Hemoptysis in a referral hospital for pulmonology*

Hemoptise em hospital de referência em pneumologia

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Abstract

Objective: To determine the main causes of hemoptysis and to classify this symptom, in terms of the amount of blood expectorated, in patients hospitalized at a referral hospital for pulmonology. **Methods:** The study included 50 patients with hemoptysis admitted to the pulmonology ward of a general hospital in the city of Recife, Brazil, between July of 2005 and February of 2006. The data of interest were analyzed and compared with those in the literature. **Results:** The most common cause of hemoptysis was infection—in 39 patients (78%)—mostly related to tuberculosis sequelae or active tuberculosis. Regarding the severity of hemoptysis, moderate hemoptysis, diagnosed in 28 patients (56%), was the most common. **Conclusions:** Our results suggest that all patients who present with hemoptysis should be investigated for infection.

Keywords: Hemoptysis/classification; Hemoptysis/etiology; Comorbidity.

Resumo

Objetivo: Determinar as principais causas de hemoptise e classificar esse sintoma quanto ao volume de sangue expectorado em pacientes internados em um hospital de referência em pneumologia. **Métodos:** Foram incluídos 50 pacientes com hemoptise internados na enfermaria de pneumologia de um hospital geral na cidade do Recife (PE) no período entre julho de 2005 e fevereiro de 2006. Os dados de interesse foram analisados e comparados aos da literatura mundial. **Resultados:** As infecções foram principais causas de hemoptise — em 39 pacientes (78%) — a maioria delas relacionadas a sequelas de tuberculose pulmonar ou secundárias a tuberculose ativa. Em relação ao grau de hemoptise, as hemoptises moderadas, diagnosticadas em 28 pacientes (56%), foram as mais encontradas. **Conclusões:** Nossos resultados sugerem que todos os pacientes com hemoptise devam ser investigados quanto a infecções.

Descritores: Hemoptise/classificação; Hemoptise/etiologia; Comorbidade.

Introduction

Hemoptysis is defined as bleeding arising from the lower airways. Its most common presentations are the coughing up of blood and the expectoration of blood-tinged sputum. It is a common and nonspecific sign, occurring in a wide variety of diseases.[1] Its presence always requires investigation, even if only a small quantity of blood is expectorated.[2]

In hemoptysis, bleeding can originate from one of two main sources: the systemic arterial circulation, which is a high-pressure system arising from the bronchial arteries; and the pulmonary arterial circulation, which is a low-pressure system arising from the pulmonary arteries.[1,2] In most cases (90%),[3] hemoptysis originates from the systemic arterial circulation (bronchial arteries), whereas it originates from the pulmonary arterial circulation in 5%. Massive hemoptysis usually originates from the bronchial arteries, due to the high pressure of that circuit.[3,4]

The etiology of hemoptysis can be divided into several groups: infections; cardiovascular diseases; lung diseases; cancer; vasculitis; coagulopathy; trauma; drug use; iatrogenesis; foreign body aspiration; and unknown, which

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includes catamenial hemoptysis (secondary to tracheobronchial endometriosis) and cryptogenic hemoptysis.

During the investigation of hemoptysis, it is important to determine whether the bleeding is truly of pulmonary origin, since other types of bleeding (originating from the upper airways or the digestive tract—known as pseudohemoptysis) can be mistaken for hemoptysis.[1,3]

Hemoptysis can be classified as mild, moderate or massive, depending on the amount of blood expectorated: < 100 mL in 24 h (mild); 100-600 mL in 24 h (moderate); and > 600 mL in 24 h or > 30 mL/h (massive).[1]

Identifying the etiology of hemoptysis and classifying it in terms of the amount of blood expectorated play a fundamental role in defining the treatment to be instituted and deciding whether or not hospital admission is necessary. In addition, the rate of bleeding is the major determinant of mortality, and asphyxia is the leading cause of death.[1,5]

The objective of this study was to determine the main causes of hemoptysis and to classify this symptom, in terms of the amount of blood expectorated, in patients admitted to the pulmonology ward of a general hospital in Brazil.

Methods

This was a descriptive study. Using a local database at the *Hospital Geral Otávio de Freitas* (HGOF, Otávio de Freitas General Hospital), located in the city of Recife, Brazil, we determined the number of patients admitted to the pulmonology ward of that hospital with a primary complaint of dyspnea between July of 2005 and February of 2006.

The etiology and the amount of hemoptysis were determined. The criterion for classifying the amount of hemoptysis was that previously described.

The Epi Info 2000 software was used for data analysis, and Microsoft Excel spreadsheets were used to create the illustrations.

Results

Between July of 2005 and February of 2006, 376 patients were admitted to the pulmonology ward of the HGOF. Of those 376 patients, 50 were admitted for hemoptysis, corresponding to 13.2% of the admissions.

Table 1 - Distribution of the causes of hemoptysis in 50 patients admitted to the pulmonology ward of the Otávio de Freitas General Hospital between July of 2005 and February of 2006.

Underlying disease	n	%
ABPA	1	2
Lung abscess	1	2
Rounded atelectasis	1	2
Bronchiectasis	19	38
Interstitial lung disease	2	4
Upper respiratory tract infection	1	2
Lower respiratory tract infection	2	4
Mycetoma	8	16
Lung cancer	5	10
Community-acquired pneumonia	3	6
Active pulmonary tuberculosis	4	8
Pulmonary vasculitis	1	2
COPD	2	4
Total	50	100

ABPA: allergic bronchopulmonary aspergillosis.

Of the 50 patients, 44 (88%) were male and 6 (12%) were female. Ages ranged from 19 to 83 years.

Chief among the causes of hemoptysis (Table 1) were infection, accounting for 78% of the cases, and cancer, accounting for 10%.

Among the infectious etiologies (Table 2), bronchiectasis accounted for 38% of the cases, followed by mycetoma (16%), active pulmonary tuberculosis (8%) and community-acquired pneumonia (6%). It is of note that bronchiectasis was defined as a single group, regardless of its cause.

Table 2 - Distribution of the infectious causes of hemoptysis in 50 patients admitted to the pulmonology ward of the Otávio de Freitas General Hospital between July of 2005 and February of 2006.

Underlying diagnosis	n	%
ABPA	1	2.6
Lung abscess	1	2.6
Bronchiectasis	19	48.7
Upper respiratory tract infection	1	2.6
Lower respiratory tract infection	2	5.2
Mycetoma	8	20.5
Community-acquired pneumonia	3	7.7
Active pulmonary tuberculosis	4	10.3
Total	39	100

ABPA: allergic bronchopulmonary aspergillosis.

Table 3 - Severity of hemoptysis in 50 patients admitted to the pulmonology ward of the Otávio de Freitas General Hospital between July of 2005 and February of 2006.

Severity of hemoptysis	n	%
Mild	15	30
Moderate	28	56
Massive	7	14
Total	50	100

Regarding the amount of blood expectorated (Table 3), moderate hemoptysis was the most prevalent, accounting for 56% of the cases, mild hemoptysis accounted for 30% of the cases and massive hemoptysis accounted for only 14%.

Discussion

The incidence of hemoptysis is influenced by several factors, including the geographic area of study and the institution where the research is conducted (general hospital or referral hospital).[2] In Brazil, most cases of hemoptysis are caused by infection.

Chief among the infectious causes of hemoptysis is tuberculosis.[6] As mentioned above, of the 50 cases of hemoptysis evaluated, 8% were directly related to pulmonary tuberculosis and 38% were related to bronchiectasis. The data collected in this case series corroborate the data reported in the literature. One group of authors,[7] evaluating 185 patients admitted for hemoptysis to a center for clinical medicine and pulmonology, observed that pulmonary tuberculosis was the leading cause of admission. In a study of patients diagnosed with pulmonary tuberculosis, hemoptysis was present as a symptom in 31% of the elderly patients and in 51% of the non-elderly patients.[8]

It is known that bronchiectasis consists of irreversible bronchial dilatation and occurs due to the destruction of the muscle and elastic components of the bronchial wall.[9] Two elements are key to this destruction: infectious disease and impaired clearance of bronchial secretions.[9,10] Infection with *Mycobacterium tuberculosis* is still quite common in Brazil and can cause bronchiectasis, either due to the active infectious process in the bronchi or to lung scarring caused by a previous infection, or even due to bronchial compression caused by hilar adenopathy.[9]

Infection with other agents, such as *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and *Mycoplasma pneumoniae*, also results in lung damage that can cause bronchiectasis.

It should be borne in mind that fungal colonization in cavitary lesions remaining after pulmonary tuberculosis has been cured, as well as in pockets of bronchiectasis, is a cause of recurrent hemoptysis.[1,11] When these cavitations are colonized, a fungus ball (mycetoma) can form, and *Aspergillus* is the fungal genus most commonly involved in this process.[1,11,12]

Of the 50 patients admitted for hemoptysis, 8 (16%) had an underlying diagnosis of mycetoma, which is one of the major infectious causes.

Community-acquired pneumonia also had a prominent position among the infectious causes found in this study, accounting for 6% of the admissions for hemoptysis. In a retrospective study conducted in 1997 and involving a sample of 208 patients, one of the four main etiologies of hemoptysis identified was pneumonia, which accounted for 16% of the cases, compared with 20% for bronchiectasis, 19% for lung cancer and 18% for bronchitis.[13]

In our study, the major noninfectious cause of hemoptysis was cancer, which accounted for 5 cases (10%). The classic symptoms of lung cancer are hemoptysis, cough, dyspnea, chest pain and recurrent chest infections.[14] These clinical manifestations can result from local tumor growth, from metastases or from paraneoplastic syndromes.

Lung cancer occurs more frequently in elderly patients and is related to the smoking habit. The presence of obstructive pulmonary disease with persistent cough and frequent acute attacks of bronchitis with sputum production and hemoptysis make lung cancer difficult to diagnose.[14]

A study of 500 patients with hemoptysis and submitted to bronchoscopy was published in 2002.[15] In that study, the leading cause of hemoptysis was lung cancer, which accounted for 58% of the cases. Most (66%) of the patients were male, 88% were smokers, and the mean age was 60 years.

It is of note that the signs and symptoms of lung cancer, including hemoptysis, are late manifestations and usually indicate advanced or metastatic disease.[15] In addition, the

sudden onset of hemoptysis with no identified cause, especially in smokers, should always be considered a possible manifestation of lung cancer.[11,16]

Among the noninfectious causes of hemoptysis found in the present study, vasculitis accounted for 2% of the cases, that is, only 1 patient had vasculitis as the underlying cause of hemoptysis.

Vasculitis is considered an uncommon cause of hemoptysis. In one study,[13] pulmonary vasculitis was the cause of hemoptysis in only 1% of a sample of 208 patients.

In order to classify hemoptysis in terms of the amount of blood expectorated, we used three categories (mild, moderate and massive), based on the reported amount of blood expectorated in the 24 h before admission. Classifying hemoptysis in terms of the amount of blood expectorated helps to determine severity and to define the treatment to be provided.[1] In the present study, moderate hemoptysis (100-600 mL of blood expectorated in 24 h) was the most common, being identified in 28 patients (56%). Mild and massive hemoptysis respectively accounted for 30% and 14% of the cases evaluated.

One group of authors[17] reported a result similar to ours regarding the amount of bleeding. Of the 500 patients studied by those authors, 453 (90.6%) presented with mild or moderate hemoptysis and only 47 (9.4%) presented with massive hemoptysis.

In one study,[13] the following classification, based on the amount of blood expectorated, was used to evaluate 208 patients with hemoptysis: mild or trivial hemoptysis (cases presenting with bloody or blood-tinged sputum); moderate hemoptysis (< 500 mL of blood expectorated in 24 h); and massive hemoptysis (≥ 500 mL of blood expectorated in 24 h). The results of that study were quite similar to ours, despite the difference in classification, with hemoptysis being classified as mild 38% of the patients, moderate in 48% and massive in 14%. This demonstrates once again that our study presents results that are very similar to those found in the literature.

In another study,[7] the hemoptysis was classified as mild (< 50 mL of blood expectorated in 24 h), moderate (50-500 mL in 24 h), massive (500-1,000 mL in 24 h) and exsanguinating (> 1,000 mL in 24 h). Despite the different classification, the results were similar to those previously obtained in other studies: 33.71% of the patients presented with mild hemoptysis; 57.14% presented with moderate hemoptysis; 7.42% presented with massive hemoptysis; and 1.71% presented with exsanguinating hemoptysis.

Studies of the etiology of hemoptysis are scarce in Brazil, and no such studies were found in the databases searched (LILACS and SciELO), thereby precluding any comparisons with our data.

Based on the results of the present study, we can conclude that hemoptysis continues to be a major cause of hospital admission in Brazil, and that infectious diseases are the leading causes of this condition.

Comparing the data obtained in this study with those reported in the literature, we observed that the causes found were not so different from those reported in studies conducted primarily in Latin America.

We found that moderate hemoptysis was the most common, as previously reported in the literature.

The present study was carried out only to collect data on the causes of hemoptysis in inpatients. Future studies of this topic should be expanded to evaluate the types of treatment and their outcomes.

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