INTRODUCTION:

Dysphagia due to benign esophageal strictures is an important cause of morbidity and mortality in veterinary medicine. While intrinsic benign esophageal strictures most commonly occur as a result of esophagitis following gastro-esophageal reflux, any significant chemical or mechanical injury to the esophageal mucosa can potentially result in formation of a stricture. In dogs, food or debris can pass by small stricture areas; however, in dogs with severe strictures, it can be costly to treat and often associated with a poor prognosis.

The goal of treating benign esophageal strictures (BES) is to reduce the frequency of regurgitation to the extent that oral feeding can be used to maintain nutrition and hydration. The current mainstays of mechanical dilation therapy include endoscopic-guided balloon dilation and bougienage. A “good” outcome has been reported following balloon dilation (74-88%) and bougienage (74-78%) for benign esophageal strictures in dogs. Authors of these studies report that a “successful outcome” often requires two or greater dilation therapies; these treatments are performed under general anesthesia, which can encourage further esophageal reflux, and can be costly. In addition, a “good” outcome is often defined as achieving a soft food or a gruel; as the structure often remains to some degree. Few (likely under 20%) of these animals ever regain normal feeding regimens.

Esophageal stenting has been attempted as a possible one-stage solution for BES. Unfortunately, the authors’ experience with esophageal stenting has been disappointing, however these procedures were performed in patients with interstitial or recurrent benign esophageal strictures (BESs) defined as ≥3 dilations with strictures recurring. The major advantage of the presence of a stent is the consistent dilation performed, not permitting the structure to reform, or the edges of the tear mucosa to reattach. Unfortunately the stents are often not well tolerated by the patients, with subsequent high rates of dysphagia, gagging and discomfort.

From review of the data available in previous reports, it seems the ideal treatment for benign esophageal strictures would be to provide consistent (or nearly consistent) dilation of the structure to prevent reformation, but also permit easy removal of the device if it is not well tolerated, or when the structure has been effectively treated. The primary purpose of the study performed here is to determine if a one-stage balloon esophageal dilation feeding tube (EBDFT) could be an effective, single-procedure alternative to repeated balloon dilation procedures for the treatment of benign esophageal strictures in dogs. To the authors’ knowledge, no study to date has reported the clinical use of such a device for palliative management of benign esophageal strictures.

MATERIALS & METHODS:

Study Population

Dogs diagnosed with benign esophageal strictures were included following client consent; exclusion criteria included comorbidities preventing general anesthesia, or lack of follow-up communication. Dysphagia scores (TABLE 1) were obtained prior to, and following, placement of the EBDFT throughout the follow-up period.

Procedure

With the help of engineers at Milli International Inc., we designed a non-compliant esophageal balloon dilation device mounted on commercially available and commonly used esophageal feeding tube (FIGURE 1). The noncompliant balloon is covered with a compliant polyurethane balloon to help capture and contract the noncompliant balloon contained inside to provide a low-profile device when it is not inflated. This device was placed using a similar technique to that currently used for E-tube placement, and left in place for approximately one month (FIGURE 2). The balloon performs twice daily balloon inflations at home (FIGURE 3), using predetermined air volumes and provides supplementation of food, water and medications through the tube necessary. While strictures can be incompletely herniated, the initial strictural efficiency would occur under notable and surgeon’s control; subsequent dilations would not be expected to be associated with discomfort. In between the twice daily inflations, the balloon would be maintained permitting passage of normal food and liquid boluses during normal per os eating and drinking.

RESULTS:

Five female spayed and 1 male castrated dog ranging from 8 months to 7 years with confirmed esophageal strictures were included in this preliminary study. Causes for the strictures were confirmed following OHE surgery in 2, dental prophyllaxis in 1, parvovirus infection in 1, IVDD surgery in 1, and suspected due to nasoscopy following tracheostomy for polyoma virus in 1. At the time of EBDFT placement, these patients received between 1 and 16 previous esophageal balloon dilations; 2 of which were considered recurrent (RBES) (>3 previous dilations). Prior to EBDFT placement, 2 dogs had dysphagia scores of 3/4 (only able to swallow liquids) and 1 had a score of 2/4 (able to tolerate gruels but continued to regurgitate).

All patients had endoscopic and fluoroscopically guided balloon dilation of the strictures as well as esophagostomy before and after EBDFT placement. Five dogs had EBDFT placement via esophagostomy and one dog received pharyngostomy placement due to the proximal stricture location. There were no major intra- operative complications. All patients were discharged the same or the following day.

Post-operative complications occurred in 2 dogs including premature tube removal by the dog (1), and EBDFT failure requiring exchange (1). Two additional dogs had minor irritation or local infections at the tube sites that improved with cleaning and oral antibiotics. The prematurely removed tube was vomited, presumably due to the location of the tube entering the oropharynx secondary to the very distal location of the stricture; this patient’s final dysphagia score was 2/4 (able to swallow some kibble and canned food) following removal and esophagotomy demonstrated only a mild esophageal narrowing remaining. The EBDFT failure patient was ultimately euthanized due to severe comorbidities including polyoma virus and other undiagnosed disease processes. Tubes remained in place between 14 and 36 days (FIGURE 4). Follow-up time ranged from 14 to 733 days (median 185 days, mean 254 days). Five of 6 dogs had improved dysphagia scores compared to pre-operative measurements (TABLE 2) and the sixth was ultimately euthanized due to comorbidities. While balloon inflations caused apparent minor, temporary discomfort in all patients, the owners felt it was well tolerated and spontaneously resolved following balloon deflation.

DISCUSSION/CONCLUSION:

Initial results suggest that the EBDFT may be an effective, single-procedure alternative to repeated balloon dilation procedures for the treatment of benign esophageal strictures in dogs. Preliminary results indicate complications including insertion site irritation/restriction, infection, discomfort, and early tube failure requiring removal or exchange. However, the results presented here are preliminary and must be evaluated prospectively. Further studies will determine the suitability of the EBDFT for treating benign esophageal strictures in dogs and cats. As the EBDFT is placed in a similar manner to a standard esophageal balloon dilation device, it will be available in a wider range of balloon diameters and lengths which will expand the range of patients that can be treated.

These first patients have demonstrated that the EBDFT has the potential for improved (and less expensive) outcomes in the treatment of BES as well as other BISS.

FOOTNOTES AND REFERENCES:


