

CASE REPORT

# Temporary end-on colostomy as a treatment for anastomotic dehiscence after a transanal rectal pull-through procedure in a dog

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**Abstract**

**Objective:** To describe a temporary end-on colostomy to treat the dehiscence of a transanal rectal pull-through in a dog.

**Study design:** Case report

**Animal:** A 7-year-old intact female Australian shepherd dog that was treated for a rectal adenocarcinoma with a transanal rectal pull-through.

**Methods:** Partial dehiscence of the previous end-to-end colorectal anastomosis and formation of a perianal sinus tract were diagnosed 4 days after surgery. A pararectal approach was used to revise the surgery with debridement of the sinus tract, rectal wall reconstruction with single interrupted sutures, and placement of a passive drain. Dehiscence occurred 2 days later. The colon was transected cranial to the pelvic brim, and each stump was oversewn prior to salvage temporary end-on colostomy. Postoperative care included analgesia, antibiotic therapy, and local care of the perineal/perianal area and colostomy site. After 90 days, the perineal/perianal sinus tract had healed, the colostomy was eliminated, and an end-to-end anastomosis of the colon was performed.

**Results:** Management of postoperative complications focused on dermatitis of the stoma and perineal/perianal area, stoma incontinence, and perineal/perianal medications of the sinus tract. One year after the final surgery, the dog had occasional episodes of fecal incontinence and a good quality of life without other complications.

**Conclusion:** Use of a temporary end-on colostomy prior to revision surgery led to a satisfactory outcome but required long and challenging postoperative management.

**Clinical significance:** Temporary end-on colostomy may be an option to manage dehiscence and potential recurrent stenosis after transanal rectal pull-through in dogs.

## 1 | INTRODUCTION

Adenocarcinoma is the most common malignant colorectal tumor in dogs.<sup>1,2</sup> Surgical resection is the treatment of choice,<sup>3</sup> and the transanal rectal pull-through with full-thickness colorectal amputation and anastomosis from the cranial and distal rectal stumps is one of the most common procedures used.<sup>3–6</sup> Transanal rectal pull-through may be associated with postoperative complications such as tenesmus, stricture, dehiscence, and fecal incontinence.<sup>6,7</sup> Dehiscence after transanal rectal pull-through can be catastrophic

and challenging.<sup>3,6</sup> In human medicine, stenosis or dehiscence after colorectal/transanal rectal pull-through can be treated by a colostomy that bypasses the distal gastrointestinal tract.<sup>8</sup> Colostomy in veterinary medicine has rarely been described.<sup>9–14</sup> Loop colostomy and end-on colostomy (jejunal or colonic) are 2 procedures that have been reported in veterinary medicine<sup>11,14,15</sup> for the temporary or permanent management of rectocutaneous fistula or obstructive colorectal or pelvic neoplasia.<sup>11,13,14</sup> The objective of this case report was to describe clinical findings, surgical treatment, and outcome in a dog that underwent temporary end-on

colostomy followed by colorectal end-to-end anastomosis for the treatment of the dehiscd original transanal rectal pull-through site. To the best of the authors' knowledge, there are no similar reports in the literature; the only other end-on colostomy reported in the veterinary literature was permanent.<sup>13</sup>

## 2 | CASE HISTORY

A 7-year-old, intact female Australian shepherd dog was referred to the authors' hospital because of hematochezia and tenesmus. Abnormal findings at physical examination consisted of a 3-cm nodular intraluminal rectal broad base mass that was identified by rectal palpation approximately 4 cm from to the anus. No other abnormalities were found at physical examination. Preoperative evaluation included hematological analysis, thoracic radiography (3 views), and abdominal ultrasonography with unremarkable results. Under inhalation anesthesia, rectocolonoscopy was performed. Endoscopic examination revealed inflammation of the colon and a single nodular mass causing colorectal obstruction. The

histology of the biopsy samples taken during endoscopy was compatible with rectal adenocarcinoma. Among the various treatments proposed (surgical, chemotherapy, or palliative treatment), the owner opted for a transanal rectal pull-through. Before surgery, 1 dose of 10 mg/kg of metronidazole (Deflamon 500 mg; Bieffe Medical S.p.A, Grossotto (SO), Italy) was administered intravenously as a prophylactic preoperative measure. Transanal rectal pull-through was carried out as previously described.<sup>3-6</sup> A total length tract of 6 cm of the full-thickness rectum was excised, with tumor margin excisions of 1.5 cm on both sides of the resection. Care was taken to preserve at least 1.5 cm of the distal rectum at the anocutaneous junction, resulting in a colorectal end-to-end anastomosis performed with 3/0 polyglyconate (Maxon; Covidien Italia S.p.A, Segrate (MI), Italy) in a full-thickness simple interrupted suture pattern.<sup>3</sup> Histology confirmed adenocarcinoma (mitotic index between 1 and 4 × high power fields) contained within the mucosa/submucosa layer, and excision margins appeared not infiltrated by neoplastic cells. The dog was hospitalized and monitored

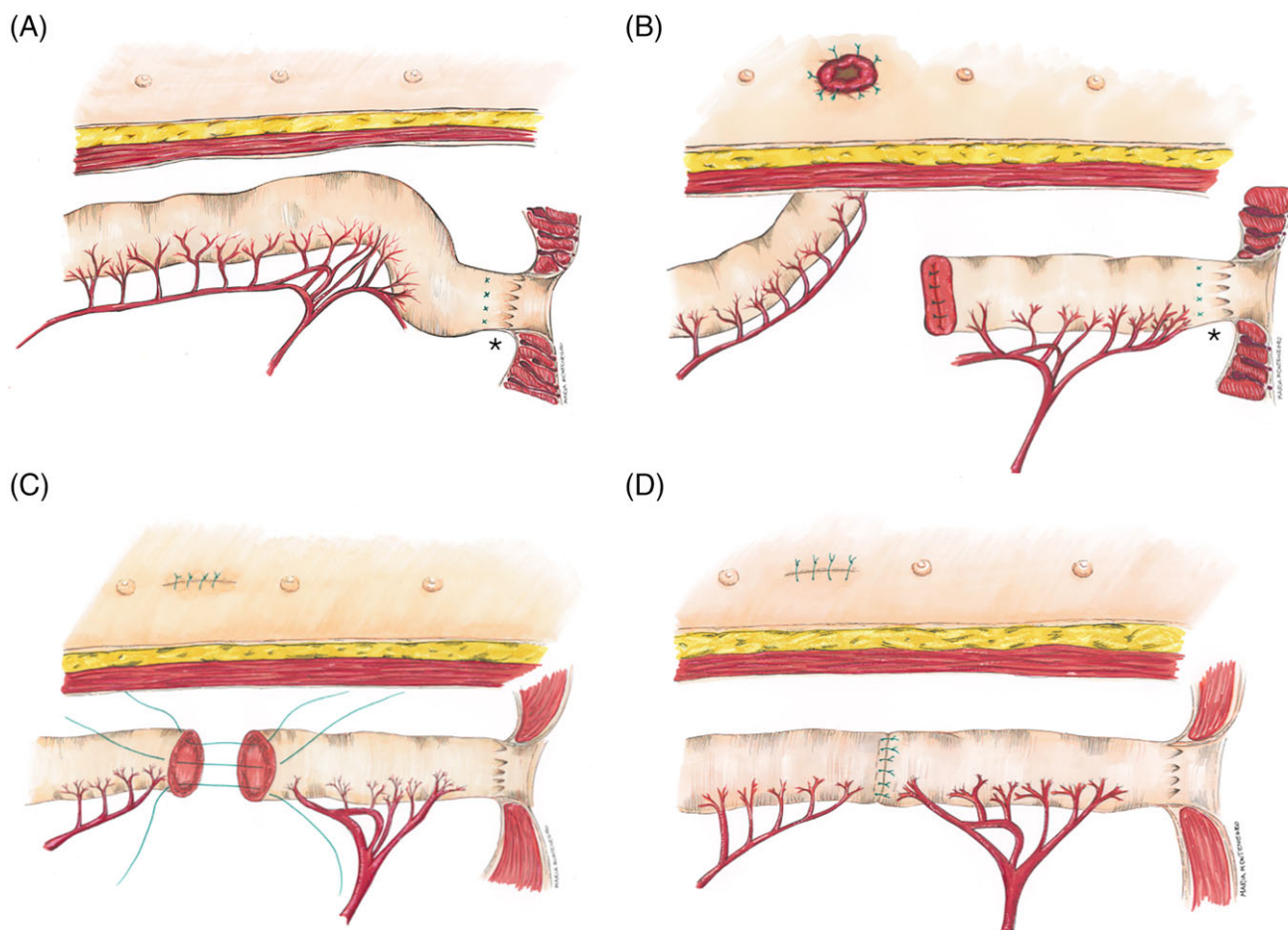


**FIGURE 1A**, Dehiscence and fecal contamination 6 days after transanal rectal pull-through (second dehiscence). **B-D**, Temporary end-on colostomy for management of complications associated with transanal rectal pull-through. Site of colon resection (**B**), proximal segment used for the colostomy (\*; **c**), distal segment of the colon (arrow; **C**), and stoma appearance after surgery (**D**). **E**, The perineal region during the revision surgery. **F-H**, Peristomal dermatitis 7 days after the colostomy (**F**) and the perineal region during treatment and application of a tie-over bandage (**G,H**). **I**, The stoma site 90 days after the colostomy. **L-N**, The final end-to-end anastomosis of the colon performed after complete healing of the perineal region. Removal of the colostomy (**L,M**) and end-to-end anastomosis between the proximal and distal portions of the colon (**N**)

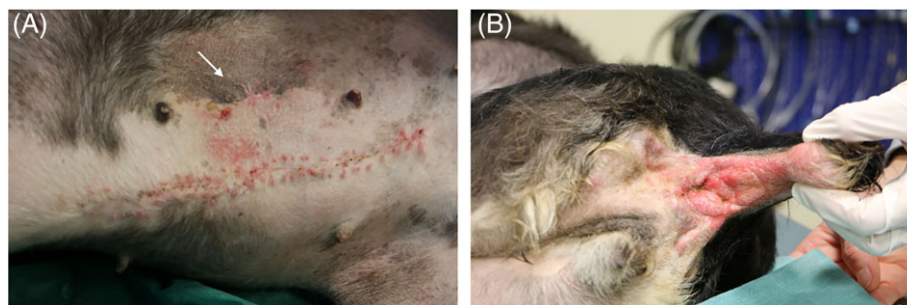


daily. Dyschezia, tenesmus, and hematochezia were observed 4 days after surgery with a visible sinus tract in the left ventral perianal region. Digital rectal palpation and endoscopic examination confirmed the presence of partial ventral-left-lateral dehiscence of the colorectal anastomosis localized approximately 1.5 cm from the anus. On the next day, a surgical revision was performed through a left pararectal approach including sinus tract debridement, full-thickness rectal wall reconstruction with 3/0 polyglyconate interrupted sutures, and the placement of a passive drain (Redon drain; B. Braun Milano S.p.A, Milano, Italy). During the hospitalization, the dog received maintenance fluid therapy with NaCl 0.9% at 4 mL/kg/h and 10 mg/kg metronidazole-spiramycin orally every 12 hours (Stomorgyl; Merial Italia S.p.A, Milano, Italy). Dehiscence recurred 2 days after the revision surgery and extended to approximately a full circumferential dehiscence of the colorectal anastomosis. A colonic diversion procedure was recommended to the owner as an alternative treatment option, and a temporary end-on colostomy was performed. With the dog positioned in dorsal recumbency, the

descending colon, through a ventral abdominal midline approach, was transected 5 cm cranial to the pelvic brim, cranially to the colorectal dehiscence, leaving a tract of the distal descending colon. The distal colonic stump was then closed with a thoracic-abdominal (TA) stapler (TA 55–3.5 mm; Covidien) oversewn with 3/0 polyglyconate continuous suture while completing the colostomy, prior to addressing the dehiscenced surgery site via a perineal incision. No leak test was performed in the distal colonic stump. The proximal colonic stump was temporarily closed with a TA stapler and exteriorized through an incision made in the left lateroventral abdominal wall. The circumference of the seromuscular surface of the colon was anchored to the abdominal musculature with 3/0 polyglyconate with simple interrupted sutures. Then, the colonic stump was opened in the most proximal part by circumferential incision, and a stoma was created by suturing the full thickness of the colon to the skin of a circular opening with 3/0 polyglyconate suture material in a simple interrupted suture pattern. The laparotomy wound was closed routinely. Finally, after repositioning the dog in ventral



**FIGURE 2** Schematic representation of a temporary end-on colostomy. Asterisks (A,B) indicate the site of dehiscence of the transanal rectal pull-through. The colon was transected, and the distal end was closed with a thoracic-abdominal stapler and oversewn with a continuous suture pattern (A,B). The proximal end was exteriorized through an abdominal wall incision, and a stoma was created by suturing the full thickness of the colon to the skin with absorbable sutures in a simple interrupted pattern. At 90 postoperative days, the perineal/perianal sinus tracts had healed completely. The colostomy site was closed, and the proximal and distal stumps of the descending colon were definitively treated by an end-to-end anastomosis (C,D)



**FIGURE 3** Photographs taken 20 days after the final surgery and 110 days after the colostomy. The stoma site (arrow; A) and perineal region have healed, although there is mild dermatitis (B)

recumbency, the perineal/perianal area sinus tract was lavaged and debrided through a pararectal approach. The dog received 10 mg/kg metronidazole and spiramycin (Stomorgyl; Meril Italia S.p.A) orally every 12 hours for 14 days, 12.5 mg/kg amoxicillin-clavulanic acid (Synulox; Pfizer Italia Srl, Rome, Italy) orally every 8 hours for 14 days, and 3 mg/kg tramadol (Altadol 500 mg; Formevet Srl, Milan, Italy) orally every 12 hours for 3 days. The colostomy was well tolerated by the dog. The stoma was initially managed by using a colostomy bag designed for human patients, but this was not successful. The hair around the stoma was periodically clipped, cleaned with 1% chlorhexidine, and medicated daily with honey ointment (Vetramil 10 mg; BFactory Italia Srl, Mantova, Italy) and vegetal ointment (Hypermix 200 mL; RIMOS. Srl, Modena, Italy). Daily management of the sinus tracts and perineal/perianal lesions included lavage with sterile saline, serial debridement, topical treatment with sugar and honey ointment, and vegetal ointment under a tie-over bandage until second intention healing was completed. Transanal endoscopy was performed 15, 30, and 60 days after surgery to evaluate the healing of the distal end of the colon. Serial endoscopic evaluation of the distal stump of the colon revealed the regress of inflammation, healing of the colonic mucosa and abundant mucoid secretion, and decrease only at the last endoscopic control at 60 days postoperatively, probably due to chronic colonic inflammation. The dog was discharged from the clinic in good clinical condition 60 days postoperatively and was medicated at home by the owner by flushing with a sterile solution (NaCl 0.9%) and applying vegetal ointment every 12 hours. The dog was reevaluated once per week at our clinic. At 90 days postoperatively, the perineal/perianal sinus tracts had healed completely, and the colostomy site appeared normal except for mild peristomal dermatitis. The final surgery (at 90 days) was carried out with the dog in dorsal recumbency. A caudal celiotomy was performed, and a circular incision was made around the colostomy site. The proximal segment of the descending colon was exteriorized, the stoma was resected to obtain healthy intestinal tissue, and then was temporarily oversewn with 3/0 polyglyconate in a simple continuous suture pattern before returning it to the abdominal cavity. The abdominal wall and skin of the previous stoma were closed routinely. A final

colonic end-to-end anastomosis was performed after debridement with 3/0 polyglyconate in a simple interrupted suture pattern. The laparotomy wound was closed routinely, and the dog was discharged 6 days later (Figures 1,2). The dog experienced occasional episodes of fecal incontinence (approximately every 2 months), but no other complications were reported 1 year after surgery (Figure 3).

### 3 | DISCUSSION

Transanal rectal pull-through is a well-described procedure for the excision of rectal malignancy despite the high incidence of postoperative complications (78%).<sup>6,7,16</sup> Dehiscence is a possible complication, and its incidence increases with resected margins  $\geq 6$  cm.<sup>2,17,18</sup> Furthermore, inexperience with the surgical technique, poor suture placement, tension, and infection could be potential causes of dehiscence of the anastomotic site.<sup>3</sup> Preoperative antibiotic therapy for 1–2 days before surgery has been recommended to achieve peak concentrations in the wound.<sup>3</sup> However, administration of antibiotics 60 minutes before the surgical incision, as performed in this case, has also been found effective.<sup>3</sup> Infection is therefore unlikely to have caused the dehiscence observed in the case reported here. The specific pathogenesis of the dehiscence in this case is therefore unknown; it is possible that the wide excision of the colon/rectum ( $\geq 6$  cm) may have resulted in tension at the anastomotic site with potential dehiscence, or partial devascularization may have occurred.

Transanal rectal pull-through should be reserved for annular lesions or lesions that fully obstruct the rectal canal, as in the current case. The owner should be informed about possible complications of the procedure, which requires challenging management, high costs, and prognosis. Other prophylactic strategies could be used to reduce the tension and risk of dehiscence during the transanal rectal pull-through, including reversed colopecty, in which the colopecty serves to move the colon toward the rectal canal and be pexied in an anastomotic tension relieving fashion or the use of reinforcing suture patterns in the anastomotic area. Furthermore, these procedures could be used in the first instance in case of transanal rectal pull-through complications to reduce the tension at

the anastomotic site, leaving colostomy as a last option. Colostomy is used for fecal diversion in the management of rectal disease in small animals.<sup>11,13,14</sup> Selection of animals for colostomy depends on the primary disease (frequently as a salvage procedure), the clinical condition of the animal, animal temperament, surgeon experience, owner compliance, and financial concerns. Temporary end-on colostomy was used successfully to manage rectocutaneous fistula in a cat,<sup>14</sup> and a permanent end-on colostomy was described to manage complications after the failure of a transanal rectal pull-through in another dog with incomplete tumor resection.<sup>13</sup> Temporary or permanent loop colostomy in the left flank was used in 5 dogs for management of rectal and pelvic neoplasia.<sup>11</sup> The goal of the procedure in our case were fecal diversion and reduction of tension on the anastomotic site to allow for the healing of the distal colorectal area and perineal/perianal region. For these reasons, and to facilitate healing of the distal segment of the colon by isolating it completely, the end-on colostomy was preferred rather than the loop technique. Mucosal prolapse through the stoma and dermatitis are reported complications of the end-on colostomy.<sup>13</sup> Prolapse did not occur in the present case. Careful selection of the stoma site, which should be free of skin folds, is essential for reducing the risk of dermatitis and allowing for the use of a fecal collection bag. The major complications in our dog were dermatitis and management of stoma incontinence. The use of a fecal collection bag was unsuccessful and not practical, as similarly reported in other dogs after colostomy.<sup>11</sup> This was due to the position of the collection bag in the dog and the adhesives designed for humans that adhered poorly to the canine skin, requiring frequent flange changes.<sup>11</sup> The dermatitis around the stoma was treated daily, initially with honey ointment and then with vegetal ointment. Although home management of dogs with a colostomy can be challenging, the owner felt it was easy to perform.

Temporary end-on colostomy provided fecal diversion, allowing healing of the distal rectum and perianal/perineal area. The occasional fecal incontinence after healing could be attributed to colorectal inflammation, internal/external anal sphincter damage, or temporary damage to the left caudal rectal nerve.

Temporary end-on colostomy may be an option for the management of dehiscence and potentially recurrent stenosis associated with a transanal rectal pull-through in dogs. Additional case studies are required to determine the success and complication risk of the procedure.

#### ACKNOWLEDGMENT

The authors thank Maria Montenegro DVM for the schematic representation of the surgical procedure in Figure 2 (temporary end-on colostomy) and the team of the Centro Veterinario Luni Mare for the management of this dog.

#### CONFLICT OF INTEREST

The authors declare no financial or personal relationships with any person or organization that could inappropriately influence or bias the content of this report.

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**How to cite this article:** Cinti F, Pisani G. Temporary end-on colostomy as a treatment for anastomotic dehiscence after a transanal rectal pull-through procedure in a dog. *Veterinary Surgery*. 2019;1–5. <https://doi.org/10.1111/vsu.13152>