**Name of Journal:** ***World Journal of*** ***Gastroenterology***

**Manuscript NO: 43063**

**Manuscript Type: CASE REPORT**

# **Tertiary stent-in-stent for obstructing colorectal cancer: A case report and literature review**

Vanella G *et al*. Long-lasting palliation of a metastatic cancer

Giuseppe Vanella, Chiara Coluccio, Emilio Di Giulio, Daniela Assisi, Rocco Lapenta

**Giuseppe Vanella, Chiara Coluccio**, **Emilio Di Giulio,** Department ofDigestive Endoscopy, Sant’Andrea Hospital, Sapienza University of Rome, Rome 00189, Italy

**Daniela Assisi, Rocco Lapenta,** Department ofDigestive Endoscopy, Regina Elena National Cancer Institute, Rome 00144, Italy

**ORCID number:** Giuseppe Vanella (0000-0001-7280-1761); Chiara Coluccio (0000-0002-8791-7764); Emilio Di Giulio (0000-0002-5668-7863); Daniela Assisi (0000-0003-2853-8649); Rocco Lapenta (0000-0002-9361-1657).

**Authors contributions**: Vanella G, Assisi D and Lapenta R were involved in the procedure and in concept of the report; Vanella G and Coluccio C were involved in retrieving useful information from clinical charts and writing the manuscript; Vanella G, Coluccio C and Di Giulio E were involved in literature review; Di Giulio E, Assisi D and Lapenta R were involved in critical revision of the manuscript; all authors had access and approved the last version of the manuscript.

**Informed consent statement:** The patient gave informed consent prior to the procedure.

**Conflict-of-interest statement:** The authors declare that they have no conflicts of interest.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

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**Manuscript source:** Unsolicited manuscript

**Corresponding author to: Emilio Di Giulio, MD, Professor,** Department ofDigestive Endoscopy, Sant’Andrea Hospital, Sapienza University of Rome, Via di Grottarossa 1035-1039, Rome 00189, Italy. emilio.digiulio@uniroma1.it

**Telephone:** +39-6-33776151

**Fax:** +39-6-33776692

**Received:** October 29, 2018

**Peer-review started:** October 30, 2018

**First decision:** November 29, 2018

**Revised:** December 5, 2018

**Accepted:** December 13, 2018

**Article in press:**

**Published online:**

**Abstract**

***BACKGROUND***

Self-expandable metal stents (SEMSs) are frequently used in the setting of palliation of occluding, inoperable colorectal cancer (CRC). Among possible complications of SEMS positioning, re-obstruction is the most frequent, and its management is controversial, potentially including secondary stent-in-stent placement, which has been poorly investigated. Moreover, the issue of secondary stent-in-stent re-obstruction and of more-than-two colonic stenting has never been assessed. We describe a case of tertiary SEMS-in-SEMS placement and we furthermore discuss our practice on the basis of available literature.

***CASE SUMMARY***

A 66 years old male with occluding and metastatic CRC was initially treated through the positioning of a SEMS, which had to be revised six months later when a symptomatic intra-stent tumor ingrowth was treated by a SEMS-in-SEMS. We hereby describe a further episode of intestinal occlusion due to recurrence of intra-stent tumor ingrowth that, despite several negative prognostic factors [splenic flexure location of the tumor, carcinomatosis with ascites, chemotherapy subsequently including bevacizumab and two previously positioned stents (1 SEMS and 1 SEMS-in-SEMS)] underwent successful management through the placement of a tertiary SEMS-in-SEMS, with immediate clinical benefit and no procedure-related adverse events after 150 d of post-procedural follow-up. This endoscopic management has permitted 27 mo of partial control of a metastatic disease without the need for chemotherapy discontinuation and, ultimately, a good quality of life until death.

***CONCLUSION***

Tertiary SEMS-in-SEMS is technically feasible, and seems to be a safe and effective option in case of recurrent SEMS obstruction.

**Key words:** Bevacizumab; Colorectal neoplasms; Intestinal obstruction; Palliative care; Self expandable metallic stents; Case report

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**Core tip**: Endoscopic positioning of Self-expandable metal stents (SEMSs) has an established role in the palliation of obstructing metastatic colorectal cancers (CRCs). More controversial is the management of re-obstruction due to intrastent tumor ingrowth. In our case, a patient with obstructing, metastatic, carcinomatous CRC, primary palliated with SEMS placement, experienced two different episodes of intrastent tumor in growth during a long-lasting history of partial efficacy of chemotherapy including bevacizumab. Both these episodes were successfully treated through subsequent stent-in-stent placement, with immediate symptoms relief, no procedure-related complications (notwithstanding different negative prognostic factors), no need for chemotherapy discontinuation and, ultimately, a good quality of life.

Vanella G, Coluccio C, Di Giulio E, Assisi D, Lapenta R. Tertiary stent-in-stent for obstructing colorectal cancer: A case report and literature review. *World J Gastroenterol* 2018; In press

**INTRODUCTION**

Colorectal cancer (CRC) is one of the most commonly encountered neoplasm, especially in Western countries, with an increasing incidence during the last years[1,2]. More than a quarter of CRC patients are diagnosed with IV stage disease and about 10% of CRC patients present with large-bowel occlusion[3-5], whose management (endoscopic *vs* surgical) is still debated[3,6-8]. The application of self-expandable metal stents (SEMSs) for CRC obstruction has been increasingly used over time in the setting of palliation of inoperable cases, alternatively to an emergency surgery[9]. Surgical procedures are burdened by a high mortality rate in this setting[4,10,11], they are not oncologically indicated in advanced disease and require a time interval before undertaking chemotherapy[12], which represents the only possibility of disease control for these patients. On the contrary endoscopic procedures, despite being less invasive[13] and requiring shorter hospitalization[11,14-16], suffer from a suboptimal technical success rate (particularly for tortuous colorectal flexures[17]) and from the possibility of complications[6,10,17-22]: Colonic perforation (10%), stent migration (9%) and re-obstruction (18%)[10]. The issue of complications looks even more noteworthy when patients are candidate for chemotherapy with antiangiogenic agents (*e.g.*, bevacizumab), a described risk factor for colonic perforation in the presence of a SEMS[23,24]. While some of the complications need to be treated by surgery, re-obstruction can be treated by stent-in-stent deployment[25], although technical success and clinical efficacy are scarcely reported but nevertheless lower than primary stenting[3,25]. Moreover, the issue of the stent-in-stent patency and the possible management of an additional intra-stent neoplastic ingrowth has never been assessed.

We describe the case of a man with occluding splenic flexure CRC treated with SEMS positioning due to metastatic, carcinomatous disease, immediately starting chemotherapy after the first stent positioning. However, in two different occasions (6 mo and 22 mo after primary stenting) the patients experienced symptoms of a radiologically confirmed bowel occlusion due to endoscopically diagnosed intra-stent tumor ingrowth, while systemic disease was substantially under control with chemotherapy. Despite the presence of negative prognostic factors (splenic-flexure location, carcinomatosis, bevacizumab subsequently added to chemotherapy regimen, previously positioned SEMS and SEMS-in-SEMS), both 2 episodes were successfully treated with positioning of additional stent-in-stents, which allowed a substantial chemotherapy continuity and a lasting partial disease control of a carcinomatous disease.

**CASE PRESENTATION**

A 66 years old man was diagnosed in March 2016 with occluding colonic cancer immediately proximal to and partially involving the splenic flexure. Because of the presence of liver metastasis and peritoneal carcinomatosis with ascites, a 22 mm/6 cm through-the-scope (TTS) SEMS (WallflexTM, Boston Scientific) was placed through the stenosis and chemotherapy with fluorouracil/folinic acid/irinotecan was immediately started. Six months later, an occluding intra-stent tumor ingrowth (with responsive systemic disease) was treated by the placement of a colonic stent-in-stent (22 mm/9 cm TTS SEMS; WallflexTM, Boston Scientific) and chemotherapy resumed 2 d after.

After more than 1 year of substantial disease stability (but bevacizumab was added to chemotherapy regimen 18 mo after the diagnosis), the patient experienced symptoms of intestinal occlusion in January 2018 (+16 mo from the second stent). Physical examination revealed abdominal distension, hyper-tympanism on percussion, and tinkling bowel sounds. An abdominal X-ray showed ileocolic dilation proximal to the correctly located previous stents (Figure 1A) and colonoscopy showed new intrastent tumor ingrowth (Figure 2A).

**FINAL DIAGNOSIS**

The conclusive diagnosis was bowel occlusion due to intrastent tumor ingrowth in a patient with previously positioned multiple SEMS for the palliation of an obstructing, metastatic, carcinomatous CRC with partial disease control under chemotherapy including bevacizumab.

**TREATMENT**

Considering the presence of carcinosis and ascites and the patient’s willingness to avoid a stoma, after multidisciplinary discussion and informed consent, a further TTS 22 mm/8 cm SEMS (Hanarostent®, M.I.Tech) was successfully positioned within the two previous stents (Figure 3), under fluoroscopic guidance and deep sedation.

**OUTCOME AND FOLLOW-UP**

Despite the stent opening appeared endoscopically not brilliant (Figure 2B), the patient experienced immediate relief of occlusive symptoms, the following X-ray showed no residual bowel dilation (Figure 1B) and chemotherapy was resumed 8 d after.

No SEMS-related adverse events occurred until June 2018 (+150 d from the last procedure and +27 mo from diagnosis), when the patient died due systemic complications related to disease progression.

**DISCUSSION**

This 66 years old patient with metastatic, carcinomatous, occluding CRC, was successfully treated with multiple endoscopic procedures (1 SEMS and 2 SEMS-in-SEMS placements), without procedure-related complications and with clinical benefit, good quality of life and partial systemic disease control for more than 2 years.

Some aspects made us to consider this case of interest for endoscopy, gastroenterology and oncology practitioners.

First of all, to our knowledge, the possibility of positioning a third stent-in-stent for recurrent intrastent tumor ingrowth has never been considered and described.

Moreover, some presumptive technical difficulties and negative prognostic factors[26] did not interfere with the success and the efficacy of the endoscopic palliation. As for example, a significantly lower technical success of SEMS placement[27] and patency after SEMS placement[25] has been demonstrated in patients with carcinomatosis (83% *vs* 93% for technical success[27] and 118 d *vs* 361 d for SEMS patency[25]), and carcinomatosis as well as the proximal location of the obstruction were found to be independent predictors of technical failure[27]. Moreover, concomitant chemotherapy with bevacizumab has been preliminary associated to increased perforation risk when compared to chemotherapy without bevacizumab and no chemotherapy[23,24,28-30]. However, in our case, neither the presence of peritoneal carcinomatosis with ascites nor the splenic flexure location nor the chemotherapy subsequently including bevacizumab affected the technical success and the lasting clinical benefits of the procedures. The patient has in fact remained asymptomatic, on a varied fibre-free diet and with an acceptable quality of life until death due to disease progression.

In one study focusing on secondary stent-in-stent placement[25], the rate of technical success was not reported (patients with attempted but failed secondary SEMS placement were excluded), overall clinical success after secondary positioning was achieved in 75% of patients (which is lower than reported in the setting of primary stenting), and long-term clinical failure was reported in 52% of patients with initially successful secondary positioning. Also in that study, the presence of carcinomatosis was associated with reduced long-term clinical success. However, in our case, not even the presence of the two previously positioned SEMS hampered the successful positioning and clinical efficacy of the third stent-in-stent.

The same authors also compared for the first time the clinical outcomes of an endoscopic re-stenting *vs* palliative surgery after a first stent failure due to malignant re-obstruction in 115 patients, demonstrating that among patients undergoing secondary SEMS placement the overall mortality rate and the median duration of hospital stay were significantly lower than in the surgery group, where instead the median lumen patency was higher (7.9 mo *vs* 3.4 mo for the stent patency); no significant differences were registered in overall and progression-free survival between the two groups[31]. In this scenario, we report one case with an extraordinary stent patency of 480 d after secondary stenting and of 150 d after tertiary stenting.

All these data highlight the need for a cautious evaluation of the solution best suited for one specific patient with stent re-obstruction.

**CONCLUSION**

In this case, despite the presence of negative prognostic factors and technical difficulties, tertiary stenting was technically successful and the patient experienced immediate relief of symptoms, has not encountered any SEMS-related adverse event and has maintained a good quality of life during the 150 d following the last stent positioning, without the need for chemotherapy discontinuation. Even if evidence on multiple stenting is controversial and experiences of tertiary stent-in-stenting are lacking, this report suggests that in patients with recurrent intra-stent tumor ingrowth the positioning of a third stent-in-stent should at least be considered and might be a reasonable and effective option. Further research are needed to confirm the safety and reproducibility of this approach compared with surgical options, not only in terms of technical feasibility, but mainly focusing on quality of life and long-term outcomes.

**EXPERIENCES AND LESSONS**

SEMS positioning is an established treatment for the palliation of occluding unresectable CRCs.

Even in the presence of negative prognostic factors, the feasibility of endoscopic palliation may be discussed in multidisciplinary tumor boards of facilities with high endoscopic expertise and prompt surgical back-up.

SEMS re-obstruction is the most frequent complication of the endoscopic palliation of occluding CRCs and SEMS-in-SEMS placement has proven to be a valid option in this setting.

Even after secondary failure of a SEMS-in-SEMS due to recurrent tumor ingrowth, a tertiary SEMS-in-SEMS placement is technically feasible and might be an option in referral centres.

**ACKNOWLEDGMENTS**

The authors would like to thank the nursing staff of the Endoscopy Unit and the medical staff of Oncological Division of Regina Elena Cancer Institute which has collaborated in retrieving clinical information during the procedure and during patient’s follow-up.

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**P-Reviewer:** Iliescu EL, Sipos F **S-Editor:** Wang XJ

**L-Editor:** **E-Editor:**

**Specialty type:** Gastroenterology and hepatology

**Country of origin:** Italy

**Peer-review report classification**

Grade A (Excellent): 0

Grade B (Very good): B

Grade C (Good): C

Grade D (Fair): 0

Grade E (Poor): 0

**A B**

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**Figure 1** **Abdominal X-ray before and after the positioning of the third stent**. A: Large bowel massive distention (long arrows) without apparent stent migration; curves highlight the profiles of proximal edges of the first and second previously placed stents; B: The third stent placed within the two previously placed stents (short arrows indicating some of the radiopaque markers), with detention of proximal loops.

**A B**

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**Figure 2** **Endoscopic appearance of the neoplastic stenosis before and after the third stent.** A: Tumor ingrowth inside the two completely hidden previously placed stents; B: A small diameter hole inside the stenotic tract immediately after the deployment of the third stent.

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**Figure 3 Intraprocedural radiological appearance of the three stents bypassing the lesion above splenic flexure.** Curves highlight proximal edges of the first and second previously placed stents; arrows indicate some of the radiopaque markers of the third just positioned and gradually expanding stent.