

PALLIATIVE TREATMENT OF MALIGNANT GASTRIC OUTLET OBSTRUCTION WITH SELF EXPANDABLE METAL STENTS

Hashmatullah Khan¹, Fan Zhining², Aamer Ghafoor³, Abbas Khan Khattak⁴, Muhammad Kamran Hassan⁵

^{1, 3-5} Department of Gastro-ent-erology, Lady reading hospi-tal, Peshawar - Pakistan.

² Jiangsu Province Hospital, Nanjing - China.

Address for correspondence:

Dr. Hashmatullah Khan

Senior Registrar,

Department of Gastro-enter-ology, Lady reading hospital, Peshawar - Pakistan.

Email: drhashmat1980@gmail.com

Date Received:

April 06, 2016

Date Revised:

June 22, 2016

Date Accepted:

June 30, 2016

ABSTRACT

Objectives: To determine the technical feasibility and clinical outcome of Self-expandable metal stents (SEMS) to palliate symptoms of malignant gastric outlet obstruction (GOO).

Methodology: This was a prospective non-randomized study. It was performed at Jiangsu Province Hospital, Najing China. Duration was one year from april 2015 to 2016. Patients with gastric outlet obstruction caused by unresectable malignancy of stomach, pancreas and duodenum were included in a consecutive manner. Stenting was done under direct endoscopic and fluroscopic visualization and conscious sedation. Only uncovered SEMS were used. We evaluated our technical success rate, Gastric Outlet Obstruction Scoring System (GOOSS) score before and after stent placement, and complications.

Results: Total number of patients was 30. Self Expandable Metal Stents (SEMS) were successfully placed in all patients. Thus, technical success rate was 100%. 29 patients resumed oral intake without vomiting. Clinical success rate was 96.7%. There was significant improvement in GOOSS score with stenting (p value < 0.05). Only 2 (6.7%) patients had their stents blocked due to tumor ingrowth later in the course of follow-up which was successfully managed by re-stenting.

Conclusion: Use of SEMS as a palliative modality for malignant GOO is a feasible, safe and effective method.

Key Words: Malignant gastric outlet obstruction, Self-expandable metal stents, Palliation

This article may be cited as: Khan H, Zhining F, Ghafoor A, Khattak AK, Hassan MK. Palliative treatment of malignant gastric outlet obstruction with self expandable metal stents. J Postgrad Med Inst 2016; 30(3): 213-7.

INTRODUCTION

Pancreatic, gastric and duodenal malignancies lead to gastric outlet obstruction in 20% of patients¹. Loss of appetite with poor oral intake, nausea, vomiting, abdominal distension, epigastric pain are the common presenting symptoms. Dehydration and malnutrition, with resultant poor quality of life are frequent consequences of GOO.

Surgically created gastro-jejunostomy has long been considered the traditional treatment modality for malignant GOO. This modality, although has good functional outcome and symptomatic relief, is highly morbid and there is need for general anesthesia in already fragile patients²⁻⁵.

Use of self-expandable metal stents (SEMS) for duodenal stenting is less invasive and can be performed under conscious sedation⁶. Initially radiologists used to place the stents perorally or percutaneously under flu-

oroscopic guidance but being invasive and with limited technical success rates this approach never got popularity⁷. Reduction in the size of stent assembly, allowing its passage through the working channel of endoscope was a major breakthrough as described by Truonge et al in 1992. Such stents can be placed under both fluoroscopic and endoscopic guidance⁸.

With technological advances this endoscopic placement of stents has become more successful and gained popularity. Treatment of malignant GOO by SEMS has become an effective and safe method. Several studies have reported technical success rate of 90-100% and a favorable clinical success rate of 67-100%. Being less invasive and without the need for general anesthesia it has become the treatment of choice for such patients⁹⁻¹².

Use of SEMS for duodenal stenting is not without complications. Stent blockage leading to recurrence of symptoms is a common complication. It can be due to either tumor overgrowth/ ingrowth into the stent

mesh or impaction of food bolus. Many endoscopic techniques are available to deal with stent blockage including re-stenting. Stent migration is another common complication. It can occur during stent deployment or after stent placement. Perforation and bleeding are the most severe, but rare, complications^{13,14}. In this study the technical success and clinical outcomes of duodenal stenting are evaluated.

METHODOLOGY

This prospective study was performed at Jiangsu Province Hospital, Nanjing China over a period of one year from April 2015 to 2016. We included patients with documented gastric outlet obstruction caused by malignancy of stomach, pancreas or duodenum (confirmed by endoscopy or radiography). These patients had advanced disease and hence not suitable for surgical resection (determined by U/S, CT or EUS as and when needed). Patients having gastroduodenal strictures at multiple sites and those considered unfit for upper GI endoscopy were excluded. Risks, benefits and alternatives were explained to each patient and all patients gave consent for stenting. Approval was taken from the institutional review board of Jiangsu Province Hospital.

We used metal stents made by Boston scientific USA or Microtec China. These were 9 or 12cm long with diameters of 18-23mm.

3mg intravenous midazolam was used for sedation and upper GI endoscopy was performed with adult size colonoscope, the working channel of which is large enough to allow the passage of stent assembly. World-wide colonoscopes are used for enteral stenting as the working channel of upper GI Endoscope does not allow the passage of stent, due to smaller channel size. After endoscopic visualization of the stricture lumen a standard biliary guide wire (jag wire) 0.035 inches in size was traversed through the stricture followed by passage of ERCP catheter over the wire. ERCP catheter was advanced beyond the stricture followed by injection of contrast into the catheter channel. The fluoroscopic image thus obtained gives the length of the stricture. The guide wire is then exchanged for a longer and hydrophilic guide wire (Kangawa Japan).

With guide wire in the working channel of the scope the stent assembly is advanced over it and into the stricture. The stent was advanced back and forth to achieve a correct alignment across the stricture. The stent is then released gradually and deployed in a distal to proximal manner.

The patients were observed for early complications like perforation, stent migration or hemorrhage endoscopically/fluoroscopically during the procedure and then clinically. Once the patient was clinically stable

clear liquids were allowed from the next morning and then semisolid food was started as tolerated.

Patients were considered fit for discharge once they were able to take at least a liquid/softened diet without vomiting. They were then followed fortnightly for three months and inquired about the type of food and recurrence/worsening of symptoms. Patient with recurrent symptoms had a barium study or endoscopy.

Technical and clinical success rates; complications, including stent obstruction, stent migration, perforation and hemorrhage were the main outcome measures. A stent was considered to be technically successful when it fully covers the stricture and its precise positioning is confirmed by endoscopy and fluoroscopy. A clinically successful stent was one which enables oral intake without vomiting. Gastric Outlet Obstruction Scoring System score (GOOSS) of each patient was determined before and after stenting as proposed by Adler and Baronn as follows: 0, no oral intake; 1, liquids only; 2, soft solids; and 3, low-residue or full diet¹².

Data were analyzed by SPSS version 20. Data were expressed as numbers (%) for categorical variables or as mean (range) for continuous variable. Pre & post GOOSS mean scores were compared using student t-test. p value was considered significant if less than <0.05.

RESULTS

Duodenal SEMS were placed in a total of 30 patients. Table 1 shows baseline characteristics of patients. Pancreatic cancer was the most common malignancy (47%) followed by gastric cancer (33%). Duodenal cancer was present in 6(20%) patients. Self-expandable metal stents (SEMS) were successfully placed in all patients. Thus, technical success rate was 100%. Only one patient had stent migrated during deployment. None of the patient had severe complications like perforation and hemorrhage. Only 2 (6.7%) patients had their stents blocked due to tumor in-growth. 29 patients resumed oral intake without vomiting. Clinical success rate was 96.7% (table 2).

In 21 patients (70%) oral intake was not possible without stenting (GOOSS score 0) and 6 were able to take liquids only (GOOSS score 1). 26 patients (86.7%) resumed solid or semisolid food intake with duodenal stenting (GOOSS score 2or3). There was highly significant improvement in GOOSS score with stent placement (p value <0.00001) (table 3).

Table 1: Baseline characteristics of patients

Age (Years)	
<50	3(10%)
50-69	20(66.6%)
≥70	7(23.3%)
Mean(Range)	65(40-90)
Gender	
Male	18(60%)
Female	12(40%)
Malignancy	
Gastric	10(33.3%)
Pancreatic	14(46.6%)
Duodenal	6(20%)

Table 2: Outcome of SEMS

Outcome of SEMS	
Technical Success	100%
Clinical Success	96.7%
Complications	
Perforation	0
Hemorrhage	0
Stent Migration	1(3.3%)
Stent Occlusion	2(6.7%)

Table 3: GOOSS score before & after stenting

GOOSS Score	Before	After	P Value
0	21(70%)	1(3.3%)	<0.00001
1	6(20%)	3(10%)	
2	2(6.67%)	18(60%)	
3	1(3.3%)	8(26.7%)	
Mean GOOSS Score	0.43	2.1	

DISCUSSION

Gastric Outlet Obstruction (GOO) is a frequent complication of advanced cancers of stomach, pancreas and duodenum. Surgically created gastro-jejunostomy has long been considered the traditional palliative treatment modality for malignant GOO. The development of through the scope SEMS has emerged an alternative treatment option. Its functional outcome is similar to that of gastrojejunostomy¹⁵.

SEMs are compressed cylindrical mesh made of various types of alloy. They come in different lengths and diameters. When the stent is released it exerts a radial expansive force until it achieves its maximum diameter. This anchors the stent. To prevent migration most SEMs have a proximal and/or distal flare.

Duodenal stents can be covered and uncovered. Most of the stents are made up of Nitinol alloy. Nitinol stents have better axial and radial anchoring force as they are more flexible. It has almost replaced other materials.

Duodenal stenting should only be performed in centers where expertise and equipment are available. The technique is now well established. In our study duodenal stents were successfully placed in all 30 patients. Thus our technical success rate was 100%. In 2007 Huang et al reported similar success rates in their 15 patients¹⁶. However majority of other studies shows technical success rates of around 90-95%¹⁷⁻²⁰. This is due to the small sample size of our study which also seems to be the reason for high success rate reported by Huang et al.

Most of the literature shows that duodenal stenting has a good functional outcome. Symptoms of GOO like vomiting, pain and fullness rapidly resolves and patients can take normal or near normal diet with stenting²¹⁻²⁴. Our study also showed this rapid resolution of these symptoms. After stent placement a significant improvement of GOOSS score was observed as compared to pre-stenting value. Mean score of 0.43 improved to 2.1 with stenting, (p value <0.00001). Resolution of oral intake was possible in all but one patient. Hence our clinical success rate was 96.7%. In this patient the stent patency and position was re-examined and found optimal. However he may have gastro-paresis or peritoneal carcinomatosis, both sequel of underlying malignancy.

Blockage and migration are relatively common complications of duodenal stenting. It can be due to either tumor overgrowth/ ingrowth into the stent mesh or impaction of food bolus. Perforation and bleeding are the most severe, but rare, complications^{13,14,25-27}. Our review showed comparable frequency of complications. In our study there was no perforation or hemorrhage during stent deployment. One patient had forward migration of stent during placement which was repositioned endoscopically. There were no cases of delayed migration in our series which is because of the fact that we used only uncovered stents. Stent blockage due to tumor ingrowth or overgrowth is a late complication manifesting as recurrence of GOO symptoms. We encountered two cases of stent occlusion due to tumor ingrowth. In both cases re-stenting was successful in alleviating patient symptoms.

CONCLUSION

Duodenal stenting with SEMS is an effective and relatively safer method for palliative treatment of malignant GOO.

REFERENCES

1. Jeurink SM, van Eijck CHJ, Steyerberg EW, Kuipers EJ, Siersema PD. Stent Vs gastrojejunostomy for the palliation of gastric outlet obstruction: a systematic review. *BMC Gastroenterol* 2007; 8:7-18.
2. Holt AP, Patel M, Ahmed MM. Palliation of patients with malignant gastroduodenal obstruction with self-expanding metallic stents: the treatment of choice? *Gastrointest Endosc* 2004; 60:1010-7.
3. Maetani T, Tada T, Ukita T, Inoue H, Sakai Y, Nagawa J. Comparison of duodenal stent placement with surgical gastrojejunostomy for palliation in patients with duodenal obstructions caused by pancreaticobiliary malignancies. *Endoscopy* 2004; 36:73-8.
4. Del Piano M, Ballare M, Montino F, Todesco A, Orsello M, Magnani C et al. Endoscopy or surgery for malignant GI outlet obstruction? *Gastrointest Endosc* 2005; 61:421-6.
5. Hosono S, Ohtani H, Arimoto Y, Kanam Y. Endoscopic stenting versus surgical gastroenterostomy for palliation of malignant gastroduodenal obstruction: a meta-analysis. *J Gastroenterol* 2007; 42: 283-90.
6. Mosler P, Mergener KD, Brandabur JJ, Schembre DB, Kozarek RA. Palliation of gastric outlet obstruction and proximal small bowel obstruction with self-expandable metal stents: a single center series. *J Clin Gastroenterol* 2005; 39:124-8.
7. de Baere T, Harry G, Ducreux M, Elias D, Briquet R, Kuoch V, Roche A. Self-expanding metallic stents as palliative treatment of malignant gastroduodenal stenosis. *AJR Am J Roentgenol* 1997; 169:1079-83.
8. Truong S, Bohndorf V, Geller H, Schumpèlick V, Günther RW. Self-expanding metal stents for palliation of malignant gastric outlet obstruction. *Endoscopy* 1992; 24:433-5.
9. Dormann A, Meisner S, Verin N, Weng Lang A. Self-expanding metal stents for gastroduodenal malignancies: systematic review of their clinical effectiveness. *Endoscopy* 2004; 36:543-50.
10. Laasch HU, Martin DF, Maetani I. Enteral stents in the gastric outlet and duodenum. *Endoscopy* 2005; 37:74-81.
11. Telford JJ, Carr-Locke DL, Baron TH, Tringali A, Parsons WG, Gabbrielli A et al. Palliation of patients with malignant gastric outlet obstruction with the enteral Wallstent: outcomes from a multicenter study. *Gastrointest Endosc* 2004; 60:916-20.
12. Adler DG, Baron TH. Endoscopic palliation of malignant gastric outlet obstruction using self-expanding metal stents: experience in 36 patients. *Am J Gastroenterol* 2002; 97:72-8.
13. Nassif T, Prat F, Meduri B, Fritsch J, Choury AD, Dumont JL et al. Endoscopic palliation of malignant gastric outlet obstruction using self-expandable metallic stents: results of a multicenter study. *Endoscopy* 2003; 35:483-9.
14. Kim TO, Kang DH, Kim GH, Heo J, Song GA, Cho et al. Self-expandable metallic stents for palliation of patients with malignant gastric outlet obstruction caused by stomach cancer. *World J Gastroenterol* 2007; 13:916-20.
15. Shaw JM, Bornman PC, Krige JE, Stupart DA, Panieri E. Self-expanding metal stents as an alternative to surgical bypass for malignant gastric outlet obstruction. *Br J Surg* 2010; 97:872-6.
16. Huang Q, Dai DK, Qian XJ, Zhai RY. Treatment of gastric outlet and duodenal obstruction with uncovered expandable metal stents. *World J Gastroenterol* 2007; 13:5376-9.
17. Jung GS1, Song HY, Kang SG, Huh JD, Park SJ, Koo JY et al. Malignant gastroduodenal obstructions: treatment by means of a covered expandable metallic stent-initial experience. *Radiology* 2000; 216:758-63.

18. Morikawa S, Suzuki A, Nakase K, Yauda K. Palliation of malignant upper GI obstruction with self expandable metal stents. *Korean J Radiol* 2012; 13:98-103.
19. Lowe AS, Beckett CG, Jowett S, May J, Stephenson S, Scally A et al. Self-expandable metal stent placement for the palliation of malignant gastroduodenal obstruction: experience in a large, single, UK centre. *Clin Radiol* 2007; 62:738-44.
20. Kim JH, Song HY, Shin JH, Yook JH. Metallic stent placement in the palliative treatment of malignant gastroduodenal obstructions: prospective evaluation of results and factors influencing outcome in 213 patients. *Gastrointest Endosc* 2007; 66:256-64.
21. Wong YT, Brams DM, Munson L, Sanders L, Heiss F, Chase M et al. Gastric outlet obstruction secondary to pancreatic cancer: surgical vs endoscopic palliation. *Surg Endosc* 2002; 16:310-2.
22. Lee KM, Choi SJ, Shin SJ, Hwang JC, Lim SG, Jung JY et al. Palliative treatment of malignant gastroduodenal obstruction with metallic stent: prospective comparison of covered and uncovered stents. *Scand J Gastroenterol* 2009; 44:846-52.
23. Cho YK, Kim SW, Hur WH, Nam KW, Chang JH, Park JM et al. Clinical outcomes of self-expandable metal stent and prognostic factors for stent patency in gastric outlet obstruction caused by gastric cancer. *Dig Dis Sci* 2010; 55:668-741.
24. No JH, Kim SW, Lim CH, Kim JS, Cho YK, Park JM et al. Long-term outcome of palliative therapy for gastric outlet obstruction caused by unresectable gastric cancer in patients with good performance status: endoscopic stenting versus surgery. *Gastrointest Endosc* 2013; 78:55-62.
25. Graber I, Dumas R, Filoche B, Boyer J, Coumaros D, Lamouliatte H et al. The efficacy and safety of duodenal stenting: a prospective multicenter study. *Endoscopy* 2007; 39:784-7.
26. Brimhall B, Adler DG. Enteral stents for malignant gastric outlet obstruction. *Gastrointest Endosc Clin N Am* 2011; 21:389-403.
27. Soetikno RM, Lichtenstein DR, Vandervoort J, Wong RC, Roston AD, Slivka A et al. Palliation of malignant gastric outlet obstruction using an endoscopically placed Wall-stent. *Gastrointest Endosc* 1998; 47:267-70.

CONTRIBUTORS

HK conceived the idea, planned the study, and drafted the manuscript. FZ, AKK and MKH helped acquisition of data and did statistical analysis. AG supervised the study and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.