

An unexpected cause of multiple intra-abdominal abscesses in an HIV-positive patient

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ABSTRACT

This case report describes a female HIV-positive patient diagnosed with pelvic actinomycosis using 16S rRNA gene sequence analysis. Actinomycosis is notoriously difficult to diagnose by microbiological culture. 16S rRNA gene sequence analysis allows rapid definitive diagnosis of actinomycosis and is potentially of great value in a clinical setting. This is the first report of pelvic actinomycosis in an HIV-1 infected patient.

KEYWORDS

16S rRNA gene sequence analysis, actinomycosis, HIV-1 infection

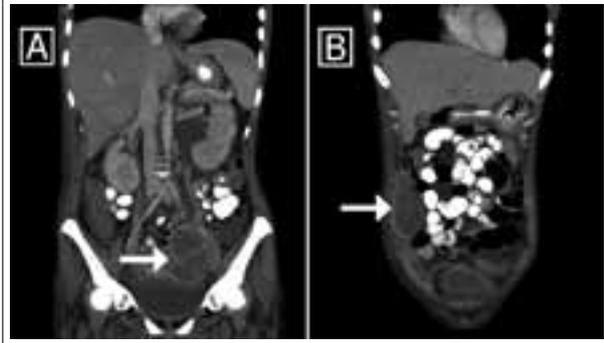
INTRODUCTION

Actinomycosis is notoriously difficult to diagnose due to both its variety in clinical presentation and its challenging growth in microbiological culture. As microbiological culture leads to confirmation of the diagnosis in less than 50% of clinically suspected cases, the final diagnosis is often based solely on the distinctive Gram stain of *Actinomyces*.^{1,3} Sequence analysis of the 16S ribosomal (r)RNA gene is another available method for the detection of *Actinomyces* species. This molecular technique allows earlier and improved diagnosis of actinomycosis without the difficulties encountered using traditional phenotypic methods.^{4,5} We present the case of a female human immunodeficiency virus 1 (HIV-1) infected patient with pelvic actinomycosis, diagnosed using 16S rRNA gene sequence analysis. We are the first to report pelvic actinomycosis in an HIV-1 infected patient.

CASE REPORT

A woman in her early thirties, previously healthy, was admitted to our hospital with a three-month history of fatigue, intermittent fever, poor appetite with marked weight loss and a productive cough with white sputum. The patient's vital functions were normal. Physical examination revealed no abnormalities besides evident cachexia (body mass index 14.0) and mild lower abdominal pain with no palpable mass. Laboratory tests indicated leucocytosis ($18.4 \times 10^9/l$), normochromic normocytic anaemia (Hb 3.5 mmol/l), hypoalbuminaemia (19 g/l), elevated C-reactive protein (139 mg/l) and impaired renal function (estimated creatinine clearance 64.0 ml/min). The chest radiograph showed no abnormalities. Urine analysis indicated leucocyturia. The HIV-antibody test was positive and the CD4 count was $170 \times 10^6/l$. Treatment with intravenous (iv) ceftriaxone was initiated for a presumed urinary tract infection and due to the possibility of a *Pneumocystis pneumonia* iv co-trimoxazole was added at a therapeutic dose. Both blood and urine cultures showed growth of an *E. coli* after which the antibiotics were switched to oral ciprofloxacin. Computed tomography (CT) of the chest showed no intrapulmonary abnormalities after which the co-trimoxazole was stopped. An abdominal ultrasound revealed an abscess-like lesion between the liver and right kidney and hydronephrosis of the left kidney. The CT abdomen revealed a left-sided tubo-ovarian abscess with compression of the left ureter and subsequent hydronephrosis, a large abscess of the abdominal wall and multiple smaller abscesses throughout the pelvis and abdomen (figure 1). Percutaneous nephrostomy was performed to relieve the left kidney and the patient's intra-uterine device (IUD) was removed. The two largest abscesses were drained and their contents cultured. The Gram-stain revealed branched Gram-positive

Figure 1. Computed tomography of the abdomen shows (A) a left-sided tubo-ovarian abscess (white arrow) measuring 5x5x7 cm with compression of the left ureter and subsequent hydronephrosis and (B) a right-sided abscess of the abdominal wall (white arrow) measuring 3x6x9 cm



rods, suspicious of *Actinomyces*. Anaerobic culture showed growth of colonies compatible with *Actinomyces* spp. Definitive identification was achieved using 16S rRNA gene sequence analysis after which treatment with iv penicillin G (2 million U, four times a day) was initiated. The patient's condition improved markedly. She was discharged after 15 days with an intravenous penicillin pump (12 million U/24 hours) for six weeks, followed by oral amoxicillin (500 mg, four times a day). On re-evaluation the CD4 count had increased to $380 \times 10^6/l$ and initiation of antiretroviral therapy was postponed.

DISCUSSION

In this case, the patient presented with surprisingly mild and unspecific symptoms given the extent of her pelvic actinomycosis. This illustrates the variable clinical picture that actinomycosis can present and the delay in diagnosis this can cause.^{6,7} Rapid reliable diagnostic testing such as 16S rRNA gene sequence analysis is an important tool in overcoming these difficulties.

Actinomycosis

Actinomycosis is a chronic granulomatous infection caused by anaerobic Gram-positive bacteria from the *Actinomyces* genus. These commensal inhabitants of the oral cavity and gastrointestinal tract cause infection after preceding mucosal disruption, resulting in the formation of multiple connecting abscesses.^{2,8} *A. israelii* is the most common pathogen in humans.^{2,8}

Due to the disease's variety in clinical presentation and invasive spread which is often mistaken for malignancy, the diagnosis is frequently missed making the overall incidence difficult to determine.^{3,6} Estimates range from

1/40,000 to 1/119,000 cases per year.⁸ Known risk factors include surgery, trauma and IUD use.

Actinomycosis usually involves the cervicofacial (50%), abdominal (20%) and thoracic (15%) regions.^{3,8} Clinical symptoms depend on the site of infection and are frequently unspecific including (mild) pain, fatigue and intermittent fever.

Anaerobic culture is the preferred diagnostic test; however, this can be time-consuming and yields results in only 50% of clinically suspected cases.¹³ The distinctive Gram stain is often the only indication of the diagnosis.⁸ Typically, affected tissues produce pus with sulphur granules of 1 to 2 mm containing branched, Gram-positive filaments. Although these sulphur granules are commonly considered pathognomonic for the disease, they are only present in 50% of cases.^{2,3} *Actinomycosis* therefore still poses a great diagnostic challenge when using traditional phenotypic methods.

Molecular genetic methods, such as 16S rRNA gene sequence analysis, bypass many of the problems encountered using traditional methods.⁹ The 16S rRNA gene is the part of the genetic code most commonly used for the taxonomy of bacteria.⁴ It contains both highly conserved genomic sequences and variable sequences which allow species differentiation. Sequence analysis of the 16S rRNA gene is an effective method for precise identification of bacteria which are otherwise rarely isolated.⁴ 16S rRNA gene sequence analysis allows rapid definitive diagnosis of actinomycosis and identification of specific *Actinomyces* strains and can be of great value in the clinical setting.^{5,10,11}

Actinomycosis requires long-term antibiotic therapy. The treatment of choice is high-dose iv penicillin G (10-20 million U/day) for four to six weeks followed by six to 12 months of oral penicillin or amoxicillin.⁸

Actinomycosis and HIV

Despite the impaired cellular and humoral immunity associated with HIV infection there is no increase in the incidence of actinomycosis in the HIV-positive population.¹² The sporadic examples available in the literature of HIV-positive patients with actinomycosis do indicate an increased prevalence of the atypical acute, invasive, ulcerative form of the disease.¹² Despite this observation, HIV infection does not appear to predispose an individual to actinomycosis.^{12,13}

CONCLUSION

Actinomycosis remains notoriously difficult to diagnose due to its variety in clinical presentation and challenging growth in microbiological culture. Molecular genetic methods such as 16S rRNA gene sequence analysis allow

more rapid and accurate diagnosis of actinomycosis than traditional phenotypic methods and are potentially of great value in the clinical setting. Actinomycosis is rare in the HIV-positive population. There are no other reported cases of pelvic actinomycosis in an HIV-1 infected patient.

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