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 self-expanding 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 straining 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].
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 (T4N0M0). 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
Esophagorespiratory Fistula

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 fistulae. 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.

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References