOHN T. PAYNE, DVM, MS, Diplomate ACVS, GAYLE C. JOHNSON, DVM, PhD, Diplomate ACVP, and COLETTE C. WAGNER-MANN, MA, DVM, PhD

A subtotal colectomy was performed on 12 normal adult cats using an interrupted apposing suture pattern of monofilament polyglyconate (n = 6) or a biofragmentable intestinal anastomosis ring (Valtrac, Davis and Geck Company, Danbury, CT) (n = 6) composed of polyglycolic acid and barium sulfate. Abdominal radiographs were made daily, beginning 10 days after surgery, to determine fragmentation rates of the anastomosis ring. The cats were euthanatized 30 days after surgery, and a gross and histopathological evaluation of anastomotic healing and stricture formation was performed. The technique for implantation of the anastomosis ring was easy to learn and required only two purse string sutures to complete. Intraoperative complications associated with the anastomosis ring were minor, and included problems with purse string suture placement, small serosal tears, and spasms of the colon that reduced the lumenal diameter. There were no intraoperative complications in the cats with sutured anastomoses. Postoperative recovery was uneventful in all cats. The anastomosis rings fragmented 12.2 ± 1.1 days (mean ± standard deviation [SD]) after implantation and passed in the stool 3.8 ± 1.9 days later without clinical signs in five of six cats. There were no statistically significant differences between the time required to perform the anastomosis (P = .348), postmortem gross anastomosis grades (P = .088), or percent of lumenal stricture (P = .178) between the two groups. Histologically, the only significant differences were an increased muscular inversion in the anastomoses performed using the fragmentable ring (P = .039) and an increased muscular eversion in the sutured anastomoses (P < .001) compared with normal colonic architecture.

C H R O N I C MEGACOLON, in cats, can be temporarily managed with medical therapy, however, subtotal or total colectomy is a more definitive treatment. A biofragmentable anastomosis ring (BAR)(Davis and Geck Company, Danbury, CT) has several properties that make it promising for application in the surgical treatment of feline megacolon. Anastomoses using the BAR are relatively simple to perform and result in consistently successful small intestinal anastomoses in dogs, swine, and humans. There is minimal fecal contamination during implantation and leakage from the anastomotic site is unusual. In addition, there is no permanent foreign material left at the anasto-
mosis site and potentially better anastomotic healing compared with sutured or stapled anastomoses.\textsuperscript{1,5} The BAR is composed of 87.5\% polyglycolic acid polymer and 12.5\% barium sulfate.\textsuperscript{10} The device is treated with gamma-irradiation, which both sterilizes and facilitates fragmentation of the BAR.\textsuperscript{3,4} Barium sulfate is added to make the BAR radiopaque, allowing radiographic monitoring of the device.

The BAR is supplied in four external diameters: 34 mm, 31 mm, 28 mm, and 25 mm. The inner lumenal diameter of the BAR is 14 mm less than the outer diameter.\textsuperscript{5} After the BAR disintegrates, the formed mean lumenal diameter is 9 mm less than the outside diameter.\textsuperscript{5} In the open position the BARs have a 6-mm gap between their edges and are available with different closed gap sizes to accommodate different intestinal wall thicknesses (Fig 1).\textsuperscript{5,10}

The purpose of this research was to compare anastomoses using the BAR with hand-sutured anastomoses after subtotal colectomy in cats.

**MATERIALS AND METHODS**

**Animals**

Twelve sexually intact cats were obtained from a closed laboratory breeding colony. All cats were guaranteed free from feline leukemia virus, feline immunodeficiency virus, feline infectious peritonitis, rhinotracheitis, and calicivirus. There were eight males and four females with a mean age of 3.00 ± 1.56 years (mean ± standard deviation [SD]) and weighing 4.42 ± 0.83 kg.

Each cat had a physical examination, abdominal radiographs, urinalysis, complete blood cell count, serum biochemistry profile, and fecal flotation at the start of the study; no abnormalities were detected. All cats were fed the same diet (Feline Maintenance Dry, Hill’s Science Diet, Topeka, KS) for at least 4 days before the start of the study. The cats were housed and cared for according to guidelines of the University of Missouri Animal Care and Use Committee.

**Experimental Design**

Food was withheld from all cats for 8 hours before surgery, and water was available until 2 hours before surgery. Each cat was premedicated with glycopyrrolate 0.011 mg/kg intramuscular (IM), acepromazine 0.22 mg/kg IM, and ketamine hydrochloride (HCl) 25 mg/kg IM. A 21-gauge intravenous (IV) catheter was placed in the jugular vein and lactated Ringers solution was infused at a rate of 10 mL/kg/hr during surgery. Endotracheal intubation was performed in all cats under the effects of the premedication, and a surgical plane of anesthesia was maintained with halothane in oxygen, using a Bain semiopen anesthetic circuit. Cefoxitin sodium (Merck, Sharp and Dohme, West Point, PA) (22 or 44 mg/kg IV) was administered on induction and then at 2 and 4 hours postinduction as part of a separate, concurrent project.\textsuperscript{11} Each cat’s abdomen was clipped and routinely prepared for aseptic surgery.

A ventral midline celiotomy was performed from the umbilicus to the pubis. The colon was isolated and packed-off with saline-soaked laparotomy sponges. A segment of colon extending from just distal to the ileocolic valve to approximately 4 cm cranial to the pelvic brim was resected to allow a tension-free anastomosis. The right colic, left colic, and appropriate branches of the ileocolic vessels were double-ligated and transected to remove the colonic segment. Colonic contents were compressed manually from the transection sites, and digital pressure, by an assistant, was used to occlude the lumens. In six cats a standard end-to-end intestinal anastomosis was performed using a single layer simple interrupted approximating suture pattern of 3-0 polyglyconate with a swaged-on reverse cutting needle (Davis and Geck Company). To aid proper approximation of colonic ends, excessive mucosa was resected before suturing and attempts were made to include as little mucosa as possible with each needle pass. In the other six cats a 25-mm, 1.5-mm gap size BAR were implanted as directed by the manufacturer. A modified Fur-
A mesoclip clamp (United States Surgical Corporation, Norwalk, CT) was used to place purse string sutures of 3-0 polyglyconate around the ends of each colonic segment (Fig 2A to 2D). The mesenteric defect in all the cats was closed with a simple continuous suture pattern of 3-0 polyglyconate. The abdomen was then irrigated with 0.9% saline solution, suctioned empty, and closed routinely in two layers after changing gloves and instruments. All cats received butorphanol tartrate 0.1 mg/kg IM after surgery for analgesia. The resection/anastomosis time (first vessel ligation to mesocolon closure) and the anastomosis time alone was recorded for each surgery.

All cats were monitored closely for postoperative complications. The cats were offered water and the same diet starting 12 hours after surgery. The IV catheters were removed when the cats started drinking water. Return of appetite was recorded in all cats. Estimates of stool character, frequency, and volume were made during the entire postoperative period. The stool was monitored for fragments of BARs and blood. Caudal abdominal radiographs were obtained once a day from postoperative day 10 until postoperative day 20. The cats that had hand-sutured colonic anastomoses were subjected to the same manipulations and radiation exposure as those with the BAR. On postoperative day 30, each cat was euthanatized using a barbiturate euthanasia solution (Beuthanasia-D, Steris Laboratories, Kenilworth, NJ) at 25 mg/kg IV.

Gross necropsies were performed without knowledge of the study group. The anastomosis and surrounding tissues were evaluated for the presence of adhesions, ab-

Fig 2. A BAR being placed into the oral colonic segment (A). Purse string suture being tightened around the barrel of the BAR (B). Placement of the BAR into the aboral colonic segment (C). Finished BAR colonic anastomosis in a cat (D).
scases, or other signs of intestinal leakage. The anastomosis sites were graded subjectively as follows: (1) excellent (difficult or impossible to determine site of anastomosis); (2) good (anastomotic site visible with normal healing, ± minor omental adhesions); (3) fair (abnormal healing of mucosa and colonic wall as evidenced by obstruction [stricture formation/colonic wall inversion] or tissue tags, and omental adhesions); (4) poor (abnormal healing with more pronounced obstruction, or tissue tags, necrosis, and fibrous adhesions); and (5) dehiscence of intestines.

Nonstimulated colonic motility adjacent to the anastomotic site was monitored for 5 minutes immediately after euthanasia and opening the abdominal cavity. An approximately 10-cm long segment of colon, including the anastomotic site, was removed from all cats after necropsy. Colonic contents were removed by lavaging the lumen with isotonic saline. A double contrast radiographic study was then performed on the colonic segment with the segment inflated to a pressure of 20 mm Hg. High-detail radiographs were made using a cabinet x-ray system (Hewlett Packard Faxitron Series model 43855A option A04, McMinnville, OR) set at 40 kVp and 3 mA for 30 seconds. The diameter of the colon at the oral (B), aboral (C), and anastomotic (A) sites was measured directly from the radiographs (Fig 3).

Each colonic segment was then incised longitudinally and placed in neutral buffered formalin. After formalin fixation, three histological samples from each cat’s colon were graded with the pathologist blinded to the anastomotic technique. The histological samples were taken from equal distances around the circumference of the anastomosis. Muscular apposition (eversion or inversion), amount of granulation tissue, degree of mucosal regeneration, extent of inflammation at the anastomosis, and inflammation in the serosa or mesentery were graded based on a previously published, four-point grading scale that was modified for this project (Table 1).

All data were analyzed using independent t-tests with the exception of the subjective grading scale data that was analyzed using the Kruskal-Wallis analysis of variance. Statistical significance was set at $P \leq .05$. All data were expressed as the mean ± SD.

## RESULTS

Implantation of the BAR was uncomplicated in most cases. Selection of the 1.5-mm gap size BAR was appropriate for the colonic wall thickness in all cases. The diameter of the aboral colonic segment (29.9 ± 1.6 mm as measured on the postmortem

### Table 1. Histological Grading Scales for Colonic Anastomoses

<table>
<thead>
<tr>
<th>Muscle Apposition*</th>
<th>Amount of Granulation Tissue</th>
<th>Mucosal Regeneration†</th>
<th>Inflammation at the Anastomosis</th>
<th>Distant Inflammation‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>0: No inversion or eversion</td>
<td>0: No granulation tissue present</td>
<td>1: ±75% present</td>
<td>1: Minimal inflammation</td>
<td>1: Minimal inflammation</td>
</tr>
<tr>
<td>1: &lt;30% deviation</td>
<td>1: Minimal amount of granulation tissue present</td>
<td>1: ±50 &lt;75% present</td>
<td>2: 2 to 4 layers of leukocytes</td>
<td>2: 2 to 4 layers of leukocytes</td>
</tr>
<tr>
<td>2: ≥30 &lt;60% deviation</td>
<td>2: ≥½ 4X field granulation tissue present</td>
<td>2: ≥25 &lt;50% present</td>
<td>3: &gt;4 layers of leukocytes</td>
<td>3: &gt;4 layers of leukocytes</td>
</tr>
<tr>
<td>3: ≥60 &lt;90% deviation</td>
<td>3: ≥½ &lt;1 4X field granulation tissue present</td>
<td>3: &gt;1/2 &lt;1 4X field granulation tissue present</td>
<td>4: Abscess</td>
<td>4: Abscess</td>
</tr>
<tr>
<td>4: ≥90% deviation</td>
<td>4: ≥1 4X field granulation tissue present</td>
<td>4: &gt;25% present</td>
<td>4: Abcessed anastomotic site</td>
<td>4: Abscess</td>
</tr>
</tbody>
</table>

* Inversion = (−), eversion = (+). † Proportion of mucosal thickness at anastomosis. ‡ Serosa or mesentery.
radiographs) permitted easy insertion of the BAR cap, however, the oral segment was difficult to fit over the BAR because of its smaller lumenal diameter (20.2 ± 1.5 mm) \((P = .003)\). Manual dilation and lubrication of the oral colonic segment facilitated placement of the BAR. Two cats had serosal splitting of the oral colonic segment during BAR insertion. Cat no. 10 had a minor, approximately 3-mm, serosal tear that was repaired with two sutures. The second serosal splitting occurred in a cat that had a colon too small for the 25-mm diameter BAR. A sutured ileocolonic anastomosis was performed in this cat. There were problems with poor placement of the purse string suture in cats no. 3 and no. 6. Placing the suture before resecting the colon eliminated this problem by preventing retraction of the cut colonic tissue under the Furness clamp. Replacing the purse string suture was easily performed and did not interfere with the final anastomosis.

There were no intraoperative complications with any of the sutured anastomoses. Mucosal eversion was more noticeable with the suture technique, however, trimming of the mucosa before anastomosis minimized subsequent eversion. Lack of mechanical bowel preparation before surgery did not cause problems during surgery and potential fecal contamination was easily controlled. Total surgery time for the BAR anastomosis group averaged 60.8 ± 9.5 (range, 50 to 71) minutes compared with 57.7 ± 6.6 (range, 45 to 60) minutes for the sutured group \((P = .516)\). Time taken to complete the anastomosis alone was 32.0 ± 6.1 (range, 22 to 40) minutes for the BAR anastomosis and 29.0 ± 4.3 (range, 22 to 35) minutes for the sutured anastomosis \((P = .348)\).

All cats recovered rapidly from surgery and required only one dose of analgesic. Most cats had one bowel movement of blood, mucus, and firm stool immediately after surgery. Small amounts of bright red blood were noted in the feces of cats no. 5 and no. 12 for the first 2 days after surgery. No tenesmus was noted in any of the cats at any time after surgery. All but one cat, no. 8, started passing a formed stool by the end of the 30-day study period (mean, 14.6 ± 8.4 days), however, the consistency of the stool would occasionally become softer or even liquid. All cats were eating the preoperative diet by 4 days after surgery (mean, 2.5 ± 1.1 days) with the exception of cat no. 3. She refused to eat the preoperative dry diet but ate a canned diet (Feline Maintenance Canned, Hill's Science Diet, Topeka, KS). No postoperative wound infections were noted in any cats. Cat no. 11 developed an upper respiratory infection on day 10 but was clinically recovered without therapy by day 17. Cats no. 5 and no. 12 developed fevers averaging 39.7°C and 40.1°C, respectively. Cat no. 5 had a fever that started on day 7 and ended on day 15 after surgery with no other clinical signs. Cat no. 12 had a fever that corresponded to the passage of his BAR (days 12 to 15) and ended with passage of the last BAR fragments.

The BAR fragmented and passed without clinical signs in the remaining cats on day 12.2 ± 1.1 (range, 11 to 13; \(n = 5\)). Cat no. 8 passed the BAR unobserved before postoperative day 10. All BARs (\(n = 5\)) took 3.8 ± 1.9 days to pass completely from the body from the initial time of fragmentation. Radiographically, fragmentation started with one or both caps of the BAR, followed by collapse of the BAR's barrel. The barrel of the BAR typically passed as a unit (Fig 4). One cat (no. 12) had small amounts of bright red blood on the BAR fragments. All but the anorectic cat had regained their preoperative weights by the time they were euthanatized. There were no significant differences between cats with BAR or suture anastomosed colons comparing time until first defecation \((P = .615)\), return of appetite after surgery \((P = .311)\), soft stool passage \((P = .143)\), or formed stool passage \((P = .600)\).

Gross necropsy showed minor omental adhesions to the linea alba in most cats. Omental adhesions also were found covering two of six BAR anastomoses and all of the sutured anastomoses. Grossly
evident granulomatous reactions were found around all of the sutures placed between the colonic segments. Biofragmentable anastomosis ring anastomoses had a gross graded score of $1.58 \pm 0.49$ compared with sutured anastomoses scores of $2.05 \pm 0.34$ ($P = .088$). Colonic motility was noted in the area of the BAR anastomoses, however, motility was delayed or was blocked across the sutured anastomoses.

Double contrast radiography of the BAR colonic anastomosis sites demonstrated a $55.0 \pm 9.9\%$ decrease in luminal diameter compared with a $40.1 \pm 23.3\%$ decrease in luminal diameter in the sutured anastomoses ($P = .178$). Anastomosis diameters were compared with the oral colonic segment's diameter because the aboral segment's diameter was significantly larger (BAR, $P = .003$; sutured, $P = .001$) and would not contribute to fecal obstruction. Five of six BAR anastomosed colons had the purse string sutures visible in the lumen, whereas four of six sutured anastomoses had sutures visible in the lumen.

Histologically, there was moderate to extensive submucosal lymphoid hyperplasia in the oral colonic segments of three of six BAR anastomoses and two of six sutured anastomoses. Virtually all of the cells in the oral colonic mucosa were goblet cells containing mucous granules. The myenteric plexus appeared intact in all histological sections. Microabscesses were noted at the anastomosis or just oral to the anastomosis in three of six BAR and two of six sutured anastomoses. Inflammation with epithelioid macrophages and scattered neutrophils were almost always associated with suture material at the anastomotic site. There was thinning of the colonic wall at the anastomosis site in all of the cats.

Comparing histological grading scores of BAR versus sutured anastomoses there were no statistical differences in amount of granulation tissue ($1.50 \pm 0.46 \text{ v} 1.61 \pm 0.57 [P = .713]$), degree of mucosal regeneration ($2.33 \pm 0.84 \text{ v} 2.45 \pm 1.46 [P = .874]$), degree of inflammation at the anastomosis site ($2.28 \pm 0.83 \text{ v} 3.06 \pm 0.71 [P = .111]$), or distant inflammation ($1.61 \pm 0.80 \text{ v} 2.39 \pm 0.93 [P = .152]$). A statistical difference was found between groups with regard to muscular apposition (Fig 5). Inversion occurred more frequently in the BAR anastomoses ($2.05 \pm 1.06; n = 6$) compared with the sutured anastomoses ($0.44 \pm 0.10; n = 3$) ($P = .039$) whereas eversion occurred only in sutured anastomoses ($1.34 \pm 0.47; n = 2$) ($P < .001$).

**DISCUSSION**

Intraoperative complications associated with the use of the BAR in this study were similar to those reported in other BAR studies, including problems with placing the purse string suture, serosal tearing, intestinal diameter too small for the smallest BAR, gap widths too small for the selected BAR, and lack of a transanal insertion tool.$^{3,6-8,17}$

Purse string suture placement is critical because it is the primary method of securing the intestinal segments to the BAR. Hand-sutured purse string sutures can be used, however, the modified Furness clamp greatly simplifies and standardizes the technique. When the colon was resected before placing the suture through the Furness clamp, the cut end of the colon had a tendency to retract under the clamp. Placing the purse string before cutting the colon along the edge of the Furness clamp is recommended and resolved the problems with poor purse string placement.

Serosal and mucosal splitting of the intestinal ends have been reported in other studies.$^{3,6-8}$ Splitting of the intestinal wall on insertion of the BAR can be caused by a BAR that is too large for the intestinal lumen, or in the case of cat no. 10 tearing of the colonic wall occurred from one of the stay sutures pulling through the end of the colonic segment.
Intestinal segments have a tendency to spasm after manipulation, greatly narrowing the lumenal diameter. Based on cadaver studies, the oral colonic segment of normal cats was already determined to be marginal for placement of 25-mm diameter BARs. Several techniques have been developed to dilate or overcome the smooth muscle contraction that causes the lumenal narrowing of the intestines. Pharmacologically, topical 1% lidocaine or IV glucagon has been recommended to reduce the spasticity of the colonic smooth muscles in humans. Mechanical dilation of the gastrointestinal tract with a Foley catheter has also been reported. A size 26 or 30F Foley catheter with a 30-mL balloon will expand to approximately 27 mm, allowing placement of a 25-mm anastomosis device. In this study, the oral segment of colon was gently dilated mechanically by opening the tips of a carmalt forceps in the opening of the colon.

The proper BAR gap width has been found to be important in intestinal healing, especially in patients that could have severe postoperative mural swelling (ie, radiation therapy patients). Compromise of the intramural blood supply to the ends of the colonic segments could occur with severe mural swelling despite the scalloped edges of BAR caps. The 1.5-mm gap size BARs used in this study did not appear to overly compress the ends of the colon after closure of the BAR. To determine the specific gap size BAR to use, the colonic wall thickness can be measured using a tissue-measuring device (Proximate tissue-measuring device, Ethicon Corporation, Somerville, NJ).

Special care should be taken when pressing together the two ends of the BAR. Excessive digital pressure over sharp edges of the BAR can cause damage to the overlying colonic wall. Very slight bruising and blanching was noted on a few of the BAR anastomoses that corresponded to placement of the surgeon’s fingers during closure of the BAR. This problem has been reported in human patients.

The amount of colon resected in this study was not as extensive as would normally be performed in clinical cases because of a need for colonic tissue, oral and aboral to the anastomosis, for postmortem testing. Performing BAR anastomoses at the pelvic brim after subtotal colectomy should be possible. Inserting the BAR into the aboral segment first, using the inserting tool, would facilitate implantation of the BAR. A transanal insertion device for the BAR is currently under development and may make implantation of the device easier in cats (personal communication, Davis and Geck Company). Because ileocolonic anastomosis is not possible due to the small lumenal diameter of the ileum in cats, the proximal extent of the colonic resection should be at a level where the lumenal diameter will accept the BAR.

There were no technical difficulties associated with performing the sutured colonic anastomoses. The oral colonic segment had to be cut at a more acute angle than the aboral segment to anastomose the larger diameter aboral segment to the smaller diameter oral segment. Trimming the everted mucosa in the sutured anastomoses assisted in the apposition of the colonic segments.

There was no significant difference in the time required to perform the BAR or sutured anastomoses in this study. Previous studies have found BAR anastomoses to be significantly faster than sutured anastomoses. Several factors can explain the similarity of anastomoses times in this study. The BAR anastomoses took longer than anticipated to perform because of the difficulty of placing the oral colonic segment over the BAR. The lumenal diameter of the oral colonic segment was much smaller and had to be gently stretched over the proximal end of the BAR. In contrast, the aboral colonic segment was easily and quickly placed over the distal end of the BAR. Experience in using the BAR also probably played a significant factor in the speed of performing the BAR anastomoses. Studies in humans have demonstrated a decreased anastomosis time after using BARs in large clinical trials compared with smaller trials. Finally, the sutured anastomosis technique used in this study was a single layer technique compared with double layer techniques used in all of the other timed studies. The single layer anastomosis technique is quicker to perform than the double layer technique.

No wound infections were noted clinically or at postmortem in any of the cats in this study. The lack of preoperative bowel preparation, either mechanical cleansing or antibiotic sterilization, apparently did not cause any adverse effects on postoperative infections. Fecal contamination during surgery was easily controlled. Likewise, cefoxitin used at 22 or 44 mg/kg IV did not cause any clinically apparent side effects. Administering prophylactic antibiotics...
immediately before the start of surgery is well accepted. There is some controversy in continuing prophylactic antibiotics after the surgery is finished, however, continuation of postoperative antibiotics beyond 24 hours is not recommended.

Fragmentation rates of the BAR in this study were similar to other animal studies. The BAR has been reported to fragment a few days earlier in animals than in humans, and earlier in the colon than in the small intestine. Animals are thought to have a more rapid fragmentation rate because of their relatively increased body temperature. In humans, colonic BARs are believed to fragment more rapidly than small intestinal BARs because of the consistency of the stool passing through the device and possibly because of the stronger colonic motility. The rate at which the fragmenting BAR is passed in the stool is also probably affected by the consistency and volume of stool, and the strength of the colonic motility.

Typically in this study, one or both of the BAR caps would collapse, followed by collapse of the barrel of the BAR. The barrel of the device consistently passed collapsed, as a unit, whereas the pieces of cap would pass over a few days. The BAR fragments passed without apparent discomfort in any of the cats. In human trials, patients rarely noticed the passage of the BAR. The BAR fragments passed by the cats in this study were firm in consistency, but very friable and easily crushed to a powder between two fingers. One cat passed its BAR before monitoring by radiographs on day 10. This cat was very fractious and may have passed the BAR early because of increased colonic motility from stress or because of the increased handling and restraint needed to work on this animal. There were no clinical signs of premature passage of the BAR in this cat, nor were there any postmortem signs of leakage. Six to seven days after anastomosis, the cat’s colon should have had enough strength to withstand distraction if the BAR was lost this early.

Omental adhesions were noted around all of the sutured anastomoses. The simple interrupted appositional suture pattern used to anastomose the colon is known to imperfectly appose the intestinal ends. There is both slight inversion and eversion of the colonic ends at the anastomosis site using this appositional suture pattern. Because BAR anastomoses result in mucosal inversion, slight or no adhesions were noted.

Granulomatous reactions, consisting predominately of macrophages with a few neutrophils, were found around all of the suture material in all of the colons. Polyglyconate has not been associated with granulomatous reactions in other studies. These suture-associated granulomas may be caused by colonic lumenal contents migrating along the suture tracts. Resolution of these granulomatous reactions would be anticipated after suture absorption.

Immediately after euthanasia, colonic motility was subjectively noted to pass across all of the BAR anastomoses while being delayed or completely stopped at the sutured anastomoses. The significance of this finding is unknown because the reproducibility and reliability of measuring postmortem colonic motility has not been documented. However, because euthanasia and postmortem examinations were performed identically in all of the cats in this study, poorer neuromuscular transmission may occur across the sutured anastomoses compared with the BAR anastomoses.

By inflating the colonic segment in the postmortem radiographic study, a more accurate and physiological colonic anastomosis diameter should have been obtained. The radiographic double contrast study also gave more information on the lumenal shape of the anastomosis site (ie, inversion or apposition). The percentage decrease in lumenal diameter at the BAR anastomosis sites was comparable with other colonic anastomosis studies using inverting anastomosis techniques. No clinical signs of intestinal obstruction were noted at any time in this study, therefore, the diameter of the anastomoses was apparently large enough for normal colon function.

Based on this research, the BAR is a safe and effective method of performing an anastomosis after a subtotal colectomy in normal cats without preoperative bowel preparation.

REFERENCES

ANASTOMOSIS RING v SUTURING FOR COLECTOMY IN CATS


10. Davis & Geck Medical Device Division; Valtrac package insert. Danbury, CT. American Cyanamid Co. 1990


