Case Report

ORL

ORL 1998;60:51–54

Received: April 24, 1997
Accepted after revision: October 1, 1997

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Treatment of an Esophagorespiratory Fistula by Insertion of an Esophageal Montgomery and Tracheal Dynamic Stent after Failure of Conventional Endoprosthesis

Key Words
Esophagorespiratory fistula
Gianturco-Song stent
Montgomery stent
Dynamic stent

Abstract
Esophagorespiratory fistulae at the adult age can develop through malignant tumor growth, endoscopy, bougienage, laser therapy, or through a radiochemotherapy. We report a female patient with inoperable bronchial cancer, who developed a symptomatic esophagorespiratory fistula during radiochemotherapy with cisplatin. At first, conventional plastic tubes and then novel selfexpanding silicone-coated Gianturco-Song stents were used in an unsuccessful attempt to close the fistula. After the extraction of two Gianturco-Song stents, the insertion of a Montgomery-Salivary bypass stent in the esophagus and a dynamic stent in the trachea resulted in a permanent occlusion of the fistula. This case demonstrates that Montgomery-Salivary bypass stents do not tend to migrate due to their characteristic shape and self-fixation, and that the novel self-expanding, silicone coated Gianturco-Song stents can be extracted with rigid endoscopy if necessary.

Introduction

Esophagorespiratory fistulae at an adult age can be secondary to a radiochemotherapy by malignant primary disease as, for example, by bronchial or esophagus cancer, whereby the latter affects the male gender with a ratio of 5:1 more often, increasingly between the 5th and 7th decade in life [1, 2]. Surgical therapy is very risky and seldom successful [3]. For this reason, palliative endoscopic measures are preferred. Small fistulae can be sealed by using histoacryl and ethoxysclerol for adhesion [4]. To close larger esophagobronchial fistulae, either conventional plastic tubes or novel self-expanding, silicone-coated stents are used, having the advantage of a less strainful and minimal invasive insertion [5–7].

We report the case of a female patient with inoperable bronchial cancer in the area of the main tracheal bifurcation, who developed a symptomatic esophagorespiratory fistula while under radiochemotherapy with cisplatin. Closure of the fistula could not be achieved with conventional synthetic tubes or with modified silicone coated Gianturco-Song stents [6, 7]. Therefore, a Montgomery-Salivary bypass stent was inserted, which until now has only been occasionally described in the literature for closure of a fistula, and which in connection with a tracheal stent leads to a complete closure of the fistula [5, 8, 9].

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0301–1569/98/0601–0051$15.00/0

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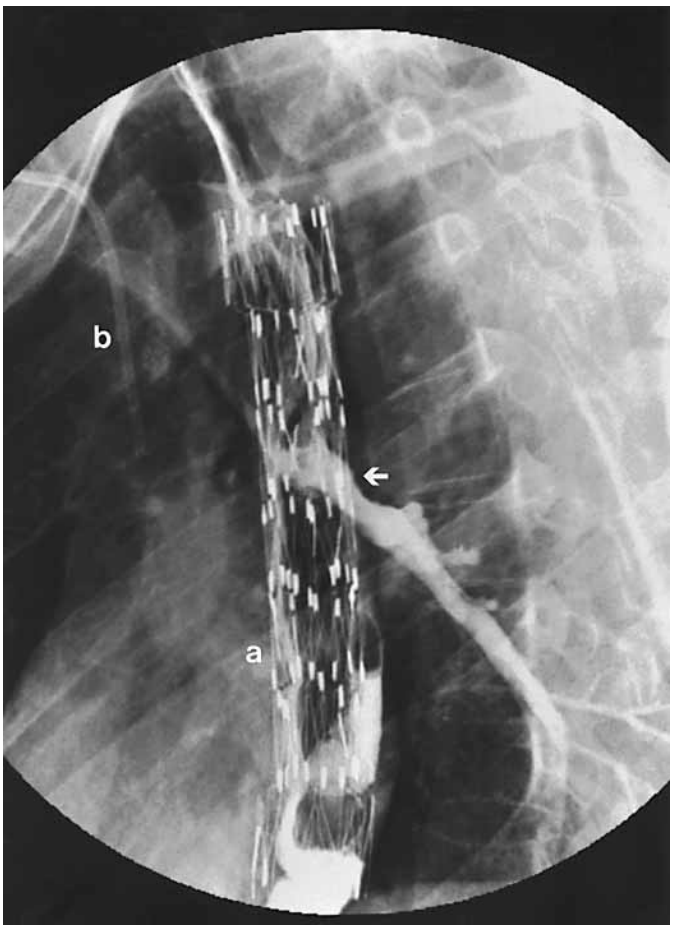

Fig. 1. Gianturco-Song stents in lateral thorax X-ray (**a**). Contrast medium enters the bronchial system (arrow). Central venous port (**b**).

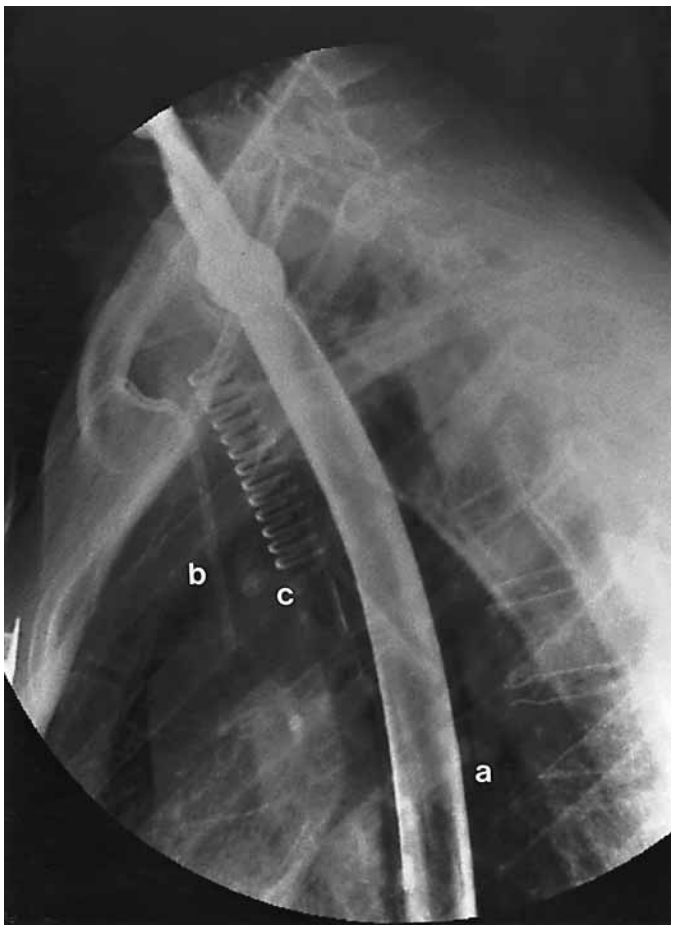

Fig. 2. Lateral thorax X-ray withMontgomery stent in projection on esophagus (**a**). Good contrast medium passage, no leakage visible. Dynamic stent in projection on trachea (**c**) and central venous port (**b**).

Case Report

The subject of this case report, a 32-year-old female, had a nicotine consumption of 20–30 cigarettes per day since age 15. In July 1993, during a preoperative diagnosis (concerning an ovarian cyst), an elevated level of the tumor marker CA-125 and a mass in the area of the tracheal bifurcation, visible in a thorax X-ray, were noticed. Further investigation revealed, following bronchoscopic biopsy, a minimally differentiated, strong polymorphocellular adenocarcinoma of the lung. CT scan presented an already far advanced regional expansion ($T_4N_xM_0$). Bronchoscopy revealed that the trachea in the area of the left main bronchus exit was already infiltrated by tumor growth which is a criterion of inoperability for curative purposes [10]. Distant metastasis could not be proven. From September to November 1993 the patient was treated with a combined radiochemotherapy with cisplatin, during the course of which an esophagorespiratory fistula developed. A Cuff tube (William Cook Europe Ltd., Mönchengladbach, Germany) was implanted in the esophagus without sealing the fistula, so that the patient suffered from aspiration. Oral food intake was insufficient and a percutaneous endoscopic jejunostomy (PEJ) was performed in December 1993, following an insertion of a port system in the right vena cephalica for additive parenteral feeding. The patient's condition, however, increasingly deteriorated. In August 1994, she was transferred to our clinic to evaluate further possibilities for palliative therapy.

Examination Findings. On admission the patient was in a clearly reduced nutritional and general condition. An X-ray examination with contrast medium Isovist (Isovist 300, Schering AG, Berlin, Germany) presented an esophagorespiratory fistula with contrast medium penetrating from the esophagus into the left bronchial system. Bronchoscopy revealed an esophagorespiratory fistula of 15 mm, approximately 1 cm distal to the main tracheal bifurcation in the left bronchus, exposing the arched esophagus tube.

Therapy and Progress. Because of these extended findings, we tried to close the fistula with a modified novel self-expanding and silicone-coated Gianturco-Song stent (Sooho Medi-Tech Co., Seoul, Korea) inserted in the esophagus. After the extraction of the Cuff tube a 14-cm-long Gianturco-Song stent (diameter 18 mm) was

inserted which, however, did not completely close the fistula (fig. 1). The implantation technique has already been described previously [7]. Based on the insufficient occlusion and continuous aspiration, we decided to place a second Gianturco-Song stent proximal to the first stent, to prevent fluid from passing lateral to the first stent. This procedure was successful, and during X-ray examination no penetration of contrast medium in the bronchial system could be detected. The patient was coughing significantly less and was able to take in liquids and semi-solid foods without problem. Five days later, however, the patient began to aspirate very strongly again. During an esophagoscopy, a gaping wide cleft could be seen between the upper tubus rim and the esophagus, which was presumably responsible for the leakage of the contrast medium lateral to the stent into the fistula. No defect could be detected in the Gianturco-Song stent. Based on the extended findings and the instable wall conditions of the esophagus and trachea/bronchus, an implantation of a tracheobronchial dynamic stent (Silikomed®, Dynamic stent, Rüsch AG, Kernen, Germany) [8] was performed under general anesthesia. Since an extraction of the two Gianturco-Song stents by means of flexible endoscopy was not successful, they were extracted from the esophagus under general anesthesia using a rigid esophagoscope and a rigid forceps. During the same intervention, an 18-cm-long (diameter 16 mm) Montgomery-Salivary bypass stent (E. Benson Hood Laboratories, Pembroke, Mass., USA) with a funnel-shaped opening at the proximal end, which achieves fixation in the hypopharynx, was implanted. Control X-ray presented free passage of the contrast medium through the stent, without any signs of leakage (fig. 2). Thereafter, the patient was able to take in liquids and solid foods orally. The patient, whose general condition had been clearly improved (Karnofsky index at admission: 40–50%, at release: 70–80%), was released 7 weeks after admission. Five months after the insertion of the Montgomery and Dynamic stents she reported that her condition, compared to the one at release, had not worsened and her food intake was mainly oral, supplemented with tube food (Survimed®, Fresenius AG, Bad Homburg) via PEJ tube. She felt that her quality of life and her psychological constitution had clearly improved. Seven months following implantation of the two stents, the patient's general condition deteriorated because of progressive tumor growth. This caused the Montgomery stent to move 2 cm distally and resulted in acute aspiration pneumonia of which the patient died.

Discussion

Esophagorespiratory fistulae can develop during infiltrating growth of the esophagus or bronchial cancer. Furthermore, esophagobronchial fistulae can also occur secondary to bougienage, laser therapy, endoscopy, or as in this case during the course of a radiochemotherapy causing tumor necrosis [11]. In the case of esophageal or bronchial cancer, surgical treatment of fistulae is not generally possible, as in these cases the tumors are too far advanced, and palliative operative measures are accompanied by a 50% mortality rate [11–13]. For this reason, endoscopic placements of tubes/stents are the method of choice [14, 15]. In most cases, palliative endoscopic procedures rapidly improve the symptoms which, in view of the often expected short life-span, is crucial for the quality of life. It is possible to seal esophagorespiratory fistulas with a conventional plastic tube which is, however, a stressful procedure for the patient and includes a 10–15% risk of additional perforation [16]. Up to now, self-expanding metal stents are used e.g. in stenotic diseases of the esophagus and have proved to be less strainful and safer than plastic tubes [17, 18]. But these open mesh wires are not suitable for the treatment of fistulae. Recently, Song et al. [6] used modified self-expanding and silicone-coated Gianturco stents for the treatment of esophagorespiratory fistulas. Eight patients with esophagus carcinoma and esophagorespiratory fistulae were treated with these stents. In all cases a closure of the fistula could be accomplished [6]. In our clinic we achieved an occlusion of esophagorespiratory fistulae in 7 of 8 cases in a collective group of 8 patients having the same constellation of findings [7].

In 1955 Montgomery [19] described for the first time the use of a tubus, made of polyethylene, to close the gap between pharynx and esophagus after laryngectomy and prior to reconstructing the cervical esophagus. These Montgomery-Salivary bypass stents can be obtained in different diameters (external diameter of 8–20 mm), having a length of 18 cm and can be adjusted to the lumen of the pharynx and the esophagus, respectively. The stents are kept in position by the proximal rim of the funnel, which is placed in the hypopharynx and held in position by the autotonus of the esophagus. Furthermore, the upper sphincter of the esophagus prevents a migration to distal. Warren et al. [5] achieved a closure of the fistula with a Montgomery-Salivary bypass stent in all cases in a collective group of 19 patients with esophagorespiratory fistulae [5]. Other authors report that they could not achieve an occlusion of the fistulae in 21% of the patients (6 of 28 patients) [20, 21]. The survival rate of the collective group of patients with an esophagorespiratory fistula treated by Warren et al. [5] was between 2 and 7 months (average 5 months). Our female patient died 7 months after implantation of the Montgomery stent. The advantage of palliative stent implantations by esophagorespiratory fistulae is, that with this minimal invasive procedure, the quality of life of the patient can be significantly improved by having a normal food intake, a decrease of pulmonary complications and of hospitalization. The above data point out that up to now similar results were achieved with the Montgomery-Salivary bypass stents and Gianturco-Song stents.

The present case illustrates that conventional synthetic tubes or self-expanding, silicone-coated stents raise the

risk of migration in patients who have an esophagorespiratory fistula but no simultaneous stenosis of the esophagus. There is a further risk of insufficient sealing by the prosthesis because liquids can enter into the fistula lateral from the proximal end of the stent. The Montgomery stent, however, even without an associated stenosis in the esophagus, has a reduced risk of migration based on its fixation with the proximal, funnel-shaped end in the hypopharynx and guarantees a complete sealing of the marginal area. Furthermore, the case points out that self-expanding, silicone coated stents of the Gianturco-Song type are removable through rigid endoscopy, if required.

Acknowledgments

The authors wish to thank the Margarete-Ammon-Foundation for supporting this study.

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