

Medical Case Report

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Silicosis, persistent pneumothorax, and respiratory failure: Grim consequences of galamsey

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Abstract

Illegal small-scale gold mining (galamsey) is often plagued with a deleterious working environment and a lack of proper safety protocols. In this case report, a 32-year-old male galamsey miner presented with progressive shortness of breath, cough, chest pain and weight loss. He was suspected of having silicosis and persistent pneumothorax. Surgery could not be done due to the poor state of the lungs. Despite immediate medical intervention, including chest tube insertion, the patient's condition deteriorated rapidly, and he succumbed to respiratory failure. This case report is highly representative of the medical condition of many galamsey workers. There is an urgent need for intensified safety measures, regulatory enforcement, and improved healthcare access. Concerted efforts of various stakeholder collaborations are key to creating a safer and more sustainable mining industry.

Keywords: Galamsey, silicosis, respiratory failure, gold mining

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INTRODUCTION

Illegal small-scale gold mining, commonly called galamsey in Ghana, is often characterised by dangerous working conditions and a lack of proper safety measures. Gold is a major export commodity that contributes significantly to gross domestic product (GDP) and employs hundreds of thousands of individuals in Ghana [1,2]. The devastation of illegal mining in Ghanaian communities has been reported to include water pollution, environmental degradation, impoverished local communities and a lack of basic amenities [3]. Gold miners who worked underground are known to have health problems, including decreased life expectancy, increased frequency of cancers, pulmonary tuberculosis (PTB), silicosis, asbestosis and other lung diseases [1,3–5]. Small-scale illegal miners in Ghana (galamsey workers) are usually unprotected and thus inhale mining dust containing

silica and other metals, which are then trapped in the lungs and pleura resulting in lung diseases. In this case report, we present a case of a galamsey worker who developed severe silicosis and pneumothorax and succumbed to respiratory failure.

Case

Our case involves a 32-year-old male who has been a galamsey gold miner for over a decade. After years of unprotected illegal mining, the patient developed shortness of breath, cough, chest pain and weight loss of two years duration. The symptoms, which were intermittent, later became severe and progressive three months prior, for which reason he visited various health facilities without improvement. He was referred to the Accident and Emergency Department of Tamale Teaching Hospital for further management. He had a past medical history of PTB that was treated two years ago. On examination, the patient was conscious, cachectic and in severe respiratory distress. His oxygen saturation was 75% on room air, respiratory rate

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was 26 cycles per minute, blood pressure was 139/92 mmHg, pulse was 134 beats per minute, and temperature was 36.6°C. There was no cyanosis, finger clubbing or palpable lymphadenopathy. Chest expansion was decreased bilaterally, percussion note was resonant for most lung zones and hyper resonant in the left upper lung zone, and air entry was reduced bilaterally with bronchial breath sounds in the left upper lung zone and crepitations in both lung zones. All other examination findings were unremarkable. Chest x-ray after initial stabilisation

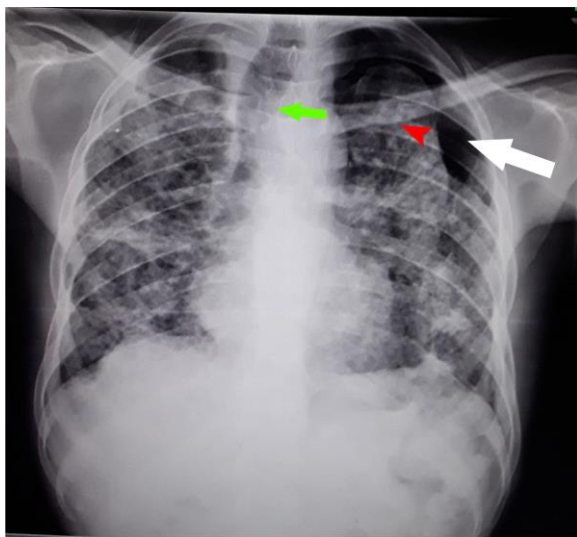


Figure 1. A chest x-ray of the patient showed a collapsed left lung with irregular opacities and a fine reticular pattern of the lung fields (red arrow), left pneumothorax (white arrow) and tracheal deviation to the right (green arrow).

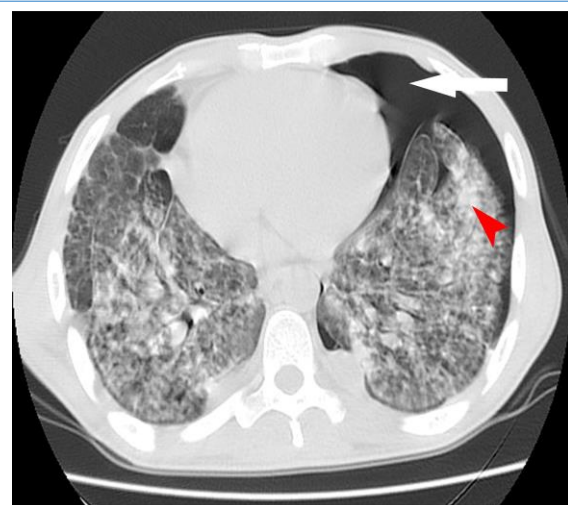


Figure 2. Chest CT scan image showing diffuse reticulonodular opacities within both lungs and a collapsed left lung (red arrow) in a background of ground-glass opacification with left pneumothorax (white arrow).

revealed irregular opacities with a fine reticular pattern of the lung fields and a left pneumothorax (Figure 1).

An initial diagnosis of left secondary spontaneous pneumothorax secondary to pneumoconiosis was made, and a chest tube was passed. Despite the chest tube insertion, the patient's condition did not improve and was complicated by pneumonia. A chest CT revealed diffuse reticulonodular opacities within both lungs in a background of ground-glass opacification, bilateral upper lobar consolidations and a left pneumothorax (Figure 2).

He was discharged home on oxygen with minimal pneumothorax after three weeks of admission when he was clinically stable but still dependent on minimal oxygen. The chest tube was removed after clamping it over 24 hours without significant change. The patient presented after two months to the thoracic surgery clinic with similar symptoms and a pneumothorax identical to the previous admission. He was admitted for oxygen treatment and chest tube insertion on account of persisting pneumothorax and respiratory distress. Despite immediate medical intervention, including chest tube insertion, the patient's condition deteriorated rapidly. Surgery was not considered due to the extensive lung fibrosis. His weakened respiratory system from previous PTB ravaged by silicosis was unable to sustain normal oxygenation. The patient ultimately succumbed to respiratory failure.

DISCUSSION

This case of a man who developed severe silicosis complicated by persistent pneumothorax resulting in respiratory failure and difficulty in accessing early intervention after working for decades as a galamsey gold miner presents a stark reality of the multifaceted health risk associated with such activities. Silicosis remains a significant public health issue, and the inhalation of tiny particles of silica causes inflammation and fibrosis in the lung tissue. The risk of silicosis is dose-dependent and increases exponentially with cumulative dust dose. The major source of silicosis-related diseases, including cancer, PTB and other respiratory diseases, is occupational exposure to silica from mining gold [6,7]. The most common cause of pneumoconiosis in gold miners is silicosis, with a reported prevalence of 11-37% [7]. With most mining companies in Ghana and galamsey activities still using an open-pit method of mining, which is reported to be most devastating to human health and the environment, mining remains the most hazardous occupation in the world irrespective of its short or long-term consequences [2,8].

The underlying conditions of previous PTB and silicosis exacerbated the pneumothorax or vice versa, making it more difficult for the lung to re-expand. The cause of the persistent pneumothorax was not obvious from the clinical findings and images. There was no trapped lung, as was evident on the CT scan. However, due to the extent of lung

destruction over the years, bronchopleural fistula is likely, although the typical imaging characteristics of bronchopleural fistula were not evident on the chest CT, and there was no spontaneous bubbling of the underwater seal. Progressive lung fibrosis from pneumoconiosis could also adversely affect lung healing and delay the resolution of pneumothorax. Previous researchers have made recommendations including but not limited to monitoring of dust levels, screening, medical examination, continuous education on safety measures of mining, streamlining activities of galamsey, coordination of related agencies in preventing exposure and social-economic support for affected communities to help prevent galamsey related diseases [1,6,9].

Conclusion

The case of this male patient with severe silicosis and pneumothorax resulting from illegal small-scale gold mining serves as a distressing reminder of the urgent need for enhanced safety measures, regulatory enforcement, and improved healthcare access in these high-risk occupations.

DECLARATIONS

Ethical consideration

Informed consent was obtained from the patient's caregivers for this report. All ethical issues have been considered to protect the patient's rights.

Consent to publish

All authors agreed on the content of the final paper.

Funding

None

Competing Interest

None

Author contributions

AI was involved in the study concept, design, and case management. MY was involved in the drafting of the report. All authors were involved in the interpretation of data, critical revision of the manuscript for important intellectual content and review of the final report.

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Availability of data

The data for this work is available upon request from the corresponding author.

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