

Endobronchial Closure of Total Bronchopleural Fistula With Occlutech Figulla ASD N Device

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Bronchopleural fistula may be treated by medical, endoscopic, and surgical techniques, but large fistulas remain a challenge to be closed using endoscopic techniques. We describe the endoscopic closure of a bronchial total fistula with the Occlutech Figulla ASD N device (International Occlutech AB, Helsingborg, Sweden), originally designed for closure of an atrial septal defect. The procedure was conducted without general anesthesia or rigid bronchoscopy, bronchography, or radioscopy. An immediate reduction in the air leak was observed and also later on bronchoscopy, as the device was almost covered by granulation tissue. The endobronchial technique described seems to be safe and effective to manage large bronchopleural fistulas.

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Bronchopleural fistula (BPF) is an uncommon but often severe complication of pulmonary resection [1, 2]. The BPF may be treated by a range of medical, surgical, and endoscopic techniques, but invasive surgical procedures may not be well tolerated by patients in a postoperative period [3].

Endobronchial techniques have been reported for the delivery of biological glue, sealants, coils, and covered stents with a variable degree of success, depending on the size of the fistula. Experience with endobronchial techniques for closure of big fistulas is scarce and related to a high failure rate [4–6].

We report using the Occlutech Figulla ASD N transcatheter atrial septal defects occluder (International Occlutech AB, Helsingborg, Sweden) for endobronchial closure of a total right upper lobe fistula.

A 53-year-old man with a history of heavy smoking, chronic hepatitis B, systemic arterial hypertension, aneurysm of the thoracic aorta, and bilateral carotid, congestive heart failure in New York Heart Association's functional class II, with tuberculosis was treated 20 years ago for aspergillosis, and he underwent a right upper lobectomy.

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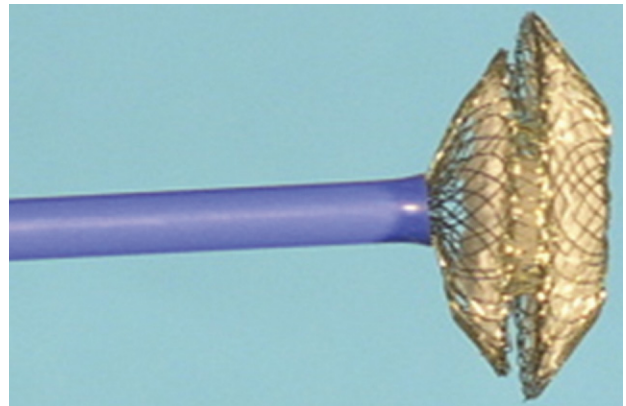


Fig 1. Occlutech Figulla atrial septal defect occluder (International Occlutech AB, Helsingborg, Sweden) physical profile.

He had a total bronchopleural fistula of the right upper lobe bronchial stump and pleural empyema developed. When he was examined, he had a residual apical cavity with an open thoracic tube with air leaking and mucopurulent secretion (Fig 1).

Due to the debilitating conditions of the patient, we decided to attempt a minimally invasive approach [7]. The procedure was approved by the Ethics Committee at our institution, and informed consent was obtained from the patient.

A bronchoscopy with an Olympus BF 160 videobronchoscope (Olympus Corp, Tokyo, Japan) was used with the patient topical anesthetized and sedated, and the fistula diameter was measured using a 7F Swan-Ganz catheter (Edwards Lifesciences, Irvine, CA) that was introduced in parallel with the bronchoscope. The estimated diameter of the fistula was 12 mm.

A guidewire (Hydra Jagwire; Boston Scientific, Natick, MA) was introduced through the working channel of the videobronchoscope, and a 10F sheath (Cook Medical Inc, Bloomington, IN) was advanced over the guidewire and was positioned within the pleural cavity across the fistula orifice.

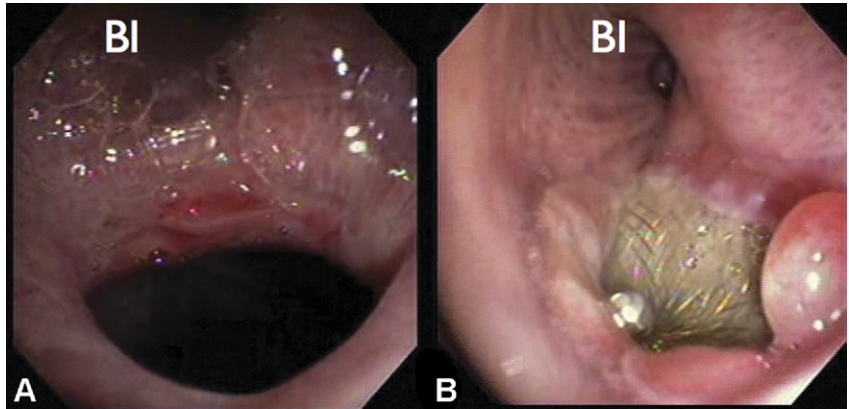
A decision was made to implant an Occlutech Figulla atrial septal defects occluder within the fistula. This occluder is a new double-disk device designed for the transcatheter closure of atrial septal defects; it is made of a nitinol wire mesh. The first stage releases the distal disks. Then a central waist is formed when the second, proximal disk is released.

For closure of atrial septal defects, it has been recommended to use a device whose waist is 20% to 30% larger than the largest diameter of the defect. Because the fistula measured 12 mm in our patient, the 15-mm occluder was selected, ensuring that the proximal disk would cover the entire stump.

The selected 15-mm device was advanced through the sheath and was implanted under direct bronchoscope vision by opening the distal disk in the pleural space and the proximal disk on the bronchial side of the stump; thus the waist of the device adjusts to the fistula orifice. Movements of the delivery cable showed that the device was securely placed. Procedure time was 60 minutes. The patient was transferred to the ward and was uneventfully discharged home on the next day.

An immediate reduction in the air leak from the chest

Fig 2. (A) Endoscopic view of the broncus intermedius (BI) and total bronchopleural fistula before intervention. (B) Control bronchoscopy performed 8 months later.



drain was observed. A progressive reduction and cleaning of the pleural effusion was observed during the following weeks. A repeated bronchoscopy 8 months later showed that the proximal disk of the device was covered by granulation tissue and new mucosa (Fig 2). The patient is free from air leakage symptoms and has minimal pleural effusion drainage from the open thoracic tube.

Comment

Several methods of endoscopic treatment have been tried for the closure of BPFs with limited success and large BPFs have a high failure rate when treated endoscopically.

A recent article [7] described a technique for the endobronchial closure of BPF by the implantation of an atrial septal defects occluder. The Occlutech Figulla is an atrial septal occluder with encouraging clinical experience in the heart [8].

Although we applied a similar technique as described by Kramer and colleagues [7], some differences must be emphasized. First and foremost, the fistula described herein measured 12 mm, considerably larger than those found in a previous publication [7] and generally believed to be too large to be treated endoscopically. Second, we applied a simple endobronchial technique without general anesthesia, rigid bronchoscopy, fluoroscopy, or bronchography.

In conclusion, this endobronchial technique seems to be safe and effective to manage large BPFs. If similar results are seen with ongoing experience, it may represent a major step forward in the management of a debilitating and difficult-to-treat complication after pulmonary resections.

No funding was used to perform the evaluation, and the device tested for this new use was donated to the study by the manufacturer. In addition, the authors had full control of the design of the study, methods used, outcome measurements, analysis of data, and production of the written report.

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