Acquired esophageal stricture in the dog: a case report

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ABSTRACT: Complicated case, which after several surgical interventions ended up with an acquired esophageal stricture is presented. The possibility of reflux esophagitis should be kept in mind during postoperative period, especially in primarily troubled patients. An early management of reflux esophagitis could prevent such a condition successfully and help taking full control of a patient after surgery. This report describes etiology of the problem, follows its dynamics, as well as evaluates treatment options suggested in textbook against options available and those finally applied after consulting the owner. Authors try to point out cardial incompetence as one of the most important etiological factors. Despite some early remissions, authors finally succeeded to extend the diameter in the site of the stricture from 5 mm to over 15 mm within seven sessions performed in the period of six months, improving functional outcome.

Keywords: dog; endoscopy; reflux esophagitis; balloon dilation

Esophageal strictures are relatively uncommon condition in small animals. They can be divided into two main categories – benign and malignant. Based on localization we recognize intrinsic (intramural) or extrinsic (extramural) strictures (Gualtieri, 2001). Benign intrinsic esophageal strictures represent narrowing of the lumen secondary to fibrous contraction of the esophageal wall (Leib, 1997).

Four main factors likely play a role in ethiopathogenesis of reflux esophagitis leading to stricture formation (1) Incompetence of an antireflux system, (2) Quality of gastric juice leaking, (3) Self-cleaning capacity of esophagus, (4) Resistance of esophageal mucosa (Duda and Hildebrand, 1999). The most important part of an antireflux system is lower esophageal sphincter (LES). Its proper function is essential for prevention of gastroesophageal reflux. Strictures generally develop after intraluminal ulcerative inflammatory process that extends deep to the submucosa and muscular layer (Twedt, 1995). In severely damaged tissue, fibroblasts appear within 24 hours of the insult and collagen fibers are built within one week. Even though fibrotic changes begin early, clinical signs may not appear until after fibrous tissue maturation, which reduces the diameter of the esophageal lumen (Guilford and Strombeck, 1996). In the majority of cases, a solitary fibrous band is noted; however, multiple strictures can be seen occasionally. Although esophageal stricture can occur after any severe mucosal damage (esophageal foreign body, ingestion of caustic substances, esophageal surgery, penetrating lesions, secondary reflux esophagitis following hiatal herniation), we can observe it most commonly as a complication of reflux esophagitis following anesthesia (Zawie, 1989; Leib *et al*., 2001; Adamama-Moraitou *et al*., 2002).

The diagnosis is not always easy and it is based on clinical signs, radiology and endoscopic examination.

Treatment options for esophageal strictures include conservative or surgical procedures. Conservative treatment includes mechanical stricture dilation (bougienage, balloon catheter dilation) and prosthesis placement. A technique using endoscopic electrocautery incisions of the stricture before balloon dilation has been proposed and was successfully performed by Gualtieri (2001). Surgery in-

Supported by the Ministry of Education, Youth and Sports of the Czech Republic (Grant No. 161 700 002).

cludes resection and anastomosis, esophagoplasty, or reconstructive procedures (e.g., patch grafting), and it is indicated when conservative treatment fails or in case of neoplastic or tubular strictures (Gualtieri, 2001).

The report presented describes an interesting clinical case of benign esophageal stricture in a dog.

CASE HISTORY

A four-year-old female Labrador Retriever of 29 kg body weight was presented to the authors' veterinary teaching hospital with quite complicated history. There was ovariohysterectomy two years ago performed by a local veterinarian, with some minor complications afterwards – namely delayed wound healing and peritonitis. Then, approximately six months later, the patient was involved in a dogfight. She has had a deep, never healed wound in inguinal region ever since and, as things had been getting worse and deep fistulation appeared, ultimately radical surgical therapy was recommended. The possibility of an ovaric fistulation was not kept in mind at that time and an attempt of complete surgical excision was made. In condition of an insufficient asepsis, the surgeon found himself (not prepared) in abdominal cavity and could not successfully finish the procedure. As a result of this intervention, another contamination of retroperitoneal space led to circumscribed septic peritonitis with an abscedation of the right kidney. During few more days severe generalized sepsis had developed (general health deterioration, somnolence, decrease in food intake, hyperemia of mucous membranes, signs of shock) and patient was sent to the veterinary teaching hospital to be dealt with.

Physical examination, CBC and chemistry had been done first, along with hemocultivation. After sepsis was taken under control and homeostasis of the patient was balanced by the infusion therapy, an explorative celiotomy had been consulted with the owner and then performed.

The surgery included complete exploration of abdominal cavity through the ventral midline approach, as well as an excessive flushing by saline with meticulous sucking out all the fluid. Apparent on the first sight during the surgery was enlargement of the right kidney, dilation of the right ureter and two more abscesses within the mesenterial root. Eventually, complete right nephroureterectomy was performed, along with total excision of two remaining abscesses.

Within four days the patient started to vomit several times a day with more and more symptoms of regurgitation. After few more days, she was not able to take any diet and her status was further deteriorating. Six days later, the patient came back to the hospital and further diagnostics was urgently recommended.

According to clinical manifestation, after ruling out of serious systemic diseases, gastric and/or esophageal disorders were to be considered first, so contrast radiography and endoscopy were performed. Contrast radiographs revealed prolonged passage of the contrast medium (barium sulphate) within the esophagus. Both investigative methods subsequently confirmed the diagnosis of ulcerative esophagitis. Endoscopically the lumen appeared wide open into the stomach (Figure 1), with the pool of gastric juice within distal esophagus. These findings advocate possibility of hiatal disease (cardial incompetence with gastro-esophageal reflux). Proper medication was commenced (metoclopramide along with ranitidine and sucralfate). The effect of medication apparent almost immediately was disappearing of vomitus, however, there was still significant regurgitation with further irritation of esophageal mucosa.

Repeated esophagoscopy revealed that chronic esophagitis led to developing of significant esophageal stricture. There was single stricture located in the cervical esophagus, 25 cm from incissors (Figure 2). The diameter at the stricture was estimated using the endoscope tip and suggested to be 5–7 mm (flexible endoscopes Olympus type XP-20 and Olympus BF type PE being used). Passing the endoscope tip (Olympus type XP-20) through the cranial limit of the stricture appeared to be impossible at that time, so mechanical dilation of the stricture was performed under general anesthesia with endoscopic visualization. Balloon catheters with a balloon size of 10 and 18mm in diameter (when inflated) and 8 cm in length were used. The catheter was guided alongside the endoscope. Deflated catheter was inserted to the lumen of the stricture and then inflated to the 90 and 50psi for 10 and 18mm balloon catheter, respectively (manufacturer-recommended pressure). For treatment we have chosen endoscopic balloon dilatation of the stricture as a method of choice, as we ruled out possibility of another surgery. We started with a protocol of four

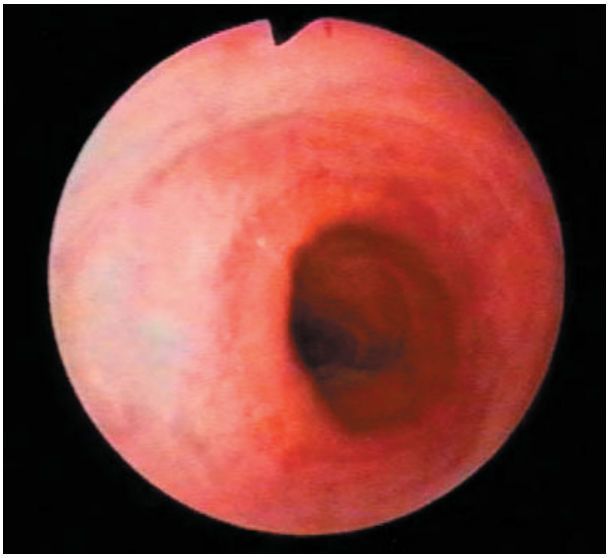

Figure 1. The cardia opens completly under air insufflation in the gastric cavity is well seen directly from the esophagus

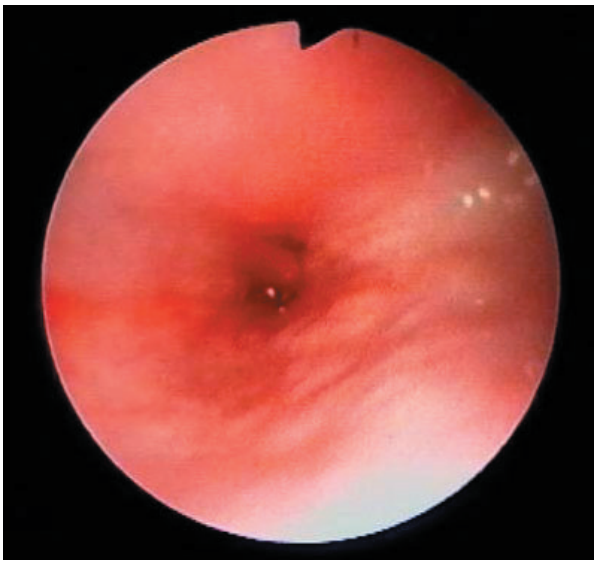

Figure 2. Esophageal stricture apparent from the first sight

balloon dilations (120 seconds each procedure), approximately 5 minutes apart, first, fifth, twelfth and eighteenth day of therapy with increasing of diameter of balloon catheter, with proper medication (prednisone 0.5 mg/kg q12 h, metoclopramide 0.5 mg/kg q8 h, ranitidine 2 mg/kg q12 h). Even though we could observe significant improvement in both clinical and endoscopic outcome, it was not back to normal, yet. The dog had to be fed with the special semisolid diet from an elevated place (adjusted step-stool), while the owner could still sometimes observe regurgitation.

As the owner turned down the possibility of feeding through the tube gastrostomy, we decided to continue with more acceptable combination of drug and dietary therapy. We extended the intervals between endoscopies to two weeks in the beginning and to one month later on and the patient underwent a total of seven treatment sessions. Eventually, we have changed the medication: prednisone 0.5 mg/kg q12h, cisapride 0.5 mg/kg q8 h later q12 h (instead of metoclopramide), omeprazole 1 mg/kg (instead of ranitidine). There was clear evidence of improvement each time. The patient gained seven kilograms during first two months. Eventually, six month after beginning of the therapy (balloon dilation), the diameter at the site of stricture has become as wide as 15 mm (Figure 3). The patient has remained without clinical symptoms and has become very lively and demanding of outdoor activities.

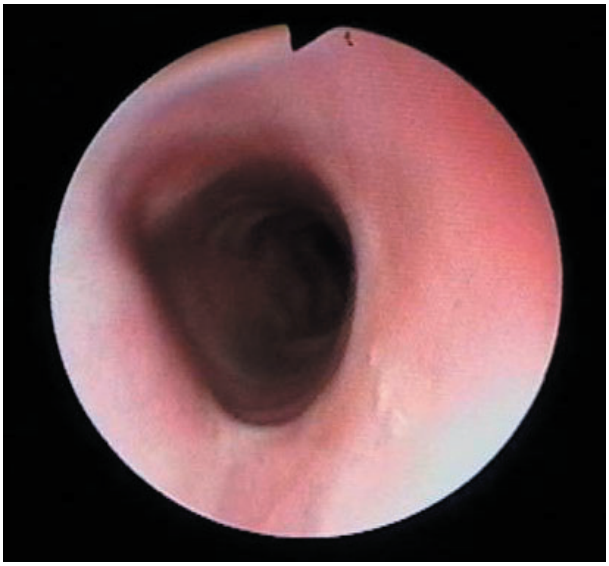

Figure 3. Site of the stricture exactly six month after first course of treatment

DISCUSSION

Gualtieri (2001) suggests that esophageal strictures in dogs and cats are most likely formed after reflux esophagitis secondary to reflux of gastric acid and enzymes during general anesthesia or hiatal disease and from passage and removal of esophageal or gastric foreign bodies.

Hiatal disease is syndrome affecting the LES or esophageal hiatus of the diaphragm or both of them, which results in reflux esophagitis. The most frequent cause of gastroesophageal reflux in the dog and cat is supposed to be cardial incompetence, described as a lack of coordination between the muscle of the LES and the diaphragmatic crura (Gualtieri, 2001). In our opinion, there are probably some patients with very decent manifestation of cardial incompetence, but without the real clinical symptoms, so hard to recognize. These patients in particular, would be sensitive to anesthesia, namely to developing of reflux esophagitis, which could ultimately lead to secondary esophageal stricture. Of course, the more patient is anesthetized, the greater is a likelihood of any complication associated with anesthesia. Some of our endoscopic findings in this very patient support our hypothesis, as they revealed a significant leakage of gastric juice into the distal esophagus through an insufficient cardial sphincter.

Previous studies have documented that gastroesophageal reflux commonly occurs during anesthesia in variety of surgical procedures and after different kinds of premedication (Strombeck and Harrold, 1985; Hashim and Waterman, 1991; Galatos and Raptopoulos, 1995a). Age, intraabdominal procedures, and prolonged preoperative fasting were reportingly associated with an increased reflux. Body positioning and tilting the surgical table were not significantly important according to some authors (Galatos and Raptopoulos, 1995b).

It remains not clear, why the stricture in our case developed in a border of proximal and middle third of esophagus, instead of distally, closer to the cardia, where irritation of mucosa is definitely the most severe. Although some authors suggest that most strictures are found at the thoracic inlet (Hardie *et al*., 1987), others describe the majority of strictures being localized at the distal portion of the thoracic esophagus (Leib *et al*., 2001; Adamama-Moraitou *et al*., 2002).

Even though we omitted tissue sample collection followed by a pathohistological examination, we are positive in our assumption that our case is all about a benign etiology of the stricture. We have considered the reasons suggested by Leib *et al*. (2001): (1) the infrequent incidence of esophageal neoplasia, (2) the gross endoscopic appearance of the stricture as smooth white-glistening tissue, (3) the lack of visible friable or granular mass, (4) the lack of development of a mass during subsequent endoscopic examinations, (5) long-term clinical improvement, whereas malignant esophageal tumors are highly aggressive and have a poor long-term prognosis.

As far as the methods of treatment are concerned, endoscopy should be considered in the first place, because it is the least invasive technique with low risk of possible complications, it is the most effective (with the success rate as high as 85% to 88%) (Harai *et al*., 1995; Leib *et al*., 2001), as well as it is probably the cheapest one. Not only we are able to make proper corrections according to actual status during therapy, but also more importantly we can see the progress during each visit and make decision, whether or not to go on with balloon dilation, so we can follow dynamics of the disease easily. Surgery in the other hand is costly, with high risk of various complications, including improper healing of the suture. Drug therapy is usually insufficient, while stent causes further continuous irritation of mucosa (in fact, it is a foreign body) or it can move if it is not positioned tightly enough.

We can't estimate in advance how many treatment sessions will be needed. In our patient it took total of seven sessions to reach the diameter of 15 mm, big enough for nearly adequate food intake. This high number of sessions was required probably by persistent reflux esophagitis even after stricture formation, along with big narrowing of the lumen.

CONCLUSION

Although we have to admit that esophageal strictures are rare as postoperative complications, there is no doubt they should be always considered possible and first subtle symptoms should be recognized and treated properly. Cardial incompetence (the Gualtieri definition), with decent or no clinical manifestation is found during routine endoscopic examination quite commonly. These patients, in our opinion, are more prone to developing reflux esophagitis, eventually leading to stricture, particularly in a combination with other factors playing role in ethiopathogenesis (such as anesthesia).

Acknowledgements

Authors would like to express their sincere gratitude to professionality of the staff at Dogs and Cats Clinic, namely Drs. P. Proks and J. Peslova, helping to handle anesthesia, Mr. V. Cerny, technician at endoscopy, as well as many others.

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Received: 03–02–07
Accepted after corrections: 04–02–25

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