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*CASE FOR DIAGNOSIS*

# Haemoptysis and an abnormal X-ray after prolonged treatment in the ICU

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## Case report

A 67 year old man, with a history of insulin-dependent diabetes, hypertension and pulmonary tuberculosis, was admitted to the Medical ICU because of respiratory failure and shock. Three days earlier, a partial resection of the left maxilla had been performed because of a T2N0M0 squamous cell carcinoma. His only complaint before admission to the ICU had been general malaise and shortness of breath.

On initial physical examination, the patient had a respiratory rate of 40 breaths·min$^{-1}$, cyanosis, a heart rate of 140 beats·min$^{-1}$ and a blood pressure of 70/40 mmHg. Rales were heard over both lower lung fields. Laboratory evaluation revealed leucocytosis, hypoxaemia (arterial oxygen tension ($Pa_{O_2}$) 6 kPa (45 mmHg) and an increased creatine phosphokinase level in the blood. An electrocardiogram (ECG) was compatible with acute anterior myocardial infarction. A chest radiograph demonstrated pulmonary oedema. *Staphylococcus aureus* was cultured both from the operation wound and from the blood. Staphylococcal sepsis, myocardial infarction and adult respiratory distress syndrome (ARDS) were diagnosed. Mechanical ventilation was instituted, and therapy with antibiotics (cefotaxime, flucloxacillin and metronidazole) and vasoactive drugs resulted in initial improvement of haemodynamics and ARDS.

After 5 weeks of artificial ventilation and haemodialysis, the patient developed fever and haemodynamic instability. Tracheal suctioning revealed bloody secretions. There was haemorrhagic diathesis due to liver failure. The chest radiograph, which had shown considerable improvement of the initial ARDS pattern, now started to show a worsening picture (fig. 1, 1 week before death). Extensive investigation, including bronchoscopy with bronchial washing, revealed no cause. The patient was considered not fit enough for thoracotomy and biopsy. Although fever and leucocytosis suggested infection, no other diagnosis could be made, except for "chronic ARDS" and an unknown infection. Despite supportive and broad-spectrum antibiotic therapy (including imipenem and erythromycin) the patient succumbed to pulmonary haemorrhage. An autopsy was performed. Lung tissue was sectioned (Fig. 2).

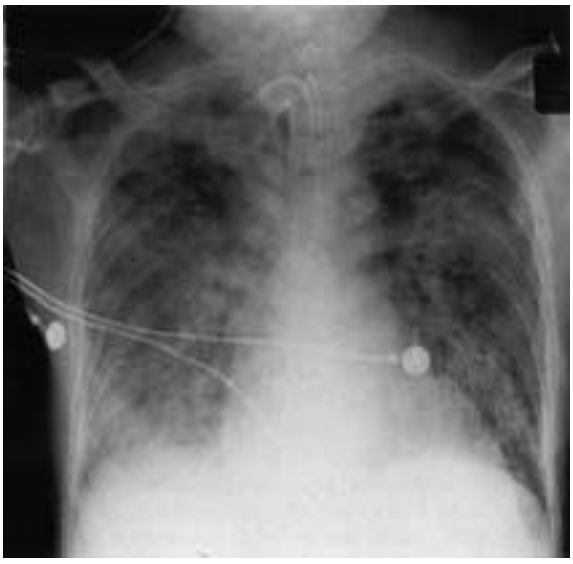

Fig. 1. – Chest roentgenogram, supine, 1 week before death.

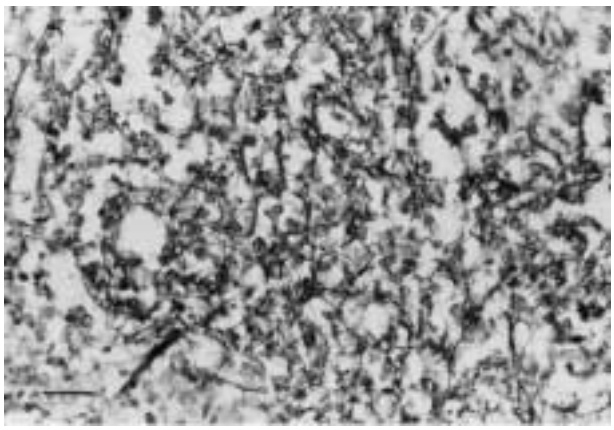

Fig. 2. – Microphotograph of a section of lung tissue obtained at autopsy. (Silverstain; scale bar=25 μm).

**BEFORE TURNING THE PAGE: - INTERPRET THE CHEST ROENTGENOGRAM (FIG. 1) AND THE MICROPHOTOGRAPH OF A SECTION OF LUNG TISSUE OBTAINED DURING AUTOPSY (FIG. 2).**

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*Interpretation of chest roentgenogram (fig. 1)*

In this patient with a tracheostomy, there is a coarse interstitial nodular pattern predominant in the lower lung fields. On the right side there are confluent noduli. No evidence of pleural fluid is seen. The heart is slightly enlarged in this projection with a cardiothoracic ratio (CTR) of 0.55.

*Interpretation of microphotograph (fig. 2)*

In this section of pulmonary parenchyma, stained with a silver stain, there is infiltration with polymorphonuclear granulocytes. There are fine filamentous branching micro-organisms visible, highly suggestive of Nocardia.

## Postmortem diagnosis: extensive Nocardia bronchopneumonia

*Clinical course*

Two days after death, 2 out of 6 blood cultures taken 6 days prior to death grew *Nocardia asteroides*. In culture, the Nocardia proved to be sensitive to vancomycin and clindamycin and resistant to ampicillin, erythromycin, piperacillin and pefloxacin.

Autopsy revealed necrotizing bronchopneumonia due to Nocardia in both lungs (fig. 2). Examination of the heart showed no endocarditis. No other evidence of dissemination was found. There was no permission to perform brain examination.

## Discussion

*Nocardia asteroides* is an ubiquitously occurring, aerobic actinomycete. It is a Grampositive, weakly acid-fast micro-organism, able to appear in bacillar, coccoid and filamentous forms. As a human pathogen, it was first described by EPPINGER [1] in 1890. Infection with Nocardia can lead to acute or chronic bronchopneumonia, with subsequent abscess and/or empyema formation. Dissemination occurs predominantly to skin, soft tissue and brain. Colonization of the airways has been described [2].

Clinical manifestations are often aspecific, as in our case, and can mimic pulmonary tuberculosis, other mycotic infections and malignancy. Other reasons, besides aspecific clinical manifestations, for late diagnosis and treatment are a low index of suspicion, slow growth in culture (up to 4 weeks), and overgrowth by other micro-organisms in standard cultures [3].

Depending on the reporting institution, 24–55% of the patients described are immunocompromised [4]. Both abnormalities in aspecific immunity and in humoral and cellular immunity are thought to predispose to Nocardia infection. Our patient was probably immunocompromised by virtue of having diabetes, a solid tumour, corticosteroid treatment for presumed adrenal failure, and prolonged ICU treatment [5].

Although dissemination has been described to occur in up to 45% of cases, Nocardia is rarely isolated from blood [4]. A survey of the literature revealed 11 cases of nocardaemia since 1945. Nine of these patients were immunocompromised. The mortality (4 out of 11) is not as high as found by PRESANT *et al*. [6] (80%) in their series of disseminated nocardiosis.

Early therapy might improve the prognosis and, therefore, improvement of diagnostic techniques is necessary [7]. Special blood culture techniques to increase the yield of Nocardia from blood are available [8]. The easiest way to demonstrate the infection is by tissue biopsy. In particular, in cases with pulmonary involvement, when the diagnosis cannot be made by less invasive means, such as bronchoscopy, a more invasive procedure should be considered. With the currently available, minimally invasive thoracoscopic surgery, lung biopsy should be performed at an early stage [9].

### References


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**ABSTRACT: We describe a case of Nocardia bronchopneumonia occurring in a patient after 5 weeks of treatment in an ICU. The clinical features were haemoptysis and fever, and an aspecific coarse nodular pattern on the chest roentgenogram. The diagnosis was made, after death, by positive blood cultures for *Nocardia asteroides* and autopsy showing Nocardia bronchopneumonia.**

**Keywords: Critical care, haemoptysis, immunosuppression, *Nocardia asteroides*, respiratory distress syndrome**