

Palliation of Esophageal Cancer with Self-Expanding Metal Stents (SEMS): The Impact on Quality of Life

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Abstract—PURPOSE: To report the impact of self-expanding metal stents (SEMS) on the quality of life of patients with advanced esophageal cancer. **METHODS:** 50 patients with advanced inoperable esophageal cancer (EC) underwent palliative esophageal SEMS. Quality of life was evaluated using a cancer specific questionnaire (EORTC QLQ C-30), the Karnofsky performance scale and a dysphagia score. All questionnaires were completed prior to stent placement, 24 hours after SEMS, 7, 60 and 120 days later. All analyses were performed on an intention-to-treat basis. **RESULTS:** Stent placement was technically successful in all patients. Mean survival time was 144 ± 138 days (12-663 days). Dysphagia score improved significantly from 3.6 ± 0.4 before stent placement to 2.7 ± 0.5 after 24 hours, 2.0 ± 0.2 at one week, 1.8 ± 0.4 at 2 months, and 2.5 ± 0.5 at 4 months ($p < 0.0001$). A significant improvement in Karnofsky index was seen 7 days after SEMS. In the EORTC QLQ C-30 questionnaire, differences were detected in questions 19, 26, 27, 29 and 30. **CONCLUSION:** The use of SEMS in patients with inoperable esophageal cancer had a positive impact on patient's quality of life, measured by different methods, being a good choice as a palliative treatment.

Index Terms— Esophageal Neoplasms, Deglutition Disorders, Palliative Care.

I. INTRODUCTION

According to the National Cancer Institute, although esophageal cancer (EC) is still relatively uncommon in the United States, its incidence has been increasing with 17,460 new cases and 15,070 deaths estimated in 2012. The majority of new cases occur in developing countries. Esophageal cancer is the eighth most common cancer worldwide, with 482,000 new cases estimated in 2008. In the same year, it was estimated that 407,000 deaths occurred making EC the sixth most common cause of death from cancer in the world [1]. Based on the Brazilian National Cancer Institute (INCA), EC is the sixth most common cancer in men and ninth in women with 10,810 new cases and 7,930 deaths estimated in 2016 in Brazil [2].

Esophageal cancer carries a poor prognosis due to the late clinical presentation and diagnosis, when curative treatment

is no longer available [3]. This makes palliative treatment an important option for these patients. In more than 70% of patients, dysphagia is the main symptom. Recently, esophageal stents have emerged as one of the main palliative options [4]. Self-expanding metal stents (SEMS) are a well-established palliative modality around the world [5]. In addition to relief of dysphagia, maintenance of oral intake and nutritional status, a reduction in the risk of aspiration and improvement in the quality of life (QoL) are goals of SEMS placement. To date, only a few studies have been published evaluating QoL in EC patients after SEMS placement. Most of these studies measured only dysphagia as a result of QoL improvement [6],[7]. We report the impact of SEMS on the QoL of patients with advanced EC based in another variables besides the relief of dysphagia, but also other variables.

II. METHODS

From August 2007 to September 2009, 50 patients with advanced EC were enrolled in a prospective study performed at Barretos Cancer Hospital, São Paulo, Brazil. All patients were submitted to palliative treatment with placement of a Brazilian made esophageal SEMS (Braile Oncology® Sao Jose do Rio Preto, São Paulo, Brazil). Patients with advanced EC were included in cases with circumferential obstructing unresectable tumor and no previous treatment, or residual/recurrent tumor after neoadjuvant chemo-radiotherapy with or without respiratory-esophageal fistulae. Exclusion criteria were patients with previous tracheal or esophageal stent placement, without overall health conditions for the procedure, and lesions 1.5 cm from the upper and lower esophageal sphincters. All patients received adjuvant therapy for pain control. The protocol was approved by the Ethics Committee of Barretos Cancer Hospital and all patients signed an informed consent term.

The stents used were partially covered with polyurethane or completely uncovered with 20mm of inner diameter and [7], 10 or 13 cm in length. All patients answered a cancer-specific questionnaire (EORTC QLQ C-30 version 3), applied by the main author. The focused questions were 19 (Did pain interfere with daily activities?), 26 (Has your physical condition or medical treatment interfered with your family life?), 27 (Has your physical condition or medical treatment interfered with your social activities?), 29 (How would you rate your overall health during the past week?) and 30 (How would you rate your overall quality of life during the

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past week?) [8]. The assessment of functional status was made using the Karnofsky performance scale regarding physical ability (IKp) as shown in Chart 1 [9].

Chart 1: Karnofsky performance status scale

Karnofsky performance status scale	%	Criteria
Able to carry on normal activity and work; no special care needed	100	Normal no complaints; no evidence of disease
	90	Able to carry on normal activity; minor signs or symptoms of disease
	80	Normal activity with effort; some signs or symptoms of disease
Unable to work; able to live at home and care for most personal needs; varying amount of assistance needed	70	Cares for self; unable to carry on normal activity or to do active work
	60	Requires occasional assistance, but is able to care for most of his personal needs
	50	Requires considerable assistance and frequent medical care
Unable to care for self; requires equivalent of institutional or hospital care; disease may be progressing rapidly	40	Disabled; requires special care and assistance
	30	Severely disabled; hospital admission is indicated although death not imminent
	20	Very sick; hospital admission necessary; active supportive treatment necessary
	10	Moribund; fatal processes progressing rapidly
	0	Dead

Dysphagia score ranged from 0 - 4 (0 = able to eat normal diet / no dysphagia; 1 = able to swallow some solid foods; 2 = able to swallow only semi solid foods; 3 = able to swallow liquids only; 4 = complete inability to swallow / total dysphagia). Patients weight and survival time were also recorded.

All questionnaires were completed prior to stent placement (PRE), 24 hours after SEMS (M0), 7 (M1), 60 (M2) and 120 (M3) days later. The data were presented in a descriptive form with mean, standard deviation, median, maximum and minimum value and represented by Box-Plot chart type. The Kruskal-Wallis test was used to evaluate the degree of dysphagia and physical ability (scale of Karnofsky – IKp). Box & Whisker test was applied to survival time and Tukey-Kramer for weight. Friedman test followed by with Conover Post-test were employed to analyze the EORTC QLQ C-30. All analyses were performed on an

intention-to-treat basis. A p value <0.05 was considered statistically significant.

III.RESULTS

Fifty patients were included in this study, with 41 (82.2%) males. All patients had squamous cell carcinoma with metastasis. A partially covered SEMS was placed in 32 patients (64%) and an uncovered stent was used in 18 patients (36%). Stent placement was technically successful in all patients. During follow up, there were seven late complications: 4 food bolus impaction, 1 perforation, 1 migration and 1 fatal bleeding. Mean survival time was 144 ± 138 days (12-663 days). All patients completed the questionnaires at time M0 and M1. Because of deaths, the number of completed questionnaires decreased to 38 (75%) in M2 and 18 (38%) in M3.

The dysphagia evaluation, before and after stent placement, showed significant improvement from 3.6 ± 0.4 at PRE to 2.7 ± 0.5 at M0 (p < 0.0001), 2.0 ± 0.2 (p < 0.0001) at M1, 1.8 ± 0.4 (p < 0.0001) at M2, and 2.5 ± 0.5 (p < 0.0001) at M3 (Fig.1).

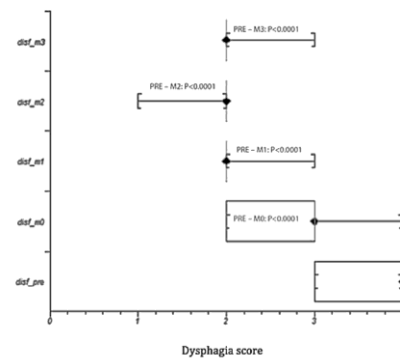


Fig.1: Box-plot of the median values of the dysphagia score, at different moments.

There was no significant weight loss after stent placement (Fig. 2), with no differences in mean weight between PRE and M1 (54.4 ± 11kg, p = 0.999). A slight increase in weight was seen at M2 (57kg ± 12) and M3 (60kg ± 13), but also not statistically significant (p = 0.737 and p = 0.278, respectively).

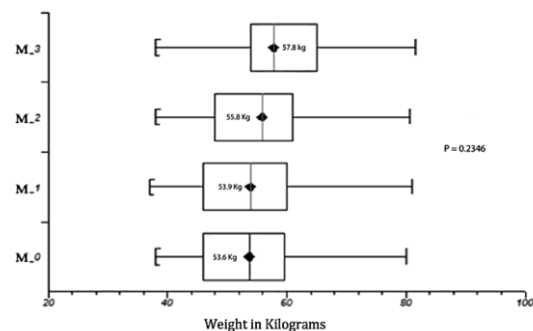


Fig. 2: Box-plot of the mean values of the weight, at different moments.

Although most patients were in poor physical condition and despite the progression of the disease, a significant improvement in IKp was noted in M2 after stent placement (Fig. 3).

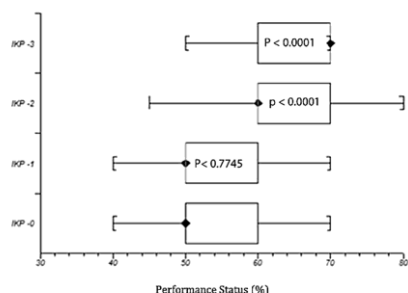


Fig. 3: Box-plot of the IKp Score, at different moments

In the analysis of the EORTC QLQ C-30 questionnaire, significant differences were detected in the previous selected questions (19, 26, 27, 29 and 30), as shown in Table 1.

Table 1: Mean-rank values obtained for EORTC QLQ C-30 questionnaire (questions 19, 26, 29, 29 and 30): comparison between M0 and M1, M2 and M3.

	M0		M1		M2		M3	
	N = 50	N = 50	p-value*	N = 38	p-value*	N = 18	p-value*	
Question 19	3.09	2.97	0.6579	1.84	<0.0001	2.09	0.0009	
Question 26	3.31	2.56	0.0069	2.06	<0.0001	2.06	<0.0001	
Question 27	3.44	2.81	0.0293	1.81	<0.0001	1.94	<0.0001	
Question 29	1.31	2.53	<0.0001	3.00	<0.0001	3.16	<0.0001	
Question 30	1.31	2.28	<0.0001	3.06	<0.0001	3.34	<0.0001	

*Friedman Test, followed by Conover Post-test.

IV. DISCUSSION

Because Health-related quality of life (HRQoL) involves different aspects of human perception regarding physical, emotional and social functions, as well as disease and treatment-related symptoms [10]. The primary aim of treatment in patients with inoperable EC is relief of dysphagia, leading to QoL improvement. The use of SEMS is a well-established palliative modality for EC with rapid improvement in swallowing and nutritional status while minimizing the risk of aspiration [5]. Questionnaires are the most common instruments used to measure QoL. Nonetheless, in most studies regarding advanced EC, the relief of dysphagia is the only aspect of QoL assessed.

For this study, 50 patients with inoperable EC were submitted to SEMS placement. The mean survival time was 144 ± 138 (12-663 days), what is similar to previous reports 7,11. In our study only one stent-related death occurred due to massive bleeding, though in many of these patients the tumor extends into the aorta and bleeding is often a fatal event.

In line with the literature, dysphagia score improved significantly in all studied moments [11],[12]. At M3 we observed a decrease in dysphagia score due to disease progression, though the improvement from the pre-stent period remained statistically significant. Food impaction occurred in 4 patients and distal migration in one, all of which were easily treated endoscopically and did not interfere with overall dysphagia score.

After stent placement, patients' weight did not change in the first week, and a slight improvement was seen at M2 and M3. Although not statistically significant, these values may be considered clinically significant because weight loss was expected based on the disease progression and only occurred late and was attenuated with the SEMS placement, considering that nearly all patients are unable to eat because of nausea, malaise and anorexia, with the progression of the disease.

The Karnofsky performance scale has been used to assess the physical ability (IKp) of patients with cancer [9]. This instrument applied at different intervals characterizes the impact of disease on patient well being and the effect of interventions [13]. Our results showed an increase in the Karnofsky index of 50% to 70%, what was considered clinically significant, especially at M3, a very advanced stage of the disease. These results were also better than the reported by Yajima et al., where a third of patients showed no improvement in IKp after SEMS [14].

The EORTC QLQ-C30 is classified as a cancer specific questionnaire. In this study, the most relevant questions associated with advanced EC were selected for analysis: 19 (symptoms), 26 and 27 (social function), 29 and 30 (global measure of health and QoL). Although there is a specific version of the EORTC QLQ-C30 for esophageal cancer, it was not used in this study since it was not validated in Brazil at the time the study began. In question 19 (Did pain interfere with your daily activities?), no statistical difference was observed between M0 and M1. This was expected since pain frequently occurs during the first week following stent placement due to the radial force and stent expansion [15],[16]. After the first week, using adjuvant therapy, the pain was controlled and a significant difference was identified until M3, when the pain score worsened probably because of the disease progression. In question 26 (Has your physical condition or medical treatment interfered with your family life?), and 27 (Has your physical condition or medical treatment interfered with your social activities?), our results showed an improvement of score demonstrating that the disease and its treatment had a positive impact in maintaining patient's social and family activities for a period of up to four months after stent placement. The results from the patients' response about their overall health and quality of life was assessed in questions 29 (How would you rate your overall health during the past week?) and 30 (How would you rate your overall quality of life during the past week?) and showed improvement after stent placement, despite disease progression (Table 1). Our results are similar to previous studies [6],[16-19].

V. CONCLUSION

We concluded that the use of SEMS in patients with inoperable esophageal cancer had a positive impact on patient's quality of life, measured by different methods, being a good choice as a palliative treatment.

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