

# Concurrent infection with pulmonary nocardiosis and *Salmonella bovis* bacteraemia in a previously healthy female

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## Abstract

We report the case of a woman from sub-Saharan Africa who presented with pyrexia, pulmonary lesions and a urinary tract infection (UTI). She was found to have multiple infections, i.e. *Salmonella bovis* bacteraemia, *Escherichia coli* UTI, and pulmonary nocardiosis. In the presence of lymphopaenia, a Human Immunodeficiency Virus (HIV) antibody test was performed and was positive. This is the first reported case of *S. bovis* infection in Acquired Immunodeficiency Syndrome (AIDS). It is a reminder that HIV infection should always be suspected in patients who normally reside in an area of high prevalence of HIV and present with any infection, but particularly if unusual or multiple infections occur simultaneously.

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## Keywords

HIV; non-typhimurium salmonella; nocardia; infection.

## Case report

A 61-year-old lady having arrived in the UK from sub-Saharan Africa 1 week earlier presented with a 6 week history of breathlessness, a productive cough, fever, and night sweats. She had lost 10 kg in weight over the previous 8 months. There was no history of alteration in bowel habit. Systems inquiry was otherwise unremarkable. Her only past medical history was hypertension treated with reserpine. Her adult son had recently died from tuberculous meningitis. There was no history of IV drug use or blood transfusions; she was in a long-term stable heterosexual relationship. She drank no alcohol and was a life-long non-smoker.

On examination she was pyrexial (39.5 °C), tachypnoeic, and tachycardic with a blood pressure of 108/73 mmHg. The chest was dull to percussion at the right base, with associated crackles. Neurological and abdominal examination were unremarkable. There was no lymphadenopathy or hepatosplenomegaly, and no skin or joint abnormalities.

Laboratory investigations included a Hb of 8.8 g/dl, with an mean corpuscular volume (MCV) of 95.3 fl, a total white cell count of  $4.0 \times 10^6$ /l, and platelets  $325 \times 10^{12}$ /l. Biochemistry was unremarkable. An arterial blood gas on air confirmed hypoxia with a pH 7.42 kPa, pCO<sub>2</sub> 5.14 kPa, pO<sub>2</sub> 7.85 kPa, HCO<sub>3</sub> 27.4 mmol/l, and SaO<sub>2</sub> of 91.4%. Blood cultures grew *Salmonella bovis mortificans*, and a mid stream urine (MSU) grew *Escherichia coli*. Hepatitis and Toxoplasma serology were negative. Venereal Disease Research Laboratory (test for syphilis) (VDRL) serology and cytomegalovirus Detection of Early Fluorescent Foci (a polymerase chain reaction based test) (CMV DEAFF) were positive. Autoimmune screen was negative save for perinuclear Anti-Neutrophil Cytoplasmic Antibody test (pANCA) that was borderline positive but felt to be non-specific. A bone marrow aspirate was normal and the trephine showed only non-specific reactive hyperplasia. A chest radiograph showed a

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**Fig. 1.** Chest radiograph shortly after admission. There is an ill-defined mass in the right mid-zone and some patchy shadowing at the right base. The generalised haziness in both lower zones is due to overlying breast tissue.

single right mid-zone shadow without hilar lymphadenopathy and trivial patchy shadowing at the right base (Fig. 1). Fibre-optic bronchoscopy and washings from the right upper and middle lobes yielded no growth. A mantoux test was negative and sputum culture grew no acid-fast bacilli. Thoracic computerised tomography (CT) revealed a 5 × 2.5 cm lobular mass in the anterior segment of the right upper lobe associated with pleural thickening (Fig. 2(a)). There were further nodules in the right middle lobe and right lower lobe with associated consolidation (Fig. 2(b)). A CT guided biopsy of one of the lesions was partially acid-alcohol fast and subsequently grew *Nocardia asteroides*.

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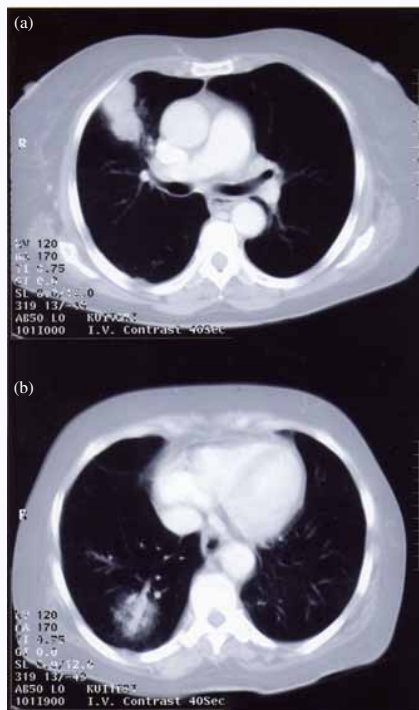
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**Fig. 2.** Representative CT scans demonstrating pulmonary mass in the right middle lobe (top (a)), with a further mass and consolidation in the right lower lobe on a lower scan (bottom scan (b)). The left lung is clear.

The combination of bacteraemia with an unusual organism, pulmonary nocardiosis, and lymphopaenia, led to a suspicion of an underlying immunocompromised state. After counselling an HIV-1 antibody test was performed and was positive. Her CD4+ lymphocyte

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count was only  $5 \times 10^6$ /l. She was treated with co-trimoxazole and folinic acid. Despite positive CMV serology there was no evidence of CMV retinitis or CMV infection in the lung. The patient was offered treatment in the UK but returned to Africa and passed away several months later.

## Discussion

Nocardioses can occur in immunocompetent as well as immunosuppressed patients. The former typically present as cutaneous lesions whereas pulmonary involvement is usual in the latter. *Nocardia asteroides* is the most frequent organism implicated. Haematogenous and lymphatic spread occur in as many as half of infected patients, with a predilection for the central nervous system. The radiographic picture in pulmonary nocardiosis is variable. Solitary masses which can be mistaken for a lung malignancy, lobar or multi-lobe consolidation, reticulo-nodular infiltrates, pleural effusions, cavitation and predominant upper lobe involvement are common<sup>[1]</sup>. The CT features of pulmonary nocardiosis are also variable, but when associated with Human Immunodeficiency Virus (HIV) infection consistently display more lesions than are apparent on the chest radiograph<sup>[2]</sup>. Microbiological diagnosis of pulmonary nocardiosis can be difficult<sup>[3]</sup>. Tissue obtained by fibre-optic bronchoscopy (transbronchial biopsy and/or bronchoalveolar lavage) is not always diagnostic. CT guided transthoracic needle biopsy provides an effective and safe alternative<sup>[4]</sup>. Non-paratyphoid *Salmonella* (NTS) bacteraemia not associated with gastroenteritis is well recognised in Acquired Immunodeficiency Syndrome (AIDS) and has been reported in patients from central Africa<sup>[5]</sup>. Conversely NTS gastroenteritis is more common in immunocompetent patients. The predominant organisms found in NTS bacteraemia are *Salmonella typhimurium* and *Salmonella enteritidis*<sup>[6]</sup>. NTS bacteraemia is often associated with advanced AIDS and carries a high mortality. Focal complications are rare but include infection of the urinary tract, lungs, and soft tissues. Joint infections, endocarditis and meningitis have also been reported<sup>[7]</sup>. When concomitant lung involvement does occur, it is more often with other opportunistic organisms. In one series the commonest organisms were *Pneumocystis carinii*, pyogenic organisms,

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and *Mycobacterium tuberculosis*<sup>[7]</sup>. Interestingly, *S. bovis* is a rare serovar and although it is recognised as a cause of outbreaks of gastroenteritis in immunocompetent patients it has not previously been reported in association with HIV infection<sup>[8]</sup>.

Opportunistic infections are the hallmark of the clinical presentations in patients with HIV infection. Furthermore, characteristic infections occur as the CD4 count falls. Our patient is unusual in that she presented for the first time with an already low CD4 count, pulmonary nocardiosis, *S. bovis* bacteraemia, and an *E. coli* urinary tract infection (UTI) without previous illnesses that could be attributable to AIDS. In addition we believe this is the first reported case of bacteraemia with *S. bovis* in AIDS. The patient was a visitor from sub-Saharan Africa, where the prevalence of HIV is still increasing and varies from less than 2% in Somalia, to greater than 38% in Botswana. Our patient came from Central Africa where the prevalence is somewhat less (5.8–12.9%) but still substantially greater than the UK (0.6%). In contrast to the UK and the USA where the predominant groups affected are still homosexuals and intravenous drug users, the majority of HIV infection in sub-Saharan Africa is through heterosexual transmission, and is more common in women than in men. The increasing prevalence has prompted calls for screening for infectious diseases of all persons intending to reside in the UK who come from areas with a high prevalence of HIV and AIDS. Within the UK all patients with newly diagnosed tuberculosis are currently being screened for HIV because of the strong association of TB with HIV positivity.

Our patient is a reminder that the presence of concurrent and/or unusual infections such as pulmonary nocardiosis and/or NTS bacteraemia should initiate a search for causes of immune deficiency, particularly in patients previously residing in areas of high prevalence of HIV, such as sub-Saharan Africa.

## Summary points

- HIV is common in sub-Saharan Africa
- Non-Salmonella typhi bacteraemia suggests an immune deficient state
- Pulmonary nocardiosis can be the first manifestation of HIV infection

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- Chest radiography can underestimate the extent of nocardiosis
- Co-trimoxazole is effective treatment for nocardiosis
- Simultaneous opportunistic infections occur at low CD4 counts.

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