

USE OF BALLOON DILATATION TECHNIQUE VIA ENDOSCOPY PROCEDURE IN A CANINE PATIENT WITH ESOPHAGEAL STENOSIS: CASE REPORT

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ABSTRACT

Esophageal stenosis is a morphofunctional alteration that causes inflammatory lesion in the submucosal and muscular layers of the esophagus, inducing them to fibrosis and altering the esophageal diameter. The present report addresses the use of a balloon dilator as an auxiliary way to correct esophageal stenosis in a canine, female, Pug patient, with a history of recurrent vomiting as the main complaint. Through endoscopy, it was observed that the thoracic esophagus was inflamed, with thickened and fibrotic mucosa, in addition to whitish colored fibrous rings, which hindered the passage of the probe, enabling the determination of the diagnosis of esophageal stenosis. In this report, we opted for the use of a dilator balloon, with three procedures being performed one week apart, to improve the symptomatic condition. After the dilator procedure, the favorable development of the clinical condition presented by the patient was possible.

Keywords: esophageal balloon, esophagus, morphofunctional esophageal alteration

USO DA TÉCNICA DE DILATAÇÃO POR BALÃO VIA PROCEDIMENTO ENDOSCÓPICO EM UM PACIENTE CANINO COM ESTENOSE ESOFÁGICA: RELATO DE CASO

RESUMO

A estenose esofágica é uma alteração morfofuncional que ocasiona em lesão inflamatória das camadas submucosa e muscular do esôfago, induzindo-as a fibrose e que altera o diâmetro esofágico. O presente relato aborda a utilização de balão dilatador, como forma auxiliar de correção de estenose esofágica em paciente canino, fêmea, da raça Pug, apresentando histórico de vômitos recorrentes como queixa principal. Por meio da endoscopia, observou-se que o esôfago torácico estava inflamado, com a mucosa espessada e fibrótica, além de anéis fibrosos de coloração esbranquiçada, o que dificultava a passagem da sonda, possibilitando a determinação do diagnóstico de estenose esofágica. Nesse relato, optou-se pelo uso do balão dilatador, sendo feitos três procedimentos intervalados de uma semana entre eles, para a

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melhora da condição sintomática. Após o procedimento dilatador, foi possível o desenvolvimento favorável do quadro clínico apresentado pela paciente.

Palavras-chave: balão esofágico, esôfago, alteração morfofuncional esofágica

USO DE LA TÉCNICA DE DILATACIÓN CON BALÓN MEDIANTE PROCEDIMIENTO DE ENDOSCOPIA EN UN PACIENTE CANINO CON ESTENOSIS ESOFÁGICA: REPORTE DE CASO

RESUMÉN

La estenosis esofágica es una alteración morfofuncional que provoca una lesión inflamatoria en las capas submucosas y musculares del esófago, induciéndolas a la fibrosis y alterando el diámetro esofágico. El presente informe aborda el uso de un dilatador de balón como vía auxiliar para corregir la estenosis esofágica en un paciente canino, hembra, Pug, con antecedentes de vómitos recurrentes como principal síntoma. Mediante endoscopia se observó que el esófago torácico estaba inflamado, con mucosa engrosada y fibrótica, además de anillos fibrosos de color blanquecino, lo que dificultaba el paso de la sonda, lo que permitía determinar el diagnóstico de estenosis esofágica. En este informe se optó por el uso de balón dilatador, realizándose tres procedimientos con una semana de diferencia, para mejorar la condición sintomática. Tras el procedimiento dilatador, fue posible el desarrollo favorable del cuadro clínico presentado por el paciente.

Palabras clave: balón esofágico, esófago, alteración esofágica morfofuncional

INTRODUCTION

Esophageal stenosis is a morphofunctional alteration that affects dogs due to a chronic inflammatory lesion that attacks the layers of the esophagus, submucosa and muscle, and fibrosis of the affected segment (1). In view of the incited regional inflammatory process (2), there is a decrease in the esophageal lumen (3), with the formation of fibrous rings and absence of current peristalsis of the organ. In according to Luciani et al. (1) esophageal stenosis they can be intramural and extramural, with benign or malignant characteristics. It can be caused after ingestion of foreign bodies or severe gastroesophageal reflux (3), being associated with 46% to 65% of cases of esophageal stricture in dogs, being the main cause of severe esophagitis followed by stenosis (1). In addition, the healing of organ surgeries, neoplasms, ingestion of caustic substances or hot foods and persistent vomiting can be included as causes (1,2,4).

Among the clinical signs likely to occur, regurgitation of solid foods is the most common manifestation (1,5). However, depending on the location and diameter of the stenosis, patients may experience ptialism (6), dysphagia, inappetence, weight loss and occasionally cough, fever and lung crackles, due to aspiration of regurgitated content, resulting in aspiration pneumonia (1,7). The therapeutic approach for esophageal stenosis is a multimodal, encompassing surgical therapy or conservative methods (8,9). Regardless of the technique, an association of stenosis treatment with esophagitis therapy is necessary, which includes the use of prokinetic drugs, mucosal protectors, gastric secretion inhibitors, corticosteroids and occasionally antibiotics, is necessary (2). The present study aimed to report the occurrence of a case of esophageal stenosis in a canine that had a history of vomiting and weight loss. The treatment recommended for the patient was the use of the balloon dilator, obtaining satisfactory results after three procedures.

CASE DESCRIPTION

At a veterinary clinic in the city of Itaúna, Minas Gerais, a canine patient, female, of the Pug breed, aged 4 years and with a body weight of 5 kilograms (kg) with a history of vomiting and weight loss, was seen. During the anamnesis, the tutor reports that the animal had been regurgitating all types of solid food for two weeks. In this period, the dog had progressive weight loss, and already had a history of recurrent vomiting. Upon clinical examination, the patient was apathetic, normothermic, normal mucous membranes, with no changes during cardiac and respiratory auscultation, lymph nodes with no changes in normal size and consistency, in addition to absence of pain on abdominal palpation. The clinical condition of the patient's body at the time of veterinary care and in association with the information obtained through the anamnesis was characterized by a marked and progressive weight loss, with visualization of 8-10% dehydration, moderate weakness, reduced voluntary food intake and water, among others.

In view of the situation, blood samples were collected for the performance of a complete blood count and biochemical examination. Later the patient was referred to the inpatient sector for intravenous fluid therapy (IV) with serum Ringer's with Lactate, and an amino acid vitamin supplement (Glycopan pet) was instituted, 2.5 ml, *per os* (PO) every 12 hours (BID)), and administered antiemetic (Maropitant citrate, 1.0 milligram per kilogram - mg / kg), subcutaneously (SC), to every 24 hours (SID). The blood count showed an increase in leukocytes, with the remaining cells within the reference range for the species. The red blood series showed no change, and the respective cells were within the normal range.

The biochemical exam showed a significant increase in urea, above the reference value for the species. The increase in urea was detected in the blood sample collected before starting the fluid therapy, thus, the increase can be explained by the reduction in the patient's fluid volume. A new biochemical exam was performed on the patient after the end of fluid therapy and before the endoscopic procedure, and that could be observed a reduction in urea levels. There were no radiographic and ultrasound examinations prior to the endoscopy procedure.

Endoscopic examination was indicated based on the suspicion of possible gastritis and / or the presence of a foreign body, due to persistent clinical signs. Thus, the patient fasted for 12 hours without food and for 3 hours without water and was prepared for the procedure using pre-anesthetic medication with midazolam (0.5 mg / kg, intramuscular - IM) and meperidine (4 mg / kg, IM), anesthetic induction with propofol (5mg / kg, IV) and anesthetic maintenance with isoflurane in a semi-closed system with 100% oxygen. The equipment used for the procedure was a flexible endoscope (Olympus GIF XQ20™) with a 3 mm probe.

DISCUSSION

At the endoscopic examination, several whitish fibrous rings were seen along the thoracic esophagus. There was some difficulty in passing the tube due to the occurrence of esophageal stenosis (Figure 1), which corroborated for elucidation of the clinical condition. The thoracic esophagus presented an aspect of chronic inflammation, with thickened and fibrotic mucosa in some points. The presence of luminal content in this path was not visualized.

Esophageal endoscopy is a diagnostic test that allows the observation of esophageal lesions (10,11). Among the possible results obtained through the exam are inflammatory conditions, ulcerations and erosive lesions, although some patients may not present changes in the organ (10). According to Radlinsky (5), "in other cases the stricture is a ring of white

fibrous tissue that narrows the esophageal lumen and fails to distend with insufflation". Furthermore, the use of esophagoscopy provides assistance in the process of identifying the type and degree of stenosis, in addition to benefiting dilatation (12,13).



Figure 1. Visualization of the patient's esophageal segment during the endoscopic procedure. Note: Shape, caliber, expandability and altered esophageal aspect, severe decrease in the esophageal lumen in the middle third region with deposition of fibrin across the circumference - the white arrow indicates the stenosis region (1); clear pink mucosa in the inspected path, incision of a dilator balloon (2); esophagus after first dilatation (3).

According to Tan et al. (14), "these strictures usually result from scar tissue formation after circumferential mucosal ulceration and erosion, resulting in subsequent luminal compromise". The main clinical sign of esophageal stenosis is regurgitation, due to the decrease in esophageal lumen, as observed in the patient (4). The endoscopic examination showed an inflammatory lesion in the layers of the esophageal mucosa, more precisely the submucosa and muscle, which can result in fibrosis (5,13).

Treatment was carried out using an endoscopic balloon for esophageal enlargement (5,9), with a total of three procedures with intervals of one week, to decrease clinical signs (7). The steps to perform the balloon dilatation technique are described by Radlinsky (5). The use of a balloon to dilate esophageal stenosis proved to be safer than the use of bougienage and the surgical procedure, due to the difficulty of this procedure and the associated complications, such as suture dehiscence and possible recurrence with the formation of scar stenosis. In accordance with Josino et al. (15) "there is no difference between bougie and balloon dilatation of benign esophageal strictures regarding symptomatic relief, recurrence rate at 12 months, bleeding, and perforation". Recommended to repeat the procedures (3,6,9,14) until a 1-2 cm diameter is reached at the stenosis site. Most patients need to repeat the dilatation procedure (5,9), on average 2.2-4.5, with an efficiency of around 70-88% (7).

Throughout the treatment with a balloon dilator, with a total duration of three weeks, gastric mucosa protector was administered (sucralfate, 0.5 mg / animal, PO, every twelve hours (BID), for 15 days). Furthermore, pump inhibitor protons (omeprazole 1mg / Kg, PO, SID, 20 days), steroidal anti-inflammatory (prednisone 1mg / kg, PO, BID, for 10 days) and antibiotics (enrofloxacin 5mg / Kg, PO, every twenty-four hours (SID), for 15 days) were also prescribed for treatment. During this time the feeding was only liquid by PO (Nutralife Intensiv® - Vetnil), making the head tilt caudally, to avoid regurgitation of the food provided every 6 hours (QID), until the end of the balloon procedure. The use of sucralfate, omeprazole and prednisone are in accordance with Cotias et al. (11).

The patient continued to return to the clinic once a week for follow-up, and after three months she was already eating normally with no history of vomiting. The ability to eat food, with different consistencies, can be observed in 12-23% of the cases, corroborating for the improvement of the clinical condition (11,14). During the patient's returns, blood tests were performed, including blood count and biochemical exam. A decrease in leukocytosis was observed in the following weeks after the use of the indicated pharmacological therapy. The

other cells, from the red and white lineages, in addition to the biochemical examination, were within the normal range for the species.

The dilatation technique used in this patient was based on the use of a dilator balloon, which adheres to the esophageal mucosa. The risks of complications such as ruptures or recurrences are inherent to surgical procedures in general. Thus, it is necessary to be careful with the decision to perform the procedure. The use of dilator balloons allows for a lower chance of perforations, for example, due to the direct observation of the esophageal region at the moment the balloon is placed. In the present report, due to the possibility of recurrences and perforations, the patient was monitored every time the patient underwent the procedure, including monitoring during the hospital stay.

Weeks after the last dilatation, a new endoscopy was performed to verify the success of the procedure and the possibility of complications, with no complications being observed. It was considered that the technique could be effective for this case, in particular, because the animal showed improvement in the symptoms of vomiting and apathy, there was weight gain during the dilatation procedures (more progressive after the last dilatation), and due to the absence of esophageal changes during the last endoscopic procedure. It is noteworthy that the animal continued to be monitored months after the procedure and that it periodically (every 6 months) returns to the veterinary clinic for check-ups. So far, the patient has not had any recurrence or persistence of symptoms suggestive of esophageal stenosis.

Reductions in clinical symptoms, such as regurgitation, in addition to weekly patient assessment, along with endoscopic examination, determined the number of procedures necessary to dilate the esophagus and improve swallowing (5). In the literature, this procedure is more advantageous due to the difficulty of the surgical intervention and the complications of the post-surgical period, such as scar stenosis and suture dehiscence. Surgical resection is no often recommended due to reports of failure and recurrence of the narrowing, and the methods for dilatation the narrowed segment, performed by bougienage (dilatation by bougie) (6) or balloons with catheters, showed better results.

Several causes can be considered as evidence for the emergence of esophageal stenosis. Juvet et al. (16) describe the permanence of foreign bodies in the esophageal lumen, which induces esophagitis and later the development of esophageal stenosis, as well as anesthetic procedures (stomach-esophagus reflux). Furthermore, Hedlung et al. (17) mention that drugs such as xylazine and ketamine can reduce the tonus of the cardia region, with the return of gastric substances to the esophagus.

There is a possibility that the use of drugs with possible ulcerogenic action may predispose to the occurrence of esophagitis, which may encourage the development of esophageal stenosis. Among the drugs with possible ulcerative action are: doxycycline, anti-inflammatory drugs (non-steroids) and clindamycin, these if administered without the aid of water or food source. Thus, these drugs can adhere to the esophageal mucosa and cause injuries for long periods (18).

In the report described above, the cause of origin, that is, the primary factor that triggered the esophageal stenosis, could not be conclusively defined. However, there is a strong suspicion, although without definite proof, that the cause of this patient's stenosis by the prolonged use of doxycycline for the treatment of tick disease. This fact was described by the tutor during the anamnesis, although there is no proof that the animal actually had the infection, since the tutor did not have documents justifying the disease.

The increase in urea observed before the procedure was related to the patient's dehydration condition. Dehydrated patients may have increased urea values due to reduced blood flow. Dehydrated dogs have blood concentration, which hinders renal filtration and the elimination of substances such as urea. Thus, hypovolemia conditions induce increases in the reabsorption of sodium, water and urea passively. H₂ receptor antacids and

antagonists are successfully used to inhibit gastric acid production and secretion. Corticosteroids is used empirically for the purpose of reducing inflammation and the formation of fibrous tissue. The use of corticosteroids can guarantee benefits in the treatment by helping to prevent the occurrence of stricture reformation. The administration of antibiotics before surgery is recommended in situations of prophylaxis to avoid the risk of bacterial infection, however the use in dogs is not fully understood (5).

Balloon dilatation appears to be a safe (9) and efficient procedure (14), due to the lower risk of esophageal perforation (5,9), since the application of the stretching force is done radially instead of longitudinally, as occurs with dilatation by bougie. It is associated with the techniques of electrocautery incision or steroids injection as a way of better resolution of clinical signs and less repetition of dilatation procedures (5,6). Oliveira et al. (8) reported success with the use of triamcinolone in humans as a form of treatment for esophageal stricture. The prognosis is considered reserved and is independent of the techniques employed since recurrences may occur; in the present case, treatment with a balloon dilator was of great value for the evolution of the case and favorable development of the patient's clinical condition.

CONCLUSION

Esophageal stenosis is a pathology that can cause moderate to severe symptoms in affected patients. Treatments should be instituted so that there is clinical improvement and an increase in the animal's quality of life. Balloon dilatation, associated with pharmacological therapy, proves to be a safe procedure, with less risk of perforation, and with less chance of recurrence, as in surgical treatment. Even though more than one procedure is needed to obtain the expected clinical result, the technique is favorable.

REFERENCES

1. Luciani MG, Biezu G, Cardoso HM, Müller TR, Ferian PE, Souza DS, et al. Esophageal stricture in two female dogs after ovariohysterectomy: case report. *Arq Bras Med Vet Zootec* [Internet]. 2017 [cited 2021 Apr 25];69(4):908-14. Available from: <https://www.scielo.br/j/abmvz/a/gKz7vKtvB56zRQMr5CKHXxL/?lang=pt>
2. Kook PH. Esophagitis in cats and dogs. *Vet Clin North Am Small Anim Pract*. 2021;51(3):1-15. doi: 10.1016/j.cvsm.2020.08.003.
3. Hernández JM, Arias SP, Franz CAC, Mejía MV. Dilation of a proximal esophageal stricture by endoscopically and radiologically guided balloon in a Falabella foal. *Rev Med Vet*. 2016;(31):85-95.
4. Corgozinho KB, Neves A, Belchior C, Toledo F, Souza HJM, Hora AS. Use of local triamcinolone in a cat with esophageal stricture. *Acta Sci Vet*. 2006;34(2):175-8.
5. Radlinsky MG. Surgery of digestive system. In: Fossum TW, editor. *Small animal surgery*. 4th ed. St. Louis: Elsevier; 2012. Chap. 20, p. 441-4.
6. Gallagher AE, Specht AJ. The use of a cutting balloon for dilation of a fibrous esophageal stricture in a cat. *Case Rep Vet Med* [Internet]. 2013 [cited 2021 Apr 23]:1-4. Available from: <https://www.hindawi.com/journals/crivem/2013/467806/>

7. Adamama-Moraitou KK, Rallis TS, Prassinou NN, Galatos AD. Benign esophageal stricture in the dog and cat: a retrospective study of 20 cases. *Can J Vet Res.* 2002;66(1):55-9.
8. Oliveira MT, Trindade AB, Souza FW, Dalmolin F, Pinto Filho STL, Schmitt B, et al. Endoscopic esophageal dilation associated with intramural triamcinolone in a bitch with esophageal strictures after elective ovariohysterectomy. *Cienc Rural.* 2013;43(9):1683-6. doi: 10.1590/S0103-84782013005000113.
9. Benites-Goñi HE, Arcana-López R, Bustamante-Robles KY, Burgos García A, Cervera-Caballero L, Calderón AV. Factors associated with complications during endoscopic esophageal dilation. *Rev Esp Enferm Dig.* 2018;110(7):440-5. doi: 10.17235/reed.2018.5375/2017.
10. Baloi PA, Kircher PR, Kook PH. Endoscopic ultrasonographic evaluation of the esophagus in healthy dogs. *Am J Vet Res [Internet].* 2013 [cited 2021 Apr 22];74(7):1005-9. Available from: <https://pubmed.ncbi.nlm.nih.gov/23802672/>
11. Cotias CE, Ferreira AM, Sousa CAS, Abidu-Figueiredo M. Treatment of esophageal stricture in a dog through dilation via endoscopy. *Acta Vet Bras.* 2014;8(4):277-81. doi: 10.21708/avb.2014.8.4.4455.
12. Marks SL. Diseases of the pharynx and esophagus. In: Ettinger SJ, Feldman EC, Côté E, editors. *Textbook of veterinary internal medicine.* 8th ed. Philadelphia: Elsevier; 2017. p. 1476-90.
13. Santos IFC, Apolonio EVP, Gallina MF, Souza P, Nishimura R, Almeida K, et al. Videosurgery in dogs and cats – Literature Review. *Vet Zootec.* 2020;27:1-16. doi: 10.35172/rvz.2020.v27.456.
14. Tan DK, Weisse C, Berent A, Lamb KE. Prospective evaluation of an indwelling esophageal balloon dilatation feeding tube for treatment of benign esophageal strictures in dogs and cats. *J Vet Intern Med.* 2018;32(2):1-8. Available from: <https://pubmed.ncbi.nlm.nih.gov/29460330/>.
15. Josino IR, Madruga-Neto AC, Ribeiro IB, Guedes HG, Brunaldi VO, Moura DTH, et al. Endoscopic dilation with bougies versus balloon dilation in esophageal benign strictures: systematic review and meta-analysis. *Gastroenterol Res Pract.* 2018;2018:5874870. doi: 10.1155/2018/5874870.
16. Juvet F, Pinilla M, Shiel RE, Mooney CT. Oesophageal foreign bodies in dogs: factors affecting success of endoscopic retrieval. *Ir Vet J.* 2010;63(3):163-8. doi: 10.1186%2F2046-0481-63-3-163.
17. Hedlung CS. Cirurgia do esôfago: princípios e técnicas gerais. In: Fossun TW, editor. *Cirurgia de pequenos animais.* São Paulo: Roca; 2002. p. 309-31.
18. Graham J, Lipman AH, Newell SM, Roberts GD. Esophageal transit in capsules in clinically normal cats. *Am J Vet Res.* 2000;61(6):655-7. doi: 10.2460/ajvr.2000.61.655.

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