CASE REPORT

Aggregatibacter actinomycetemcomitans pneumonia with chest and abdominal wall involvementIris Storms,¹ Marre van den Brand,² Peter Schneeberger,³ Nico van 't Hullenaar⁴¹Canisius Wilhemina Ziekenhuis, Nijmegen, The Netherlands²VU medisch centrum School of Medical Sciences, Amsterdam, The Netherlands³Jeroen Bosch Ziekenhuis, Den Bosch, The Netherlands⁴Ziekenhuis Bernhoven, Uden, The NetherlandsCorrespondence to
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SUMMARY

A 54-year-old man presented with a productive cough, chest pain, fever and weight loss. Initial analysis revealed a palpable chest wall mass and consolidation in the left lower lobe and pleural abnormalities on imaging. At that point no infectious cause or malignancy was identified. Microbiological analysis of a needle biopsy from a newly developed abdominal wall mass revealed growth of *Aggregatibacter actinomycetemcomitans*. The patient was successfully treated with antibiotic therapy for 1 year. *Aggregatibacter actinomycetemcomitans* is a Gram-negative coccobacillus and is part of the normal oral flora. It is capable of causing infections in humans including periodontitis, soft tissue abscesses and systemic invasive infections, most commonly endocarditis.

BACKGROUND

Aggregatibacter (formerly *Actinobacillus*) *actinomycetemcomitans* is a fastidious Gram-negative coccobacillus, which is part of the normal oral flora. It is capable of causing serious infections in humans.¹ Here we report about a patient who presented with a chest wall mass accompanied by severe pain caused by an infection with *Aggregatibacter actinomycetemcomitans*, which was detected only after an intensive diagnostic workup.

CASE PRESENTATION

A 54-year-old Egyptian man, with no medical history, was evaluated in our outpatient facility because of a

Figure 2 A contrast enhanced CT scan of the chest (A) confirming consolidation of the left lung with volume loss. Also showing pleural irregularities, a minimal amount of pleural fluid and (B) thickening of the left thoracic and abdominal wall.

severe chest pain radiating to the left shoulder for 6 weeks. Further complaints consisted of a productive cough, fever, weight loss (2 kg) and anorexia. He was an active smoker with 30 pack years and no asbestos exposure. Physical examination revealed decreased breath sounds on the left side of the thorax and a palpable chest wall mass.

INVESTIGATIONS

Laboratory investigation showed an elevated erythrocyte sedimentation rate (>100 mm/h, reference value 0–20), C reactive protein (178 mg/L, reference value 0–8) and white blood cell count ($17.1 \times 10^9/L$, reference value $4.0\text{--}10.0$). A chest radiograph (figure 1) revealed a consolidation of the left lung, which was confirmed by CT (figure 2A,B) and was fluorodeoxyglucose capturing on a positron emission tomography/CT (PET-CT). The CT further uncovered left-sided lymphadenopathy, pleural irregularities, a minimal amount of pleural fluid and thickening of the left chest and abdominal wall. On PET-CT, this appeared as a left-sided malignant pleural invasion and a possible infectious or metastatic focus in the abdominal wall. Bronchoscopy, pleural aspiration and needle biopsy of the chest wall mass were performed successively and the obtained material was sent for pathological and microbiological examination. Pathology results showed signs of chronic inflammation without evidence for malignancy. Microbiological cultures, of sputum, bronchoalveolar lavage, pleural effusion and biopsy of the chest wall mass, were incubated to allow growth of mycobacteria, yeast, fungi and fastidious organisms as *Actinomyces* spp and *Nocardia* spp. All microbiological tests, including an HIV test, remained negative.

On suspicion of an infectious cause, two courses of amoxicillin/clavulanate (500/125 mg three times

Figure 1 Chest radiography showing consolidation of the left lung with volume loss.

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Figure 3 Photograph of the abdominal wall mass.

a day) for 7 days were given without any relief of symptoms. Worsening of pain required opioid therapy, and the patient developed new chest and abdominal wall masses. Two months after initial presentation, a second needle biopsy of a newly developed abdominal wall mass (figure 3) was performed. Microbiological culture showed growth of *Aggregatibacter actinomycetemcomitans*, known for its characteristic colonies (figure 4). Species identification was performed with matrix-assisted laser desorption/ionisation time of flight (Bruker Daltonic, Bremen, Germany) and verified by 16S rRNA gene sequencing. Susceptibility testing revealed that this strain was resistant to penicillin (minimum inhibitory concentration (MIC) 8 µg/mL) and susceptible to amoxicillin (MIC 0.5 µg/mL) and ceftriaxone (MIC 0.016 µg/mL).

DIFFERENTIAL DIAGNOSIS

Malignancy with pleural invasion: primary lung carcinoma, mesothelioma.

Infection: bacterial, mycobacterial (tuberculosis), actinomyces, nocardia and fungi.

TREATMENT

The patient was admitted to the hospital for treatment with ceftriaxone intravenously 2000 mg once daily. Ceftriaxone was continued for 1 month followed by amoxicillin 500 mg three times a day orally for 12 months.

OUTCOME AND FOLLOW-UP

We performed additional investigations because of the known association with endocarditis and periodontitis. No signs of

Figure 4 Colony of *Aggregatibacter (Actinobacillus) actinomycetemcomitans* on a blood agar plate with characteristic star-shaped morphology isolated from this patient.

endocarditis were seen on the cardiac ultrasound. The oral and maxillofacial surgeon diagnosed periodontal disease and treated accordingly. A culture of the periodontal pocket, obtained after initiation of antibiotic therapy, remained negative. At the end of therapy, the patient was fully recovered with resolution of the chest and abdominal wall masses.

DISCUSSION

Aggregatibacter (formerly *Actinobacillus*) *actinomycetemcomitans* was first identified in 1912. For many years, invasive infections were only seen in conjunction with *Actinomyces* spp.^{1 3} Only in 1966, its role as a sole pathogen was recognised as it was recovered from blood and normally sterile body fluids.^{2 3} Most often described infections are periodontitis and endocarditis. As a causative agent in endocarditis, it belongs to the HACEK group.^{1 4-9} Other serious infections caused by *Aggregatibacter actinomycetemcomitans* are soft tissue and brain abscesses, endophthalmitis, glomerulonephritis and osteomyelitis.^{2 8 10-13}

The first documented pulmonary infection was reported in 1971; since then few case reports have been published.^{2 8 14-16} Diagnosis of *Aggregatibacter actinomycetemcomitans* infection is hampered by its indolent clinical course, non-specific presentation and the fastidious nature of the organism. Usually treatment with antibiotics is successful, but for treatment with penicillin and amoxicillin, susceptibility testing is advisable as resistance is described. There is no evidence for recurrent infections.⁸

Our patient had an infection with *Aggregatibacter actinomycetemcomitans* mimicking a malignancy since there was growth of a solid mass without abscess formation and suspicion of malignant pleural invasion on imaging. Materials obtained by bronchoscopy and needle biopsy showed signs of chronic inflammation while cultures remained negative and hence did not provide us with conclusive results. Only after repeated culturing, *Aggregatibacter actinomycetemcomitans* was identified and this emphasises the importance of performing repeated cultures.

We hypothesise that there must be haematogenous spread of the infection in our patient because the chest and abdominal wall masses were not directly adjacent to the lung lesions (which could be the result of direct spread via the respiratory system) and therefore could not be the result of direct invasion. Although it cannot be proven because blood cultures remained negative.

Learning points

- *Aggregatibacter actinomycetemcomitans* infection can mimic a malignancy.
- *Aggregatibacter actinomycetemcomitans* infection has an indolent clinical course and non-specific presentation. Only after repeated cultures, *Aggregatibacter actinomycetemcomitans*, a fastidious Gram-negative coccobacillus, was identified and this emphasises the importance of repeated culturing.

Contributors We state that all authors contributed to this case report. The idea for the article was from IS, MB, PS and NH. The literature search was performed by IS and MB. IS, MB, PS and NH wrote the article. The guarantor is IS.

Competing interests None declared.

Patient consent Obtained.

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