

Palliative management of irresectable carcinoma esophagus using self expandable metallic stent (SEMS)

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Abstract

Objective: To evaluate the symptomatic relief of dysphagia after stenting in patients with carcinoma esophagus

Methods: A prospective non randomized descriptive study was conducted at Surgical Unit 4, Civil Hospital Karachi, Pakistan over a period of 1 year, from August 2006 to July 2007. A total of 41 patients with biopsy proven carcinoma esophagus having irresectable disease on the basis of CT scan or poor risk for major surgery were included in the study. Self expandable metallic stents were placed under fluoroscopic guidance in all the patients. Follow up was done weekly for 1 month and monthly for 6 months or till death of the patient. Data was analyzed using SPSS version 11.

Results: Age of the study population ranged from 25-80 years with mean age of 51.49±14.25 years. Male to female ratio was 1.15:1. Preoperative dysphagia for solids was seen in 4.9%, for semi solids in 31.7%, and for liquids in 63.4%. 80.5% of patients had squamous cell carcinoma and 19.5% of patients had adenocarcinoma. Dilatation prior to stenting was done up to 12.8 mm in 65.9%. Complete relief of dysphagia was seen in 73%. No procedure related mortality was seen in our study. Overall complication rate was 29.2%.

Conclusion: SEMS is an effective method for the relief of dysphagia in patients with irresectable carcinoma esophagus (JPMA 59:437; 2009).

Introduction

Cancer of the esophagus is the 9th most common malignancy world wide and third common amongst gastrointestinal malignancies.^{1,2} It is the 6th most common cause of cancer deaths universally.^{3,4} This malignancy is relatively more common in Pakistan, being seventh most common cancer in men and sixth most common in women in Karachi.⁵

Most cases are detected late and are unsuitable for surgical resection. The five year survival is approximately 5%.⁶ Despite advances in the treatment of esophageal carcinoma, 50-60% of patients have incurable disease at presentation. Without an adequate esophageal lumen, they suffer dysphagia, sialorrhea, regurgitation of saliva and food and malnutrition with aspiration. The treatment goal in these patients is palliative because few patients can expect extended survival.^{6,7}

Aim of all forms of palliative treatment is to relieve dysphagia, the cause of much distress and discomfort to these

patients. Several non surgical palliative techniques are available which include endoluminal laser therapy, photodynamic therapy, argon beam coagulation, bipolar electro coagulation, ethanol injection, brachytherapy and use of esophageal stents along with radiation.

Esophageal intubation for palliation has been used longer than 100 years. Symmonds in 1885⁸ described the first successful intubation using a metallic device, since then several types of endoprosthesis have been tried. The first description of endoscopic placement of an expanding metallic spiral stent was made by Frimberger in 1983⁹ and the first use of a wall stent designed for the esophagus was reported in 1990 by Domschke et al.¹⁰

Stenting has proved to be a convenient and long lasting method of palliation for malignant dysphagia. Use of covered self expandable metallic stents (SEMS) and more recently self expandable plastic stents (SEPS) has led to an increase in the success rate in palliative management of strictures of esophagus.

Patients and Methods

Forty one patients with histologically proven carcinoma esophagus needing palliation of dysphagia were prospectively included in the study, over a period of one year from August 06 to July 07.

All patients presenting with dysphagia underwent clinical examination, abdominal ultrasonography and chest X ray. Upper gastrointestinal endoscopy and biopsy was done to confirm the diagnosis. CT of the chest and abdomen was performed along with esophageal endoscopic ultrasound (EUS).

Patients with inoperable esophageal malignant strictures due to extensive extra esophageal spread, poor functional status, unfit for major surgery due to comorbid, presence of distant metastasis and involvement of trachea, aorta or pericardium on CT scan or EUS were included in the study. Patients with operable carcinoma esophagus and tumour within 2 cms of the cricopharyngeus were excluded from the study.

Informed consent was taken from all the patients before stent placement. Patients were kept nil per OS for 6 hours before the procedure.

Technique of stent insertion:

Stents were inserted under fluoroscopic guidance by a single expert endoscopist with conscious sedation using midazolam and nalbuphine. First upper gastrointestinal endoscopy was performed to delineate the site and length of stricture with patient placed in the left lateral position. Dilatation was done with Savary Gilliard dilators when scope was unable to traverse the stricture. Proximal and distal margin of tumour or stricture site was determined with scope in situ and taking vertebral column as anatomical landmark under fluoroscopy. Numbers of vertebra above and below diaphragm were counted on fluoroscopy. One vertebra above and below the tumour site were taken to determine the site of proximal and distal end of the stent. Length of stent was chosen so that at least 2.5cms of normal esophagus was covered above and below the stricture. Position of stent was confirmed endoscopically at the end of the procedure (Figure).

The procedure was done as day admission. At 4 hours after SEMS deployment, oral feeds were resumed starting from liquid diet. Patients were discharged if there were no complications.

The data of all the patients was filled in the proforma and entered into a locally developed database in Microsoft Access 2006 by a single operator. The patients were followed up weekly for one month and monthly thereafter for six months or till the death of the patient which ever came first. On each follow up, symptoms and dysphagia score was assessed and recorded.

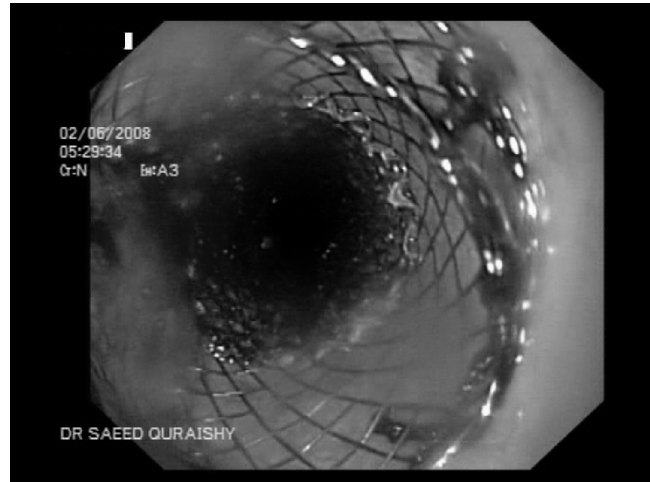


Figure: Endoscopic view of stent placed in esophagus.

Dysphagia score used was:

- 0 - no dysphagia
- 1 - dysphagia for solids
- 2 - dysphagia for semisolids
- 3 - complete dysphagia

Pain was classified as mild, moderate and severe using visual analogue score.

The data analysis was done by a statistician using SPSS version 11.0. T-test was applied for quantitative data and Chi-square for qualitative data. P-value of <0.05 was taken as significant.

Results

Forty one patients were included in the study and followed up. Age ranged from 25 years to 80 years with a mean of 51 ± 14.253 years. There were 22 (53.7%) males and 19 (46.3%) females, with a male to female ratio of 1.15:1. Histopathology of the tumour revealed squamous cell carcinoma in 33 patients (80.5%), out of which 15 were males and 18 females, while adenocarcinoma was noted in 8 (19.5%), out of which males were 7 and 1 female. Dilatation of the stricture was done in 27 patients (65.9%). Prior to stenting there were 2 (4.9%) patients with dysphagia for solids, 13 (31.7%) with dysphagia for semisolids and 26 (63.4%) patients with complete dysphagia. Mean duration of dysphagia before presentation was 107 ± 76.38 days. Out of two patients with dysphagia for solids one improved with no dysphagia post stenting while one continued to have dysphagia for solids. All patients with dysphagia for semisolids improved, while 19 patients with complete dysphagia improved with no dysphagia, 6 had dysphagia for solids post stenting and 1 patient did not show any improvement (Table). Following the placement of

Table: Improvement of dysphagia following stenting.

Pre-stent dysphagia	Post-stent dysphagia			Pre-stent dysphagia Total
	No dysphagia	Dysphagia for solids	Complete dysphagia	
Dysphagia for solids	1	1	-	2
Dysphagia for semisolids	13	-	-	13
Complete Dysphagia	19	6	1	26

stent, 19 (46.3%) patients had no pain, 11 (26.8%) had mild pain, 2 (4.9%) had moderate pain and 9 (22%) patients had severe pain. There were 2 (4.9%) patients who had stent obstruction by tumour overgrowth, one (2.4%) patient had haematemesis, and 4 (9.8%) patients had bolus obstruction. No complications were observed in 29 (70.73%) patients. Minimal survival after stenting was 3 days and maximum was 360 days with a mean survival of 97.39 ± 86.61 days.

Discussion

In spite of recent advances in early diagnosis and curative treatment, the survival rate for carcinoma esophagus has remained unchanged over the last four decades.¹¹ The emphasis has now shifted towards achieving an acceptable quality of life during the limited survival period by relief of dysphagia. Immediate relief of dysphagia and likelihood of being discharged from the hospital are essential for the improvement of quality of life. Self-expanding metallic stents provide a substantial progress in the management of patients with irresectable carcinoma esophagus. SEMS made up of an alloy, usually nitinol or stainless steel is deployed using endoscopic and/or fluoroscopic techniques, quickly restores oral intake and reduces hospital stay and cost.¹²

The technical success rate of placing SEMS is closer to 100% and clinical success rate exceeds 90% in international literature.^{13,14} In our study comparable rates were obtained with technical success rates of 100% and clinical success rate of 97.5%.

Following stent deployment, lasting and excellent relief of dysphagia has been a consistent finding in various studies allowing patients to enjoy the pleasures of eating and drinking and to spend less time in the hospital.¹⁵ This was also seen with our results where 97.5% had immediate relief of dysphagia.

All of our patients were dealt as day case and discharged 6 hours after the procedure thus reducing the cost of hospital stay and treatment.

The use of covered stents has been plagued by stent migration especially for lower esophageal tumours because the distal portion of the stent projects freely into the gastric fundus. Stent migration has been reported to occur in up to 30% in such cases.^{16,17} In our study no patient had stent migration. This could be due to the fact that minimal dilatation of the tumour, where required was done enabling the tumour to hold the stent

in place while the proximal and distal parts of the stent expanded normally.

The main sites of strictures due to esophageal cancer in which SEMS was placed were upper thoracic esophagus in 11, mid esophagus in 20 and lower esophagus in 10 patients. SEMS placement in the lower thoracic esophagus requires attention to positioning the inferior side of the stent to avoid lower esophageal sphincter dysfunction. However this was not possible as 10 patients had cancers involving distal esophagus. All these patients had some symptoms of reflux and were given anti reflux medical treatment post stenting.

Recurrent obstructive symptoms or complications necessitating re-intervention have been reported. Recurrent dysphagia is the leading symptom of stent dysfunction due to tumour ingrowth or overgrowth, usually seen in up to 36% of the patients.¹⁸ In our study 6 patients required re-intervention. Tumour overgrowth causing stent obstruction was seen in 2 (4.8%) patients. They were treated effectively by absolute alcohol injection. Other re-canalization procedures such as laser therapy or further stent insertion, chemotherapy and radiation seem to be of major importance to prolong stent patency but are more expensive.

Impaction of food in a stent is less of a complication of the stent itself and more a consequence of inadequate patient education and non compliance with proper food selection, chewing and swallowing. Dietary instructions, verbal and written should be given to patients and care givers before discharge from the hospital. Taking food in small boluses and chewing properly should be emphasized. Increased fluid intake especially carbonated drinks enhance the flow of solid food through the stent lumen. Soft bread should be toasted to make it crisp and easy to swallow. Skins of vegetables and meat should be avoided and food taken in upright position. Medications should be taken in crushed or liquid form. There were 4 (9.7%) patients with bolus obstruction who were treated with pushing by forceps.

Majority of patients with carcinoma esophagus tend to be over 70 years of age¹⁹ but in our study the mean age of the patients was 51 ± 14.25 years. This is statistically significant ($p < 0.001$) showing that it is seen increasingly in earlier age groups.

Currently adenocarcinoma accounts for more than 50% of new cases of carcinoma esophagus whereas in our study squamous cell carcinoma was the predominant type in 80.5% of

patients and this was statistically significant ($p < 0.0001$). Even patients with lower esophageal tumours tend to have squamous cell carcinoma in this study population. Only 8 patients had adenocarcinoma out of which 7 were males and 1 female, this was significant ($p < 0.034$) showing that males are more prone to adenocarcinoma than females. This correlates with the literature establishing that Barrett's is twice as common in males as in females.²⁰

Mean duration of dysphagia before patients presented to our institution was 107 days. Most of them were treated by quacks or inexperienced doctors. Another factor was the non existence of facilities where these patients could be diagnosed and treated. They had to travel long distances to reach such facilities along with economic constraints. In our study the patients with proximal tumours had presented early while those with distal tumours presented late ($p < 0.001$). This could be because of the fact that with distal tumours esophagus can dilate considerably to accommodate oral intake while with proximal tumours the patient has intractable vomiting with the intake of oral diet.

Mean survival has been reported to vary from 10-20 weeks in patients with carcinoma esophagus undergoing SEMS placement.^{21,22} In our study the mean survival was 97 ± 86 days which could be due to poor nutritional status of patients and delayed presentation with advanced stage of the disease.

Complications are uncommon following SEMS placement, major ones being bleeding, perforation and aspiration pneumonia. One study has cited a procedure related mortality rate of 7%.¹⁶ In our study there were no procedure related deaths. Complications related to the procedure were seen in 12 patients (29.2%) and were managed expectantly. This is again consistent with international studies. Nine (22%) patients experienced severe pain necessitating the use of narcotic analgesics after stent placement. This could be due to the stretching effect of the metallic stents. Esophageal pain tends to be more common with rigid stents. Early chest pain occurs in up to 100% of patients but prolonged chest pain occurs in fewer than 13% of patients.²³⁻²⁴

During a computerized literature search only one local study was found where the author has cited stent insertion in four patients without fluoroscopic guidance. The long term results are not mentioned.²⁵ Our method of stent placement is different from conventional external marker or dye localization. As no external markers are used considerable time is saved from moving the patient and placing the markers. This method has not been reported in the literature. We did not encounter any misplacement of stent with this technique.

Conclusion

Endoscopic self expandable metallic stent placement is a safe and effective technique in patients with irresectable

carcinoma of esophagus providing rapid relief of dysphagia and improving the quality of remaining life. Our method of stent placement using vertebral column as a marker is a unique method not reported before.

References

1. Day NE, Varghese C. Oesophageal cancer. *Cancer Surv* 1994; 19-20: 43-54.
2. Roohullah, Khurshed MA, Shah MA, Khan Z, Haider SW, Burdy GM, et al. An alarming occurrence of esophageal cancer in Balochistan. *Pak J Med Res* 2005; 44: 101-4.
3. Enzinger PC, Mayer RJ. Esophageal cancer. *N Engl J Med* 2003 349: 2241-52.
4. Pisani P, Parkin DM, Bray F, Ferlay J. Erratum: Estimates of the worldwide mortality from 25 cancers in 1990. *Int J Cancer* 1999; 83: 870-3.
5. Alidina A, Ghaffar A, Hussain F, Islam M, Vaziri I, Burney I, et al. Survival data and prognostic factors seen in Pakistani patients with esophageal cancer. *Ann Oncology* 2004; 15: 112-8.
6. Kubba AK, Krasner N. An update in the palliative management of malignant dysphagia. *Eur J Surg Oncol* 2000; 26:116-29.
7. Lee SH. The role of esophageal stenting in non surgical management of esophageal strictures. *Br J Radiol* 2001; 74:891-900.
8. Symmonds CG. A case of malignant stricture of the esophagus illustrating the use of a new form of esophageal catheter. *Trans Clin Soc Lond* 1885; 18:155-8.
9. Frimberger E. Expanding spiral - a new type of prosthesis for the palliative treatment of malignant esophageal stenoses. *Endoscopy* 1983; 15:213-4.
10. Domschke W, Foerster EC, Matek W, Rödl W. Self expanding mesh stent for esophageal cancer stenosis. *Endoscopy* 1990; 22: 134-6.
11. Muller JM, Erasmi H, Stelzner M, Zieren U, Pichlmaier H. Surgical therapy of esophageal carcinoma. *Br J Surg* 1990; 77: 845-57.
12. Espinel J, Sanz O, Vivas S, Jorquera F, Manzo F, Olcoz JL, et al. Malignant gastrointestinal obstruction: endoscopic stent versus surgical palliation. *Surg Endosc* 2006; 20: 1083-7.
13. Simmons DJ, Baron JH. Technology insight: enteral stenting and new technology. *Nat Clin Prac Gastroenterol* 2005; 2: 365-74.
14. Holt AP, Patel M, Ahmed MM. Palliation of patients with malignant gastroduodenal obstruction with self-expanding metallic stents: the treatment of choice? *Gastrointestinal Endosc* 2004; 60: 1010-7.
15. Yang Hs, Zhang LB, Wang TW, Zhao YS, Liv L. Clinical application of metallic stents in the treatment of esophageal carcinoma. *World J Gastroenterol* 2005; 11: 451-3.
16. Lee SH. The role of esophageal stenting in the non surgical management of esophageal strictures. *Br J Radiol* 2001; 74:891-900.
17. Morgan R, Adam A. Use of metallic stents and balloons in the esophagus and gastrointestinal tract. *J Vasc Intern Radiol* 2001; 12: 283-97.
18. Rozanes I, Poyanli A, Acunas B. Palliative treatment of inoperable malignant esophageal strictures with malignant esophageal strictures with metallic stents: one center experience with four different stents. *Eur J Radiol* 2002; 43: 196-203.
19. Ginsberg R. Cancer treatment in elderly. *J Am Coll Surg* 1998; 187: 427-8.
20. Cook MB, Wild CP, Forman D. A systematic review and meta-analysis of the sex ratio for Barret's esophagus, erosive reflux disease, and non-erosive reflux disease. *Am J Epidemiol* 2005; 162: 1050-61.
21. Elphick DA, Smith BA, Bagshaw J, Riley SA. Self expanding metallic stents in the palliation of malignant dysphagia: outcome analysis in consecutive patients. *Dis Esophagus* 2005; 18: 93-5.
22. Wegner U, Johnsson E, Arnelo U, Lundell L, Lagergren J. An antireflux stent versus conventional stents for palliation of distal esophageal or cardia cancer: a randomized clinical study. *Surg Endosc* 2006; 20: 1675-80.
23. Acunas B, Rozanes I, Akpinar S, Tunaci A, Tunaci M, Acunas G. Palliation of malignant esophageal strictures with self expanding nitinol stents: drawbacks and complications. *Radiology* 1996; 199: 648-52.
24. Meyer-Wyss B. Esophageal and intestinal stents. *Ther Umsch* 2003; 60:219-23.
25. Qureshi H, Ahmed W. Use of esophageal self expandable metal stents - the local experience. *J Pak Med Assoc* 2002; 52: 257-8.