

Complications after treating esophageal strictures with prostheses and stents – 20 years' experience

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Abstract

Introduction: Over 80% of patients with esophageal cancer are qualified only for palliative treatment. The main goal of the therapy is to eliminate symptoms of dysphagia.

Aim: To analyze complications after insertion of prostheses and stents in patients with inoperable cancer of the esophagus/cardia.

Material and methods: From 1996 to 2015 prostheses of the esophagus were implanted in 1309 patients. In the strictures of the lower part of the esophagus, Barbin-Mousseau prostheses (102 cases) and Häring prostheses (324 cases) were placed. In the strictures of the upper and middle part of the esophagus, Wilson-Cook prostheses (65 cases) and Sumi prostheses (51 cases) were implanted using rigid oesophagoscopy. Since 2001, 867 esophageal stents have been implanted.

Results: Complications occurred in 146 (11%) patients, including 7 (0.6%) cases of death. The most common complication was the recurrence of swallowing disorders (74 patients). In 51 patients, tumor overgrowth over the stent/prosthesis was responsible for that symptom, and in 23 patients its clogging. A fistula (22 cases) and the passage of the prosthesis/stent (25 cases) were the second most common group of complications. Compression of the trachea, bleeding, and dehiscence of wounds occurred in a total of 18 patients. Complications were mostly treated through the repositioning of the prosthesis/stent or the insertion of an additional one.

Conclusions: The most common complications after esophageal prosthetics are the recurrence of dysphagia, a fistula and the displacement of the prosthesis/stent. The basic treatment of complications is the repositioning or insertion of an additional prosthesis.

Key words: complications, stents, prostheses, esophageal stricture.

Introduction

The prognosis in esophageal cancer is poor; in over 80% of cases patients are qualified only for palliative treatment. The most common and earliest symptom (70%) is swallowing disorder leading to weight loss and ultimate emaciation of the patient.

Aim

The main goal of the treatment is to eliminate that symptom with minimal perioperative trauma,

allowing one to improve the quality of life in patients with advanced cancer [1–3]. In this paper, we wish to share our experience in implantation of esophageal prostheses and discuss the most commonly observed complications and their treatment.

Material and methods

From 1996 to 2015 prostheses of the esophagus were implanted in 1309 patients in the Department of Thoracic Surgery in Lodz. Initially, in the strictures of the lower part of the esophagus, Barbin-Mous-

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Table I. Incidence of complications after prosthetics of the esophagus and/or cardia with various prostheses and stents

Complication	Mousseau-Barbin (N = 102)	Häring (N = 324)	Wilson-Cook (N = 65)	Sumi (N = 51)	Stent (N = 867)	Total (N = 1309) n (%)
Hypertrophy of the tumor	2	2	–	4	43	51 (4)
Blockage	4	7	1	2	9	23 (2)
Fistula	2	4	5	2	9	22 (2)
Displacement	1	4	2	2	16	25 (2)
Compression of the trachea	1	1	1	–	6	9 (1)
Eversion	5	–	–	–	–	5 (0.4)
Bleeding	1	–	–	1	2	4 (0.3)
Death	2	–	2	–	3	7 (0.6)
Total	18 (18%)	18 (5%)	11 (17%)	11 (22%)	88 (10%)	146 (11)

seau prostheses (102 cases) and Häring prostheses (324 cases) were placed through high gastrotomy. In the strictures of the upper and middle part of the esophagus, Wilson-Cook prostheses (65 cases) and Sumi prostheses (51 cases) were implanted using rigid esophagoscopy. Since 2001, 867 esophageal stents have been implanted, gradually replacing

prostheses. All treatments were performed under general anesthesia.

Results

Complications occurred in 146 (11%) patients, including 7 (0.6%) cases of death (Table I). The most common complication was the recurrence of swallowing disorders (74 patients). In 51 patients, tumor overgrowth over the stent/prosthesis was responsible for that symptom, and in 23 patients its clogging. A fistula (22 cases) and the passage of the prosthesis/stent (25 cases) were the second most common group of complications. Compression of the trachea, bleeding, and dehiscence of wounds occurred in a total of 18 patients. Complications were mostly treated through the repositioning of the prosthesis/stent or the insertion of an additional one (Table II). In 8 patients with tumor overgrowth over the rigid prosthesis, clearing with plasma argon coagulation was applied. The further course depended mainly on tumor growth. The presence of an esophageal bronchial/tracheal fistula worsened the prognosis. All cases of death occurred in patients with a bronchial/tracheal/esophageal fistula.

Table II. Ways of treating complications after esophageal prosthetics

Hypertrophy of the tumor:	
Additional stent	38
Replacement of the prosthesis/stent	5
Additional burn-out of the tumor (APC)	8
Clogging with food:	
Endoscopic unblocking	23
Fistula:	
Drainage of the pleural cavity	10
Repositioning of the stent or implanting an additional stent	9
Covering the perforation with a net	3
Displacement:	
Removing the prosthesis and placement of a new one	25
Compression of the trachea:	
Placement of a tracheotomy	6
Insertion of a stent into the trachea	3

Discussion

The creator of the first esophageal prosthesis was the French surgeon Leroy d’Etoiles. In 1845, he made an esophageal prosthesis of ivory. In 1886,

Charles Symonds described his experiences of treating the malignant stricture of the esophagus using a prosthesis made of wood (boxwood) and silver. In the 1950s, Mousseau and Celestine introduced plastic prostheses which were used until the end of the 20th century [1, 4]. In our centre, Mousseau-Barbin prostheses were still used in the first years of the 21st century [5]. In the late 1980s and early 1990s there was rapid progress in the field of minimally invasive techniques [6, 7]. Self-expanding stents are gradually replacing plastic prostheses in inoperable cancerous strictures of the esophagus [2, 3]. The first esophageal stent in our clinic was placed in 2001 and we are currently using self-expanding stents.

According to the Souttar assumptions, an esophageal prosthesis should be flexible, resistant to compression, sufficiently broad and should remain permanently in the place of the stricture [5]. Both plastic prostheses and stents meet most of those criteria. The advantage of self-expanding stents is their minimally invasive manner of placement, ease of insertion and one-day stay of the patient in hospital. In the case of plastic prostheses it was necessary to perform laparotomy and gastrotomy, which significantly extended the hospitalization [3, 5, 8].

The retrospective study comparing stents and prostheses in the treatment of cancerous strictures of the esophagus showed a comparable result in the treatment of dysphagia; however, the advantage of stents was the minimal perioperative trauma, and thus the lower mortality and lower number of complications [5, 9, 10].

The incidence of complications after esophageal prosthetics is 12–53%, and it depends on the type of the prosthesis/stent [5]. In our material, complications occurred in 11% of the patients.

Complications after esophageal prosthetics can be divided into two groups: early complications resulting from the procedure of prosthesis/stent placement and late complications resulting mostly from the patient's cancer [2, 5, 11].

Early complications include chest pain, bleeding, esophageal perforation and aspiration.

Pain after prosthetics occurs mainly in the first hours after the procedure and usually resolves after the use of traditional analgesics. Chronic pain after esophageal prosthetics occurs in approximately 6–14% of cases and is observed particularly in cases of stents of the upper part of the esophagus.

Bleeding after esophageal prosthetics results from surgical trauma. It is observed in 4–15% of cases during the first 48 h after treatment and usually resolves spontaneously. Retrospective studies showed an increased risk of bleeding when plastic stents were used. Massive life-threatening bleeding occurs rarely (up to 4% of cases) and is most often connected with the location of the tumor at the height of the aortic arch. Among our patients, dangerous bleeding concerned only in 4 patients (0.4% of cases).

Perforation of the esophagus is noted in 4–15% of cases. This complication was usually observed during the widening of the esophagus while using plastic stents and was related to excessive expansion. Perforation usually takes place in patients who have previously undergone radio- and/or chemotherapy.

Choking usually occurs in patients who have the prosthetics of the drain without the use of stents with an anti-reflux valve. This complication was more often observed when a plastic prosthesis was used [2, 3, 5, 12, 13].

Complications that are no longer observed include complications of healing surgical wounds. Those complications occurred in as many as 20–25% of cases in patients who had a plastic prosthesis placed through laparotomy [4, 5, 8].

Late complications include obstruction of the prosthesis, its shifting, a tracheal-esophageal/bronchial-esophageal fistula, and airway compression.

Clogging of the prosthesis manifests with the recurrence of difficulties in swallowing and is present in approximately 50% of cases. This complication most often occurs as a result of the progression of tumor disease (overgrowth through the stent, overgrowth over the prosthesis) or as a result of a dietary error. Stent overgrowth was observed in 8–38% of cases in which non-coated stents were used and in 2–4% of cases for coated stents. This complication appears approximately 3 months after treatment. Tumor overgrowth over the prosthesis is observed in approximately 18% of patients. The complication is more common when the margin between the tumor and the end of the prosthesis is smaller than 2 cm. Clogging of the prosthesis with food occurs in approximately 6–19% of patients. It most often concerns patients who do not follow dietary recommendations. It is less frequently observed after the introduction of self-expanding stents (approximately 2% of cases). In our material, nearly half of the

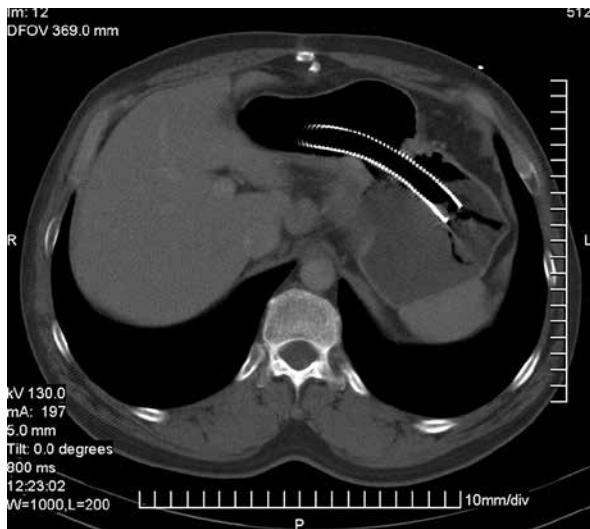


Photo 1. Haring prosthesis displaced to the stomach in a patient with a cardiac tumor

complications involved the recurrence of difficulties in swallowing and concerned mostly tumor overgrowth over the stent/prosthesis.

Stent shifting is more often observed in the case of coated stents than in the case of non-coated ones (23% vs. 8.7%). This complication also appears more frequently when the prosthesis is performed in the drain (Photo 1). Factors predisposing to stent shifting include supplementary chemo-radiotherapy leading to the reduction of the tumor mass and increase of the esophageal lumen. This complication occurred with similar incidence when a plastic prosthesis was used (11–20%). In our material, shifting occurred with similar frequency in patients who had prostheses and stents.

A bronchial/tracheal-esophageal fistula is the result of long-lasting prosthesis pressure or tumor infiltration of the respiratory tract. Predisposing factors are esophageal ulcers and radio- and chemotherapy applied before or after prosthetic treatment. The incidence of this complication is estimated at approximately 2–10% of cases. Mortality is high and reaches up to 40–50%. Among our patients, a fistula occurred in 2% of the patients and was responsible for all cases of deaths.

Compression of the airways is a rare complication (1–2%) but also dangerous (Photo 2). It may lead to respiratory failure and, in the chronic course, to the formation of a fistula. This complication most often develops in the prosthetics of tumors located on the border of the neck and chest [1, 2, 5, 11, 12, 14].

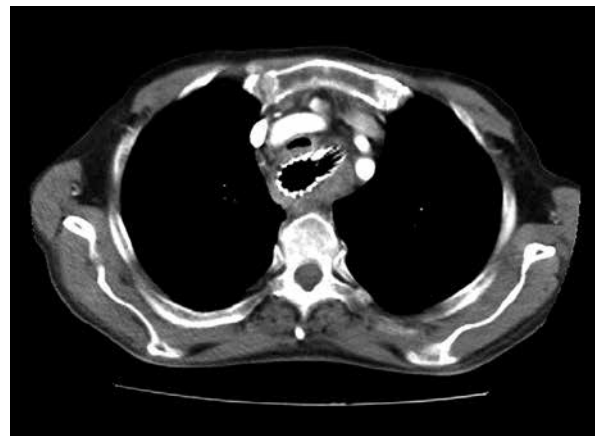


Photo 2. Compression of the trachea by a self-expanding stent

The manner of treating the complications depends on its character and is most often (as many as 70% of cases) conducted using endoscopic techniques [5, 15].

Early complications, such as bleeding, aspiration or pain, require symptomatic treatment. Only massive bleeding or perforation requires an urgent surgical intervention [2, 3].

Late complications most often require the placement of another stent or prosthesis [2, 3, 12].

In case of a recurrence of dysphagia caused by tumor overgrowth over the prosthesis, endoscopic burning may be performed using laser or plasma argon coagulation. However, the placement of another prosthesis/stent is most often recommended. If the recurrence of difficulties in swallowing is caused by food clogging, the treatment of choice is endoscopic patency of the prosthesis/stent. In addition, we should consider more precisely instructing patients on the proper diet [1, 3]. In our patients, tumor overgrowth over the prosthesis was treated by the insertion of another stent. In eight cases of patients with tumor overgrowth over the rigid prosthesis, we used burning with plasma argon coagulation.

The shifting of the prosthesis can rarely be corrected by its re-setting in the right place. That usually takes place if the shifting occurred shortly after the treatment. However, the treatment usually involves the removal of the old prosthesis/stent and insertion of a new one [1, 3, 5]. Such a method of treatment was the method of choice for our patients.

In case of respiratory pressure through the prosthesis, we should consider performing a tracheostomy or inserting a stent into the trachea. If, because

of the pressure, a fistula occurs, the treatment of choice is the insertion of a stent to close its lumen [1, 3, 16].

Conclusions

The most common complications after esophageal prosthetics are the recurrence of dysphagia, a fistula and the displacement of the prosthesis/stent. The basic treatment of complications is the repositioning or insertion of an additional prosthesis.

Conflict of interest

The authors declare no conflict of interest.

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