Community acquired bilateral upper lobe pneumonia with acute adrenal insufficiency: A new face of *Achromobacter Xylosoxidans*

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CASE REPORT

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Abstract

Achromobacter xylosoxidans is an uncommon pathogen of low virulence known to cause serious nosocomial infection in the immunocompromised. Its inherent multi-drug resistance makes treatment difficult. Community-acquired infections are rare despite its ubiquitous existence. We present a 50-year-old immunocompetent woman who presented with one-month history of coughing with expectoration who was subsequently diagnosed with bilateral upper lobe pneumonia and acute adrenal insufficiency. *Achromobacter xylosoxidans* was isolated from sputum and bronchoalveolar lavage culture. The acute adrenal insufficiency recovered after appropriate antibiotic therapy. Amongst the myriad of presentations, we highlight the rarity of acute adrenal insufficiency triggered by the infection.

Key Words
Achromobacter xylosoxidans; pneumonia; adrenal insufficiency

Implications for Practice

1. *Achromobacter xylosoxidans* is pathogen of low virulence causing serious life-threatening infection in immunocompromised patients.
2. In this case report, an immunocompetent lady developed bilateral upper lobe pneumonia with acute adrenal insufficiency due to *Achomobacter xylosoxidans* which is a pathogen of low virulence.
3. Due to the inherent multi-drug resistance of many pathogens an appropriate antibiogram is required. While nosocomial infections of this particular pathogen are common, community-acquired infections are rare. This is the first report of concomitant acute adrenal insufficiency that has been reported. Further studies are required to establish the causal mechanisms.

Background

Achromobacter xylosoxidans is an aerobic, motile, non-fermenting, gram-negative bacillus formerly classified under the genus *Alcaligenes.*[1] Though known as a pathogen with low virulence, invasive nosocomial infections with high mortality are known to occur in the immunocompromised.[2] Despite its ubiquitous existence in the environment and various aqueous sources, community-acquired infections (especially in immunocompetent individuals) are rare. We report one such rare case of *Achromobacter xylosoxidans* causing bilateral upper lobe pneumonia with acute adrenal insufficiency in an adult immunocompetent person.

Case details

A 50-year-old lady presented to the emergency department with high-grade fever with chills and cough with yellowish expectoration over the previous month. She denied a history of haemoptysis or known exposure to tuberculosis. She had suffered a non-significant weight loss (1kg in one month duration) and also complained of extreme fatigue with myalgia. This was her first hospitalisation with these symptoms.

On examination she was anxious and tachypnoeic with a body mass index of 18.5 kg/m^2. Her blood pressure was 100/60 mmHg with a postural drop of 20mmHg. Pallor and lymphadenopathy were absent. Chest examination revealed crepitations bilaterally in the infraclavicular areas. Blood tests showed a high total leucocyte count (15 * 10 ^{3} /microL) with neutrophilic predominance. Blood sugars, renal and liver function tests were normal. Mantoux test and serology for HIV were negative. Serial blood cultures were sterile. Chest radiography revealed the presence of bilateral upper lobe consolidation. Basal cortisol levels were extremely low (8 am cortisol: 1 UG/dL), however the remaining hormone profile was normal. With a suspicion of adrenal insufficiency an ACTH stimulation test was performed with cortisol levels failing to rise appropriately (Pre-test cortisol: 2.5 UG/dL , Cortisol after 30 minutes : 5.6 UG/dL, Cortisol after 1 hour: 6.6 UG/dL). In view of the primary adrenal insufficiency, the patient was started on steroid replacement therapy. Ultrasonography of the abdomen did not reveal any adrenal mass. Investigations for other causes of adrenal insufficiency such as drug intake, pituitary involvement, adrenal haemorrhage or tumours and infective aetiology were negative.

The patient underwent fibre-optic bronchoscopy that was grossly normal. A gram negative bacilli was identified by gram staining of both sputum and broncho-alveolar lavage. Cultures on MacConkey agar and sheep blood agar showed growth of a non-fermenting, oxidase and catalase positive bacilli that was identified as *Achromobacter denitrificans* using API 20 NE (bioMérieux, La Balme les Grottes, France). Using Kirbey Bauer disk diffusion method, antibiotic susceptibility was performed. The isolate was susceptible to ceftazidime, ciprofloxacin, ofloxacin, piperacillin-tazobactum and cefoperazone-sulbactum as per Clinical Laboratory Standards Institute (CLSI) guidelines. Cultures for Mycobacterium tuberculosis were negative.

The patient was started on a 14-day course of injectable ciprofloxacin and was afebrile by the third day of therapy. At discharge her serum cortisol levels were approaching normal limits. At further follow-up, the patient was re-evaluated and found to have complete recovery of adrenal reserves.

Discussion

Achromobacter xylosoxidans was first described by Yabuuchi and Ohyama in 1971 after its isolation from the ear discharge of patients with chronic otitis media.[3] The natural sources of infection are moist soil and water.[4] Most case reports describe nosocomial infections caused by *Achromobacter xylosoxidans* in immunocompromised individuals with case mortality ranging from 3% for bacteraemia with up to 80% for neonatal infection.[5, 6] In the hospital setting, sources of infection range from ventilators to humidifiers and disinfectant solutions.[7] It is also known to infect immunocompromised individuals with in-dwelling medical devices such as catheters and endotracheal tubes.[5] Patients with HIV, haematological and solid organ malignancies, cystic fibrosis and those receiving high-dose corticosteroids are particularly at high risk.[8,9]

Pulmonary involvement has usually been reported in cases with underlying medical disorders especially with cystic fibrosis.[9, 10] Several cases of pneumonia have been reported in patients with underlying IgM deficiency,[11] malignancy[12] and on mechanical ventilation.[13] In contrast to the majority of cases described in the literature, our case was a community-acquired infection in an immunocompetent lady without a predisposing lung disease.

Treatment of *Achromobacter xylosoxidans* is usually difficult owing to its multi-drug resistance.[12] A drug sensitivity pattern is crucial and mandatory to optimise therapy with appropriate antibiotics. Yet another predicament is its uncommon isolation, which prompts it to be either overlooked or discarded as a contaminant. Despite its low virulence, it has been reported to produce severe life threatening disease in immunocompromised individuals. A large series comprising of 52 cases of nosocomial bacteraemia was reported by Gomez-Cerezo et al in patients suffering from neoplasms where the major source of infection was contaminated intravenous catheters.[14]

This is the first published case of *Achromobacter xylosoxidans* with concomitant acute adrenal insufficiency. Pituitary involvement was ruled out by ACTH stimulation test. Our patient had no history of prior intake of corticosteroids or other implicated drugs. Abdominal ultrasonography ruled out any adrenal gland pathology such as adrenal haemorrhage or tumours. HIV, tuberculosis and fungal infections were also ruled out. The patient received replacement dosage of steroids and recovered. At follow-up, the adrenal reserves were found to be adequate. The complete recovery of serum cortisol levels after antibiotic therapy provided us with supportive evidence to link *Achromobacter xylosoxidans* to the adrenal insufficiency. However, further investigation on the pathogenesis and causal mechanism are required to explore this relationship.

To conclude, while nosocomial pneumonias are well documented, community-acquired *Achromobacter xylosoxidans* causing pneumonia in an immunocompetent person is rare. Furthermore, *Achromobacter xylosoxidans*

causing acute adrenal insufficiency has not previously been reported. Having access to appropriate diagnostic procedures and facilities, including antibiogram, are key to expediting diagnosis and treatment for rare pathologies of bacterial origin.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests

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PATIENT CONSENT

The authors, Karanth Suman S, Gupta Anurag, Prabhu Mukhyaprana, declare that:

1. They have obtained written, informed consent for the publication of the details relating to the patient(s) in this report.
2. All possible steps have been taken to safeguard the identity of the patient.
3. This submission is compliant with the requirements of local research ethics committees.