Update Diagnosis and Treatment of Hemoptysis

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ABSTRACT

Hemoptysis refers to the occurrence of bleeding that comes from a location situated below the voice chords. Typically, it is categorized as normal, mild, or major, with the latter referring to bleeding exceeding 200–600 mL (about 1-2 cups) within a 24-hour period. Massive hemoptysis refers to bleeding that is either hemodynamically significant or poses a threat to ventilation. In a single study, the percentage of deaths within the hospital was found to be 6.5%. The primary objective of managing extensive hemoptysis is to provide therapeutic interventions rather than focusing on diagnostic procedures. The majority of occurrences of hemoptysis observed in patients receiving treatment outside of a hospital setting are attributed to infection, such as acute or chronic bronchitis, pneumonia, tuberculosis, or aspergillosis. The purpose of this study is to provide information on the latest advancements in the diagnosis and treatment of hemoptysis symptoms.

1. Introduction

Hemoptysis is an indication of bleeding that originates from a location situated beneath the voice chords. Typically, it is categorized as normal, mild, or major, with the latter referring to bleeding exceeding 200–600 mL (about 1-2 cups) within a 24-hour period. Massive hemoptysis refers to the presence of severe bleeding that poses a risk to the patient’s circulation or ability to breathe. In a single study, the rate of death within the hospital was recorded at 6.5%.¹² The primary objective of managing extensive hemoptysis is to provide therapeutic interventions rather than focusing on diagnostic procedures. Most of the time, outpatients who have hemoptysis do so because they have an infection, like acute or chronic bronchitis, pneumonia, tuberculosis, or aspergillosis. Key factors to examine for diagnosing hemoptysis include a patient’s medical history of fever, cough, symptoms indicating infection in the lower respiratory tract, smoking history, and any instances of bleeding from the nose or gastrointestinal system. The results of a complete blood count and chest radiography should confirm these worries.³⁻⁵ The purpose of this study is to provide an overview of the latest advancements in diagnosing and treating symptoms of hemoptysis.

Etiologies of hemoptysis

Hemoptysis can be physically classified based on its etiology. Blood can come from the trachea as a result of cancerous invasion or from the airways in conditions such as COPD, bronchiectasis, bronchial Dieulafoy’s disease, and bronchogenic carcinoma. It
can also originate from the pulmonary vasculature in cases of left ventricular failure, mitral stenosis, pulmonary embolism, pulmonary arterial hypertension, and arteriovenous malformations. Additionally, blood can come from the lung tissue itself in cases of pneumonia, fungal infections, cocaine inhalation, or granulomatosis with polyangiitis. In very rare cases, warfarin can lead to diffuse alveolar hemorrhage, which can be seen on chest x-rays as alveolar infiltrates and bleeding from small blood vessels. Most cases of hemoptysis seen in people who are getting medical care outside of a hospital are caused by infections like acute or chronic bronchitis, pneumonia, tuberculosis, or aspergillosis. In very rare cases, warfarin can lead to diffuse alveolar hemorrhage, which can be seen on chest x-rays as alveolar infiltrates and bleeding from small blood vessels. Most cases of hemoptysis seen in people who are getting medical care outside of a hospital are caused by infections like acute or chronic bronchitis, pneumonia, tuberculosis, or aspergillosis.6,7

The incidence of hemoptysis caused by lung cancer rises proportionally with age, constituting around 20% of cases in the elderly population. High blood pressure in the pulmonary veins can occasionally cause hemoptysis, but this only happens in less than 10% of cases. Examples include mitral stenosis and pulmonary embolism. Most cases of hemoptysis go away on their own within 6 months, even if the cause can’t be found with a CT scan or bronchoscopy. However, it is important to note that there are certain exceptions to this, particularly for those who are at a heightened risk of developing lung cancer, such as smokers over the age of 40. Iatrogenic bleeding can happen after a transbronchial lung biopsy, treatment with blood thinners, or when the pulmonary artery bursts because a catheter with a balloon tip was placed too far away. Hemoptysis may be associated with obstructive sleep apnea. Pulmonary amyloidosis is a potential cause of hemoptysis. The reason remains unidentified in 15–30% of cases.8

**Clinical symptom of hemoptysis**

If healthy young individuals (under 40 years of age) who do not smoke experience blood-tinged sputum during upper respiratory tract infections, there is no need for further diagnostic investigation as long as the coughing up of blood stops when the infection is resolved. Still, hemoptysis is often a sign of a serious illness, especially in people who have a high chance of having a lung problem. Hemoptysis emerged as the sole symptom identified as a distinctive prognosticator for lung cancer. Distinguishing between blood-tinged sputum and blood-producing cough is not beneficial during examination. The purpose of the medical history is to identify people who are at risk of acquiring either of the aforementioned conditions. Additional characteristics encompass the length of symptoms, the existence of respiratory tract infections, and previous or ongoing tobacco consumption. It is important to rule out bleeding from sources other than the lungs, such as the sinuses or gastrointestinal tract.9,10

**Physical evaluation related hemoptysis**

The presence of an elevated heart rate, low blood pressure, and reduced oxygen levels indicates significant blood loss, necessitating urgent assessment and stabilization. Thoroughly inspect the nose and oropharynx to detect possible origins of bleeding in the upper respiratory system. Examination of the chest and heart may uncover indications of heart failure or mitral stenosis.10,11

**Diagnostic evaluation**

The diagnostic assessment should encompass chest radiography and a complete blood count. In specific situations, it is suitable to perform renal function testing, urinalysis, and coagulation studies. The presence of blood in the urine, along with coughing up blood, may suggest the presence of Goodpasture syndrome or vasculitis. With flexible bronchoscopy, 3 to 6% of people with hemoptysis who have normal chest x-rays can be found to have endobronchial carcinoma. The majority of these patients are individuals who smoke and are over the age of 40, and a significant portion of them will have symptoms lasting longer than 1 week. A high-resolution chest CT scan is a valuable addition to bronchoscopy as it can detect bronchiectasis and arteriovenous malformations that may not be initially anticipated. Additionally, it is highly effective in identifying central endobronchial malignancy in the majority of instances. The preferred diagnostic method for suspected small peripheral cancers is a high-resolution chest CT scan. Helical CT pulmonary angiography is the preferred initial diagnostic
technique for assessing patients with suspected pulmonary embolism. But people with even mild chronic kidney disease (serum creatinine levels higher than 2.0 g/dL of normal values) should be careful not to use too many contrast agents. For patients who do not have a high risk of pulmonary embolism, the Wells or PERC score for pulmonary embolism could be used along with a very sensitive D-dimer test to avoid the need for helical CT scanning. Echocardiography can detect indications of heart failure or mitral stenosis.12,13

**Treatment of hemoptysis**

The management of mild hemoptysis involves the identification and treatment of the underlying cause. Massive hemoptysis poses a significant risk to one’s life. Endotracheal intubation is necessary to safeguard the airway, while breathing and circulation must be carefully maintained. If the precise location of the bleeding site is identified, the patient should be positioned in the decubitus position according to the specific lung affected.

Rigid bronchoscopy and surgical consultation are necessary for managing uncontrolled hemorrhage. Flexible bronchoscopy can identify the specific location of bleeding in stable individuals, whereas angiography can be used to block the affected bronchial arteries. Initially, embolization is successful in 85% of instances; however, there is a possibility of rebleeding in up to 20% of patients during the next year. In a small percentage of individuals, the anterior spinal artery originates from the bronchial artery. If this artery is mistakenly cannulated and embolized, it can lead to paraplegia. A double-blind, randomized controlled trial was conducted to compare the efficacy of inhaled tranexamic acid, an antifibrinolytic medication, with placebo (normal saline) in patients who were hospitalized with mild hemoptysis, defined as losing less than 200 mL of blood per 24 hours.1,14

A greater number of patients who received tranexamic acid achieved remission of hemoptysis within 5 days of treatment in comparison to those who received a placebo (normal saline). In addition, the tranexamic acid group had a shorter average hospital stay and a lower number of patients who needed invasive procedures (such as interventional bronchoscopy or angiographic embolization) to manage bleeding. If lower respiratory tract bronchoscopy is necessary, patients should be directed to a pulmonologist. If an upper respiratory source of bleeding is detected, patients should be referred to an otolaryngologist. In cases of severe coagulopathic problems, patients should be referred to a hematologist. Patients who are in danger of or are having major hemoptysis may undergo hospitalization to stabilize bleeding. Additionally, hospitalization may be considered to address coagulation abnormalities by administering clotting factors, platelets, or both and to reverse the effects of anticoagulation. Another purpose of hospitalization is to stabilize gas exchange in the blood.14,15

2. **Conclusion**

Hemoptysis is the medical term for bleeding that occurs from a site below the vocal cords. It is commonly classified as either normal, mild, or severe. The main objective of hemoptysis management is to prioritize therapeutic actions over diagnostic techniques. The diagnostic process includes chest radiography, a complete blood count, renal function testing, urinalysis, and coagulation studies.

3. **References**


