Original Article

Endoscopic stenting should be advocated in patients with stage IV colorectal cancer presenting with acute obstruction

Tian-Zhi Lim[1], Dedrick Kok Hong Chan[1], Ker-Kan Tan[1,2]

[1]Division of Colorectal Surgery, University Surgical Cluster, National University Health System, Singapore, Singapore; [2]Department of Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore

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Correspondence to: Ker-Kan Tan. Division of Colorectal Surgery, University Surgical Cluster, 1E Kent Ridge Road, National University Health System, Singapore 119228, Singapore. Email: ker_kan_tan@nuhs.edu.sg.

Background: It remains contentious whether endoscopic stenting or upfront surgery is more optimal in patients with metastatic colorectal cancers presenting with large bowel obstruction.

Methods: A retrospective review of all patients with metastatic colorectal cancer who underwent either endoscopic stenting or emergency surgery for acute large bowel obstruction was performed.

Results: Between January 2007 and June 2014, 66 patients, median age, 64 (range, 25–96) years, presented with acute large bowel obstruction from metastatic colorectal cancer. Forty (60.6%) patients underwent endoscopic stenting whilst the rest received immediate upfront surgical intervention. Of the 40 patients, 29 (72.5%) were successfully stented. The remaining 11 (27.5%) patients who failed endoscopic stenting required immediate emergency surgery to relieve the obstruction. Patients who failed endoscopic stenting had worse complications than those patients who had their stents successfully inserted [odds ratio (OR), 23.3; 95% confidence interval (CI), 2.29–250.00, P=0.004]. Patients who underwent emergency surgery had a longer median length of stay than patients who had successful endoscopic stenting (P=0.003). The patients that underwent successful stenting had earlier commencement of chemotherapy compared to those who had upfront surgery (P=0.02). There was no difference in stoma creation rates between patients who had emergency surgery versus those who were successfully stented.

Conclusions: Stenting is a safe option in patients with stage IV colorectal cancer presenting with acute large bowel obstruction. Earlier commencement of chemotherapy occurs in patients who were successfully stented. Patients who failed stenting have equivalent outcomes to those who undergone upfront emergency surgery.

Keywords: Metastatic; colorectal cancer; stenting; treatment outcome

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Introduction

In patients with metastatic colorectal cancers presenting with acute large bowel obstruction, there is the need to alleviate the obstruction, whilst bearing in mind that disease load and response to chemotherapy often determines their prognosis (1). The timing of chemotherapy administration is largely dependent on how early the patient can recover from the insult of the acute presentation. In recent years, endoscopic stenting has emerged as an alternative approach to patients presenting with such obstructed cancers, and needs to be considered in the light of the above considerations.

Endoscopic stenting enables prompt relief of the

Table 1 Demographics of the study group

Characteristics	Stenting group (n=40)	Operative group (n=26)
Median age (range, years)	67.5 [38–96]	57 [25–79]
Male sex (%)	22 [55]	13 [32.5]
Site of primary colon cancer		
Splenic flexure	2 [5]	6 [15]
Descending colon	4 [10]	3 [7.5]
Sigmoid colon	26 [65]	5 [12.5]
Recto-sigmoid	6 [15]	3 [7.5]
Rectum	2 [5]	9 [22.5]
Site of metastasis		
Liver	14 [35]	10 [38.5]
Lung	5 [12.5]	2 [7.7]
Liver & lung	16 [40]	6 [23.1]
Peritoneum	14 [35]	13 [50]
Stent success rates		
Technical		
Success	29 [72.5]	
Failure	11 [27.5]	
Clinical		
Success	29 [100]	
Failure	0 [0]	

obstruction and should enable earlier commencement of chemotherapy (2,3). However, its complications include failure of the stent which would require immediate surgery to relieve the obstruction. Earlier studies have reported that emergency surgery following an episode of failed stenting may be associated with worse complications than upfront emergency surgery (4,5). Morbidities following major surgery for colonic obstruction are significant, while less extirpative surgeries such as defunctioning stoma have implications on the patients' quality of life (6).

We undertook this study to compare the outcomes between endoscopic stenting and upfront emergency surgery in patients with metastatic colorectal cancers presenting with acute large bowel obstruction.

Methods

A retrospective review of all patients with metastatic colorectal carcinoma presenting with acute large bowel obstruction from January 2007 to June 2014 was performed. Only those who underwent emergency surgery or endoscopic stenting were included for the purpose of this study. The study was reviewed and approved by the institutional review board.

In our institution, a computed tomographic (CT) scan is typically performed within 12 hours of admission in all suitable patients presenting with features suggestive of colonic obstruction. Patients presenting with a guarded abdomen and were haemodynamically unstable were sent straight to the operating theatre instead.

Once the diagnosis of metastatic colorectal cancer causing large bowel obstruction was confirmed, the immediate aim was to alleviate the obstruction. This was performed via endoscopic stenting or emergency surgery. These two approaches form the main arms of comparison in our study. The decision to undergo either approach made at the clinical discretion of the consultant colorectal surgeon.

For endoscopic stenting, technical success was defined as the successful placement and deployment of the stent, while clinical success was defined as the presence of colonic decompression within 48 hours of successful placement of the stent, with resolution of the symptoms of large bowel obstruction.

Apart from patient demographics, extent of disease, type of procedure performed, the severity of the post-procedural complications is graded according to the classification proposed by Clavien and colleagues (7-9). Grade III and above complications were defined as severe. The dates of commencement of subsequent chemotherapy and the duration of survival were also documented. The study was analyzed with an intention to treat basis.

Categorical and continuous variables were analysed using the Fisher's exact test and Mann Whitney U test, respectively. The overall survival probability was estimated using the Kaplan-Meier method. All analyses were performed using the Statistical Package for the Social Sciences version 18.0 (SPSS, Chicago, Illinois, USA) and P values of <0.05 were considered statistically significant.

Results

During the study period, 66 patients with metastatic colorectal cancers presenting with large bowel obstruction underwent either attempted stenting or emergency surgery to relieve the obstruction (*Table 1*). Twenty-six (39.4%) patients underwent immediate surgery with no attempt at

Table 2 Post-procedural complications

Study sample grouping	GOC III, IV, V	GOC 0, I, II	P value (Fisher's exact test)	Odds ratio (95% CI)
Stenting group (n=40) (%)	6 (15.0)	34 (85.0)	1	1.03 (0.25–3.84)
Operative group (n=26) (%)	4 (15.4)	22 (84.6)		
Successful stenting group (n=29) (%)	1 (3.4)	28 (96.6)	0.004	23.3 (2.29–250)
Failed stenting followed by surgery (n=11) (%)	5 (45.5)	6 (54.5)		
Failed stenting followed by surgery (n=11) (%)	5 (45.5)	6 (54.5)	0.09	4.6 (0.93–22.6)
Operative group (n=26) (%)	4 (15.4)	22 (84.6)		
Successful stenting group (n=29) (%)	1 (3.4)	28 (96.6)	0.178	5.1 (0.53–50)
Operative group (n=26) (%)	4 (15.4)	22 (84.6)		

GOC, grading of complications.

endoscopic stenting. The remaining 40 (60.6%) patients had endoscopic stenting attempted, of which 29 (72.5%) were successful. All patients who achieved technical success also attained clinical success with resolution of their symptoms following the procedure. The 11 (27.5%) patients who failed endoscopic stenting underwent immediate surgery to relieve the obstruction. The commonest site of the obstruction for the stenting group was at the sigmoid colon (n=26, 65%). The majority of the metastases were seen in the liver (n=46, 69.7%).

Post-procedural outcomes

Amongst the 26 patients who underwent emergency open surgery, an anterior resection was performed in 5 (19.2%) patients. Nine of these patients did not have any resection performed, with 6 of them having a defunctioning loop stoma created while 3 patients underwent a bypass procedure. Two patients from this group died on their index admission. One patient with an ileo-descending bypass experienced a massive acute myocardial infarction a few hours after the operation and passed away. The second patient died from septic shock and disseminated intravascular coagulopathy (DIVC).

In the 29 patients who were successfully stented, 14 underwent elective surgery at a median duration of 18.7 (range, 1.3–99.1) weeks. The majority of these surgeries were segmental resection of the malignancy, with 4 having defunctioning stomas and 1 undergoing a bypass procedure. Two patients required emergency surgeries when they developed stent complications 1 and 2 months after the stents were inserted. Stent-related perforation of the tumor occurred in both patients and emergency surgery was performed to remove the affected segment. One passed away from the subsequent septic shock. *Table S1* illustrates the surgeries performed in this study group. In the remaining 13 patients, 7 declined surgery post-stenting and opted for palliative management while 6 patients did not follow-up after they were discharged.

The group of patients who failed the stenting procedure and underwent emergency surgery were 23 times more likely to develop severe complications compared to the group who were successfully stented [odds ratio (OR), 23.3; 95% confidence interval (CI), 2.29–250.00, P=0.004] (*Table 2*). Comparing patients who had emergency surgery following failed stenting and those who had immediate surgery, there was no statistical significant difference, although worse outcome in the failed stenting group was also observed (P=0.09). Patients who underwent emergency surgery upfront had a longer median length of stay compared to those patients who had a successful endoscopic stenting procedure (P=0.003) (*Table S2*).

Commencement of palliative chemotherapy

The number of patients who received palliative chemotherapy was comparable in both the stenting and operative groups (59.3% and 61.5%). The group of patients who were stented received chemotherapy earlier (median: 4.3; 1–6.7 weeks) than those who underwent immediate surgery upfront (median: 7; 1.3–84 weeks) (P=0.02) (*Tables 3,4*). Both groups had comparable disease specific mortality

Table 3 Palliative chemotherapy

Characteristics	Stenting group (n=27)	Operative group (n=26)	Mann-Whitney U test
Post-procedural chemotherapy (%)	16 (59.3)	16 (61.5)	NA
Median time to chemotherapy, weeks (range)	4.3 (1–6.7)	7 (1.3–84)	0.02

NA, not available.

Table 4 Analysis of patients who underwent palliative chemotherapy

Characteristics	Failed stenting followed by surgery (n=3)	Successful stenting (n=13)	Operative group (n=16)	Mann-Whitney U test
Median time to chemotherapy, weeks (range)	4.5 (4.1–4.8)	–	7 (1.3–84)	0.203
	–	3.9 (1–6.7)	7 (1.3–84)	0.02
	4.5 (4.1–4.8)	3.9 (1–6.7)	–	0.829

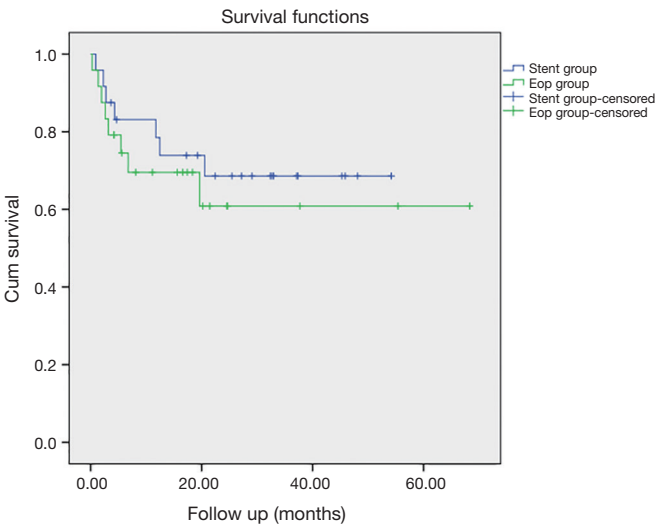

Figure 1 Kaplan Meier curve showing survival between patients who were successfully stented and those who underwent emergency upfront surgery.

rates (33.3% *vs.* 34.6%) though overall survival was longer in the group that was stented, albeit it being statistically insignificant (23.9 *vs.* 13.4 months, P=0.076) (*Figure 1*).

Discussion

Endoscopic stenting is an alternative to surgery in the management of patients with acute intestinal obstruction from stage IV colorectal cancer. Success rates of 70% to 90% have been reported (10-12). Some of the advantages include lesser morbidity from an elective procedure, less extensive surgical resection, avoidance of a stoma (13-17), possibility of a laparoscopic procedure to be performed (18,19) and a shorter hospitalization stay (6). These were also observed in our study.

The importance of chemotherapy after surgery in metastatic colorectal cancers cannot be understated (20-24). Not only does it prolong the median survival, it also increases the possibility of downstaging previously unresectable metastatic disease (25). To allow these patients the chance to have better long-term outcome, the ability to administer chemotherapy within a certain therapeutic window is important, beyond which, the benefits are questionable.

Patients who had successful stenting had the best outcomes. Interestingly, patients who failed stenting and required emergency surgery did not fare worse when compared with these patients who had upfront emergency surgery. The authors acknowledge that factors such as the angulation of the tumour to the lumen and the experience of the endoscopist are predictive of the success of the procedure and must be taken into consideration before wholesale adoption of endoscopic stenting. Moreover, the possibility of the stent giving rise to complications while the patient is undergoing chemotherapy is a genuine concern. Stent related perforation and migration can be encountered and managing these complications during their chemotherapy cycle can be associated with disastrous outcomes.

Our findings translated to earlier commencement of chemotherapy in the patients with successful stenting, and no delay in the commencement of chemotherapy between patients who failed stenting and who had upfront emergency surgery. This suggests that endoscopic stenting

may be considered in stage IV colorectal cancer patients with acute large bowel obstruction, barring any signs of clinical peritonism or contraindication to endoscopic stenting.

More importantly, numerous recent studies have confirmed the significant improvement in the quality of life in stage IV colorectal cancers who were successfully stented for their malignant obstruction. A randomized controlled trial performed by Young *et al.* showed that stenting in patients with obstructed stage IV disease was associated with better quality of life outcomes when compared to baseline at 1 week, and at 12 months (P=0.001 and P=0.01), without worse clinical outcomes in terms of 30-day mortality and median overall survival (26). This concurs with earlier non-randomized studies which have shown improved overall quality of life, as well as quality of life relating to gastrointestinal symptoms in patients who underwent stenting instead of emergency surgical decompression (27).

Our study shows that stenting enables these stage IV patients to undergo chemotherapy earlier than those who underwent upfront surgery, even though both were within a 12 weeks therapeutic window (28). Our study, however, did not demonstrate any survival benefit between the two groups. Limitations to our study include the small sample size, as well as the potential selection bias which arose due to the decision for stenting or emergency upfront surgery being made at the discretion of the consultant colorectal surgeon. As a result, there was heterogeneity in our comparison groups, such as in the proportion of patients with a rectal lesion that underwent stenting versus upfront surgery.

Conclusions

Endoscopic stenting is an option in patients with metastatic colorectal cancers presenting with acute large bowel obstruction. Patients who have undergone successful stenting commence chemotherapy earlier than those with upfront surgery without stenting. Patients who fail stenting and require emergency surgery do not fare worse than patients who undergo upfront surgery without stenting.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Ethical statement: The study was approved by the National Healthcare Group Domain Specific Review Board (NHG DSRB). NHG DSRB Reference number: 2012/00707 and informed consent was taken from all the patients.

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Supplementary

Table S1 Type of operative procedure

Characteristics	Stenting group* (n=27)	Operative group (n=26)
Nature of surgery (%)		
Elective	14 (51.9)	0 (0)
Emergency	13 (48.1)	26 [100]
Type of surgery (%)		
Laparoscopic	6 (22.2)	1 (3.8)
Open	21 (77.8)	25 (96.2)
Laparoscopic convert open	0 (0)	0 (0)
Operative procedure (%)		
Extended right hemicolectomy	0 (0)	3 (11.5)
Left hemicolectomy	1 (3.7)	0 (0)
Sigmoid colectomy	1 (3.7)	1 (3.8)
Anterior resection	13 (48.1)	5 (19.2)
Hartmann's procedure	2 (7.4)	0 (0)
Subtotal colectomy	3 (11.1)	4 (15.4)
Total colectomy	2 (7.4)	4 (15.4)
Bypass	1 (3.7)	3 (11.5)
Defunctioning stoma with no resection	4 (14.8)	6 (23.1)
Stoma creation (%)	14 (51.9)	13 [50]

*, the 27 patients comprise 11 patients with technical failure, 14 with clinical success, and 2 patients who developed stent complications.

Table S2 Perioperative outcomes

Characteristics	Stenting group (n=27)	Operative group (n=26)	Statistical test
Median length, days (range)	5 [1–56]	12 [2–40]	0.003 (Mann-Whitney U test)
Overall survival (range, months)	23.9 [1–54.2]	13.4 [1–68]	0.53 (Log Rank test)