

Bilateral pneumothorax, lung cavitations, and pleural empyema in a cocaine addict

Leonardo Solini, MD · Stavros Gourgiotis, MD, PhD
Nikolaos S. Salemis, MD, PhD · Ioannis Koukis, MD

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Abstract A case of bilateral pneumothorax, lung cavitations, and pleural empyema in a cocaine user is described. The patient was treated by left tube thoracostomy and right lower lobectomy. The postoperative course was uneventful. Six months later, the patient remains asymptomatic. The pathology examination of the specimen revealed infected bronchiectasis, interstitial desquamative pneumonia, diffuse alveolar damage, subsegmental arterial thrombosis, and consequent areas of pulmonary infarction.

Key words Cocaine inhalation ·
Pulmonary cavitations · Pleural empyema ·
Bilateral pneumothorax · Pulmonary lobectomy

Introduction

Cocaine inhalation's effects on the lung and pleura are well known. Pulmonary edema, hemorrhages, eosinophilic infiltrates, vascular diseases, foreign body granulomas, asthma, infections, bronchiolitis obliterans, pneumothorax, pneumomediastinum, and pneumopericardium have been reported.¹⁻⁷

L. Solini · S. Gourgiotis (✉)¹ · N.S. Salemis
Second Surgical Department, 401 General Army Hospital of
Athens, Athens, Greece

I. Koukis
Department of Cardiothoracic Surgery, 401 General Army
Hospital of Athens, Athens, Greece

Present address:

¹41 Zakinthinou Street, 15669, Papagou, Athens, Greece
Tel./Fax +30-21-0652-5802
e-mail: drgourgiotis@tiscali.co.uk

We describe a rare case of a cocaine addict in whom consequent bilateral pneumothorax, lung cavitations, and pleural empyema occurred simultaneously. The patient underwent successful surgical treatment. We believe that the presentation of the patient and array of occurrences, beginning with left spontaneous pneumothorax, continuing with rupture of acquired bronchiectasis (from cocaine inhalation) and right pneumothorax, and finally the creation of empyema of the right hemithorax is rare.

Case report

A 32-year-old male cocaine addict was admitted with left chest pain, cough, moderate dyspnea, and fever. He had been a cocaine addict for at least 10 years without any other significant disease in his history. The tests for human immunodeficiency virus (HIV) and hepatitis A and B virus were negative, as were all immunological tests. Arterial blood gas tests were performed (PO₂ 78 mmHg; PCO₂ 38 mmHg; saturation 93%; pH 7.32) followed by complete blood count test: white blood count (WBC) 14700/mm³; platelets 272000/mm³; hemoglobin 10.7 g/dl. Chest radiography revealed a left pneumothorax, and computed tomography (CT) (Fig. 1) confirmed five cavitations on the right pulmonary lower lobe; the largest cavitation measured 5 cm in diameter and was localized peripherally in the superior segment.

Initial treatment with tube thoracostomy led to complete reexpansion of the left lung. Gram stain of the sputum revealed *Staphylococcus aureus*.

Two days later a right pneumothorax occurred, and again a right thoracic tube was inserted and drained air

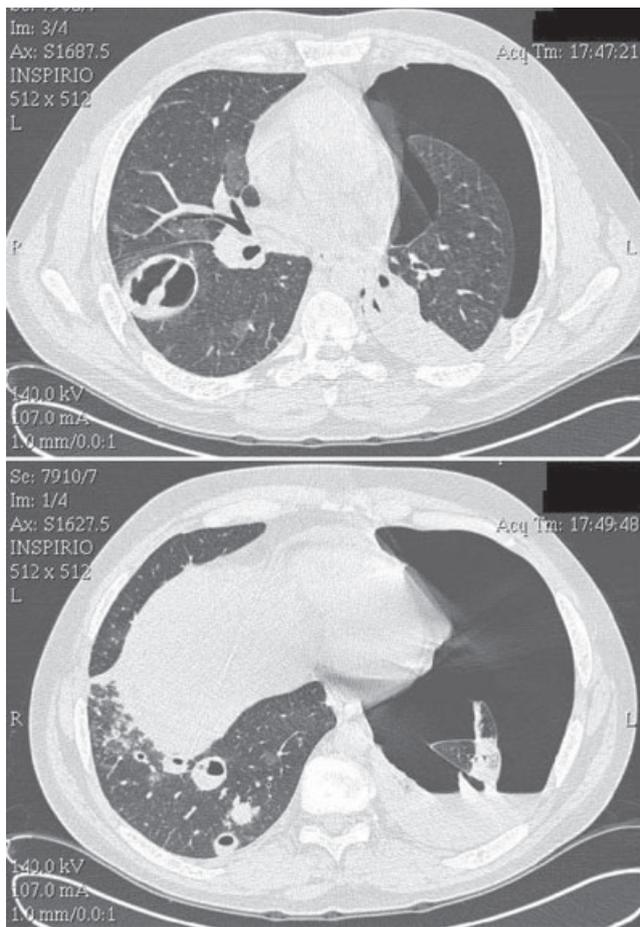


Fig. 1 Computed tomography shows a large cavitary lesion of the superior segment of the right lower lobe and multiple smaller cavitations in the basal segments. A massive pneumothorax is visible on the left side

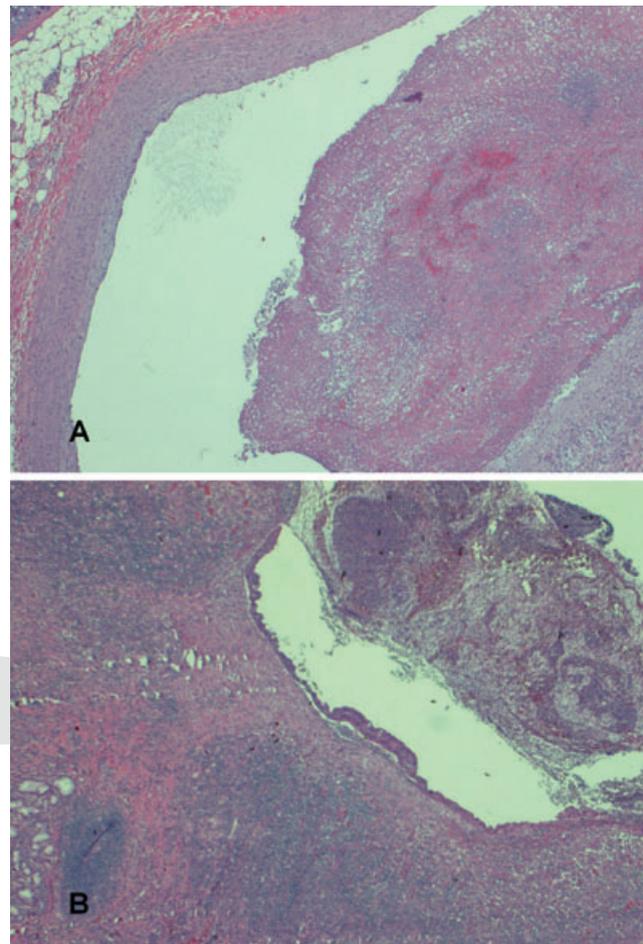


Fig. 2 Histology. **A** Thrombosis in a subsegmental artery. **B** Infected bronchiectasis with diffuse alveolar damage and interstitial desquamative pneumonia

along with a small amount of turbid fluid. Chest radiography showed almost complete reexpansion of the right lung with moderate pleural fluid. The next day the fever increased, and the right air leak persisted. The laboratory tests showed a significant increase in the WBC ($18800/\text{mm}^3$) and C-reactive protein (CRP: 102 mg/dl). Bronchoscopy was normal.

After 2 days without any improvement in the patient's condition, surgery was the next step. The initial approach using video-assisted thoracoscopic surgery (VATS) was quickly converted to open thoracotomy through the sixth intercostal space owing to the presence of empyema with multiple small loculations, adhesions, and complete fusion of the fissures. Next, complete removal of the fibrinopurulent material was carried out, freeing the entire lung. In the superior segment of the lower lobe, a cavity containing dense grayish fluid opening into the

pleura was found. Palpation revealed some nodules in the same lobe, whereas the remaining pulmonary parenchyma was normal. A standard lower lobectomy was performed.

The postoperative course was uneventful and with an appropriate antibiotic therapy, the fever was diminished after 3 days. The patient was discharged 7 days after the operation in good condition and was introduced into a detoxification program. He remains asymptomatic after 6 months.

Pathological study of the removed lobe (Fig. 2) showed that the cavitations were infected bronchiectasia associated with a diffuse alveolar damage, interstitial desquamative pneumonia, thrombosis of some subsegmental arteries, and consequent areas of pulmonary infarction. Pleura was affected by fibrinopurulent empyema. Because the patient's past medical history

was free especially of congenital lung malformations and bronchiectasis, we assumed that the bronchiectasis was acquired and due to cocaine inhalation.

Discussion

The effects of inhalation of cocaine on the lung are due to both the physical presence of the powder and its vasoconstrictive activity. Moreover, pneumothorax and pneumomediastinum can occur because of barotrauma. Although cocaine-related diseases that affect the lung are numerous,¹⁻⁴ acquired bronchiectasis is highly unusual as is its perforation into the pleura causing an empyema. In the case reported here, barotrauma seems to be the most probable cause of the left pneumothorax. On the right side it was induced by rupture of the thin wall surrounding the largest infected cavitation with consequent spilling of its content into the pleural cavity, leading to empyema.

The indication for lobectomy was based on the radiological findings by which an infected, ruptured cavity in the left lower lobe was detected. The ruptured cavity had created a bronchopleural fistula with resulting empyema, which explained the clinical and laboratory findings. Moreover, the presence of several other cystic formations on the left lower lobe and their orientation excluded segmentectomy and mandated lobectomy.

Our surgical approach for pneumothorax and pleural empyema⁸ is routinely VATS and lobectomy for benign disease.⁹ In this case, however, we had to convert the procedure rapidly because of complete fusion of the fissures, which prevented a safe hilar dissection.

Conclusion

We believe that this case shows an extreme condition of the lung following long-term inhalation of cocaine. It is important that thoracic surgeons are aware of such a condition considering the increase of this drug addiction in Western countries. The role of the surgeon may be only to insert a tube thoracostomy for a pneumothorax, but it could also include pulmonary resections when infected cavitations are found.

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