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Actinomyces turicensis infection mimicking ovarian tumour

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ABSTRACT This case report explores an unusual presentation of a commensal organism, *Actinomyces*, which mimicked a presentation of ovarian cancer. A 73-year-old woman presented to a tertiary level hospital with persistent left iliac fossa abdominal pain, anorexia and fever lasting over one week, with a three-month history of bright rectal bleeding. Imaging was suggestive of malignancy. Fine needle aspiration of an enlarged lymph node was non-diagnostic. Blood cultures taken at presentation became positive after two days for Gram-positive rods, which were most likely *Actinomyces*. The patient was treated with penicillin 1.8 g four hourly with rapid improvement. Actinomycosis is frequently misdiagnosed as malignancy initially due to its relatively indolent course. Lesions often resolve with antibiotics, without the need for surgical intervention.

Keywords: Actinomyces, Actinomyces turicensis, infection, mimicking, ovarian tumour
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INTRODUCTION

The impact of clinical examination and history-taking in forming a whole clinical picture cannot be underestimated when arriving at a final diagnosis in a patient. This is particularly important when dealing with rare infections such as actinomycosis. This paper will explore an unusual presentation of actinomycosis, including arrival at the final diagnosis and management.

CASE REPORT

A 73-year-old obese Samoan woman was admitted to hospital following one week of persistent left iliac fossa abdominal pain, anorexia and fever. The patient had three months of intermittent bright red rectal bleeding with pain on defecation. There was no nausea, vomiting, diarrhoea, weight loss, dysuria or increased urinary frequency. The patient, who was an ex-smoker, had no significant past medical history and was not taking regular medications. She had migrated to Australia seven years ago and had no recent travel history. Physical examination was unremarkable except for a temperature of 39.2°C, a left iliac fossa abdominal tenderness and haemorrhoids.

The patient had an elevated white cell count of 20.4 x 10^9/L (reference range [RR] 4.0–11.0 × 10^9/L) with neutrophilia and band forms. Her C-reactive protein (CRP) was elevated at 980 nmol/L. The urinalysis and chest radiograph were unremarkable. A presumptive diagnosis of diverticulitis was made. The patient was commenced on ampicillin, gentamicin and metronidazole following two sets of blood cultures. Abdominal computed tomography (CT) showed a 6.3 cm × 7.4 cm × 8.2 cm multiloculated cystic mass in the left iliac fossa (Fig. 1) with an adherent thickened bowel wall and two liver hypodensities. The appearance was consistent with either an ovarian malignancy invading the adjacent large bowel or a bowel malignancy invading the left ovary. Chest CT revealed an enlarged right supraclavicular lymph node. Serum CA-125 was elevated at 136 kU/L (RR < 35 kU/L). Serum carcinoembryonic antigen was not elevated. Blood cultures showed no growth after 24 hours. Fine needle aspiration cytology of the right supraclavicular node was reported as benign.

However, 47 hours later, growth was detected in both the anaerobic blood cultures. Microscopy showed Gram-positive rods. This slow-growing organism was provisionally identified as an *Actinomyces* species. Further analysis with universal 16S rRNA gene polymerase chain reaction and DNA sequencing confirmed the organism as *Actinomyces turicensis*.

The patient became afebrile and improved clinically with intravenous penicillin 1.8 g four-hourly. Her CA-125 also decreased. The entire clinical presentation was attributed to pelvic actinomycosis with haematogenous dissemination. A follow-up abdominal CT performed 21 days after commencement of antibiotics confirmed complete resolution of the left iliac fossa mass and liver lesions (Fig. 2), with normalisation of CRP and CA-125 (Table I). Following six weeks of intravenous benzylpenicillin, the patient was prescribed oral amoxicillin 500 mg three times daily for six months. No relapse of infection was noted.

DISCUSSION

This case describes an uncommon presentation of actinomycosis, which can be initially mistaken for a malignancy. Actinomycosis, an infection that affects all age groups, is characterised by sub-acute or chronic abscess formation and often nonspecific systemic symptoms. The causative organisms are anaerobic (or microaerophilic), Gram-positive, non-spore-forming, non-acid fast, filamentous, branching rods that are normal flora of the oral cavity, gastrointestinal tract and the female genital tract.[1] The precise source in our patient, however, was unclear.

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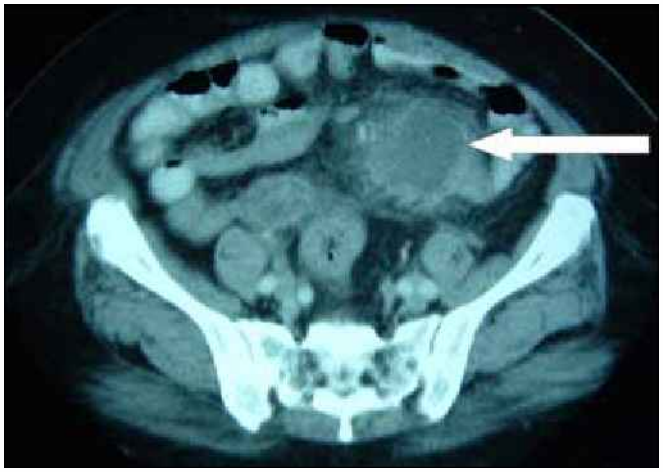

Fig. 1 Abdominal CT image shows a pelvic mass in the left iliac fossa (arrow).

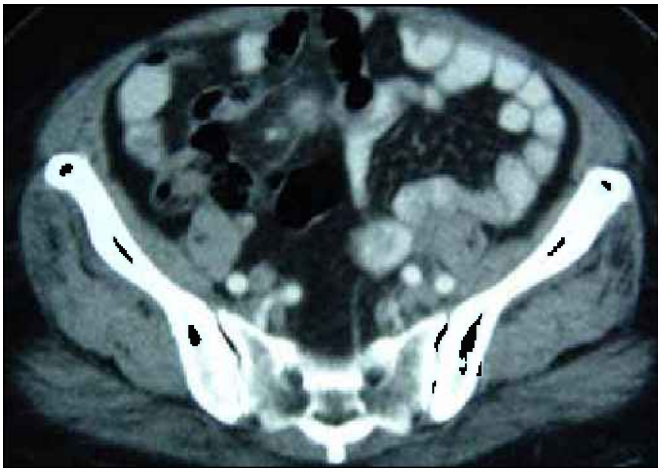

Fig. 2 Abdominal CT image taken 21 days after starting antibiotics shows resolution of the pelvic mass in the left iliac fossa.

The majority of actinomycosis cases are cervicofacial and could be attributed to poor oral hygiene or dental surgery. Thoracic actinomycosis (often related to aspiration of oral flora) and abdominopelvic actinomycosis (associated with microperforations of the bowel or intrauterine contraceptive device use) are less common. Infections generate intense inflammation, and suppuration and sinus tracts are typical. Spread occurs both haematogenously and locally across tissue planes. The range of clinical manifestations includes perimandibular swellings, pulmonary masses or infiltrates, chest wall masses, pericardial collections, intra-abdominal or pelvic collections, osteomyelitis, brain abscesses, endocarditis and bacteraemia.[1]

Although mortality is uncommon, morbidity may be significant due to chronicity of illness. Diagnosis is usually established using anaerobic culture of sinus tract swabs or infected tissue from biopsy or aspirates. Difficulty in diagnosing this organism is compounded by its slow growth, which, on average, occurs within five to seven days, but may take up to two to four weeks.[1] Some sinuses discharge characteristic sulphur granules that demonstrate the organisms on Gram stain. Imaging may show sinuses and multiple abscesses, often resembling tumour masses.[1]

Actinomyces turicensis, which was first identified in 1995 by the 16S rRNA gene sequencing,[2] has several clinical manifestations: genital infections, cutaneous infections, urinary tract infections, bacteraemia, appendicitis,[3] hepatic abscess with infection-induced thrombotic thrombocytopenic purpura and breast abscess.[4,5] Identification of distinct *Actinomyces* species using conventional laboratory methods such as biochemical profiles is notoriously difficult; therefore, molecular methods are often needed for definitive identification.[5]

The mainstay of therapy is antibiotics, often at high doses intravenously for two to six weeks and then orally for six to 12 months. Relapses occur if antibiotic duration is inadequate.[1] The agent of choice is penicillin, but cephalosporins, tetracyclines, erythromycin and clindamycin can also be used.[6] Ciprofloxacin, other quinolones, aminoglycosides and metronidazole are not effective.[1,6,7] More recently, it has been demonstrated that different *Actinomyces* species have differing antibiotic sensitivity profiles.[7] Lesions often resolve on antibiotics without surgical intervention or drainage. Although surgery is usually not curative by itself, it may be needed as adjunctive therapy for complex lesions with major anatomical disruption or local mass effects, or to decompress closed spaces.[1,6] Monitoring of therapeutic response with serial imaging and inflammatory markers is advisable.

Table I. Record of patient's CRP and CA-125 during treatment.

Day of admission	CRP (RR < 95) nmol/L	CA-125 (RR < 35) kU/L
1	980	-
4	-	136
5	505	-
6	333	-
11	-	76
22	10	32

CRP: C-reactive protein; RR: reference range

Actinomycosis is frequently misdiagnosed as malignancy initially due to its relatively indolent course, 'metastatic' foci and contiguous spread or 'local invasion'. In our patient, the imaging was consistent with malignancy and the CA-125 was elevated, leading to an initial malignant diagnosis. Serum CA-125, which is a glycoprotein used as a marker for ovarian cancer, is elevated in over 80% of women with ovarian cancer. The average reported sensitivities for early stage disease are 50% for stage I and 90% for stage II.[8] Unfortunately, CA-125 is not specific and can be elevated in 1%–2% of normal, healthy individuals as well as in other circumstances, including solid organ and haematological malignancies, inflammatory conditions, liver cirrhosis, pleural and peritoneal disease and infections including tuberculosis.[8-10] Due to its concerns with specificity, CA-125 is generally not recommended as a single modality screening tool for ovarian cancer. It is used in surveillance following treatment of confirmed cases.

In conclusion, actinomycosis can mimic tumours, and not every patient with elevated CA-125 and a pelvic mass has ovarian cancer. CA-125 is not specific for malignancy. As *Actinomyces* species are slow growing and identification can be a lengthy and complex process, infection should not be ruled out on the

basis of negative blood cultures early in illness. Abdominal or pelvic actinomycosis can often be cured by antibiotics alone, and urgent surgical intervention is often unnecessary. Treatment should be tailored according to the individual; prolonged treatment and post-treatment monitoring are highly recommended to ensure cure without relapse.

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