Published in final edited form as:

Surg Endosc. 2016 February ; 30(2): 521–525. doi:10.1007/s00464-015-4234-6.

Palliation of Malignant Gastric Outlet Obstruction with Simultaneous Endoscopic Insertion of Afferent and Efferent Jejunal Limb Enteral Stents in Patients with Recurrent Malignancy

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Abstract

Background—Patients with prior pancreaticobiliary or distal gastric cancer treated surgically may have local anastomotic recurrence with obstruction of the afferent and efferent jejunal limbs. This report describes the efficacy and safety of simultaneous endoscopic insertion of self-expanding metal stents (SEMS) into the afferent and efferent jejunal limbs in patients with gastric outlet obstruction (GOO) of post-surgical anatomy for palliation of recurrent malignancy.

Methods—Patients were identified from an endoscopic database at a specialized cancer center between September 2007 to March 2014. Technical success was defined as single-session insertion of afferent and efferent jejunal limb enteral stents. Clinical success was defined as immediate symptom relief and ability to advance diet. A durable response was defined as symptom relief of at least 60 days or until hospice placement or death.

Results—Twenty-three patients were identified who underwent insertion of two 22 mm diameter uncovered duodenal stents. Stent length varied from 60 to 120 mm. Stents were placed under endoscopic and fluoroscopic guidance. Three patients required balloon dilation to facilitate stent insertion. Average procedure time was 58.8 min (range 28–120). Technical success was achieved in 23/24 (96%) patients. Clinical success was achieved in 19/23 (83%) patients. Following initial stent insertion and prior to subsequent re-intervention 11/19 (58%) patients had a durable response with a median duration of 70 days (range 4–315). Eight (42%) patients underwent subsequent re-intervention at a median of 22 days (range 11–315). Five patients had stent revision and were able to tolerate oral intake. Two patients had percutaneous endoscopic gastrostomy (PEG)/jejunostomy

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Disclosures:

Isaac Soo MD – no conflict of interest

Hans Gerdes MD – no conflict of interest

Arnold J Markowitz MD – no conflict of interest

Robin B Mendelsohn MD – NPS Pharmaceuticals, Advisory Committee; Genentec, Consultant

Emmy Ludwig MD – no conflict of interest

Pari Shah MD – no conflict of interest

Mark Schattner: Boston Scientific, Consultant

(PEJ) insertion. One patient required surgical diversion for persistent obstruction. Complications included stent migration and post-stent insertion bacteremia due to food bolus obstruction.

Conclusions—Recurrent malignant gastric outlet obstruction in patients with post-surgical anatomy treated with simultaneous endoscopic enteral stenting of afferent and efferent jejunal limbs has a high rate of technical and clinical success, low rate of complications and provides effective palliation.

Keywords

Gastrojejunostomy; enteral stent; endoscopic palliation; pancreaticobiliary cancer; gastric cancer; malignant gastric outlet obstruction

Introduction

Symptom palliation from malignant gastrointestinal (GI) obstruction is a well accepted indication for endoscopic insertion of self-expanding metal stents (SEMS). SEMS have been placed to treat esophageal, biliary, gastric, duodenal and colonic obstructions¹⁻⁴.

Surgical treatment of patients with resectable pancreaticobiliary or distal gastric cancer commonly includes creation of afferent and efferent jejunal limbs. Patients may have local recurrence of disease with subsequent malignant obstruction of the afferent and efferent jejunal limbs at the level of the anastomosis. This results in symptomatic gastric outlet obstruction (GOO), with patients commonly presenting with nausea, vomiting, abdominal pain, distention and inability to eat per os. Some cases may also be complicated by cholangitis, due to impaired drainage of the distended, bile filled, obstructed afferent jejunal limb. As in patients with other causes of malignant GI obstruction, endoscopic insertion of SEMS may also be used for palliation in patients with post-operative anatomy and obstructed afferent/efferent jejunal limbs from recurrent malignant disease. Simultaneous insertion of two SEMS through an obstructed anastomosis into each the afferent and efferent jejunal limbs is technically challenging as stent insertion into one limb may increase the difficulty of accessing and successfully stenting the other limb.

There is currently limited information on the efficacy and safety of simultaneous endoscopic insertion of afferent and efferent jejunal limb SEMS for GOO in patients with recurrent malignancy⁵⁻¹⁰. Hence, we report our experience with this procedure at a specialized cancer center.

Materials and Methods

Patients

Retrospective review of a prospective gastrointestinal (GI) endoscopic database and the Electronic Medical Record at Memorial Sloan Kettering Cancer Center (MSKCC) was completed for records from September 2007 to March 2014 to identify patients meeting the following inclusion criteria: (1) history of surgical treatment for pancreaticobiliary or distal gastric malignancy with creation of afferent/efferent jejunal limbs; (2) clinical and radiographic evidence of gastric outlet obstruction (3) endoscopic confirmation of recurrent

malignant disease at the anastomosis; (4) attempt at simultaneous endoscopic insertion of two enteral SEMS into both the afferent and efferent jejunal limbs across the obstructed gastrojejunostomy.

Information obtained from these databases and inpatient/outpatient medical records included: age, gender, primary cancer diagnosis, surgical resection type and date, symptoms pre- and post-stent insertion, radiological images, extent of recurrent malignant disease, treatment, stent insertion procedure details, clinical response to stent insertion, complications and follow-up management.

The study was approved by the MSKCC institutional review board.

GI Endoscopy

Patients were kept nothing per os for at least 8 hours before the procedure. At time of endoscopy, patients underwent endotracheal intubation and received general anesthesia. Upper gastrointestinal endoscopy was performed using a GIF Type 1TQ160 endoscope (Olympus, Tokyo, Japan) with through the scope enteral stent placement via a 3.7 mm working channel.

Endoscopic SEMS Placement

Characterization of the malignant gastrojejunal anastomotic stricture and enteral SEMS insertion was performed under both direct endoscopic and fluoroscopic guidance. If the endoscope was not able to traverse the anastomotic stricture, then guidewires were passed under fluoroscopic guidance. Two 0.035 inch Jagwires (Boston Scientific, MA, USA) were advanced through the obstructed segment, one into each jejunal limb. In some cases, dilation of the anastomotic stricture was performed with a CRE wire-guided balloon (Boston Scientific) to facilitate insertion of the enteral stents. Radioopaque markers were placed on the skin to document the location of the surgical anastomosis and distal end of each stricture.

The stents utilized were uncovered nitinol duodenal Wallflex stents (Boston Scientific) with a body diameter of 22 mm and flare of 27 mm, of varying lengths – 60, 90 and 120 mm with a 10 Fr delivery system. The length of stent utilized was based on endoscopic and fluoroscopic findings, approximately 2–3 cm longer than the length of tumor stricture.

Two enteral SEMS were sequentially deployed across the anastomotic stricture. A minimum margin of 2 cm of non-strictured lumen at each stent end allowed for flaring and shortening following deployment. Final position and stent expansion was confirmed with abdominal radiographs post-stent insertion.

Technical success was defined as single-session insertion of both afferent and efferent jejunal limb enteral stents.

Clinical success was defined as immediate symptom relief and ability to advance diet. A durable response was defined as either symptom relief of at least 60 days or effective palliation until hospice placement or death

Statistical Analysis

Results were expressed as descriptors, means $\pm$ standard deviation, percentages or medians with ranges.

Results

Patient demographics

16/23 (70%) of patient were male. Complete patient demographics are shown in Table 1.

Technical Success

Technical success was achieved in 23/24 (96%) patients. Three patients required balloon dilation of the anastomotic stricture (up to 15 mm, 12 mm and 12 mm) to facilitate afferent jejunal limb SEMS insertion. Average procedure time was 58.8 min (range 28–120).

Clinical Success

Initial Clinical Success—Initial clinical success was achieved in 19/23 (83%) patients.

Four patients with successful SEMS placement failed to achieve immediate acceptable oral intake post-stent insertion. One patient underwent stent revision five days later for management of an obstructing food bolus that was lodged in the afferent jejunal limb stent. The food bolus was removed with a Roth net retrieval device (US Endoscopy, OH, USA), followed by insertion of a new Wallstent 22 mm x 120 mm placed coaxially within the pre-existing 22 mm x 90 mm efferent jejunal limb stent to facilitate preferential food movement into the efferent jejunal limb, as it was suspected that the afferent limb prosthesis was blocking the efferent jejunal limb stent. The patient's symptoms improved after food bolus disimpaction and stent revision. No further re-intervention was required up to 335 days of follow-up.

Of the remaining three non-responders, two patients had metastatic pancreatic cancer and 1 had metastatic gastric cancer. Two received a drainage percutaneous gastrostomy (PEG), and in both cases the enteral stents were noted to be patent at the time of endoscopy. The third patient declined drainage PEG.

Durable Response—Following initial stent insertion eleven of nineteen (58%) patients had a durable response, with a median duration of 70 days (range 4–315).

Six of eleven patients had effective palliation until time of death in hospital or discharge to home hospice (range 4–235). Three patients maintained stent patency for at least 60 days (range 76–140), before being lost to follow-up. Two patients maintained stent patency for at least 60 days (range 70–315), with subsequent need for stent revision.

Re- intervention—Eight of nineteen (42%) patients who demonstrated initial clinical success required re-intervention with either stent revision, PEG/PEJ insertion, or surgery during follow-up at a median of 22 days (range 11–315).

Five of eight (63%) patients had stent revision at a median of 22 days (range 19–315). All five attempts at stent revision were successful. See Table 2 for stent revision details. All patients were able to tolerate oral intake following stent revision. Duration of stent patency following revision lasted a median of 30 days (range 5–91); four of five patients with stent revision did not require further intervention up until the last day of follow-up. One patient received APC treatment of tumor overgrowth of stent at 5 days post stent revision.

Two patients had a combination drainage PEG and feeding percutaneous endoscopic jejunostomy (PEJ) inserted 17 and 22 days following stent insertion. All enteral stents were patent at the time of PEG/PEJ insertion.

One patient received surgical diversion with gastrojejunostomy, ileocolostomy and drainage gastrostomy tube because of persistent obstruction 11 days after stent insertion.

Complications

One patient had bacteremia that was attributed to obstruction of the afferent jejunal limb stent by an impacted food bolus felt related to afferent limb stent compression / blockage of the efferent limb stent. The patient was treated with antibiotics, food bolus disimpaction and stent revision. One patient required afferent limb stent removal following migration into the gastric body. No perforations, surgeries, or deaths occurred due to enteral stent placement.

Impact of Ascites and Peritoneal Disease on Clinical Success, and Feasibility of Initiating/or Continuing Chemotherapy after SEMS Placement

Eight of nineteen (42%) patients with initial clinical success had radiographic evidence of peritoneal disease and 8 (42%) had ascites. Two of the initial non-responders had no peritoneal disease and small volume ascites, whereas the two other patients had peritoneal disease, one with small volume ascites and the other without. The initial non-responder treated with stent revision had no ascites with presence of peritoneal disease.

Nine of twenty-three (39%) patients were receiving chemotherapy at the time of stent insertion. Following stent insertion, five patients continued, four discontinued and three initiated chemotherapy. For the four patients who discontinued chemotherapy, the decision to cease treatment was not stent related.

Discussion

There is limited data on the use of endoscopic placement of enteral SEMS for palliation of gastric outlet obstruction in patients with prior surgically created anastomosis with afferent/efferent limbs and recurrent malignancy.

Prior studies have focused mainly on comparison of endoscopic stenting compared to operative gastrojejunostomy for palliation of malignant gastric outlet obstruction in patients who had not undergone prior surgical resection of their primary pancreaticobiliary or distal gastric cancer^{4, 10–16}. For our study we included only those patients with recurrent malignant gastric outlet obstruction at the site of their post-operative afferent/efferent jejunal limb anastomosis.

We report a 96% technical success and 83% clinical success rate in patients treated with simultaneous endoscopic afferent and efferent limb enteric SEMS insertion. Patients who did not experience relief of symptoms were found to have patent stents on repeat endoscopic examination. This suggests that in some patients despite successful endoscopic enteral SEMS insertion, other underlying disease processes may be responsible for their ongoing symptoms. All three non-responsive patients had radiologic evidence of small volume ascites, one also had peritoneal carcinomatosis and none had other sites of more distal bowel obstruction.

Conversely, a significant proportion of patients with a successful clinical response also had radiologic evidence of small volume ascites and peritoneal disease so these findings alone are not a reason for failure. These findings are consistent with the results of a previous study by our group on endoscopic enteral SEMS insertion for management of malignant GOO in patients with underlying peritoneal carcinomatosis. In the absence of multifocal intestinal obstruction, SEMS placement may provide effective palliation of malignant gastric outlet obstruction, while the presence or absence of carcinomatosis or ascites did not predict clinical response ¹⁰.

Of the patients demonstrating initial clinical success, all those who underwent subsequent endoscopic re-intervention with stent revision were able to continue oral nutritional intake for a significant duration, including three patients who received coaxial insertion of a new SEMS into a pre-existing obstructed SEMS. All attempts at stent revision were successful. Our high rate of success with stent revision via second stent insertion into a pre-existing stent is consistent with findings of another prior study that reported coaxial stent re-insertion in patients with malignant GOO due to inoperable gastric cancer ¹⁷. As such, endoscopic stent revision may be considered prior to pursuing other potential palliative management options in patients with evidence of stent occlusion due to tumor in-/overgrowth following simultaneous afferent/efferent limb enteral SEMS placement in an anastomosis with recurrent malignant stricture.

There was no apparent association between SEMS insertion and a patient's ability to receive palliative chemotherapy thereafter. Patients were able to initiate or continue chemotherapy following enteral SEMS insertion. For patients who ceased chemotherapy, the decision was not related to SEMS placement.

Complications were limited in our cohort. In one patient, mal-positioning of the afferent jejunal limb enteral stent was associated with afferent stent food bolus obstruction and prosthesis-related obstruction of the efferent limb stent. The patient required treatment with antibiotics and stent revision, and subsequently was able to tolerate oral nutritional intake. Another patient had proximal stent migration into the gastric remnant which was successfully treated with endoscopic stent removal.

A high rate of technical and clinical success, and low incidence of complications, suggests that simultaneous endoscopic SEMS insertion into both afferent and efferent jejunal limbs is effective and safe palliative treatment of recurrent malignancy causing GOO in the setting of post-surgical anastomosis, and does not impact on the ability to receive chemotherapy. The

durable response rate of 48% seen in this series is also impressive and consistent with the natural history of these diseases which are often associated with multifocal progression and development of multiple symptoms following each intervention ¹⁸.

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Table 1**Patient Demographics**

Cancer Type and Sites	13 pancreas adenocarcinoma 9 gastric adenocarcinoma 1 gallbladder adenocarcinoma
Gender	16 men 7 women
Average Age at time of Surgical Resection (+/- SD)	62.6 +/- 12.0 years
Type of Surgical Resection	10 Billroth II 13 Pancreaticoduodenectomy (4 pylorus preserving)
Average Age at Time of Stent Insertion (+/-SD)	65.4 +/- 12.0 years
Extent of Malignant Disease Recurrence at Time of Stent Insertion	21 local and metastatic disease 2 local disease only
Peritoneal Disease	10 yes 13 no
Ascites	11 small to large amount 12 none or trace amount

Table 2

Summary of Stent Revisions

Insertion of 22mm x 90mm Wallflex enteral stent coaxially within pre-existing 22mm x 90mm efferent stent obstructed by tumor ingrowth
Insertion of 22mm x 120mm Wallflex enteral stent coaxially into pre-existing afferent/efferent stents obstructed from tumor overgrowth
Afferent limb enteral stent length was trimmed/ shortened with argon plasma coagulation (ERBE [Tubingen, Germany] (99 W / flow 1L/ minute) due to obstruction of food passage into efferent stent
Insertion of 22mm x 90mm Wallflex enteral stent coaxially into pre-existing afferent/efferent stents obstructed from tumor overgrowth
Removal of afferent limb enteral stent that had migrated into gastric body remnant