

Self-expandable Metallic Stenting for Advanced GI Tract Malignancy: An Effective Palliation to Relieve Obstructions

SK MAZUMDER^a, CR DAS^b, AKMMU BHUIYAN^c, S BARDHAN^d, W SHAKIR^e, MA RAHMAN^f

Abstract:

Introduction: Palliative stenting for relieving malignant obstruction of the gastrointestinal tract is routinely practiced in western world. Obstructing advanced GI malignancy requires bypass or exteriorization of proximal gut before NACT or as a bridge to definite surgery. The aim of the study was to review the experience at tertiary cancer hospital and short-term outcome with endoscopic stenting in lieu of palliative bypass surgery for advanced and obstructing GI malignancy.

Materials and Methods: This observation study was carried out in the surgical out-patient department of NICRH where all therapeutic endoscopic facilities were available. All patients treated with stenting in a 2 years period from 2018-2020 were studied.

Results: Fifty-six patients received 60 stents. No case of perforation occurred. In fifteen cases (26.78%) clogging with food occurred; in 5 cases (8.92%) displacement occur. Tumour overgrowth was noted in 7 (12.66%) cases. Four patients (6.72%) received a second stent. Mean survival of patients with esophageal stent was 221 days. Four patients received 4 stents in their colon or rectum. The stents were placed in the sigmoid (n=2), the descending colon (n=1), and the transverse colon (n=1). Mean

survival of colonic stent patients was 331 days. No perforation, no clogging by stool and no tumour ingrowth among patients with colonic stent but one (25%) had displacement. Eighteen patients received a total of 18 stents because of obstructing stomach cancer. 12 (61.22%) patients had tumour at cardia. Mean survival after gastric stent placement was 176 days. There was no perforation, one case of clogging (8.33%), and two cases of tumour ingrowth (16.66%). 5 patients underwent duodenal stenting. Remaining one at Billroth II anastomotic site. Single patients (20%) required laparotomy and stent extraction due to duodenal stent migration. Mean survival after duodenal stent placement was 242 days. No perforation, no clogging and no tumour ingrowth.

Conclusions: The present series shows that placement of expandable metallic stents in the obstructing GI tract malignancy as an alternative to bypass surgery is safe, cost effective, low complications, short hospital stay and provides good palliation.

Key Words: Endoscopic stent placement, Micro-Tech endoscopy metallic stent, advanced GI tract malignancy, palliation, endoscopy.

(J Bangladesh Coll Phys Surg 2024; 42: 241-246)

DOI: <https://doi.org/10.3329/jbcps.v42i3.74311>

Introduction:

Obstruction of the gastrointestinal tract malignancy are considered as advance stage and require palliative

- a. Dr. Suzon Kumar Mazumder, Junior Consultant, Surgery, National Institute of Cancer Research & Hospital (NICRH), Dhaka.
- b. Dr. Chittaranjan Das, Associate Professor, Dept of General Surgery, BSMMU.
- c. Dr. Abul Kheire Mohammad Minhaj Uddin Bhuiyan, Associate Professor, Department of Surgical Oncology, National Institute of Cancer Research & Hospital, NICRH, Dhaka.
- d. Dr. Sushmita Bardhan, Indoor Medical officer, Gynaecological Oncology, NICRH, Dhaka.
- e. Dr. Washif Shakir, Registrar, Surgical Oncology, NICRH, Dhaka.
- f. Dr. Mohammed Ashrafur Rahman, Junior consultant, Surgery, NICRH, Dhaka.

Address of Correspondence: Dr. Suzon Kumar Mazumder, Junior Consultant, Surgery, National Institute of Cancer Research & hospital, Mohakhali, Dhaka-1212,

Mobile: +8801913704318, Email: smazumder1205@gmail.com

Received: 30 March 2022

Accepted: 2 April 2024

bypass or proximal extoriarization of gut before definitive surgery^{1,2}. Tumours can impair bowel function in several ways: occlusion of the lumen, impairment of peristalsis due to tumour ingrowth, masses in the mesentery or omentum or adhesions creating an extraluminal obstruction, and finally infiltration of the enteric nervous system causing dysmotility³. Obstruction due to intra- or extra-luminal obstruction can be treated by endoscopic placement of metallic self-expandable stents. Oesophageal carcinoma mostly detected late with local and systemic metastases precluding resection. Most patients suffer from progressive dysphagia, and palliative care is the only option. Gastroesophageal and colorectal cancer are occurring increasingly⁴. Due to routine diagnostic endoscopy and colonoscopy in case of complaints and screening many patients can be cured by surgical resection. However, there are lots of patients presenting with metastases and incurable disease at the initial presentation. In these patients, palliative therapy is the only option before any definite surgery⁵.

Sometimes it is impossible to do a surgical resection of the primary tumour, mostly due to co-morbidity and low body mass index. In cases of malignant bowel obstruction stent placing can be an alternative in lieu of stoma or act as bridge to definitive surgery. Finally, patients with gastric cancer, duodenal cancer or ingrowing pancreatic cancer presenting with obstruction, who are unfit for surgery can be benefited by stenting. The aim of the present study was to review the experience in a tertiary cancer research hospital with endoscopic stenting of obstructing malignancies in the gastrointestinal tract.

Materials and methods:

All patients treated with endoscopic stenting in a two years period at NICRH from 2018-2020 were studied. Self-expandable Micro-Tech endoscopy stents, USA from, Micro-Tech (Nanjing) co. ltd., made in China were used for all patients. In case of oesophageal stenting the Micro-Tech endoscopy partially covered stent with sutured loop ends was placed. This stent has a proximal flare of 23 mm to ensure fixation at the proximal edge of the tumour. The applied length varies according to the length of the obstruction (10-14 cm with a covered length of 8-10 cm). All patients received a stent with proximal release. For duodenal and gastric stenting Micro-Tech endoscopy uncovered stents, USA were used. These uncovered stents, have a body of 24mm and a length of 9-14cm, with a stent flare of 30 mm. These stents were placed through the working channel of the endoscope. In the case of colonic stenting Micro-Tech endoscopy intestinal stents, USA stents were applied. The specifications are: body diameter 22-25 mm, flare of 27-30 mm and a length of 90-120 mm. These stents have a distal release. Endoscopy was performed with endoscopes (gastrosopes and colonoscopes) of Pentax medica, Japan (90k series). All procedures were done with conscious sedation with midazolam 5 mg, sometimes inj. Propofol by a trained nurse. All stents were applied via guide-wires through the endoscope (in case of stomach, duodenal, or colon obstruction) or via guidewires placed besides the endoscope through the tumour stenosis (oesophagus and rectum). Placement of the stent was done under endoscopic control. In case of malignant stricture, prior pneumatic or bougie dilatation by Cook® Savary-Gilliard® dilator was done. The patient preparation for oesophageal stent placement was overnight fasting, gastric lavage for duodenal stent,

20% mannitol with enema simplex for colonic stent. Statistical analysis was done with chi-square test for contingency tables or t-test. A value below 0.05 was considered statistically significant.

Results:

Each patient diagnosed as obstructing malignancies located in oesophagus, stomach, duodenum, or colon and rectum where open bypass was not possible due to distant metastasis or patient's poor general condition undergone a self-expandable metallic stent by therapeutic endoscopist at surgical outpatient department's endoscopy suit. Some patients undergone palliative therapy and some patients had neoadjuvant therapy in the form of chemotherapy or radiotherapy. Fifty-six patients (42 males, 14 females, mean age 72 years, range, 42-81 years) received 60 stents because of oesophageal cancer (Table 1). Mean survival after esophageal stent placement was 221 days, range, 70-624 days (Table 2). Out of 56, 54 patients undergone 1 year follow up to December, 2020. 11(19.64%) patients died due to their disease progression, 4 (7.14%) patients died due to comorbidities. Rest of the patients 53.57% with chemoradiation and or surgery are currently still alive (Table 3). Two patients received 2nd covered stents which dislocated due to a very short stenotic tract and the effect of palliative chemotherapy with tumour necrosis. No post procedural perforation was seen. In fifteen cases (26.78%) (twice in three patients, thrice in single patient) clogging of the stent with food specially fiber and meat bolus occurred. These were easily removed by endoscopy without sedation. Tumour overgrowth was seen in four cases (7.14%). No additional treatment was initiated in two cases because no significant obstruction was noted; two patients needed double stent (stent over stent) (Table 1).

Eighteen patients (10 men, 8 women, mean age 65 years, range, 42-76 years) received 18 stents because of obstructing stomach cancer. There were 5 distal gastric cancers and 12 cancer located in the cardia or at gastroesophageal junction. The latter received partially covered expandable stents with anti-reflux bulb, the remainder uncovered stents. Single stent was placed in at stoma site of Billroth II resection stomach (Table 1). Mean survival after gastro-oesophageal junction stent placement was 176 days (range, 55-387 days) (Table 2). There was no perforation, no case of clogging, and

tumour ingrowth were at two cases. Two patients got pneumatic dilatation each because of ingrowth. Two of them received no additional treatment (Table 1). Five patients (4 male, 1 female, mean age 63 years, range, 40-76 years) had stent placement in their distal stomach (Table 1). This was because of ingrowing pancreatic cancer in single cases and obstructing antral cancer in four patients. Mean survival after duodenal stent placement was 242 days (range, 67-347 days) (Table 2). No perforation or clogging occurred. Tumour ingrowth at two cases were seen. The tumour ingrowth did not lead to significant new obstruction. Single case (20%) required laparotomy and extraction of stent, resection and anastomosis due to stent migration at proximal jejunum (Table II).

Four patients (3 males, 1 female, mean age 68 years, range, 42-86 years) received 5 stents in their colon or rectum (Table 1). One patient had a very long stenotic segment (due to Lt. colonic cancer) and received two stents placed longitudinally in one procedure. The stents were placed in the rectum (n=2), the sigmoid (n=2), and the transverse colon (n=1). All patients had a dominant stenosis with obstruction. Mean survival after colonic stent placement was 331 days (range, 65-610days) (Table 2). Perforation did not occur. No tumour in-growth developed. Dislocation occurred in single cases (25%) 15 days after placement. The stent was repositioned in the next follow-up. There was no clogging (Table I).

Table-I

Number of complications of stent placement in the different anatomic localizations.

Complications	Oesophagus (n=56)	Stomach (cardia) (n=12)	Distal stomach (n=5)	Colon/Rectum (n=4)
Perforation	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Clogging	15(26.8)	0(0.0)	0(0.0)	0(0.0)
In (over) growth	4(7.14)	2(16.7)	0(0.0)	0(0.0)
Dislocation /Migration	5(8.9)	0(0.0)	1(20.0)	1(25.0)

Percentages are given in the parentheses

Table I shows the complications. There was significant difference in occurrence of complication in different stents.

Table-II

Total survival in days of the patients after placement of the stents for palliation.

Stent placement	Mean	SD	Medium	Range
Oesophagus	221	151	121	70-624
Stomach (Cardia)	176	135	108	55-387
Duodenum/Distal stomach	242	113	98	67-347
Colon	331	396	194	65-616

Table II shows the survival of patients after stent placement. Patients with stenting because of colorectal cancer had a significantly longer survival ($p < 0.02$).

Table-III

1-year follow up status of patients after palliative stenting for obstructing GI malignancy.

Stent placement	Dead	Alive	Not Documented
Oesophagus (n=56)	15(26.76)	39(69.64)	2(3.57)
Stomach (Cardia) (n=12)	2(16.57)	10(83.33)	0(0.0)
Duodenum/Distal stomach (n=5)	2(40.0)	2(40.0)	1(20.0)
Colon (n=4)	0(0.0)	4(100.0)	0(0.0)

Table III shows 1-year follow-up status of patient getting stent for obstructing GIT malignancy.

Discussion:

Placing a stent in the obstructing advanced GI tract malignancy can offer palliation in metastatic disease as well as symptom relief due to obstruction in locally advanced case unfit for surgery or before neoadjuvant therapy. The decision must be made by multidisciplinary tumour board which palliative option (bypass or stenting) will be appropriate for relieving obstruction before definitive treatment. Both covered and uncovered stents have different functional characteristics and the stent type must be selected on an individual basis⁵. In most cases technical and clinical success of oesophageal or gastroduodenal stenting is above 90%^{5,6}. Recently, self-expandable metal stents placement became popular to relieve obstruction in lieu of bypass. The present series is the experience of stent placement as an alternative to bypass is routinely practice. By the placement of stents restoring passage of food or stool adequate symptoms relief and scope for neoadjuvant therapy before definite surgery. Regarding cost benefit perspective stent placement should be considered if the life expectancy of the patient is at least two months. This is estimated by the range of survival after stent placement in the present group of patients. Some patients had to die within a very short time after stent placement. This was due to the course of their complicated underlying disease. However, survival was more than two months in the majority of patients. Self-expanding metal stent for the treatment of dysphagia is accepted and evidence based⁷. In most of the cases partially covered stents were used in case of oesophageal or cardia cancer. Common complications after stent placement include chest pain and heartburn, nausea & reflux vomiting. Haematemesis is less but seen just after the procedure. Patient ability to swallow significantly increase during follow-up after six months. Stent migration occurred less with partially covered stents⁸. The self-expandable stents may take about four to five days to maximum fit at GIT lumen. Post stent pain was common. Pain was relieved with effective analgesics. In one study 36 patients (43.4%) had recurrent dysphagia after stent placement, caused by tumour overgrowth in 32 cases⁹. In the present study, tumour overgrowth only occurred in 7(12.5%) of cases of oesophageal cancer. This low percentage may be due to adjuvant chemotherapy or

radiotherapy as definitive treatment. Lazaraki G et al¹⁰. in their study tried to evaluate predictive factors of food impaction or clogging in oesophageal stents. They reported food impaction in 41 out of 1360 patients (3.0%). 10 Clogging occurred in 15(26.78%) cases in the present study, mostly in the initial period of the study. But this problem was solved easily by changing diet, specially avoid fibres, large meat piece, pureeing their food, also risotto rice. Food impaction was easily managed by endoscopic guided removal without sedation. Placement of stents in the oesophagus is technically easy procedure. However, there are some differences in placement technique between the available stents. The endosurgeon should learn all pitfalls. In the present study only Micro-Tech endoscopy stents with a distal release system were placed. For this reason, during release of the endoprosthesis the stent has to be pulled in order to prevent dislocation into the stomach. One major lesson learnt is that a partially covered Micro-Tech endoscopy stent is not the best option for placement over a short tight stenosis. Total 5 (9.82%) stent dislocated distally, one patient this stent dislocated two times. Whether this was due to tumour necrosis as a result of chemoradiotherapy or because of the fact that the stent did not adhere tightly anymore to the oesophageal mucosa is unsure. Mean survival in the literature after stent placement was 146.3 ± 143.6 days (range, 13-680 days)⁹. The mean survival in the presented patients, 221 days, is little difference with this report, probably due to use of stent not only for palliation but also for locally advanced cases which was cured by adjuvant chemoradiotherapy. The aim in distal gastric or duodenal stenting with malignant gastric outlet obstruction is to re-establish an oral intake by restoring gastrointestinal continuity to improve the quality of life in the advanced stages of cancer. Endoscopic stenting is superior to operative gastrojejunostomy in terms of faster return to fluids and solids, and reduced morbidity for patients with a locally advanced cases, which can be cured by neoadjuvant chemotherapy followed by surgery. The main disadvantage to operative bypass is the high rate of delayed gastric emptying¹¹. In the present study 18 patients received gastric or duodenal stents. For better adherence to the mucosa uncovered stents are preferred for use. Duodenal stent-related common

complications are recurrence of symptoms due to stent clogging and stent migration. Stent dysfunction is reported in up to 25% of patients¹². Complications are ingrowth or overgrowth of tumours in 12%, bleeding in 3%, stent migration in 1.5%, and perforation in 0.5%¹³. In the current study, tumour ingrowth and/or overgrowth was seen in 2 (16.67%) patients. These complications can be usually managed endoscopically, thereby restoring food passage¹⁴. But in this study, as patient got alternate chemotherapy, tumor regression occurs and no further obstruction found. Lee et al. in a paper reported that there was no difference in major complications between stent placement and surgery in cases of palliation for colon cancer. The patients treated with stenting had fewer early complications which is understandable since laparotomy is not required¹⁵. Stent placement in the colon has its complications; perforation, migration and occlusion found in 9%, 5% and 9% cases respectively¹⁶. Placement of a stent in the colon gives good and adequate palliation given the fact that all patients in the present study had passage for stool and were treated effectively for the obstruction. No Clogging due to faecal impaction only occurred as gaining dietary experience from upper GIT stents and use of stool softeners and laxatives. No single case of perforation occurred. This is in contradiction with the literature. Especially in colon stent placement perforations were found¹⁷. Of course, this complication is a worst-case scenario because the patients were already unfitted for surgery. Happily, in our setting this did not occur. The probable explanation for the perforations mentioned in the literature are the fact that stent placement was used as a bridge to surgery in patients presenting with acute bowel obstruction with pre-stenotic dilatation¹⁷. In the present series all patient receiving a colon stent have sub-acute bowel obstruction. In addition, the majority also suffered from malignant ascites or distant metastasis. Patients after stenting of the colon survive relatively long. This is probably the result of palliative treatment with chemotherapy in all cases. Chemotherapy significantly prolonged life in colorectal cancer with metastases. Placement of colon stents contributes to this survival. Stent placement is better than colostomy in terms of cost effectiveness and fewer complications¹⁷. The present series shows that placement of expandable

metallic stents in the obstructing GI tract malignancy as an alternative to bypass surgery is safe, cost effective, less complications, less hospital stay and provides good palliation and if adjunct chemo or radiotherapy given, lengthens life. Also, recommended proper counseling of patients and proper therapeutic endoscopic training from surgeon's part before palliative stenting.

Conclusions:

It has been demonstrated in the current series that placement of expandable metallic stents in the obstructing GI tract malignancy is safe and cost effective. Moreover, it has less complications, requires less hospital stay and provides good palliation. Most importantly, it lengthens life if adjunct chemo or radiotherapy given. It can be used as an alternative to bypass surgery but proper counseling of patients and proper endoscopic training of the concerned surgeon are crucial.

Disclosure: The authors declare no conflict of interest.

Conflict of interest:

We have no conflict of interest to declare

References:

1. Hosono S, Ohtani H, Arimoto Y, Kanamiya Y. Endoscopic stenting versus surgical gastroenterostomy for palliation of malignant gastroduodenal obstruction: a meta-analysis. *J Gastroenterol*. 2007; 42(4):283- 290. <https://doi.org/10.1007/s00535-006-2003-y> PMID:17464457
2. Laval G, Arvieux C, Stefani L, et al. Protocol for the treatment of malignant inoperable bowel obstruction: a prospective study of 80 cases at Grenoble University Hospital Center. *J Pain Symptom Manage* 2006; 31:502-12. <https://doi.org/10.1016/j.jpainsymman.2005.10.009> PMID:16793490
3. Rousseau P. Management of malignant bowel obstruction in advanced cancer: a brief review. *J Palliat Med* 1998; 1:65-72. PMID:15859873
4. The global cancer observatory, Globocan, Bangladesh [Internet]. Lyon (Fr): 2020. International agency for cancer research, WHO; Available from: <https://gco.iarc.fr/today/data/factsheets/populations/50-bangladesh-factsheets.pdf>; [Cited: 10/11/2022].
5. Sgourakis G, Gockel I, Radtke A, et al. The use of self-expanding stents in esophageal and gastroesophageal junction cancer palliation: a meta-analysis and meta-regression analysis of outcomes. *Dig Dis Sci* 2010; 55:3018-30. <https://doi.org/10.1007/s10620-010-1250-1>

- PMid:20440646
6. van Heel NC, Haringsma J, Boot H, et al. Comparison of 2 expandable stents for malignant esophageal disease: a randomized controlled trial. *Gastrointest Endosc* 2012; 76(1):52-8.
<https://doi.org/10.1016/j.gie.2012.02.050>
PMid:22726466
 7. Baron TH. Expandable metal stents for the treatment of cancerous obstruction of the gastrointestinal tract. *N Engl J Med* 2001; 344:1681-7.
<https://doi.org/10.1056/NEJM200105313442206>
PMid:11386268
 8. Hirdes MM, Siersema PD, Vleggaar FP. A new fully covered metal stent for the treatment of benign and malignant dysphagia: a prospective follow-up study. *Gastrointest Endosc* 2012; 75:712-8.
<https://doi.org/10.1016/j.gie.2011.11.036>
PMid:22284093
 9. Talreja JP, Eloubeidi MA, Sauer BG, et al. Fully covered removable nitinol self-expandable metal stents (SEMS) in malignant strictures of the esophagus: a multicenter analysis. *Surg Endosc* 2012; 26:1664-9.
<https://doi.org/10.1007/s00464-011-2089-z>
PMid:22179474
 10. Lazaraki G, Katsinelos P, Nakos A et al. Malignant esophageal dysphagia palliation using insertion of a covered Ultraflex stent without fluoroscopy: a prospective observational study. *Surg Endosc* 2011; :628-35.
<https://doi.org/10.1007/s00464-010-1236-2>
PMid:20644961
 11. Chandrasegaram MD, Eslick GD, Mansfield CO et al. Endoscopic stenting versus operative gastrojejunostomy for malignant gastric outlet obstruction. *Surg Endosc* 2012; 26:323-9.
<https://doi.org/10.1007/s00464-011-1870-3>
PMid:21898024
 12. van Hooft JE, van Montfoort ML, Jeurink SM et al. Safety and efficacy of a new non-foreshortening nitinol stent in malignant gastric outlet obstruction (DUONITI study): a prospective, multicenter study. *Endoscopy* 2011; 43:671-5.
<https://doi.org/10.1055/s-0030-1256383>
PMid:21656455
 13. Costamagna G, Tringali A, Spicak J, et al. Treatment of malignant gastroduodenal obstruction with a nitinol self-expanding metal stent: an international prospective multicentre registry. *Dig Liver Dis* 2012; 44:37-43.
<https://doi.org/10.1016/j.dld.2011.08.012>
PMid:21937292
 14. Boškoski I, Tringali A, Familiari P et al. Self-expandable metallic stents for malignant gastric outlet obstruction. *Adv Ther* 2010; 27:691-703.
<https://doi.org/10.1007/s12325-010-0061-2>
PMid:20737260
 15. Lee HJ, Hong SP, Cheon JH et al. Long-term outcome of palliative therapy for malignant colorectal obstruction in patients with unresectable metastatic colorectal cancers: endoscopic stenting versus surgery. *Gastrointest Endosc* 2011; 73:535-42.
<https://doi.org/10.1016/j.gie.2010.10.052>
PMid:21257165
 16. Small AJ, Coelho-Prabhu N, Baron TH. Endoscopic placement of self-expandable metal stents for malignant colonic obstruction: long-term outcomes and complication factors. *Gastrointest Endosc* 2010; 71:560-72.
<https://doi.org/10.1016/j.gie.2009.10.012>
PMid:20189515
 17. van Hooft JE, Fockens P, Marinelli AW et al. Early closure of a multicentre randomized clinical trial of endoscopic stenting versus surgery for stage IV left-sided colorectal cancer. *Endoscopy* 2008; 40:184-91.
<https://doi.org/10.1055/s-2007-995426>
PMid:18322873