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Endoscopic Closure of Esophagothoracocutaneous Fistula with Collagen Plug and Fibrin Glue

Endoscopic closure of an esophageal fistula without concomitant stenosis can be achieved either by using one of the sealing methods [1, 2], by application of a mechanical device [3, 4], or by using a combination of these two approaches [2, 5]. In the case of a benign fistula one must apply definitive curative therapy. Endoscopic closure of the inner opening of an esophagothoracocutaneous fistula, using a collagen plug originally developed for closing arteriography pinochles and fibrin glue, is reported.

A 66-year-old patient had undergone right pneumonectomy for squamocellular lung cancer 19 years previously. Pyothorax had developed 9 years previously, requiring several drainages and subsequent thoracoplasty, but in spite of repeated interventions the empyema sinus persisted. Esophagothoracocutaneous fistula had been revealed 6 weeks previously (Figure **1**), with serious inflammation of the surrounding skin and multiple fistulas. During thoracoscopy the walls and septa of the multilocular empyema space were broken down by means of mechanical debridement and the cavity was stuffed with iodine-soaked tampons. After changes of tampons, repeated thoracoscopic necrectomies, and sucking and rinsing drainage, the postpneumonectomy space cleared up and signs of healing were detected.

During esophagoscopy a guide wire was passed through the internal orifice of the esophageal fistula, originating from a traction diverticulum of the gullet, and entered the chest cavity. At the same time we thoracoscopically grasped and pulled the guide wire in front of the chest wall. Under thoracoscopic control, a mandrin catheter (Figure **2**) was led over the guide wire into the narrow fistula reaching the esophageal mucosa. Pulling out the mandrin and partially withdrawing the guide wire we placed a collagen plug (vascular closure device; Datascope GmbH, Bernsheim, Germany) into the catheter which, while the guide wire was removed, was pushed into the inner opening. A slight protrusion on the mucosa of the esophagus was noted. A barium meal confirmed the closure of the fistula. This was followed by fibrin gluing (Tissucol; Immuno AG, Vienna, Austria) performed twice. To support the healing process a percutaneous endoscopic gastrostomy implantation was utilized for 3 weeks. The postempyema space granulated gradually and the external opening of the fistula healed completely in 10 months. The patient regained 10 kg of body weight, and was symptom- and complaint-free at the 1-year check up (Figure **3**).

Figure 1 Radiological picture of esophagothoracic fistula and thoracic abscess

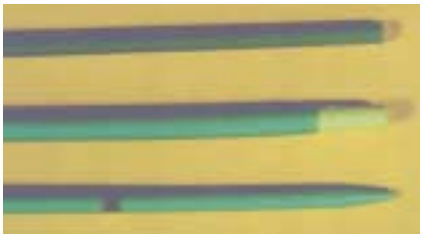

Figure 2 Collagen plug and its introducer set

The dry collagen plug takes up fluid upon contact with tissues and becomes swollen, and it provides perfect closure of the fistula. It gradually breaks down over about 6 weeks, and in the meantime, by fibroblast ingrowth, it is replaced by its own connective tissue and collagen, and resulting in complete healing.

The application of a collagen plug and fibrin sealant in selected cases of esophageal fistulas is an effective, minimally invasive, endoscopic therapeutic method.

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Figure 3 Barium meal at the 1-year check up confirms the closure of the fistula. Its location is indicated by a thorn-like protrusion of the diverticulum

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