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CASE REPORT

Hemoptysis and Dyspnea Due to Suspected Pulmonary Tuberculosis with Pneumonia as a Differential Diagnosis

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Abstract: Hemoptysis is a clinical symptom characterized by coughing up blood, originating from the lower respiratory tract. This symptom is often associated with pulmonary tuberculosis, with pneumonia being one of its differential diagnoses. Distinguishing between these two conditions in primary healthcare facilities can be challenging due to limited diagnostic resources. A 22-year-woman presented to a rural primary healthcare facility with complaints of a productive cough with fresh blood mixed with sputum, epigastric pain, nausea, vomiting, shortness of breath. Physical examination revealed tachypnea (RR: 24 breaths/min), oxygen desaturation (SpO_2 93% on room air) and coarse bibasal crackles. Laboratory examination showed leukocytosis ($13.2 \times 10^3/\mu L$), while the sputum GeneXpert MTB/RIF result was still pending. The patient received supplemental oxygen therapy, intravenous antibiotic, nebulization, corticosteroids, antifibrinolytic therapy and supportive treatment according to the resource availability. This case highlights the diagnostic complexity of differentiating pneumonia from pulmonary tuberculosis in resource-limited primary healthcare settings. Although resources are limited, timely and appropriate diagnostic investigations are crucial to establish an accurate diagnosis. However, this patient first received emergency management and stabilization at the Community Health Center before further evaluation.

Keywords: Hemoptysis, Pulmonary Tuberculosis, Community Health Center, Rapid Molecular Test

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INTRODUCTION

Hemoptysis, or coughing up blood, is the expectoration of blood originating from the lower respiratory tract below the larynx. It is generally a manifestation of an underlying disease; therefore, identification of its etiology requires appropriate clinical and diagnostic evaluation. Infectious diseases, particularly pulmonary tuberculosis in developing countries, are important causes of hemoptysis, although malignancy and cardiovascular disorders should also be considered in the differential diagnosis (Pungkasari & Setiailani, 2025).

Hemoptysis may represent a pulmonary emergency, particularly when bleeding is substantial. Severe hemoptysis can compromise the airway through blood or clot obstruction, impair gas exchange, cause significant blood loss and hemodynamic instability, and increase the risk of aspiration (Pungkasari & Setiailani, 2025).

Tuberculosis (TB) is a major infectious disease caused by *Mycobacterium tuberculosis*, which primarily affects the lungs. Transmission occurs through inhalation of infectious droplet nuclei, followed by deposition of the bacteria in the alveoli. Alveolar macrophages initially phagocytose the bacteria; however, *M. tuberculosis* can survive intracellularly and induce a cellular immune response. Subsequent accumulation of immune cells and necrotic tissue leads to granuloma formation, in which the bacteria may remain dormant or progress to active disease (Mar'iyah & Zulkarnain, 2021).

Indonesia remains one of the countries with the highest TB burden worldwide. According to the 2023–2024 Indonesian TB Inventory Study, Indonesia was estimated to have 1.06 TB cases and 134,000 TB-related deaths in 2022,

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placing the country second globally in terms of estimated TB burden. The same report estimated that approximately 15.6% of TB cases were underreported in the national surveillance system, highlighting the continuing challenge of TB case detection in Indonesia (Kementerian Kesehatan Republik Indonesia, 2024)).

Common clinical manifestations of pulmonary TB include persistent cough, fever, weight loss, fatigue, decreased appetite, night sweats, dyspnea, and hemoptysis. Hemoptysis may occur as a consequence of pulmonary tissue damage and is therefore an important clinical manifestation that warrants further evaluation for active pulmonary TB (Mar'iyah & Zulkarnain, 2021; Pungkasari & Setiailani, 2025).

Pneumonia is an acute infection of the lower respiratory tract involving the pulmonary parenchyma, particularly the alveoli, and may be caused by various bacterial, viral, and fungal pathogens. Common clinical manifestations include cough, fever, dyspnea, sputum production, and weakness (Torres et al., 2021). Diagnosis is based on compatible clinical findings supported by pulmonary infiltrates or other characteristic abnormalities on chest imaging (Kementerian Kesehatan Republik Indonesia, 2023; Torres et al., 2021).

In Indonesia, pneumonia remains an important cause of morbidity and healthcare utilization. The 2018 Basic Health Research reported that pneumonia prevalence increased with age, reaching 2.5% among individuals aged 55–64 years, 3.0% among those aged 65–74 years, and 2.9% among those aged ≥75 years (Badan Penelitian dan Pengembangan Kesehatan, 2019). The pathophysiology involves invasion of the lower respiratory tract by pathogens, followed by an inflammatory response and accumulation of fluid and cellular exudates within the alveoli. These changes impair pulmonary gas exchange and may result in cough, fever, dyspnea, and hypoxemia (Torres et al., 2021; Sherwood, 2012).

CASE REPORT

A 22-year-old woman, Ms. SY, presented to the Emergency Department of Pringgasela Community Health Center with the chief complaint of coughing up blood. The patient reported coughing up blood twice before arriving at the emergency department, with an estimated volume of approximately 50 cc of bright red blood. She had been experiencing a productive cough for about one week and had already taken cough medication without improvement. The patient also complained of epigastric pain, nausea, and one episode of vomiting at home. In addition, she experienced shortness of breath that had progressively worsened several hours before presentation, along with weakness and decreased appetite. She denied having fever, runny nose, sore throat, or any other complaints. Bowel and urinary habits were normal. The patient denied a history of night sweats, weight loss, previous episodes of shortness of breath, previous tuberculosis, any past medical illnesses, close contact, or household contact with a patient with tuberculosis.

Upon arrival, the patient appeared weak but was fully conscious and well-oriented, with a Glasgow Coma Scale (GCS) score of 15 (E4V5M6). Her blood pressure was 110/80 mmHg, heart rate was 99 beats/minute with a regular rhythm, respiratory rate was 24 breaths/minute, body temperature was 36.7°C, and SpO_2 was 93% on room air, which improved to 97% after oxygen administration via nasal cannula at a flow rate of 2 L/min. The patient's body weight was 60 kg and height was 158 cm, corresponding to a body mass index (BMI) of 24.09 kg/m², which falls into the overweight category.

On general physical examination, there were no abnormalities of the head and neck. The conjunctivae were not pale. Chest examination revealed symmetrical chest expansion without retractions. Lung auscultation demonstrated bilateral vesicular breath sounds with prominent crackles in both lung fields, without wheezing. Cardiac auscultation revealed normal first and second heart sounds (S1 and S2) without murmurs or gallops. Abdominal examination showed a soft abdomen with normal bowel sounds and tenderness in the epigastric region. Examination of the extremities revealed warm extremities with good perfusion, capillary refill time of less than 2 seconds, and no peripheral pitting edema.

Investigations performed on the same day (July 19, 2026) included a random blood glucose test using a glucometer, which was 86 mg/dL (reference value: <200 mg/dL), and a point-of-care hemoglobin measurement, which was 12.3 g/dL. A complete blood count could only be performed the following day (July 20, 2026) because the patient arrived at 4:30 PM on July 19, 2026, and the laboratory was already closed in the afternoon. The complete blood count results were as follows:

Table 1. The Result of Complete Blood Count

20/07/2026		**22/07/2026**	
Total WBC	6.5 x 10^3/µL	**Total WBC**	13.2 x 10^3/µL
Total RBC	4.34 x10^6/ µL	**Total RBC**	4.30 x10^6/ µL
Hemoglobin	13.0 d/dL	**Hemoglobin**	13.5 d/dL
Hematocrit	35%	**Hematocrit**	35%
Thrombocyte	260 x 10^3/µL	**Thrombocyte**	270 x 10^3/µL

The complete blood count showed mild leukocytosis (WBC: 6.5 × 10^3/µL; reference range: 5–12). On July 22, 2026, a repeat complete blood count demonstrated an increased WBC count (13.2 × 10^3/µL). The hemoglobin level was 13.5 g/dL, hematocrit (HCT) was 36.3%, and platelet count (PLT) was 270 × 10^3/µL.

A sputum sample was also collected for the GeneXpert MTB/RIF molecular rapid test (TCM). However, the result was not available by the time the patient was discharged because the TCM test had to be processed at another community health center equipped with the GeneXpert machine. Therefore, sputum test results are usually available after at least one week.

The patient received the following treatment:

- Combivent® nebulization (1 respule diluted with 1.5 mL of 0.9% NaCl) every 8 hours.
- Intravenous maintenance fluid with Ringer's lactate at 20 drops/minute,
- Intravenous dexamethasone, 1 ampoule every 8 hours.
- Intravenous ranitidine, 50 mg every 12 hours.
- Ondansetron, 1 ampoule every 12 hours.
- Intravenous ampicillin, 1 g every 8 hours.
- Oral ambroxol, one tablets three times daily.
- Oral Tranexamic acid 500 mg tablets, three times daily.

The patient received counseling regarding the possible causes of her hemoptysis. She was advised to be admitted to an isolation room or a separate room. Only one caregiver was permitted to accompany her, and the caregiver was required to wear a face mask. The patient was also instructed not to spit indiscriminately. After four days of hospitalization, her condition improved. She no longer experienced shortness of breath, nausea, or vomiting. Although hemoptysis persisted, the amount of blood expectorated was only minimal. Therefore, the patient was advised to consult a pulmonologist for further evaluation and management because the sputum GeneXpert (TCM) result was still unavailable at the time of discharge from the community health center.

DISCUSSION

A 22-year-old female patient presented to the emergency department with the chief complaint of coughing up fresh red blood, accompanied by a one-week history of persistent cough that had not improved despite medication and shortness of breath. Hemoptysis may result from rupture or injury of blood vessels in the respiratory tract, particularly the bronchial or pulmonary arteries, due to inflammatory erosion, increased vascular pressure, or other pathological processes. The main mechanisms include damage to the blood vessel wall caused by infection or other diseases, rupture of fragile neovascularization in chronic pulmonary disease, and increased pulmonary vascular pressure (Pungkasari & Setiailani, 2025).

Considering the patient's young age and the high burden of pulmonary tuberculosis in Indonesia, pulmonary tuberculosis was an important suspected cause of hemoptysis. In pulmonary tuberculosis, tissue destruction and cavitation may damage adjacent blood vessels. In some cases, erosion of a pulmonary artery adjacent to a tuberculous cavity may result in pseudoaneurysm formation and subsequent rupture, leading to significant hemoptysis (Mar'iyah & Zulkarnain, 2021).

The patient's cough represents one of the body's natural defense mechanisms for clearing the airways when mucociliary clearance is impaired by excessive mucus production, inflammation, infection, or ciliary dysfunction. The inflammatory response may result in the accumulation of secretions and inflammatory exudates, making coughing an important mechanism for expelling these materials from the respiratory tract (Bickley & Szilagyi, 2013; Sherwood, 2012).

In this patient, shortness of breath and rhonchi were also present. These findings may occur because hemoptysis can result in the accumulation of blood and mucus in the airways, causing partial airway obstruction and turbulent airflow. Damage to the blood vessels or lung tissue, such as that caused by tuberculosis or pneumonia, may allow blood and inflammatory secretions to enter the bronchial or alveolar lumen. The presence of blood clots, fluid, and mucus may subsequently narrow the airways and contribute to the rhonchi heard on auscultation (Bickley & Szilagyi, 2013; Torres et al., 2021).

The most likely clinical diagnosis was hemoptysis with dyspnea, with suspected pulmonary tuberculosis and pneumonia as a differential diagnosis. Physical examination showed tachypnea and oxygen desaturation, with an SpO_2 of 93% on room air. Lung examination revealed bibasal rhonchi. Laboratory examination showed leukocytosis with a white blood cell count of $13.2 \times 10^3/\mu L$ on the third day of treatment, indicating an inflammatory response. However, leukocytosis alone cannot definitively distinguish bacterial pneumonia from tuberculosis or other infectious conditions (Torres et al., 2021).

Based on the patient's history and physical examination, the findings were suggestive of pulmonary tuberculosis, with pneumonia as an important differential diagnosis. To confirm the diagnosis, additional investigations such as a rapid molecular test (TCM/Xpert MTB/RIF) of sputum and chest radiography are required. WHO recommendations support the use of rapid molecular diagnostic tests as an initial diagnostic test in patients with signs and symptoms suggestive of pulmonary tuberculosis (World Health Organization, 2024). Because these examinations were not available at the primary healthcare facility, referral to a higher-level hospital and pulmonologist was indicated for definitive diagnosis and further management.

Initial management was provided according to the resources available at the primary healthcare facility. Supplemental oxygen was administered via nasal cannula at 2 L/min, while intravenous ampicillin (1 g every 8 hours) was initiated for suspected bacterial pneumonia. Ranitidine (50 mg every 12 hours) and ondansetron were given for gastrointestinal symptoms. Dyspnea was managed with nebulized Combivent® (ipratropium bromide/salbutamol) every 8 hours, nebulized corticosteroids, and intravenous dexamethasone, while oral ambroxol (30 mg three times daily) was prescribed to facilitate sputum expectoration. Tranexamic acid was administered to control hemoptysis as adjunctive therapy (Wand et al., 2018; Gopinath et al., 2023).

After four days of treatment at the primary healthcare facility, the patient's condition improved. However, because of the limited diagnostic and therapeutic capabilities of the primary healthcare facility, referral to a higher-level hospital was strongly recommended for further diagnostic evaluation and specialist management. The patient was therefore discharged from the Puskesmas with a referral for further evaluation and treatment by a pulmonologist, including chest

radiography and microbiological examination for tuberculosis.

CONCLUSION

Despite the limited diagnostic and therapeutic resources available at the rural primary healthcare facility, patient management adhered to established clinical standards. Diagnostic and therapeutic decisions were guided by the patient's clinical presentation, physical examination findings, available investigations, and current evidence-based guidelines and literature.

STRENGTHS AND LIMITATION

The main strength of this case report lies in its detailed real-time documentation of the acute presentation in a primary healthcare setting, as well as the initial risk stratification implemented in a resource-limited environment. This case demonstrates that appropriate initial management can be provided at a rural primary healthcare facility despite limitations in diagnostic and therapeutic resources. The healthcare team followed standard clinical protocols and delivered optimal treatment based on the available resources while still advising the patient to undergo further evaluation by a pulmonologist at a hospital.

CONFLICT OF INTEREST

The authors declare that there are no financial or personal conflicts of interest regarding the publication of this case report.

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ETHICAL APPROVAL

Patient identity was heavily protected by omitting personal registration numbers and using clinical pseudonyms. Institutional clearance and informed verbal consent from the patient's family for the utilization of anonymized clinical data were secured prior to manuscript compilation.

DECLARATION OF USING AI

The authors affirm that artificial intelligence (AI) tools were used to assist in the writing process solely for language enhancement purposes, such as grammar checking, paraphrasing, and improving clarity. No AI tools were employed to generate original content, conduct data analysis, or interpret research findings. The authors take full responsibility for the content, interpretations, and conclusions presented in this manuscript.

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