



Use of tracheotube for correction of stenosis after resection of rectal diverticulum in a dog - case report

Uso de traqueotubo para a correção de estenose pós ressecção de divertículo retal em um cão - relato de caso

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ABSTRACT: Stricture in the gastrointestinal tract can occur congenitally or be acquired following the administration of medication, or caused by gastroesophageal reflux, foreign bodies, or resections that require enteroanastomosis. Rectal stricture is specifically described as rare in dogs and may be related to surgeries in the final portion of the gastrointestinal tract, such as corrections of diverticula or neoplasms, or a result of adhesions in the reproductive or urinary systems. The most common treatment for this type of lesion, albeit not standardized, is the endoscopic balloon dilation with or without intralesional administration of corticosteroids. The purpose of this study is to describe the success of an alternative treatment for a case of acquired rectal stricture secondary to surgical resection for the treatment of an intestinal diverticulum located in the rectum. The use of the tracheotube via the rectum has been shown to be a low-cost, easy-to-perform and effective technique in solving acquired rectal stenosis after surgical resection of a rectal diverticulum associated with a perineal hernia.

Keywords: perineal hernia; balloon; dilation; dexamethasone.

RESUMO: A estenose do trato gastrointestinal pode ocorrer de forma congênita ou adquirida após administração de medicação ou refluxo gástrico, corpo estranho ou ressecções que requerem enteroanastomose. A estenose retal, especificamente, é descrita como rara em cães e pode estar relacionadas com cirurgias na porção final do trato gastrointestinal, como as correções de divertículo ou neoplasias, ou como resultado de aderências no sistema reprodutivo ou urinário. O tratamento mais comum para esse tipo de lesão, embora não padronizado, é a dilatação com balão endoscópico com ou sem administração de corticoide intralesional. O objetivo deste trabalho é descrever o sucesso de um tratamento alternativo para um caso de estenose retal adquirida secundária a uma ressecção cirúrgica para o tratamento de um divertículo localizado no reto. O uso de traqueotubo por via retal se mostrou uma técnica de baixo custo, fácil de realizar e efetiva para tratar estenose retal adquirida após ressecção cirúrgica de divertículo retal associado à hérnia perianal.

Palavras-chave: hérnia perineal; balão; dilatação; dexametasona.

INTRODUCTION

Rectal stricture is a partial or total obstruction of the intestinal lumen that is rarely reported in dogs and cats. It is caused by the abnormal growth of transmural scar tissue in the rectum due to an inflammatory process, which can occur as a result of parasite infestations, foreign bodies, or iatrogenic causes, where the most common etiology is surgical trauma after local intestinal surgeries or adjacent tissue surgeries (Webb; McCord; Twedt, 2007). The diagnosis can be made through rectal palpation (Garcea *et al.*, 2003). Different therapies include endoscopic balloon dilation (with or without corticosteroid injection) and digital bougienage accompanied by symptomatic treatment and dietary management, or surgical methods such as rectal myotomy or resection and anastomosis (Chavkin; Spector; Stanley, 2010; Lamoureux; Maurey; Freiche, 2017).

Rectal diverticulum is considered a rare condition with a complex diagnosis that mainly affects

middle-aged male dogs. It's linked to the protrusion of rectal mucosa and submucosa due to muscular relaxation of the wall caused by congenital or acquired factors (Ghouse *et al.*, 2023). Animals with a history of constipation and recurrent fecal impaction, affected by intestinal infections or inflammations, and obese, old, male animals under a low-fiber diet and low water intake (Mehrjerdi; Mirshahi; Afkhami, 2013) are more affected. Surgical procedures for its correction include diverticulectomy, plication, and resection of the intestinal segment with end-to-end anastomosis. However, none of these techniques are free from complications and may culminate in rectal stricture (Aronson, 2012; Lieken *et al.*, 2019; Lipar *et al.*, 2021).

The objective of this study is to report the success in the clinical treatment of rectal stricture following the surgical correction of rectal diverticulum associated with perineal hernia using a local tracheotube. The history, clinical aspects, diagnosis, and therapeutic methodology used are discussed, which until now had not been reported in the literature.

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MATERIAL AND METHODS

A 4-year-old male castrated Maltese dog weighing 4 kg with recurrent bilateral perineal hernia, the volume increase being more evident on the right side, was treated at the Polyclinic Veterinary School at the University Center of Valença - UNIFAA. According to its history, the dog had difficulty defecating and had already undergone two surgical procedures for the correction of a right-side perineal hernia where a mesh was used on the surgical site during the second procedure. After the diagnosis of recurrent perineal hernia, a new surgical correction was recommended. A modified suture technique was applied on the sacrotuberous ligament by using a 3-0 nylon thread, as a modification to Cinti, Rossanese and Pisani (2021). After 10 days, the owner reported that the animal had not defecated for two days, and lactulose (1 mL/45 kg PO BID) was prescribed. After 5 days, the dog had not defecated normally yet. A barium-based contrast X-ray was requested, which revealed dilation and accumulation of the contrast column in the rectal region that was compatible with rectal diverticulum (Figure 1).

Figure 1 – Ventrodorsal barium sulfate contrast radiographic image of the abdomen with dilation and accumulation of contrast in the rectal portion (red arrows) compatible with rectal diverticulum.

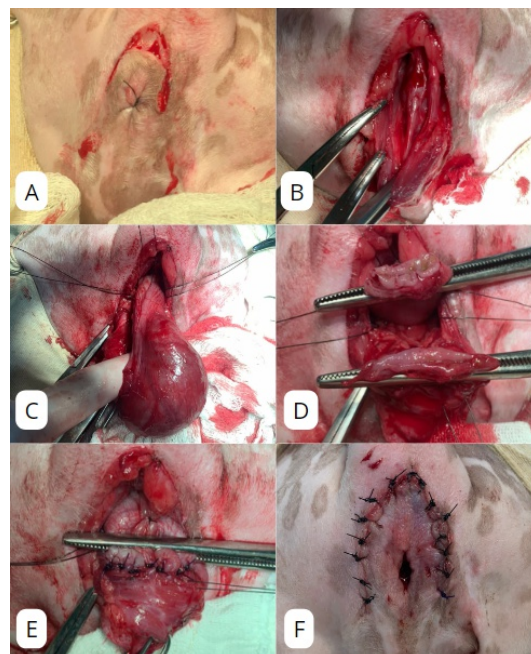


Source: author archive.

A conservative treatment using enema was chosen followed by increase the frequency of lactulose (TID). After one week, although the animal was eating well, the owner reported that the dog was experiencing tenesmus and a lot of pain when defecating. A new surgical intervention was performed to remove the diverticulum. The animal was positioned in ventral decubitus with the limbs flexed and its tail maintained in a dorsal-cranial traction. After performing a purse-string suture on the anus, the entire perineal region was antiseptically treated with alcoholic chlorhexidine. The surgery was initiated through a dorsal semicircular incision around the anus (Figure 2 - A) to approach the animal's rectal region. Tissue divulsion was performed, and the retococcygeal muscle (Figure 2 - B) was incised

and retracted to expose the dorsal portion of the rectum. The diverticulum was macroscopically identified by the dilation of all rectal layers, in addition to the presence of cotton that had been previously deposited inside (Figure 2 - C) during the preparation of the animal. A dissection around the entire rectum was performed to isolate and prepare it for resection. Repair stitches were positioned in the oral and aboral portions to avoid retraction of the oral component into the abdomen and to facilitate suturing during the resection and anastomosis of the segments (Figure 2 - C and D). With the aid of Doyen clamps to obstruct the fecal content, the procedure was performed using 3-0 polyglecaprone thread in a simple interrupted suture pattern (Figure 2 - E). A 4-0 polyglecaprone thread was used for the reduction of the subcutaneous layer and myorrhaphy, whereas a 3-0 nylon thread was used for skin synthesis (Figure 2 - F). Amoxicillin plus clavulanate (22 mg/kg PO BID for 10 days), meloxicam (0.1 mg/kg PO SID for 5 days), dipyrone (25 mg/kg PO BID for 7 days), and tramadol (6 mg/kg PO BID for 7 days) were prescribed after surgery. Additionally, animal rest was recommended, as well as cleaning of the surgical wound with saline solution followed by the administration of a local ointment (Ganadol®), wearing an Elizabethan collar, and returning after seven days.

Figure 2 – Images of the rectal diverticulectomy surgical procedure. A: Surgical approach through a dorsal semicircular incision around the anus; B: Divulsion of adjacent tissues until access to the affected rectal portion was obtained; C: Positioning of repair threads and exposure of the rectal portion affected by the diverticulum; D: Positioning of repair stitches and Doyen clamps after the diverticulectomy/enterectomy procedure; E: Rectal enteroanastomosis with simple interrupted suture. F: Skin synthesis.



Source: author archive.

Seven days after the new procedure, the owner returned with the complaint that the dog was not defecating again, despite having normal appetite. On digital rectal examination, a considerable rectal stricture was seen in the region of the surgical scar. Under general anesthesia, a No. 06 tracheotube was chosen for rectal use, ensuring its cuff was kept dilated

at the height of the stricture, forcing its dilation against this point (Figure 3) for 10 uninterrupted minutes. During this period, dexamethasone (1 mg/kg) was administered intravenously as a single dose. After the procedure, the animal was discharged without a prescription, but only with a recommendation to return in three days for reevaluation. On return, the owner reported that the dog was doing well and defecating normally without any difficulty or pain.

Figure 3 – Image of the rectal stricture correction procedure using a No. 06 endotracheal tube positioned in the animal's anus and maintained for 10 minutes.



Source: author archive.

The animal was maintained without any prescription. Follow-up visits took place once a week in the first month, and then increased to every 14 days in the second month and every 30 days in the first five months, followed by discharge. Fourteen months after the dilation procedure and the administration of dexamethasone, new information about the animal was obtained through telephone contact, with the owner stating that the dog had not shown any type of clinical complications during this period.

RESULTS AND DISCUSSIONS

The approach to rectal strictures generally involves the use of a dilation technique with a balloon of variable diameter (10-20 mm) to exert pressure on the fibrotic tissue to undo the stricture. The balloon is inserted into the animal's anus with the aid of an endoscopic device, in a procedure that could be associated or not with the administration of peri- or intralesional corticosteroids to improve the efficacy rates of the technique and reduce the number of required procedures (Webb; McCord; Twedt, 2007; Chavkin; Spector; Stanley, 2010). In the authors' view, although this technique has been used with excellent results, it is limited by the need for specific equipment and operator training, which is not always available in the veterinary practice. According to Lamoureux, Maurey and Freiche (2017), complications related to the dilation technique are considered rare but may include perforation, abscess, and hemorrhage. For the case

presented in this study, a No. 06 endotracheal tube was used as a resource and option for dilation, with the same purpose as the endoscopic balloon. We found that the shape and diameter of the tracheotube with cuff dilation had the same role as an endoscopic balloon, where the eccentric force exerted by the dilated cuff provides sufficient pressure to break the local fibrosis and open the intestinal lumen without causing major tissue damage. Additionally, dexamethasone was administered intravenously at a dose of 1 mg/kg to provide a similar action to that seen in local administrations as mentioned in previous studies. With the methodology used in this case, no complications occurred during or after the procedure.

In human patients, according to Garcea *et al.* (2003), the balloon dilation technique is quick and simple, and the procedure needs to be repeated two or three times in most cases. On the other hand, in the searched veterinary literature, there is no pre-established standard regarding the need for repetitions of the dilation procedure with or without the administration of local corticosteroids, as well as the time interval between them. According to Lamoureux, Maurey and Freiche (2017), new sessions may be conducted if there are still clinical signs that the lesion persists. In this report, the success of the treatment is highlighted by using a single dilation session at the stricture site and only one intravenous administration of dexamethasone. Over four weeks at seven-day intervals, the animal returned for check-ups and did not present with any procedure-related clinical manifestations. During the subsequent 14 months, there was no sign of tenesmus or dyschezia. The efficacy of the therapy is believed to be directly related to the short time between the surgical procedure and the diagnosis of the complication (seven days), unlike what was reported by Chavkin, Spector and Stanley (2010), where the procedure was performed eight months after surgery and required three balloon dilation sessions and intralesional administration of corticosteroids for treatment success.

Although endoscopy, computed tomography, and magnetic resonance imaging can currently be used for diagnosis, contrast radiography assists in diagnosing intestinal diverticula as an accessible method in locations with limited technological resources. Furthermore, the patient is not subjected to anesthesia and its potential complications. According to some authors, contrast radiography, both orally and via enema, is the gold standard for the identification of diverticula (Mehrjerdi; Mirshahi; Afkhami, 2013).

Techniques to correct the diverticulum include plication, diverticulectomy, and resection of the intestinal segment with end-to-end anastomosis (Aronson, 2012). Ghouse *et al.* (2023) reported using the lateral resection technique in a Labrador female dog with a history of dyschezia, discomfort, and tenesmus. In this case, the diverticulum was in the descending colon and adhered to the bladder and uterus. According to the authors, the animal recovered well with no complications. Mehrjerdi, Mirshahi and Afkhami (2013) performed a lateral diverticulectomy through the same surgical access they used to perform a herniorrhaphy in a male dog with a history of a five-month left-sided perineal volume increase. The authors report that the animal was followed up for three years without any postoperative complications during this period. Conversely, resection and enteroanastomosis were the

techniques chosen to correct the diverticulum, which resulted in rectal stricture.

Although no type of home-based treatment was prescribed after the dilation procedure with the tracheotube, laxatives, antibiotics, anti-inflammatories, and specific diets have been used for dogs and cats with a history of rectal stricture associated with gastrointestinal inflammation. Animals have been reported to undergo the digital dilation treatment and supplementation with *psyllium*. The authors reported success with this therapeutic modality with follow-ups of two and a half years for cats and three and a half years for dogs (Lamoureux; Maurey; Freiche, 2017).

The use of corticosteroids in implementing the rectal stricture treatment is variable. The intralesional administration of triamcinolone - guided by an endoscopic device - and oral prednisone are found in the literature. In the work conducted by Webb, Mccord and Twedt (2007), 14 out of 16 dogs received intralesional triamcinolone injection (10 mg/mL) at the first and/or second dilation procedure but not at the third or fourth; still, in the same work, seven dogs received oral prednisone administration after the dilation procedure with median initial doses of 10 and 12 mg/kg, respectively (ranging from 5 to 20 mg/kg) for a median duration of 28 days (ranging from 14 to 60 days). At the end of the evaluations, the authors cite the persistence of clinical signs in one dog, improvement in five, and total resolution in nine animals. In the work by Lamoureux, Maurey and Freiche (2017), all dogs received 7 to 11 mg/kg of prednisolone orally once a day, gradually over three weeks, to prevent fibrosis and stricture recurrence. Conversely, in this study, intravenous dexamethasone was successfully administered as a single-dose treatment. This treatment was chosen due to the urgency of treating the dog that could not defecate and the absence of triamcinolone for intralesional administration and an endoscope for the indicated procedure.

Surgical techniques for correcting perineal hernia in dogs include simple herniorrhaphy, internal obturator muscle transposition, semitendinosus muscle transposition, superficial gluteal muscle transposition, cystopexy with or without colopexy, as well as using autologous or synthetic meshes (Aronson, 2012). In the present report, the animal had a history of undergoing two procedures to correct a perineal hernia, both of which were unsuccessful probably due to persistent tenesmus. Although the owner could not state which technique was used, it is assumed that the first procedure used the simple herniorrhaphy technique while the second used the synthetic mesh technique, as a rectangle-shaped folded polypropylene mesh was found in the third procedure (the first to be performed by the authors). Among other existing techniques, an alternative was sought that was similar to the one described by Cinti, Rossanese and Pisani (2021), in which the authors describe the routing of the suture thread around the sacrotuberous ligament and subsequent fixation of the thread in the external anal sphincter, levator of the tail (*levator caudae*), and coccygeal muscles dorsally as well as in the internal obturator ventrally. In this report, unlike these authors, the suture (nylon) thread was transfixed in the sacrotuberous ligament, as the surgeon who performed the procedure had successfully used this variation of the technique in other unpublished cases, with subsequent

fixation in the external anal sphincter and levator of the tail muscles. This modification in the procedure prevents the threads from sliding along the ligament, which may cause suture loosening, although this was not mentioned in the referenced work. The modified technique is considered successful as there was no recurrence of the perineal hernia 14 months after surgery.

It should be noted that the treatment used here - using the cuff of the tracheotube as a balloon to dilate the stricture associated with the intravenous administration of dexamethasone - requires more information to be implemented as a treatment option. More prospective clinical studies are needed comparing different types of drugs, their dosages, and routes of administration. Thus, by presenting all stages of this clinical case and the success in treating this complication, we contribute to the academic society by suggesting a new therapeutic modality.

CONCLUSIONS

The use of a tracheotube with cuff dilation, associated with a single intravenous administration of dexamethasone, was shown to be effective in treating rectal stricture caused by surgical complications of rectal diverticula with perineal hernia, in addition to being a cheap and easy-to-apply method.

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