Introduction

Hemoptysis is the expectoration of blood from the airways. Hemoptysis results from destroyed lung parenchyma, for which the most common causes are tuberculosis and bronchiectasis in Korea 

Hemoptysis severity ranges from asymptomatic condition to airway obstruction due to hemoptysis. While only the severe (range, ≥100 mL/24 hr ~ ≥1,000 mL/24 hr) expectoration of pure blood is called hemoptysis, it generally includes blood-tinged or blood-streaked sputum. Typically, ≥600 mL/24 hr is considered as massive hemoptysis, but ≥100 mL/24 hr is also sometimes referred to as massive hemoptysis.

Conservative treatment, bronchial artery embolization (BAE), and surgical treatment are available. However, it is often the case that conservative treatment fails to control bleeding; on the other hand, surgical methods, such as pneumonectomy, are difficult to perform and are associated with high postoperative in-hospital mortality. With good immediate success rate for hemostasis, BAE is effective, but its long-term success rate is
undesirable. A large number of studies have been conducted on the prognostic factors influencing the curative effects of BAE, but so far with no conclusive results. It is also difficult to determine the appropriate treatment method because most of hemoptysis patients have chronic lung disease and poor performance status.

In this study, we investigated the clinical characteristics and etiology of hemoptysis in a hospital-based series of Korean patients. We describe the type of examinations used for diagnosis, the treatment modalities, and outcomes.

**Materials and Methods**

We reviewed the medical records of patients admitted to the Chonnam National University Hospital between January 2005 and February 2010 with hemoptysis.

The inclusion criteria were as follows: diagnosis of hemoptysis; patients treated with hemostatics (Hemocoagulase, Botropase; Hanlim Pharm. Co., Yongin, Korea); patients who underwent chest computed tomography (CT); and patients who were actually treated for hemoptysis. Based on the examination of the medical and radiotherapy records, an analysis was made on the etiology of disease, smoking history, past medical history, physical examination, chest radiography and CT, sputum smear test and culture, bronchoscopy and histopathological examination, bronchial arteriography, and postoperative histopathological examination.

In this study, hemoptysis was divided into mild (<30 mL/24 hr), moderate (≥30 and <100 mL/24 hr), and severe or massive (≥100 mL/24 hr) according to Fidan et al.

Active pulmonary tuberculosis was defined as positivity for acid-fast bacillus (AFB) on bronchoscopy aspirate smear test, positivity for *Mycobacterium tuberculosis* on tuberculosis culture, or positivity on tuberculosis polymerase chain reaction (TB-PCR) test. Bronchiectasis was diagnosed based on chest CT imaging, and lung cancer was diagnosed based on histopathological examination.

When chest CT, bronchoscopy, or bronchial arteriography could detect the bleeding site or cause, it was defined as being helpful for diagnosis.

The follow-up period of patients was based on the last day of visit, and the success rate of hemoptysis control was determined by dividing the term largely into short-term and long-term.

Short-term results were assessed based on careful observation of patients for 1 month (30 days or less) after first-line treatment and were classified into two categories: success, indicating complete cessation of hemoptysis during 1 month (30 days or less); and recurrence. Treatment failure was defined when moderate bleeding or worse continued three days after first-line treatment, and included the cases where the second-line treatment was performed, or the patient was transferred, discharged, or died without second-line treatment. When a patient was discharged because of mild hemoptysis three days after first-line treatment and did not need second-line treatment for hemoptysis, it was not considered as treatment failure. Recurrence included treatment failure, and was defined as single or multiple episodes of hemoptysis. Long-term results were evaluated in patients who could be followed for at least 1 month. Successful long-term control was defined as the successful control of hemoptysis without recurrence for the follow-up period (longer than 1 month). The same patient could be included in both short-term and long-term groups. In-hospital mortality was assessed in patients with long-term follow-up.

In addition, the patients were divided into conservative treatment, BAE, and surgical treatment group, depending on their first-line treatment regardless of the cause. Follow-up period of conservative treatment was based on the day of hospital admission. To compare the differences between short-term control, long-term control, in-hospital mortality, and duration of hospitalization, we performed statistical analyses.

For the statistical analysis, the SPSS version 18.0 (SPSS Inc., Chicago, IL, USA) program was used. The continuous variable data were presented with mean±standard deviation. In addition, ANOVA test was performed to compare the hospitalization duration of each