

Treatment of completely obstructed anastomosis after low rectal resection

A trans-anal plus endoscopic trans-colostomy rendez-vous approach and a review of the literature



Ann. Ital. Chir., 2020 91, 6: 709-715
pii: S0003469X20032558

Luca Morelli^{*/**}, Simone Guadagni^{*}, Desirée Gianardi^{*}, Matteo Palmeri^{*}, Niccolò Furbetta^{*}, Gregorio Di Franco^{*}, Matteo Bianchini^{*}, Emanuele Marciano^{*}, Giulio Di Candio^{*}, Franco Mosca^{**}

^{*}General Surgery, Department of Translational Research and new Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy

^{**}Endo-CAS (Center for Computer Assisted Surgery), University of Pisa, Pisa, Italy

Treatment of completely obstructed anastomosis after low rectal resection. A trans-anal plus endoscopic trans-colostomy rendez-vous approach and a review of the literature

AIM: Completely obstructed anastomosis (COA) after low rectal resection (LRR) represents a rare entity difficult to manage. We herein summarize the available evidence from literature on the treatment of this condition and we report our particular experience in the management of a completely obstructed colon-anal anastomosis (CAA) with a trans-anal plus endoscopic trans-colostomy rendez-vous approach.

METHODS: The Pub-Med database was inquired from inception to October 2019 about the treatment of COA after LRR reported in English literature. Article selection was carried out according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) criteria. Moreover, clinical, radiological and surgical data of our case presentation were retrieved.

RESULTS: Ten articles involving twelve patients and concerning the management of COA were identified. All of them reported the treatment of completely obstructed colon-rectal anastomosis. As we didn't find any article reporting the treatment of completely obstructed CAA, we also described a case of its treatment. The patient was successfully treated at our institution using a rendez-vous approach with a simultaneous trans-colostomy endoscopy, associated to a trans-anal dilatation. This combined approach, thanks to trans-illumination and to the miniature passage of CO₂ coming from above, permitted to identify the correct way to surgically establish a trans-anal lumen. The post-procedural course was uneventful.

CONCLUSIONS: The treatment of COA after LRR can be very demanding, particularly after CAA. Few data are reported in literature to define the best approach to treat these conditions. Our described rendez-vous technique can represent a valid choice, especially after CAA.

KEY WORDS: Colorectal anastomosis, Endoscopic treatment, Low-rectal resection

Introduction

Anastomotic stricture (AS) represents a common complication after anterior rectal resection, with a reported incidence ranging from 2.5 to 20%¹. Several risk fac-

tors have been identified, such as pre-operative radiotherapy, anastomotic leakage, prolonged fecal diversion or low-lying rectal cancer². Bowel restoration after low rectal resection (LRR) may be accomplished with stapled low colon-rectal anastomosis (CRA) or through a hand-sewn colon-anal anastomosis (CAA) in order to increase the rate of sphincter saving procedures with acceptable functional outcomes³. Compared to higher intraperitoneal ones, these two anastomoses are considered "at a higher risk"⁴ for AS and their treatment is generally easily carried-out with trans-anal digital or with Hegar dilatation, or through an endoscopic balloon dilatation. Although a complete obstruction of these anastomosis is

Pervenuto in Redazione Febbraio 2020. Accettato per la pubblicazione Marzo 2020

Correspondence to: Simone Guadagni, MD. General Surgery Unit, Department of Translational Research and new Technologies in Medicine and Surgery, University of Pisa, Pisa, Italy (e-mail: simone5c@virgilio.it)

ABBREVIATIONS

yr: years;
 RT: radiotherapy;
 AL: Anastomotic leakage;
 EUS: endoscopic ultrasound;
 ISR: inter-sphincteric resection;
 CAA: colon-anal anastomosis;
 CT: Computer Tomography;
 SILS: Single Incision Laparoscopic Surgery;
 NS: Not Specified

infrequent, when it occurs, its treatment only with those standard techniques, may be particularly demanding so that alternative approaches have been sought.

However, even if some authors have described some personal approaches in case of completely obstructed anastomosis (COA) after LRR, clear data on its best management still do not exist.

The aim of the present study is to conduct a systematic review of the current literature and summarize the available evidence about the treatment of COA after LRR, as well as to present our experience of a successfully treatment of a completely obstructed CAA.

Methods

A systematic literature review about the treatment of COA after LRR was performed from inception to October 2019 using PubMed for English literature, according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) criteria⁵. The search formulas were “completely obstructed anastomosis”, “complete anastomotic obstruction AND low rectal resection” an “complete anastomotic stenosis AND low rectal resection”, “complete colon-rectal anastomosis obstruction”, “complete colon-anal anastomosis obstruction”. Manuscripts identified by cross-referencing were also retrieved and evaluated. Inclusion criteria were articles describing the treatment of COA after LAR, defined as absence of visible lumen at endoscopy and/or absent passage of contrast medium at a contrast enema. Data extraction was performed independently by two reviewers (SM and DG) and then crosschecked. Any corrections were made after agreement between the two reviewers. Data extracted included: the year of publication, first author, authors’ institution and country, number of patients and their demographics, pathology, previous neo-adjuvant chemo-radiotherapy, previous surgery, type of treatment and follow up period.

Furthermore, we present a case of a completely obstructed CAA which was successfully managed with a combined trans-anal dilatation and anterograde endoscopic trans-colostomy rendez-vous.

Results

LITERATURE REVIEW

A total of 83 reports were identified. Of these, 5 studies were excluded because of duplicates. After title (or abstract when available) review, 66 studies were excluded. Two studies were then excluded because of being written in other languages. Four studies were excluded after full text review, three because they reported about high rectal anastomotic strictures, and one because it described the treatment of incomplete anastomotic strictures. The remaining 6 studies met the criteria and were included for data extraction and analysis. Moreover, 4 studies meeting the inclusion criteria were identified by cross-referencing and included in the review. The flowchart with each step of the selection process is presented in Fig. 1.

A total of thirteen patients from eleven institutions (including the patient from our institution) were reviewed in this study (Table I). All the articles founded in literature reported on treatment of completely obstructed CRA while no one specifically described the treatment of a completely obstructed CAA. We didn’t find any articles focusing on redo-surgery for the treatment of completely obstructed low CRA or CAA. Only a case series of three patients was found whereas the remaining articles were case reports.

CASE PRESENTATION

A 78 years old man underwent robotic LRR with CAA plus protective right colostomy with the use of da Vinci Xi platform (Intuitive Surgical, Sunnyvale, CA, USA) for rectal cancer at our institute. The patient received pre-operative chemoradiotherapy with capecitabine 825 mg m² bid plus 50.4 Gy in 28 fractions for a clinical T3N1 staging. The hospital stay was uneventful, and the patient was discharged 6 days after surgery. The patient was also treated with adjuvant chemotherapy with capecitabine 1000 mg m² bid. The contrast enema and the rectosigmoidoscopy showed a COA (Fig. 2). As trans-anal endoscopic approach failed to find a lumen for a balloon dilatation, and the manual dilatation performed as outpatient failed, so we decided to perform a rendez-vous with a simultaneous trans-colostomy endoscopy associated to the trans-anal dilatation. The patient was positioned in lithotomic fashion and a Lone Star Retractor System (Cooper-Surgical, Trumbull, CT, USA) was used in order to fully expose the anastomotic site. The lumen

Treatment of completely obstructed anastomosis after low rectal resection.

TABLE I – Literature review, characteristics of patients with complete obstructed anastomosis (COA) after low rectal resection and its treatment.

| First author (year of publication) | # of patients | Gender | Age yr | Previous RT | Previous surgery | Treatment | Devices | Follow up months |
|---------------------------------------|---------------|-------------|--------------|-------------|---|--|---|------------------|
| Kaushik (2006) | 1 | F | 47 | NO | Hartmann procedure (for cancer), colostomy takedown complicated by AL that required surgical revision + ileostomy | Rendezvous double endoscopy | Fluoroscopy Needle Guidewire Balloon | 7 |
| Reddy (2009) | 3 | 2 F; 1 M | 64 (mean) | NS | Hartmann reversal (1 case); low anterior rectal resection (for cancer (2 cases) + ileostomy | Fluoroscopy guidance of endoscopic dilatation | Fluoroscopy Contrast Needle Guidewire Balloon | 36 |
| Mukai (2009) | 1 | M | NS | NS | Rectal resection (for cancer) complicated by AL that required surgical revision + colostomy | Hook knife | Knife Balloon | 1 |
| Curcio (2010) | 1 | M | 70 | NS | Low anterior rectal resection (for cancer) + ileostomy | Supra-papillary biliary puncture catheter | Fluoroscopy Catheter Guidewire Balloon | 3 |
| Albertsmeier (2011) | 1 | M | 73 | NS | Low anterior rectal resection (for cancer) + ileostomy complicated by AL treated by sponge placement | CT scan guide endoscopic Rendezvous | CT scan Fluoroscopy Forceps Guidewire Balloon | 2 |
| Yazawa (2014) | 1 | M | 79 | NS | Rectal resection (for cancer) complicated by AL that required surgical revision + ileostomy; redo surgery for stricture | Transanal ileus drainage | Fluoroscopy Drainage Guidewire Dilatation | 12 |
| Gornals (2015) | 1 | M | 66 | NS | Low anterior rectal resection (for cancer) + ileostomy | Echoendoscopy | EUS needle Fluoroscopy Guidewire Metal stent | 1 |
| Saxena (2015) | 1 | M | 54 | NO | Hartmann reversal + ileostomy | EUS guide endoscopic Rendezvous | EUS needle Guidewire Metal stent | 1 |
| Bong (2019) | 1 | M | 49 | NO | Low anterior rectal resection (for cancer) + ileostomy | Transanal surgery | SILS port Fluoroscopy Needle Elettrocautery | 5 |
| Yuan (2019) | 1 | M | 64 | NS | Low anterior rectal resection (for cancer) + ileostomy | Endoscopic incision and balloon dilatation | Knife needle Guidewire Balloon | 18 |
| Present case (2019) | 1 | M | 78 | YES | ISR and CCA + colostomy | Trans-anal dilatation with trans-colostomy endoscopic guidance | Lone-Star Colonscopy Crile Hegar | 2 |

Abbreviations: yr, years; RT, radiotherapy; AL, Anastomotic leakage; EUS, endoscopic ultrasound; ISR, inter-sphincteric resection; CAA, colon-anal anastomosis; CT, Computer Tomography; SILS, Single Incision Laparoscopic Surgery; NS, Not Specified.

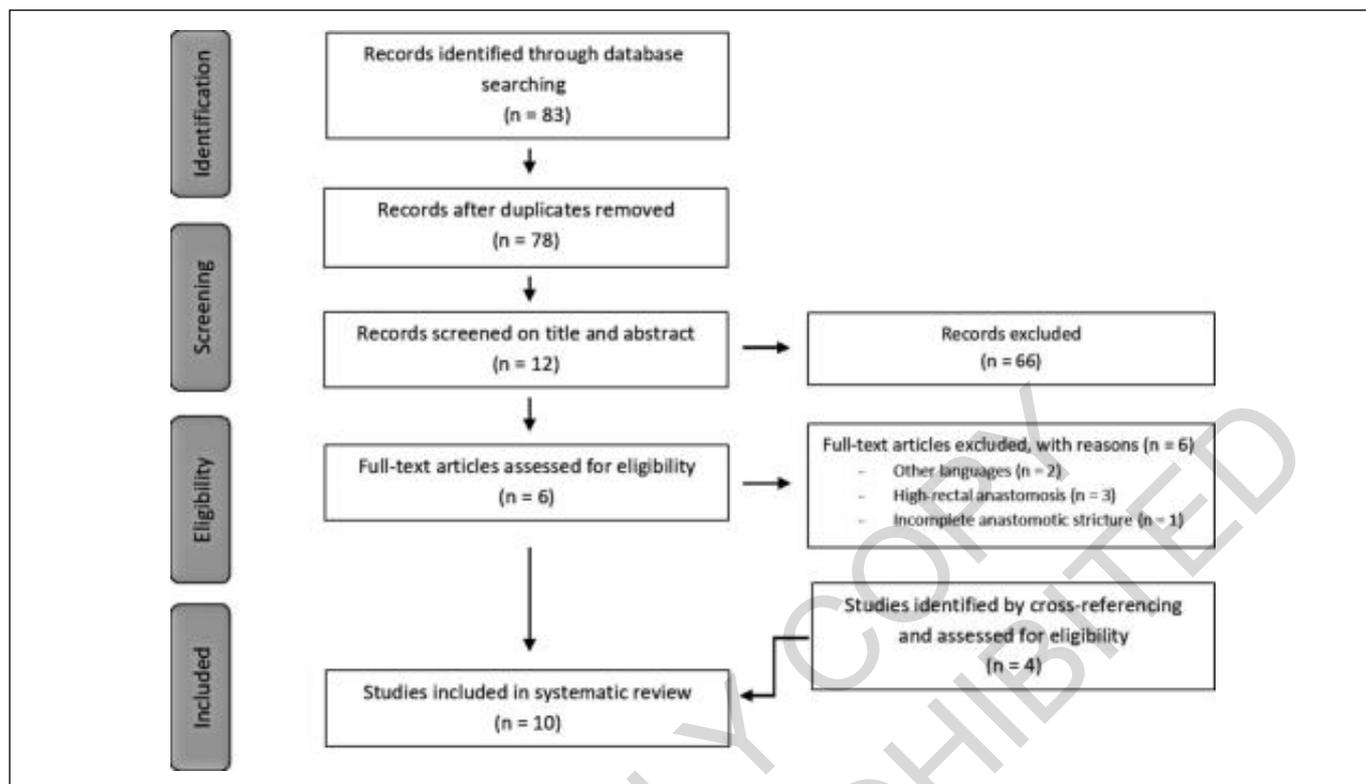


Fig. 1: Flowchart of studies screening according to PRISMA guidelines.

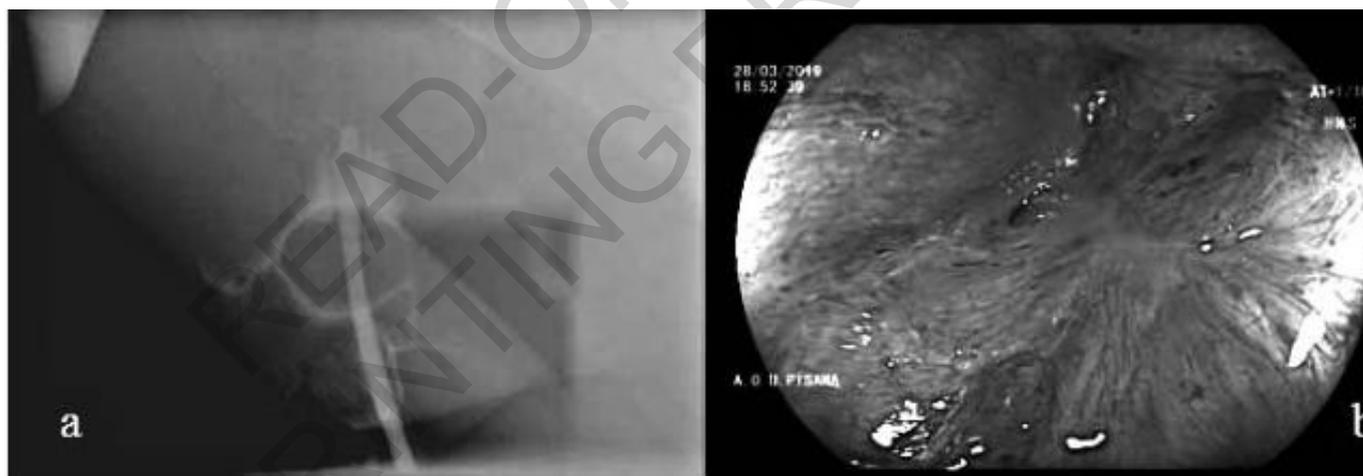


Fig. 2: Gastrografin enema (a) and recto-sigmoidoscopy (b) showing the completely obstructed anastomosis (COA).

appeared completely obliterated, and the correct way was not accessible with the perineal exploration alone. Therefore, a trans-colostomy antegrade endoscopy was performed for a rendez-vous maneuver. A diversion colitis was observed; however, we were able to advance the colonoscope (Pentax EC 3830LK; Pentax Precision Instrument Corp, Orangeburg, NY) till the upper part of the anastomosis. Thanks to trans-illumination, and to the tiny passage of CO₂ coming from above, we were

able to clearly identify the correct way and a small lumen was established and dilated through Crile forceps. A Foley catheter 22 Gauge was passed, and its extremity was clearly visualized with the endoscope (Fig. 3). Then, under visualization (both directly and with the videoscope) the anastomosis was partially dilated with Hegars and the patency was maintained by the Foley catheter left in place. The post-procedural course was uneventful, and the patient was discharged on POD 1st. During the



Fig. 3: Picture showing the double approach (perineal phase plus endoscopic assistance) during the final phase of the operation. The Foley catheter was passed throughout the restored lumen by the surgeon and its extremity was clearly visualized by the endoscopist, confirming the correct way.



Fig. 4: Post-procedural enema showing the absence of stricture with complete retrograde passage of the contrast agent.

subsequent controls the anastomosis was maintained patent with digital dilatation. One month after the procedure, a new contrast enema revealed the complete passage of the contrast agent throughout the anastomosis with normal retrograde dilatation and without fistula (Fig. 4). After a further two months, the colostomy was then successfully closed with good functional outcomes.

Discussion

Despite several improvements in abdominal surgery have been brought by the widespread of minimally invasive surgery, benign AS remains a non-negligible issue after low rectal resection, with an incidence up to 20%⁶. In recent years, thanks to new surgical techniques, a shift toward sphincter saving procedures has been definitely registered, with more and more low CRA or CAA performed today. This fact, together with the increased rate of pre-operative radiotherapy, are recognized as the major pitfalls for AS⁷.

Thus, although AS should be considered a major issue to be faced by colon-rectal surgeons, until now a detailed classification of AS is lacking, while it should be necessary in order to standardize the diagnosis and the correct management based on the different surgical methods reported in literature.

Furthermore, particularly referring to the treatment of AS, it is clear that while almost all the available studies consider endoscopic balloon dilatation the treatment of choice of high CRA strictures⁸, low CRA or CAA must be considered completely different entities that need to be managed also with different approaches, such as manual or Hegar dilatation, and with the awareness of a higher grade of failure rate⁹. For instance, in a study conducted by Lee et al.¹⁰, the more common method used to treat AS after LRR was the Hegar dilatation (89.1%), while only 6.5% of patients underwent endoscopic balloon dilatation. The rate of complication reported in this series, was more than 50%, with 29.3

% of patients who eventually had a permanent stoma. The explanation by authors was that the blind insertion of instruments through a completely trans anal approach may not be piloted via the true lumen, risking causing colonic perforation.

In this setting, COA after LRR is a further and rarer entity, even more difficult to deal with, and for which therapeutic approaches are even more questionable.

In our review, we found ten articles in which authors described their new personal approaches in the treatment of COA after LRR. Some authors have described the importance of devices usually utilized for other purposes. For example, Mukai et al ¹¹ reported their successful AS treatment on one patient, using a hook knife, generally employed for endoscopic submucosal dissection. Along the same line, Curcio et al ¹² adopted a suprapapillary biliary puncture catheter on one patient and similarly Yuan et al ¹³ used a knife needle combined to a wire-guided balloon dilator. Gornals et al ¹⁴ and Saxena et al ¹⁵ described in their case reports the utility of echo-endoscope. Instead, Yazawa et al ¹⁶ showed a blunt penetration technique with the aid of trans-anal ileus drainage in order to prevent any injuries to adjacent organs, even if the main drawback of this approach is the scarce effectiveness in case of thickness membranes or crooked anastomosis. Reddy et al in their experience of three cases used Fluoroscopy and contrast enema throughout the stoma ¹⁷ as a guide to incise the complete obstruction. Alternatively similarly like us, a trans-ileostomy endoscopy was considered in three case reports: using fluoroscopy (Kaushik et al ¹⁸) or Computer Tomography to demonstrate the exact endoscopes' position in three-dimensional fashion (Albertsmeier et al ¹⁹) or water filling and ultrasounds (Saxena et al ¹⁵) to pass a needle safely. Then a guidewire and a balloon or metal stent were considered to treat the AS in these cases. Finally, Bong et al ²⁰ described the utility of a trans-anal minimally invasive surgery in this setting, treating a COA using a SILS port and electro-cautery with satisfactory results.

Notably, all the retrieved manuscripts of the present review report on treatment of COA after CRA, but none of them reports on the treatment of COA after CAA. In this regard, all these reported cases differ from ours since the AS was not of CAA and in the formers a certain grade of rectal stump was present, whereas in our report the AS was located at the dental line.

Thus, to the best of our knowledge, our case should be considered as the first ever reported in literature of a successful treatment of COA after CAA. In our rendez-vous approach, thanks to trans-illumination guidance, and thanks to the tiny passage of CO₂ coming from above, we were able to identify the correct way and to easily surgically establish a trans anal lumen. We think that in respect to all the other techniques described for COA after LRR, our procedure has the advantage that it does not require any specialized instruments or fluo-

roscopy and, most of all, it allows the surgeon to gain the lumen and dilate it under complete visual guidance, thus reducing the risk of false ways or perforation. Possible limitations of this approach are the need of two different operators (surgeon and endoscopist) and that, in case of unknown diversion or chemotherapy colitis, antegrade endoscopy could risk damaging the colonic wall.

We did not find in literature any articles specifically referring to redo-surgery after COA in LRR. Although redo-surgery is potentially, a further option in case of failure of conservative management, it is a challenging procedure associated with high post-operative morbidity. In fact, in an article by Lefevre et al ²¹ on the treatment of CRA or CAA, but not mentioning COA, he considered thirty-three patients that underwent surgical operation for "failed" CRA or CAA, and concluded that redo surgery was a feasible option for this condition but the post-operative morbidity rate was very high, up to 55%, suggesting to use this approach with caution and only in selected cases.

Conclusion

In conclusion, AS presents multiple aspects depending on the site (high or low), the anastomosis technique (stapled or hand-sewn), and the type of stricture (partial or complete) as well as the pre-operative patient' status. Nowadays, no guidelines or controlled trials are present in Literature and several options are available with both advantages and limitations. In this setting COA represents a particularly demanding complication which should be clearly distinguished from the others entities, mostly after CAA. Scan data are reported in literature to define the best approach in this condition as in our review we found predominantly case reports and small case series, showing not standard treatment options, chosen on an individual basis. Our described rendez-vous technique can represent a valid choice, especially after CAA.

Riassunto

La stenosi anastomotica (AS) rappresenta una complicanza piuttosto frequente dopo chirurgia del retto. Molti sono i fattori di rischio comprovati per lo sviluppo di una AS, fra cui anche la localizzazione bassa della neoplasia rettale, in particolare se associata a radioterapia, seguita da intervento chirurgico di resezione anteriore del retto bassa (LRR) con colo-ano-anastomosi (CAA). Sebbene la completa ostruzione di un'anastomosi colo-rettale bassa o colo-anoale (COA) sia un evento infrequente, quando questa si verifica, il trattamento può essere particolarmente difficile, poiché le tecniche comunemente usate per le AS, quali la dilatazione endoscopica

o con Hegar, vanno spesso incontro a fallimento. A questo proposito, alcuni autori hanno descritto approcci personali nella gestione della COA post LRR, ma tuttora non esistono ancora dati chiari riguardo al suo migliore trattamento.

Nel nostro studio abbiamo effettuato una revisione sistematica della letteratura sul trattamento della COA, con la quale abbiamo selezionato dieci articoli riguardanti la sua gestione terapeutica dopo LAR, mentre non abbiamo trovato nessun articolo che specificatamente tratta il trattamento della COA dopo CAA, motivo per cui riportiamo una nostra recente esperienza a tal riguardo.

Riportiamo quindi il caso clinico di un paziente di 78 anni che ha sviluppato COA dopo resezione intersfinterica mini-invasiva con CAA. Dopo fallimento del trattamento standard endoscopico trans- anale, abbiamo deciso di intraprendere un trattamento combinato con endoscopia trans-stomale più chirurgia trans- anale. A paziente in posizione litotomica, è stata infatti eseguita una endoscopia anterograda trans-stomale fino a visualizzare la parte craniale della stenosi. Grazie alla trans-illuminazione associata ad un esile passaggio di CO₂ è stata così identificata la giusta strada, inizialmente non visibile e il lume è stato parzialmente ristabilito sotto visione, mediante un ferro chirurgico, manovrato per via trans- anale. Quindi dopo posizionamento di Foley, l'anastomosi è stata a questo punto progressivamente dilatata mediante Hegar sia sotto visione diretta che attraverso il videoscopio. Il paziente è stato dimesso il giorno successivo ed a un mese dall'intervento il controllo radiologico ha mostrato un passaggio regolare attraverso l'anastomosi.

In conclusione, esistono pochi dati in letteratura e non unanime gestione terapeutica per quanto riguarda il trattamento della COA post CRA o CAA; in questo ambito la nostra tecnica può rappresentare una valida opzione.

References

1. Qin Q, Ma T, Deng Y, et al.: *Impact of preoperative radiotherapy on anastomotic leakage and stenosis after rectal cancer resection: post hoc analysis of a randomized controlled trial*. Dis Colon Rectum, 2016; 59:934-42.
2. Zhu H, Bai B, Shan L, et al.: *Preoperative radiotherapy for patients with rectal cancer: A risk factor for non-reversal of ileostomy caused by stenosis or stiffness proximal to colorectal anastomosis*. Oncotarget, 2017; 8(59):100746-753.
3. Tekkis P, Tan E, Kontovounisios C, et al.: *Hand-sewn coloanal anastomosis for low rectal cancer: Technique and long-term outcome*. Colorectal Dis, 2015; 17(12):1062-70.
4. Sier MF, van Gelder L, Ubbink DT, et al.: *Factors affecting timing of closure and non-reversal of temporary ileostomies*. Int J Colorectal Dis, 2015; 30:1185-192.
5. Liberati A, Altman DG, Tetzlaff J, et al.: *The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration*. Ann Intern Med, 2009; 151: W65-94.
6. Lim SW, Huh JW, Kim YJ, et al.: *Laparoscopic intersphincteric resection for low rectal cancer*. World J Surg, 2011; 35:2811-817.
7. Hayden DM, Mora Pinzon MC, Francescatti AB, et al.: *Patient factors may predict anastomotic complications after rectal cancer surgery: anastomotic complications in rectal cancer*. Ann Med Surg, 2015; 4:11-16.
8. Ridditid W, Siripun A, Rerknimitr R: *Stricture at colorectal anastomosis: To dilate or to incise*. Endosc Int Open, 2018; 6(3):E340-E341.
9. Reissman P, Nogueras JJ, Wexner SD: *Management of obliterating stricture after coloanal anastomosis*. Surg Endosc, 1997; 11:385-86.
10. Lee SY, Kim CH, Kim YJ, et al.: *Anastomotic stricture after ultralow anterior resection or intersphincteric resection for very low-lying rectal cancer*. Surg Endosc, 2018; 32(2):660-66.
11. Mukai M, Kishima T, Iizuka S, et al.: *Endoscopic hook knife cutting before balloon dilatation of a severe anastomotic stricture after rectal cancer resection*. Endoscopy, 2009; 41(Suppl 2):E193-E194.
12. Curcio G, Spada M, di Francesco F, et al.: *Completely obstructed colorectal anastomosis: A new non-electrosurgical endoscopic approach before balloon dilatation*. World J Gastroenterol, 2010; 16:4751-754.
13. Yuan X, Liu W, Ye L, et al.: *Combination of endoscopic incision and balloon dilation for treatment of a completely obstructed anastomotic stenosis following colorectal resection: A case report*. Medicine (Baltimore), 2019; 98(26):e16292.
14. Gornals JB, Albines G, Trenti L, et al.: *EUS-guided recanalization of a complete rectal anastomotic stenosis by use of a lumen-apposing metal stent*. Gastrointest Endosc, 2015; 82(4):752.
15. Saxena P, Azola A, Kumbhari V, et al.: *EUS-guided rendezvous and reversal of complete rectal anastomotic stenosis after Hartmann's reversal*. Gastrointest Endosc, 2015; 81(2):467-68.
16. Yazawa K, Morioka D, Matsumoto C, et al.: *Blunt penetration technique for treatment of a completely obstructed anastomosis after rectal resection: A case report*. J Med Case Rep, 2014; 8:236.
17. Reddy RA, Venkatasubramaniam AK, Khurshid A, et al.: *Dual interventional approach of endoscopic reboring in completely stenosed rectal anastomosis using radiology guidance: A novel technique*. Colorectal Dis, 2009; 11 (1):49-52.
18. Kaushik N, Rubin J, McGrath K: *Treatment of benign complete colonic anastomotic obstruction by using an endoscopic rendezvous technique*. Gastrointest Endosc, 2006; 63:727-30.
19. Albertsmeier M, Rittler P, Hoffmann RT, et al.: *Treatment of a completely obstructed colonic anastomotic stricture using a CT-guided endoscopic rendezvous technique*. Endoscopy, 2011; 43 (Suppl 2) UCTN:E5-6.
20. Bong JW, Lim SB: *Transanal minimally invasive surgery as a treatment option for a completely occluded anastomosis after low anterior resection: A new approach to severe anastomotic stenosis*. Asian J Endosc Surg, 2019; 12(2):175-77.
21. Lefevre JH, Bretagnol F, Maggioni L, et al.: *Redo surgery for failed colorectal or coloanal anastomosis: A valuable surgical challenge*. Surgery, 2011; 149:65-74.

READ-ONLY COPY
PRINTING PROHIBITED