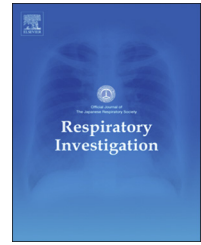




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### Case report

# Bronchial occlusion with Endobronchial Watanabe Spigots for massive hemoptysis in a patient with pulmonary *Mycobacterium avium* complex infection



Takashi Adachi\*, Kenji Ogawa, Noritaka Yamada, Toshinobu Nakamura, Taku Nakagawa, Osamu Tarumi, Yuta Hayashi, Yoshio Nakahara

Department of Respiratory Medicine, National Hospital Organization, Higashinagoya National Hospital, 5-101 Umemorizaka, Meito-ku, Nagoya, Aichi 468-8620, Japan

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#### ABSTRACT

The safety of occlusion with Endobronchial Watanabe Spigots (EWS) for the management of hemoptysis associated with chronic respiratory tract infection has not yet been established. A 57-year-old woman diagnosed as having pulmonary *Mycobacterium avium* complex (MAC) infection presented to our hospital with hemoptysis. She underwent bronchoscopy for bronchial occlusion with EWS, which resulted in the resolution of hemoptysis. Subsequently, she underwent bronchial artery embolization and then EWS were removed. During placement of EWS, no worsening of infection was observed. After removal of EWS, there was no recurrence of hemoptysis. Bronchial occlusion with EWS for hemoptysis associated with pulmonary MAC infection can be performed safely.

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## 1. Introduction

Hemoptysis is a life-threatening condition that requires prompt airway management to stabilize the patient, which must be followed by a definitive treatment such as artery embolization [1,2].

Endobronchial Watanabe Spigots (EWS) are a solid filling material invented by Dr. Watanabe and are used primarily for treating intractable pulmonary fistulas [3]. The first successful case of bronchial occlusion with EWS for the management of airway hemorrhage was reported by Dutau et al. [4]. Since then, several cases of successful management of hemoptysis with EWS have been reported [5,6].

Abbreviations: MAC, *Mycobacterium avium* complex; EWS, Endobronchial Watanabe Spigots; BAE, bronchial artery embolization; GPL, glycopeptidolipid; NTM, nontuberculous mycobacteria.

\*Corresponding author. Tel.: +81 52 801 1151.

E-mail addresses: [tadachi@med.nagoya-u.ac.jp](mailto:tadachi@med.nagoya-u.ac.jp) (T. Adachi), [ogawak-4@hosp.go.jp](mailto:ogawak-4@hosp.go.jp) (K. Ogawa), [noritaka-2@hosp.go.jp](mailto:noritaka-2@hosp.go.jp) (N. Yamada), [toshinobu.na@gmail.com](mailto:toshinobu.na@gmail.com) (T. Nakamura), [nkgwtk@hosp.go.jp](mailto:nkgwtk@hosp.go.jp) (T. Nakagawa), [taru@hosp.go.jp](mailto:taru@hosp.go.jp) (O. Tarumi), [hayay@hosp.go.jp](mailto:hayay@hosp.go.jp) (Y. Hayashi), [yoshi\\_naka2@yahoo.co.jp](mailto:yoshi_naka2@yahoo.co.jp) (Y. Nakahara).

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*Mycobacterium avium* complex (MAC) is the most commonly isolated nontuberculous mycobacteria (NTM) in Japan [7]. Hemoptysis is often associated with bronchiectasis, and Kadowaki et al. detected NTM in 26 of 147 (18%) patients with bronchiectasis [8]. In Japan, there is an increasing prevalence of pulmonary MAC infection.

We report a case of massive hemoptysis associated with pulmonary MAC infection rescued by emergency bronchial occlusion with EWS followed by bronchial artery embolization (BAE), with no worsening of infection.

## 2. Case report

The patient was a 57-year-old woman who had been diagnosed as having pulmonary MAC infection 10 years previously and who had received treatment with isoniazid, rifampicin, and ethambutol for 1 year. The patient had experienced occasional episodes of bloody sputum for about 2 years before she was admitted to our department. She experienced hemoptysis lasting for 2 days and then visited our hospital, where she was admitted emergently. With the exception of pulmonary MAC infection, she had no prior medical history.

On admission, sputum culture detected no significant bacteria while an acid-fast bacillus smear test gave a 2+ result. Subsequent polymerase chain reaction and culture detected *Mycobacterium avium*. Anti-glycopeptidolipid (GPL) core IgA antibody testing was positive at a level of 12.72 U/mL. With negative results for  $\beta$ -D-glucan, galactomannan antigen, and anti-*Aspergillus* precipitating antibody tests, co-infection with *Aspergillus* was deemed unlikely. Chest CT scans showed small nodular and infiltration shadows, and bronchodilation in the middle lobe and lingual areas (Fig. 1a). Since the patient had stable respiration at presentation, she was managed with antibiotics and hemostatics after admission. On the 2nd day of illness, massive hemoptysis of about 500 mL had occurred in the morning, which was considered fatal hemoptysis [9]. At that point, the patient's SpO<sub>2</sub> decreased, prompting us to perform emergency bronchoscopy.

A large amount of blood was found to be almost completely blocking the airway, and blood suction resulted in immediate recovery of oxygen saturation. After the source of bleeding was identified in the middle lobe bronchus, a

medium-sized EWS was inserted into the right B5a segment. Then, medium-sized EWS with their tips cut off were inserted into the entire middle lobe bronchus to achieve hemostasis and complete the procedure (Fig. 2a).

After bronchial occlusion, expectoration of a small amount of bloody sputum was noted. As she was in a stable condition, the patient underwent bronchial arteriography on the 10th day of illness. The right bronchial artery, the third to fifth intercostal arteries, and the main trunk of the internal thoracic artery were involved in bleeding. These blood vessels were also embolized with a gelatin sponge (Fig. 3). Thereafter, the patient experienced no further hemoptysis and EWS were removed on the 17th day of illness. After removal, purulent discharge from the middle lobe bronchus was noted, while no bleeding was observed (Fig. 2b).

No further expectoration of bloody sputum was noted and the patient was discharged from hospital. On the 42nd day after illness, blood tests revealed an anti-GLP core IgA antibody level of 13.35 U/mL. The patient had not experienced further hemoptysis or respiratory symptoms and showed no evidence of worsening upon imaging. The patient is now scheduled to undergo treatment for pulmonary *M. avium* infection, including the use of clarithromycin.

The above bronchoscopic procedure was approved by the ethics committee of Higashinagoya National Hospital, and written informed consent was obtained from the patient for publication of this case report and the accompanying images.

## 3. Discussion

We identified three issues to be discussed based on our experience with the present case. The first involves the role of bronchial occlusion in the management of hemoptysis and the merit of using EWS. BAE is a common procedure for treating hemoptysis, with high rates of success [1,10]; however, this technique is not readily available in many institutions and requires a specialist. Bronchial occlusion should be regarded as a temporary procedure applicable to fatal conditions requiring an urgent medical intervention to keep the airway open and stabilize the patient's condition until they are ready to undergo definitive treatment [4,5]. For hemoptysis originating from a peripheral lesion, endoscopic treatment options with demonstrated efficacy include local injection of cold saline, epinephrine solution, or other solutions [11], and

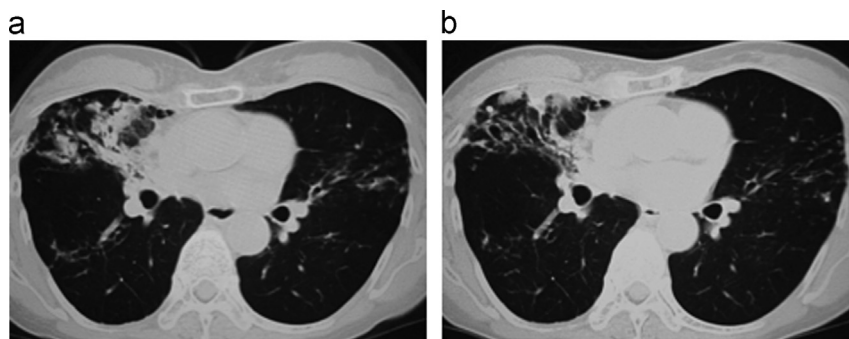


Fig. 1 – Chest CT images taken at different times during the course of treatment. (a) 1st day of illness, at first presentation. (b) 21st day of illness, after removal of EWS.

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