Global Veterinaria 9 (2): 232-236, 2012
ISSN 1992-6197

DOI: 10.5829/idosi.gv.2012.9.2.6541

Colon Surgical Stabilization on Psoases Muscles for Treatment of Megacolon in Dog

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Abstract: Megacolon refers to an abnormal dilatation of the colon. Although it seems to be more common in cats, megacolon may also occur in dogs. This study included fourteen large-breed dogs affected with megacolon, aged 6 - 11 years. Colotomy and colopexy were performed in all dogs. The results of this study showed that symptoms do not improve in five dogs and so they were needed to subtotal colectomy surgery. Also, due to late referral and old age two other dogs were died. Seven dogs were successfuly recovered with colopexy. The aim of colopexy in this study is to create a direct way for the transit of stool in the colon and also removal the angle between the damaged and healthy colon which is created at the pelvic cavity inlet. Furthermore, the contractions of vascular (caudal aorta and caudal vena cava) and muscles area stimulate colon movements.

Key words: Megacolon · Psoases Muscles · Dog

INTRODUCTION

The large intestine is responsible for absorption of water and salt and the storage of feces. The large intestine is relatively short in dogs and cats, approximately 10 - 20% of the length of the small intestine, reflecting the fact that the large intestine plays a less significant role in nutrient digestion [1]. Megacolon is a condition that is uncommonly described in dogs. It refers to an abnormal dilatation of the colon that may be acute, chronic or toxic. Chronic megacolon can be classified as congenital (also known as Hirschsprung's disease in humans) or acquired and may be either primary or secondary. The cause of primary megacolon is unknown, so it is also termed idiopathic. The pathogenesis of idiopathic megacolon is still a subject of controversy, although it has been historically attributed to a primary neurogenic or degenerative neuromuscular disorder [2]. Secondary megacolon can occur as the result of intestinal wall lesions or various conditions that prevent defecation for a prolonged period of time [3]. Two pathological mechanisms are implicated in megacolon development: dilatation and hypertrophy. Dilated megacolon represents the end-stage of colonic dysfunction in idiopathic cases. On the other hand, hypertrophic megacolon refers to the functional disorder that develops as a result of chronic obstructive lesions (stenosis of the pelvic canal, tumor, foreign body, etc.) [4]. The therapy for megacolon depends on several factors including the severity of constipation and fecal impaction and the underlying cause. The initial treatment is aimed to establish and/or maintains a fluid and electrolyte balance, as well as to eliminate the possible causes of constipation. In addition, medical therapy with stool softeners is the first-line treatment for this condition. In this respect, animals should be appropriately hydrated and then an enema should be performed. Thereafter, medical management with laxatives should be initiated. Intestinal transit and other motility disorders in both dogs and cats [5, 6]. When medical therapy is no longer effective, surgery is recommended. Although surgery is usually referred to as a subtotal colectomy, in some cases colonotomy with fecal mass removal may also be considered as the treatment of choice [7]. Postoperatively, parenteral antibiotic and vitamin therapy should be continued. Prognosis depends on early recognition and management of megacolon [8]. This study is an evaluation of colopexy in treatment of megacolon to prevent removal of the colon

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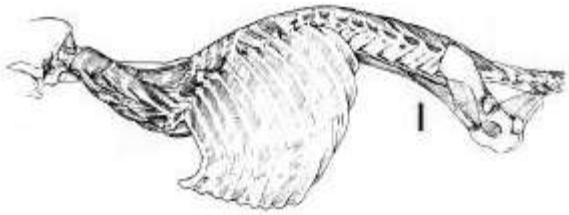

Fig1: Psoas major & minor muscle

and the recurrence of megacolon, because one of the reasons of subtotal colectomy is the prevention of megacolon recurrence. Instead of removing the colon in colopexy, first colotomy is conducted and then the colon is fixed in the lumbar muscle (Psoas major & minor) (Figure 1), because the accumulation of feces in the distended colon and increase of the volume and weight of the feces, the colon is oriented toward the bottom of the abdominal cavity and an angle near 90 degrees is created between the affected and normal colon in the pelvic cavity inlet that prevents the movement of feces into the rectum. If the angle can be omitted by fixing colon in lumbar, it is possible to prevent from recurring megacolon due to the created direct path.

MATERIALS AND METHODS

This study included 14 large-breed dogs affected with megacolon, aged 6-11 years. After recording the profile of all dogs and the diagnosis of megacolon using the clinical examination and abdominal radiographic findings, colotomy and colopexy was performed in all dogs. Abdominal radiography of all examined dogs before surgery showed colonic distension with stool retention. Dilated colon was evident on all radiographic images (Figure 2). In most cases, enlarged colon extended from the epigastric region to the pelvic canal.

Fig 2: Radiographic image of dilated colon

Fig. 3: Gross appearance of megacolon before and after colotomy

Preoperative Care: Immediately after the diagnosis was established, over a period of 2 - 3 days, all dogs were subjected to an initial treatment for restoration of their general health condition and for surgical procedure preparation. In order to correct electrolyte and energy imbalance, the animals were treated with infusions of Ringer's lactate solution (500 milliliter), 5% glucose solution (500 ml) and aminosteril solution (30 ml). In addition, once a day for three days, all animals were treated with preoperative antibiotics and vitamin therapy (penicillin G, 800,000 International unit Intra Venous; vitamin B-complex, 3-5 ml Intra Muscular). Before surgery, the animals were premedicated with atropine sulphate (subcutaneous) and acepromazine (IV) and then anesthetized with ketamine hydrochloride (IM) and maintained with isoflurane inhalation.

Surgical method; all animals underwent a median laparatomy. After pulling out the colon, extra-abdominal incision was created in the anti-mesenteric border of colon and followed by manual extraction of the intestinal contents (Figure 3).

Closure of the incision was accomplished by a continuous absorbable, synthetic, braided suture (polyglactin 910 3-0), followed by a second row interrupted cushing type suture. Then the colon was sutured by 4 horizontal mattress sutures to the left psoas

major & minor muscles near the caudal aorta and caudal vena cava. After lavage the abdominal cavity, the abdomen was closed with standard technique.

Postoperative Care: All dogs during the postoperative period (8 days after surgery), antibiotics, electrolyte solutions and vitamin therapy (penicillin G, Ringer's lactate and vitamin B-complex) were continued and dogs were closely monitored for infection. The animals were deprived of water for two days after surgery. On the third postoperative day, all animals were given water only (3 x 150 mL). In addition to water, for the next four days (4^{th} - 8^{th} postoperative day), animals were fed with chicken soup (2 x 200 mL, concentrate). Thus, the daily amount of fluid, given per os, was 1 liter. During this period, the animals were deprived of solid food. Eight days after surgery, both medicament and vitamin therapy were interrupted. Starting from the 9^{th} postoperative day, solid food (raw minced beef 2 x 150 g and corn bran 2 x 50 g, per day) was introduced to the diet and dogs were allowed access to water. During the third postoperative week, in addition to raw beef, fresh bread (2 x 50 g, per day) was introduced to the diet. In all animals were given an increased amount of food (meat 2 x 200 g, bread 2 x 50 g, corn bran 50 g and soup concentrate 2 x 200 mL). Animals were fed twice a day, during the period of 30 days after surgery. The Elizabethan collar was placed around the animal's neck to prevent them from licking or biting wounds. Skin sutures were removed on the 12^{th} postoperative day, while the protective collar was removed three days later.

Evaluation Methods: Appetite and feces of all dogs were evaluated for 30 days. 30 days after surgery, all dogs were submitted to radiographic evaluation.

RESULTS

The results of this study showed that symptoms do not improve in five dogs and so they were needed to subtotal colectomy surgery. Also, due to late referral and old age two other dogs died. At all seven dogs recovered due to doing colopexy and 20 days after surgery had a good appetite. Comparison of fecal in all dogs showed 7 dogs had normal fecal 10 days after surgery. Radiographic evaluation results showed that the descending colon lumen diameter decreased in all dogs with colopexy surgery (Figure 4).

Fig. 4: Radiographic image after colopexy of colon

DISCUSION

Patients with intractable constipation can be divided into those with normal gut diameter and those with a dilated gut. The former includes slow-transit constipation, pelvic outlet obstruction and the latter includes congenital megacolon (Hirschsprung disease), colonic pseudo-obstruction and acquired megacolon. The pathophysiology of constipation in these entities is poorly understood, although there have been several investigations on this matter [3, 9- 13]. It was previously thought that megacolon commonly affects older cats. However, recent studies show that both feline and canine megacolon may be seen at any age [14]. According to a review of 120 cases published in English veterinary literature, most cases of megacolon are observed in middle-aged, male cats (70%). These data also suggest that megacolon commonly affects domestic shorthair (46%), domestic longhair (14%) and Siamese breeding [4].

An extensive list of differential diagnosis for the obstipated cat includes numerous factors associated with a prolonged constipation, such as: neuromuscular,

mechanical, metabolic, endocrine, inflammatory and environmental factors. Although in some cases differential diagnosis may be of critical importance the majority of cases of obstipation are accounted for idiopathic megacolon (62%), pelvic canal stenosis (23%), nerve injury (6%) or Manx sacral spinal cord deformity (5%). In addition, in a small number of cases, obstipation was a result of complications of colopexy (1%) or colonic neoplasia (1%), while hypoganglionosis/ aganglionosis was suspected in 2% of cases, but not proven [4, 14]. However, the importance of differential diagnoses for the obstipated dog is not well documented. The goal of treatment is to maintain a soft stool and to improve colonic motility. Recent studies confirmed that feline megacolon is characterized by a generalized dysfunction of colonic smooth muscle and that treatments aimed at stimulating colonic smooth muscle contraction might improve colonic motility [15]. In cats the disease is characterised by repeated episodes of constipation or prolonged obstipation that may result in complete absence of defecation. Affected cats are presented with anorexia, dehydration, weight loss, vomiting and lethargy. Occasionally, chronically constipated cats have intermittent episodes of diarrhea. Cats affected with idiopathic dilated megacolon usually have a history of recurrent constipation culminating in obpstipation. On the contrary, animals affected with hypertrophic megacolon usually have a history of automobile or other trauma [16, 17]. Several surgical techniques for the management of feline megacolon have been described, including coloplasty and partial or subtotal colectomy [18]. The aim of colopexy in this study is to create a direct way for the transit of stool in the colon and also removal the angle between the damaged and healthy colon which is created at the pelvic cavity inlet. Furthermore, the contractions of vascular (caudal aorta and caudal vena cava) and muscles area stimulate colon movements. Diet was also an important part of postoperative treatment. Constipated patients are usually fed a standard diet high in fiber to help attract water to the stool, improving its consistency. Consumption of high-fiber foods contributes to optimal surgery outcome and helps to prevent postoperative constipation.

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