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Research Article

Evaluation of Self Expandable Metal Stents (SEMS) in Upper Gastrointestinal Malignancies as a Palliative Treatment, a Single Center Experience

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Abstract

Background: Self-expandable metal stents (SEMS) are being widely used to relieve symptoms of malignant esophageal and gastroduodenal obstruction in the setting of advanced inoperable upper gastrointestinal (GI) cancers.

Aim: Single center prospective study to evaluate the success rate and clinical outcome of SEMS in palliation of malignant upper gastrointestinal obstruction.

Methods: We studied 22 patients (11 with dysphagia and 11 with gastric outlet obstruction) referred to our center for SEMS insertion as palliative therapy in our endoscopy unit.

Results: The mean age of our patients was 53.09 ± 16.65 years (dysphagia patients 41.82 ± 15.85, GOO patients 64.36 ± 7.18). The stent was successfully inserted in 100% of our patients without major complications. There was improvement in obstructive symptoms with SEMS insertion as dysphagia score dropped from a mean of 3 ± 0.63 pre-stenting, to 0.91 ± 0.83. Also, marked improvement of GOOSS which changed from a mean of 0.64 ± 0.67 pre-stenting to a mean of 2.73 ± 0.46 post-stenting.

Conclusion: SEMS are a good option for palliation of advanced upper gastrointestinal malignancies that provide effective symptomatic relieve.

Keywords: *Dysphagia; Gastric Outlet Obstruction; Self-Expandable Metal Stent*

Abbreviations

SEMS: Self-Expandable Metal Stent; GOO: Gastric Outlet Obstruction; GOOSS: Gastric Outlet Obstruction Scoring System

Introduction

Upper gastrointestinal (GI) cancers have a very bad prognosis, that is attributed mainly to vague presentations or missed endoscopic detection [1,2].

Esophageal cancer by its 2 types adenocarcinoma and squamous cell carcinoma represents 8th common cancer worldwide [3]. Dysphagia is a pertain presenting symptom that affects quality of life [4].

Advanced carcinoma of stomach, duodenum and pancreas mostly results in malignant gastric outlet obstruction (GOO) in near to 20% of cancer patients [5].

Self-expandable metal stents (SEMs) are cylindrical metallic devices that are being widely used as a palliative safe alternative to surgical bypass operations to alleviate the symptoms of malignant GI obstruction especially in patients with poor prognosis [6]. These palliative endoscopic interventional procedures are used to improve symptomatic scores either dysphagia score or GOO score system (GOOSS) [5,7] and has the advantages of being a well-tolerated with low rate of complications and the ability to restore luminal patency and enteral diet [8].

Aim of the Study

The study was conducted to evaluate the success of SEMS in palliation of upper GI malignancies in our center.

Subjects and Methods

An observational cohort study done from 1/2017 to 12/2017 on patients with advanced upper GI malignancy referred to our institute for palliative SEMS insertion to relieve their symptoms. The diagnosis of obstruction was diagnosed either by barium studies or endoscopically. Patients with evident biliary obstruction associated with GOO underwent endoscopic biliary metal stenting also.

SEMS design

Esophageal and pyloro/duodenal SEMS (Niti-S stents) are covered and partially covered made by Korean manufacturer Taewoong medical.

Technique of SEMS insertion

Technical SEMS insertion assessed both endoscopically and fluoroscopically while clinical success was assessed by dysphagia score and GOOSS pre and post stenting.

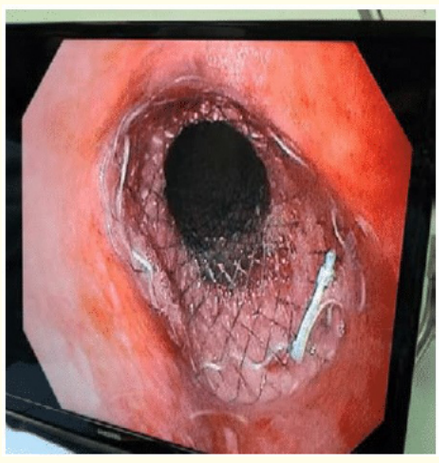
After conscious sedation, the patient was placed in the left lateral position, the endoscope was passed into the esophagus and the guide-wire (A 0.035-inch) was placed through the stricture. Dilatation was done when indicated with Savary dilators to allow passage of the scope for esophageal stricture and balloon dilatation for Gastric outlet obstruction.

The SEMS was selected with a length at least 2- 4 cm longer than the stricture, and was loaded onto the guide-wire and passed under fluoroscopic guidance. The radiopaque markers were useful in accurate positioning of the stent. The endoscope done immediately to confirm the accuracy of stent placement. The procedure was done as one-day surgery. Oral feeds with liquid diet were started 4 - 6h after the procedure and patients were discharged.

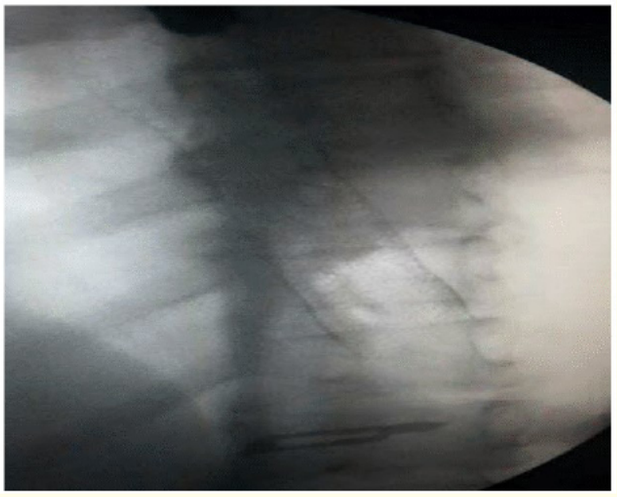
The patients were followed after 1 - 2 weeks to assess for both dysphagia and GOO scores and chest X-ray was performed to ensure no migration of the stent.

Data analysis and statistics

The data were evaluated in statistical program IBM SPSS 21. X^2 test was used for the analysis of qualitative data, which were expressed as numbers and percentages or frequencies. Continuous variables were expressed as a mean ± standard deviation. A t-test was applied to compare the mean pre- and post-stenting dysphagia and GOO scores. A p-value < 0.05 was considered as statistically significant.



A. *Esophageal SEMS endoscopic view*



B

Figure 1: *Esophageal SEMS; B. Fluoroscopic.*

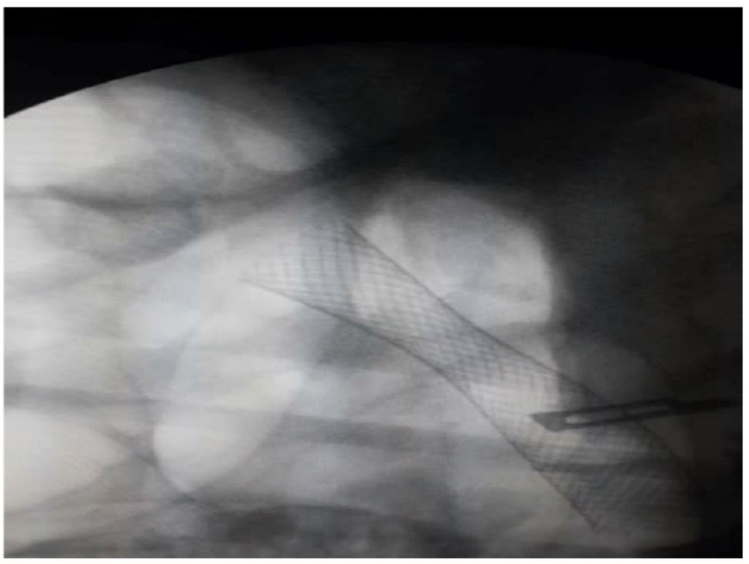


Figure 2: *Duodeno/pyloric stent fluoroscopic view.*

Results

22 patients (Table 1) enrolled in our study (11 presented with dysphagia and 11 with GOO), their mean age in years53.09 ± 16.65 (dysphagia patients 41.82 ± 15.85, GOO patients 64.36 ± 7.18). they were 17 male 77.3% and 5 female 22.7% and 10 patients 45.5%. were diabetic. 7 patients 31.8% were presented with upper GI bleeding. SEMS insertion was done for esophageal only for 10 cases 45.5%, duodenal only 8 cases 36.4%, duodenal and biliary in 3 cases 13.6% and lastly 1 case 4.5% with combined esophageal, duodenal and biliary SEMS (the patient had esophageal adenocarcinoma with intra-abdominal lymphadenopathy causing both biliary and a duodenal obstruction). Pathological data of patients was distributed as dysphagia patients (n = 11) to esophageal adenocarcinoma 9 patients 81.8% and 2 patients 18.2% with esophageal squamous cell carcinoma then GOO patients (n = 11) into duodenal adenocarcinoma 6 patients 54.5%, gastric adenocarcinoma 1 patient 9.1%, pancreatic carcinoma 3 patients 27.3% and lastly 1 patient with peri-ampullary carcinoma 9.1%. Mean of symptom duration in each group was in dysphagia patients (n = 11) 44.09 ± 15.13 days and in GOO patients 20.45 ± 8.2 days.

Characteristics		NO (%)
Age, years (mean ± SD)		53.09 ± 16.65
Sex (male:female)		17 (77.3%): 5 (22.7%)
Diabetes (no:yes)		12 (54.5%): 10 (45.5%)
Hypertension (no:yes)		17 (77.3%): 5 (22.7%)
Smoking (no:yes)		11 (50%): 11 (50%)
Upper GI bleeding (no:yes)		15 (68.2%): 7 (31.8%)
Cause of palliation	Refusal of operation	1 (4.5%)
	Co-morbidities	3 (13.6%)
	Tumour spread	18 (81.8%)
Pre SEMS dilatation (no:yes)		18 (81.8): 4 (18.2%)
Combined stenting	Oesophageal only	10 (45.5%)
	Duodenal only	8 (36.4%)
	Duodenal and Biliary	3 (13.6%)
	Oesophageal, Duodenal and Biliary	1 (4.5%)
In each group		
Lesion pathology		
A- Dysphagia patients	Adenocarcinoma	9 (81.8%)
	Squamous cell carcinoma	2 (18.2%)
B- GOO patients	Duodenal adenocarcinoma	6 (54.5%)
	Gastric antral adenocarcinoma	1 (9.1%)
	Pancreatic carcinoma	3 (27.3%)
	Ampulary adenocarcinoma	1 (9.1%)

Table 1: *All patients' data.*

The outcome of patients (Tables 2,3 and figures 3,4) was assessed by dysphagia score in dysphagia patients with pre SEMS score mean 3 ± 0.63 then post SEMS score 0.91 ± 0.83 and GOOSS for assessment of gastric outlet obstruction patients with pre SEMS score mean 0.64 ± 0.67 then post SEMS score mean 2.73 ± 0.46. Only 4 patients 18.2% from total patients (n = 22) needed pre stenting dilatation. Stent migration happened in 2 patients 9% with esophageal SEMS after they received radiotherapy.

	Dysphagia (11)	GOO (11)	Test	p-value	CI 95%
Age	41.82 ± 15.85	64.36 ± 7.18	T	< 0.001**	(- 33.49 - 11.59)
Duration of symptoms	44.09 ± 15.13	20.45 ± 8.2	T	< 0.000***	(12.8 - 34.46)
Sex	Male:female 8(36.4%):3(13.6%)	Male:female 9(40.9%):2(9.1%)	X^2	0.5	(0.07 -4.49)

Table 2: *Main diffrences between patients with dysphagia and gastric outlet obstruction.*

	Pre SEMS	Post SEMS	Test	p- value	CI 95 %
Dysphagia patients (11) Dysphagia score (Mean ± SD)	3 ± 0.63	0.91 ± 0.83	T	< 0.000***	(1.53 - 2. 64)
Gastric outlet obstruction patients (11) GOOSS (Mean ± SD)	0.64 ± 0.67	2.73 ± 0.46	T	< 0.000***	(- 2.56 - -1.62)
Stent insertion success					22 (100%)
Stent migration	Only 2 oesophageal SEMS after they received radiotherapy				2 (9%)

Table 3: *Patients outcomes.*

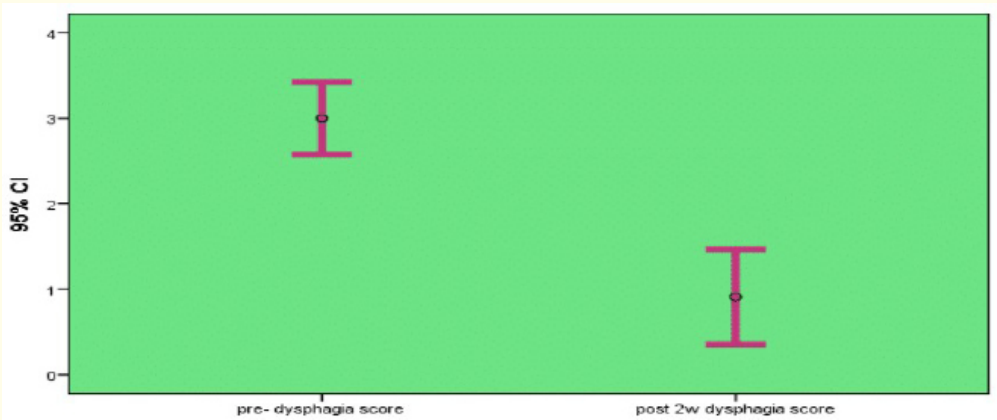


Figure 3: *Improvement of dysphagia score after esophageal SEMS.*

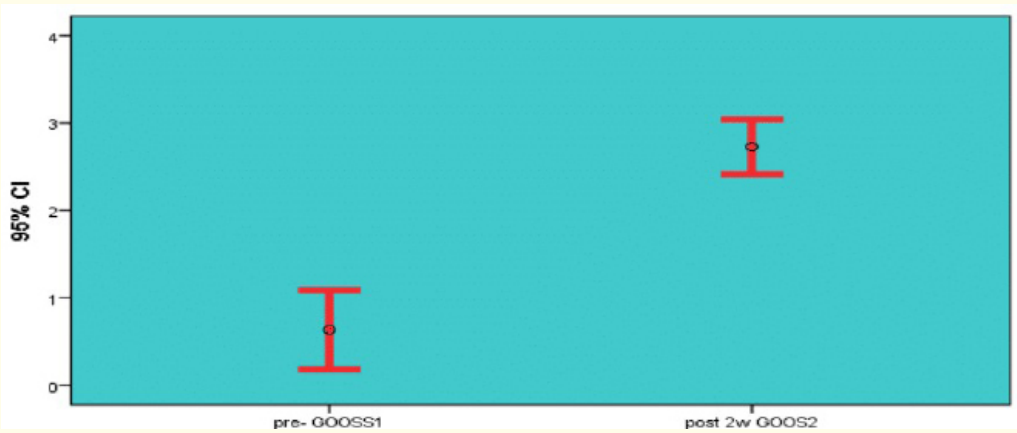


Figure 4: *Improvement of GOOSS after pyloro/duodenal SEMS.*

Discussion

The majority of upper GI cancers (esophageal, gastric, duodenal, ampullary and pancreatic) are diagnosed in advanced stages when surgical intervention is usually not accessible and this may attributed to the nature of insidious onset of their main symptoms of dysphagia, nausea and vomiting, in addition to the poor general condition of the patients due to either dysphagia or gastric outlet obstruction with resulting malnutrition and limited life expectancy [2,9,10].

Over the last two decades, the endoscopic management of malignant dysphagia or gastric outlet obstruction has been greatly evolved with the applying of Gastroduodenal SEMS which played a greater role in the palliation of advanced GI malignancies and have been associated with high success rate, low rate of complications and rapid resolution of obstructive symptoms [9,11-13].

In our study, we tried to evaluate the clinical outcome of endoscopic placing of SEMS as a palliative treatment of gastroduodenal obstruction in patients with upper GI malignancies. We studied 22 patients with either dysphagia (11patients) or GOO (11 patients). The overall success of SEMS placement was 100%, with only 2 migrated oesophageal stents post radiotherapy and pre stenting dilatation done in 4 patients (2 esophageal and 2 duodenal)which is comparable to many previous studies done before which reported a success rate close to our results [12,14,15].

Upper GI malignancies patients in our study had a mean age 53.09 ± 16.65 year. Patients with dysphagia (due to oesophageal carcinoma) had mean age 41.82 ± 15.85 year as in table 2 which is different from study done by Abdelshafy., *et al*. [7] with his patients mean age 62.3 ± 12.4, so being older (his study done on 350 patients). Also he reported 58% of his patients had esophageal Squamous cell carcinoma and 40.3% with adenocarcinoma, but we in our study table 1 showed that 18.2% had esophageal squamous cell carcinoma and 81.8% had adenocarcinoma and slightly agree with Battersby., *et al*. [14] in his study that showed diagnosis was oesophageal adenocarcinoma in 61%, esophageal squamous cell carcinoma in 30%. Diagnosis of dysphagia in cancer oesophagus is usually late. In our study mean of dysphagia diagnosis was 44.09 ± 15.13 days table 2 that was reported in different studies like Gray., *et al*. [16] in his study with median dysphagia diagnosis 109 days and Abdelshafy., *et al*. [7] reported dysphagia diagnosis mean 3.9 ± 1.1 months and this attributed to insidious onset of dysphagia presentation in malignant esophagus [2].

Dysphagia score used pre-stenting with mean 3 ± 0.63 showed marked improvement measured 1 - 2 weeks post-stenting with mean 0.91 ± 0.83 table 3 and figure 3 that is was highly significant [7]. Abdelshafy., *et al.* [7] reported that and other comparable studies [14,17,18].

Malignant gastric outlet obstruction presented with nausea, vomiting and cachexia as a sequence of advanced cancers (gastric, duodenal and pancreatic) [5]. The mean age of these patients in our study was 64.36 ± 7.18 years that being older than patients presented with dysphagia and was statistically significant. Near to that age other studies documented that [19,20]. Different types of cancers we have found 6 (54.5%) patients with duodenal adenocarcinoma (the most prevalent in our study), 1 (9.1%) with gastric antral adenocarcinoma, 3 (27.3%) patients had pancreatic carcinoma and 1 (9.1%) had peri-ampullary adenocarcinoma. Kato., *et al*. [20] reported Pancreatic cancer in 61 patients 48.8%, biliary cancer 26 patients 20.8%, gastric cancer 25 patients 20% and duodenal cancer 1 patient 0.8% and Ding., *et al*. [5] agreed with Kato in the prevalence of pancreatic cancer as a cause of GOO. This difference may be attributed to different population studied (Egyptians in our study).

Symptomatic presentation with GOO in our results had a mean 20.45 ± 8.2 days showing significant difference from late presentation of dysphagia patients' symptoms with mean 44.09 ± 15.13 days (Table 2). Marked improvement of GOOSS table 3, figure 4 from pre SEMS insertion (mean 0.64 ± 0.67) to post SEMS insertion (mean 2.73 ± 0.46) which was not different from most previous studies [5,19,20].

Overall success of SEMS insertion was 100% with only 2 migrated oesophageal stents post radiotherapy and pre stenting dilatation done in 4 patients (2 esophageal and 2 duodenal). That rate of success was reported in Ding., *et al*. [5] and Abdelshafy., *et al* [7].

Conclusion

Self-expandable metal stents are a good option for palliation of advanced symptomatic upper gastrointestinal malignancies that provides marked symptomatic improvement. Their technique is quite easy, safe and without complications.

Acknowledgment

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Conflicts of Interest

The authors have no conflicts of interest or financial ties to disclose.

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