Paediatric thoracic actinomycosis presenting as back swelling: A case report

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Abstract

Presentation: A seven years old girl presented with a three-day history of cough and fever, and several weeks of back pain, anorexia and weight loss. Examination was significant only for a tender, non-erythematous swelling to the right mid-back measuring ten centimetres in length.

Diagnosis and treatment: Investigations on admission included neutrophilia and elevated inflammatory markers. Chest radiograph demonstrated a confluent area of opacification within the right peripheral lower zone with a small pleural effusion. CT reported two large enhancing and infiltrative lesions in the right thorax and the right posterior lower ribs, and disseminated lymphadenopathy. Microbiology and histology of a tissue sample were conclusive for actinomycosis israelii. She had a full recovery following a nine month course of oral amoxicillin.

Discussion: Invasive actinomycosis is rare, and a high clinical suspicion and thorough investigation is warranted with invasive pneumonia and atypical associated symptoms.

Keywords: Actinomycosis; Pneumonia; Chest wall mass; non-acci-dental injury.

Abbreviations: ASD: Autism Spectrum Disorder; CMV: Cytomega-lovirus; CRP: C-Reactive Protein; EBV: Epstein Barr Virus; ESR: Erythro-cyte Sedimentation Rate; HIV: Human Immunodeficiency Virus.

Introduction

Actinomycosis is an uncommon, invasive and slowly progressive infection in children. These gram-positive bacteria are facultative anaerobes and live as part of the normal human flora. Thoracic disease accounts for [14 ]. To 34% of paediatric actinomycosis cases [1]. There is a higher incidence of thoracic actinomycosis in adults than children, and in males than females. Incidence rates of actinomycosis of 1 in 300,000 persons have been reported, but this has reduced in line with improved healthcare and dental hygiene [2]. Overall, paediatric actinomycosis is rare, accounting for less than 3% of all actinomycosis case. Risk factors for infection include poorly controlled diabetes mellitus, trauma and dental caries.

Case report

A seven years-old female, presented to our emergency department with a tender mass to the right mid-back and a three-week history of intermittent cough and fever, anorexia, back pain and weight loss in the month prior to presentation. She had
received a short course of oral amoxicillin early in the course of this illness, which resulted in a brief improvement of her symp-
toms. She alleged that she was struck with a stick to the area by
an adult six-days prior to presentation, and was assessed by her
general practitioner and referred to the emergency department
due to concern of non-accidental injury.

Background medical history was significant only for well-con-
trolled asthma and autism spectrum disorder. She was of South-
eastern African ethnicity but born in Ireland and up to date with the
full primary immunisation schedule. Her parents reported that
her brother had passed away at the age of three years from a
‘neck lump’, with his final diagnosis unclear. There was no sig-
nificant family history of retrovirus or mycobacterial exposures,
and her last travel to Sub-Saharan Africa was two years ago.

On examination she had a tender, non-erythematous, non-
fluctuant swelling to the right mid-back, measuring 10 cm in
length and 3 cm in diameter. Respiratory examination noted
good air entry bilaterally. There was no evidence of lymphade-
nopathy, rash or joint involvement, and she required no addi-
tional oxygen or respiratory support.

Investigations were significant for an elevated CRP [126
mg/L], Erythrocyte Sedimentation Rate of 83 [mm/H], white
cell count of 16.3x10^9/L and neutrophils of 10.9x10^9/L. Chest
radiograph demonstrated a confluent area of opacification
within the right peripheral lower zone and a small pleural effu-
sion. She was commenced on intravenous amoxicillin as treat-
ment for suspected community acquired pneumonia.

During admission, ultrasound of her left lower chest wall re-
ported a solid lesion in appearance with some colour doppler
flow between the right lower posterior ribs. Contrast computed
tomography [CT]. Identified a multi-focal abnormality with two
discontinuous enhancing and infiltrative lesions. The first le-
sion was a pleural based mass with extension to the right heart
border and right thorax [5x2.9x3.9 cm]. The second lesion was
centred around the right posterior lower ribs [7.4x3.4x9.4 cm]
with mass effect on the right kidney and extending into the
paraspinal soft tissue, posterior renal space and local muscula-
ture. There was mild periosteal reaction in the adjacent ribs but
no bony erosion, and mediastinal, right hilar and right axillary
lymphadenopathy was present.

Infectious disease screen included a negative Mantoux,
QuantiFERON, Human Immuno-deficiency Virus [HIV] Antibody,
Epstein-Barr Virus [EBV] and Cytomegalovirus [CMV] Serology.

Immunology work-up demonstrated a low IgM 0.4 [0.5-1.8 g/L]
But normal IgG and IgA. Vaccine specific pneumococcal titres
were low in nine serotypes, for which she received a booster
with the 13-valent pneumococcal polysaccharide conjugate
vaccine. Mycobacterial culture and 16S polymerase chain reac-
tion [PCR] were negative. Histological staining demonstrated
a fibro-inflammatory process, with necro-inflammatory debris
containing sulphur granules consistent with actinomyces. Chest
wall tissue culture was positive for a scanty growth of Actino-
myces Israelii.

Administration of penicillin-based antibiotics resulted in a
rapid improvement in energy, appetite, and the back swelling
quickly resolved over the course of four days. Inpatient dental
review identified severe decay in a left lower molar suggestive
of chronic infection, but no associated soft tissue inflammation
or discharging sinus. Elective dental extraction was performed
several weeks later. She was discharged home on high dose oral
amoxicillin after a ten-day inpatient stay. The total duration of
anti-biotic therapy was nine months, at which point compli-
ance had significantly deteriorated. Imaging had normalised by
twelve weeks of therapy and ultrasound and chest radiograph
11 months after diagnosis remained unremarkable.

Discussion

In this case we report an unusual presentation of a rare in-
fection in a well child. The unusual illness her sibling had passed
away from raised concern of an inherited predisposition to ma-
lignancy, mycobacterial infection or other atypical infection.
Underlying immunosuppression from acquired or inherited im-
munodeficiency was also a differential. The diagnostic process
was confounded by her initial reasons for referral to the emer-
gency department-concern of the soft tissue injury from non-
accidental injury. Utilising a conservative approach and thor-
ough medical social work assessment, no child safe-guarding
concerns were identified.

Oral amoxicillin has excellent bioavailability and is thought
to be equally efficacious to phenoxymethylpenicillin, with the
advantage of three times daily dosing [3,4]. Actinomyces spe-
cies are uniformly susceptible to penicillin and rarely acquires
resistance to penicillin antibiotics during prolonged therapy [5].
An early oral switch is possible, even in invasive disease, if sus-
ceptible. Traditional reports suggested that initial intravenous
therapy is typically given for two to six weeks, followed by six
to twelve months of oral antibiotic therapy for the treatment of
thoracic actinomycosis. In some cases, a combined medical-sul-
gery approach is necessary to manage complicated disease [2].

Figure 1: [a,b,c]- CT thorax with contrast – sagittal and axial im-
ages.

Figure 2: Histological staining demonstrating a sulphur granule
surrounded by dense sheets of neutrophils and lymphohistiocytic
infiltrates.
A retrospective review found excellent outcomes (96% cure and no clinical evidence of recurrence) with conservative management [6]. Though mortality from untreated actinomycosis can be high outcomes have been significantly improved, and the majority of cases of those with paediatric actinomycosis who receive appropriate and timely anti-microbial treatment have good clinical outcomes [7].

References


