

## Treatment of Oesophageal Cancer with NiTi Stents- An Overall Review

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DOI: [10.36347/sjds.2021.v08i01.007](https://doi.org/10.36347/sjds.2021.v08i01.007)

| Received: 01.01.2021 | Accepted: 10.01.2021 | Published: 13.01.2021

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### Abstract

### Review Article

Esophageal cancer is known to be one of the most commonly affecting disease world wide. People with esophageal cancer develop various symptom. One among those symptoms is esophageal cancer. There are various treatment for esophageal cancer but those treatments were found to have many disadvantages. In recent field of science with various advancements in technology self expanding metal stents (SEMS) and self expanding plastic stents (SEPS) were used. There are various literature stating the uses of other palliative therapy, although it had the same uses it was found to have many disadvantages and are traumatic when compared to SEMS and SEPS. Therefore we conclude that SEMS and SEPS are less traumatic when compared to other palliative treatment.

**Keywords:** Esophageal cancer, SEMS, SEPS.

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## INTRODUCTION

Esophagus is a muscular tube through which the food passes from the throat to the stomach by means of peristaltic movements. There are various factors such as age, gender, race which play an important role in the prevalence of esophageal cancer. The epidemiology ratio states that the males are mostly affected than females which occurs in the ratio of 3:1. Based on age group it is stated people >45 yrs are mostly affected. Most of the patient do not recognize the prevalence of esophageal cancer until almost 50% of the constriction of the luminal diameter of the esophagus is present. According to the survey on the prevalence of esophageal cancer among the population of united states the estimation ranges to upto 14,550 of new cases were diagnosed with esophageal cancer in the year 2006 out of which 13,770 of death rates were reported [1]. Majority of the cancers were diagnosed at their later stage where it would have advanced to distant metastasis [2]. Esophageal cancer is mainly caused due to some irritation which may be caused due to some factors such as Habits (alcohol consumption, smoking, tobacco), Reflux disorder such as GERD, Plummer-vinson syndrome, Achalasia, Barrett's esophagus, Overweight [3].

The Symptoms of esophageal cancer are Swallowing difficulty, Chest pain, Weight loss,

Hoarseness of voice, Vomiting, Chronic cough [4]. Among these symptoms dysphagia is considered as the main symptom of oesophageal malignancy which is caused mainly due to complete or partial obstruction of esophagus. Such patients are given palliative therapy in order to maintain good oral intake, treat dysphagia, to eliminate regurgitation, to reduce their stay in hospital & to relieve pain. There are various palliative therapy such as chemotherapy, photodynamic therapy, laser ablation, esophageal stents, sclerotherapy are used to treat esophageal cancer. Among them the oesophageal stents mainly SEMS (self expanding metal stents) are the most commonly used palliative therapy [5].

### Malignant Strictures and Fistulas

In spite of the improved operative technique, and better perioperative care, various literature gives us the detail that there was only 5 yrs of survival rate for esophageal cancer and it rate to about 20% approximately [6]. In a study done on 1,242 patients it was found that there was no improvement seen with specific chemotherapy [3]. Kozarek *et al.*, [7] stated that the esophageal obstruction and fistulas can be treated with rigid prostheses under the guidance of endoscope and fluoroscope but it required dilation very often [7]. It also required mapping the location and angulation of the tumour these procedures were traumatic and had higher rate of complication [8, 9].

Knyrim *et al.*, in his study stated that for treatment of malignant dysphagia SEMS seems to be advantageous compared to other treatment [10]. On comparing all the treatment for dysphagia the SEMS group had better effect and were discharged earlier compared to other treatment [11]. Higher complication rates were seen with plastic prostheses group when compared to SEMS group [12].

Studies state that covered SEMSs are better compared to uncovered stents [13, 14]. Vakil *et al.*, in his study compared covered and uncovered SEMS [15], to study the various complication and to check which is better. Sarnovic *et al.*, compared two types of SEMSs (uncovered and partially covered) for treatment on 152 patients (uncovered 54 and partially covered 98) suffering from inoperable malignant stenosis [13]. Sabharwal *et al.*, in his study he compared the different rates of complications on 53 patients suffering from inoperable distal esophageal cancer [14]. Siersema *et al.*, compared different types of partially covered stents on 100 consecutive patients with gastroesophageal carcinoma [16]. All the studies showed similar output stating that the degree of improvement rate of dysphagia and the rate of complication were similar in all the types of stent used.

### Self-Expanding Plastic Stents

Various studies stated that SEPSs are safe and effective in treating malignant dysphagia [17, 18]. Dormann *et al.*, in his study with 33 subjects (27 esophageal and 6 GEJ cancers) stated that there was improvement in dysphagia post SEPS placement [19]. Szegedi *et al.*, in his study he used SEPSs for treating malignant dysphagia they showed improved dysphagia scores [20]. Conio *et al.*, did a prospective randomized controlled trial with 101 subjects (82 squamous cell cancer and 19 adenocarcinoma) by treating them with SEPSs or SEMSs and they were successful in placing the stents for 98 [17].

There are various prospective studies which have excluded high cervical strictures patients, some retrospective studies have demonstrated the feasibility of stent placement and they were found to be effective [21, 22]. Verschuur *et al.*, in his study he treated 104 patients (66 primary esophageal carcinoma and 38 recurrent cancer after gastric tube interposition) having a malignant stricture less than 8mm with SEMS or SEPS [23]. Shim *et al.*, in his study used modified nitinol prosthesis to treat oesophageal cancer they showed higher success rate [24, 25]. Laasch *et al.*, in his study used anti-reflux Z stent [26] and compared it with Flamingo Wallstent the patients treated with anti-reflux Z stent showed better results compared to the other group.

SEMS are nitinol stents (alloy of nickel and titanium). Earlier before SEMS came into field rigid prosthesis were used to treat esophageal obstruction

which were traumatic. SEMS came into field 20 yrs ago and many studies were conducted using it which proved that SEMS are non traumatic palliative treatment to treat esophageal obstruction.

### Structure of NiTi stent

NiTi stent is a compressed sheath which is characterised by a monofilament, fine mesh that are partially covered or fully covered with polyurethane with a proximal flare of 26 mm, body diameter 18 mm, length of 80,100 or 120 mm [4]. Proximal flare is to prevent migration. The purpose of double layer configuration is that the outer uncovered nitinol wire of the stent is such that it helps the stent to fix to the esophageal wall.



### Advantages of SEMS:

- Non traumatic
  - Dysphagia score improvement
  - Increased survival
  - Lesser complication than other prosthesis and plastic stents
  - High ability to adapt to the anatomical structures
- Commercially available SEMS:

STENTS	MATERIAL
Ultraflex	Nitinol
Wallflex	Nitinol
Evolution	Nitinol
Alimaxx-E	Nitinol
Niti-S	Nitinol
Dostent	Nitinol

### Types of SEMS:

- Partially Covered stents
- Uncovered stents

Studies prove that partially covered stents are preferred than uncovered stents due to the disadvantage of tumour in growth in uncovered stent resulting in recurrent dysphagia, restenosis and GERD.

## CONCLUSION

There are various literature stating the uses of other palliative therapy, although it had the same uses it was found to have many disadvantages and are traumatic when compared to SEMS and SEPS. Therefore we conclude that SEMS and SEPS are less traumatic when compared to other palliative treatment.

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