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Chronic pneumonia due to *Klebsiella oxytoca* mimicking pulmonary tuberculosis

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Abstract

Klebsiella species infrequently cause acute community acquired pneumonia (CAP). The chronic form of the disease caused by *K. pneumoniae* (Friedlander's bacillus) was occasionally seen in the pre-antibiotic era. *K. oxytoca* is a singularly uncommon cause of CAP. The chronic form of the disease caused by *K. oxytoca* has been documented only once before. A 50-year-old immunocompetent male smoker presented with haemoptysis for 12 months. Imaging demonstrated a cavitary lesion in the right upper lobe with emphysematous changes. Sputum stains and cultures for *Mycobacterium tuberculosis* were negative. However, three sputum samples for aerobic culture as well as bronchial aspirate cultured pure growth of *K. oxytoca*. A diagnosis of chronic pneumonia due to *K. oxytoca* was established and with appropriate therapy, the patient was largely asymptomatic. The remarkable clinical and radiological similarity to pulmonary tuberculosis can result in patients with chronic *Klebsiella* pneumonia erroneously receiving anti-tuberculous therapy.

Key words: cavitary lesions, chronic necrotising pneumonia, imaging, *Klebsiella oxytoca*, *Mycobacterium tuberculosis*

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Introduction

Klebsiella, an aerobic gram-negative bacillus, is a rare but well established cause of community acquired pneumonia (CAP), especially in the pre-antibiotic era [1]. This organism continues to be an infrequent source of CAP accounting for 1–5% of the patients [2–4]. However, two studies have documented *Klebsiella* as a causative organism of CAP in as high as 12 and 22% of the patients respectively [5, 6]. Although, an uncommon cause of CAP, hospital acquired pneumonia caused by *Klebsiella* is fairly frequent and can be life threatening [7, 8].

CAP due to *K. pneumoniae* usually has an acute presentation resembling that of pneumococcal lobar pneumonia, occurring almost exclusively in debilitated subjects [5]. Rarely, pneumonia caused by *Klebsiella* species can manifest as

a chronic disease, which can last for weeks or months. This singularly uncommon form of the disease may be seen in elderly subjects and the presentation is strikingly similar to that of pulmonary tuberculosis [1, 9–11]. In high tuberculous prevalent areas, this unusual clinical entity can often be misdiagnosed and treated for tuberculosis while lung damage continues to occur [11]. Other important conditions that can simulate pulmonary tuberculosis radiologically include non-tuberculous mycobacterial infections, other bacterial pneumonias especially pulmonary nocardiosis, fungal infections, allergic bronchopulmonary aspergillosis and lung malignancies [12]. Although *K. pneumoniae* (Friedlander's bacillus) is the most commonly cultured organism, three other species viz. *K. oxytoca*, *K. rhinoscleromatis* and *K. ozaenae* can also be responsible infrequently [13]. *K. oxytoca* has rarely been implicated

as a cause of CAP. The reports available in the literature suggest that CAP due to this organism has an acute manifestation. This was highlighted by a study from Switzerland which reported 12 (12.4%) patients with CAP requiring hospitalisation due to *Klebsiella* species which included two caused by *K. oxytoca* [5]. The chronic form of the disease caused by *K. oxytoca* has been documented only once previously in an 82-year-old female from Canada who presented with a non-resolving pneumonia of 9 months duration [14].

The paucity of the literature on the subject prompted us to report a middle-aged man with a 30-pack-year history of smoking who presented with chronic necrotising pneumonia of 12 months duration caused by *K. oxytoca*.

Case report

A 50-year-old male, non-diabetic, HIV-negative, a farmer by occupation, was referred to our Institute for evaluation of haemoptysis of 12 months duration. Haemoptysis was intermittent with 10 to 12 episodes over the past year. Blood was often mixed with sputum but recently he had experienced two episodes where he had expectorated about 500 mL of frank blood, which prompted the referral. For the preceding two months this was associated with cough and expectoration of approximately four to five teaspoonful of non-foul smelling muco-purulent sputum. He had smoked 30 pack-years before quitting one year ago with the first episode of haemoptysis. He had received several short courses of oral antibiotics for this complaint without relief. However, he had not received anti-tuberculous therapy. On presentation, general physical and respiratory system examinations were unremarkable.

Complete blood counts, ECG, urine analyses and renal as well as hepatic function test results were within normal limits. Chest apicogram done on presentation showed the presence of a small cavity in right upper zone with increased lung markings as compared to the left upper zone (Fig. 1). A high resolution computed tomography (HRCT) of the thorax demonstrated thick walled cavity in apical segment of right upper lobe surrounded by fibrosis and centrilobular nodules while emphysematous bullous area was seen in left upper lobe (Fig. 2). Paraseptal emphysema was also visible bilaterally along with centrilobular emphysema in the left lung. Small nodular lesions were also visible in left lower lobe. However, spirometry with reversibility was within normal limits with post-bronchodilator FEV₁/FVC ratio of 0.77.

Figure 1. Chest apicogram done on presentation showed the presence of a small cavity in right upper zone with increased lung markings as compared to the left upper zone

Figure 2. HRCT of the thorax demonstrated thick walled cavity in apical segment of right upper lobe surrounded by fibrosis and centrilobular nodules while emphysematous bullous area was seen in left upper lobe

Several stains for acid-fast bacilli (AFB) done prior to presentation were negative. Three sputum smears for AFB and cultures for *Mycobacterium tuberculosis* done at presentation were also negative. *K. oxytoca* was isolated as a pure growth in sputum culture performed for aerobic bacteria other than *M. tuberculosis*. The organism was cultured in the initial sample and the subsequent two samples also and was sensitive to almost all common antibiotics. Fiberoptic bronchoscopy visualised a normal bronchial mucosa. Cytological examination of the bronchial aspirate smear showed benign columnar epithelial cells, moderate infiltration of lymphocytes and few macrophages with no malignant cells. Aerobic culture of the aspirate also yielded pure growth of *K. oxytoca*. Stains and cultures for *M. tuberculosis* or other aerobic organisms continued to be negative.

A diagnosis of chronic pneumonia caused by *K. oxytoca* was made. Although the spirometry was within normal limits, the patient had a 30-pack-year history of smoking and the CT picture was suggestive of emphysema. The patient had never experienced any symptoms suggestive of exacerbation of chronic obstructive pulmonary disease (COPD) nor had he ever received inhaled/oral corticosteroids or any other therapy. Based on the culture sensitivity report, the patient received antimicrobial therapy with oral amoxicillin/clavulanic acid (500 + 125 mg 8 hourly) along with intravenous gentamicin (160 mg 12 hourly) for a fortnight. With this, the patient experienced marked symptomatic improvement and within 2 weeks, haemoptysis was largely abolished. The patient was relatively symptom-free and after 3 months he was lost to follow-up.

Discussion

Pneumonia due to *Klebsiella* generally occurs in elderly people with risk factors including alcoholism, diabetes mellitus, smoking, co-morbidities such as COPD and other debilitating illnesses [6, 13]. Of the 2,776 patients hospitalised for CAP in 1991 in two counties in Ohio, *Klebsiella* species were implicated in 29 (1%) [3]. The retrospective study from Switzerland [5] in 293 hospitalised patients with bacterial pneumonia, specific bacteriological aetiologies were found in 97 (33.1%). Twelve (12.4%) of these patients were due to *Klebsiella* species [5]. A prospective study in 70 patients with CAP from India reported aetiological confirmation in 53 (75.6%), 12 (22.6%) of whom were caused by *K. pneumoniae* [6].

K. pneumoniae is usually the causative species but *K. oxytoca* as a potentially significant respiratory pathogen was first recognised in a retrospective study in 1983. This study found that of the 4,800 patients with respiratory complaints, 110 sputum samples and one blood culture were positive for *Klebsiella* species. Of these, *K. oxytoca* was isolated in 11 samples from 11 patients including the one from blood culture. Four of these 11 patients had lobar pneumonia while one had bronchopneumonia, five had acute exacerbations of chronic bronchitis and one had an acute respiratory tract infection superimposed on cryptogenic fibrosing alveolitis. The authors advocated that treatment was indicated whenever this organism was isolated from the clinical specimens [15].

In another prospective study [16] of 15 patients with bacteremically proven *Klebsiella* pneumonia,

right upper lobe involvement was documented in 11 cases. The authors observed that immunosuppression was a significant risk factor for *Klebsiella* pneumonia and infections were mostly hospital acquired. Of the 15 patients, *K. oxytoca* was isolated in five, four of whom had bilateral disease. The authors stated that *K. oxytoca* was seen more often in patients with bilateral infiltrates while *K. pneumoniae* was more common in patients with unilateral infiltrates [16]. Our patient too had right upper lobe necrotising pneumonia with infiltrates in the left lung. *K. oxytoca* has also been implicated as an offending agent for hypersensitivity pneumonitis [17].

The chronic form of the disease caused by *Klebsiella* species is rarely encountered. In the pre-antibiotic era, Solomon [1] reviewed 17 patients with chronic Friedlander pneumonia and documented that it occurred predominantly in males in the later decades and especially those affected by alcoholism. Upper lobe lesions were seen in 14 (82%) patients and the involvement of multiple lobes occurred in 5 (30%). Lung abscesses were documented in majority of these patients. Both lungs were involved in only two patients. The author further stated that frequent occurrence of blood streaking and mucopurulent sputum along with the cavities in upper lobes on chest X-ray can lead to strong suspicion and even treatment for pulmonary tuberculosis in these patients [1].

A study published from Japan [18] reported four patients with *Klebsiella* (Friedlander's) pneumonia of whom, one had a chronic presentation with typical cavitary lung abscesses in the right lung [18]. Chronic presentation of pneumonia due to *K. pneumoniae* has also been reported from India in an immunocompetent elderly male. He was a reformed smoker who, prior to presentation, had received anti-tuberculous therapy with no relief due to marked clinical and radiological resemblance to that of pulmonary tuberculosis. Subsequently, a diagnosis of chronic *Klebsiella* pneumonia was established when initial sputum samples cultured *K. pneumoniae*. The patient had a marked symptomatic improvement with appropriate antibiotics and was largely symptom free. A chest X-ray done after eight months showed considerable clearing of the lesion with some remaining fibrosis [11]. Imaging in our current patient too had a marked resemblance to that of pulmonary tuberculosis as there was cavitation in the right upper lobe.

Non-resolving pneumonia of 9 months duration caused by *K. oxytoca* has been documented

only once before from Canada in an 82-year-old previously healthy woman with a 30 pack-year history of smoking. Radiologically, the patient had an extensive consolidation of the left lower lobe with volume loss, which was confirmed on HRCT along with emphysematous changes. The diagnosis was established with the culture of the organism from bronchoalveolar lavage [14]. In our patient too, non-resolving pneumonia along with a history of smoking and emphysematous changes were present. *K. oxytoca* was cultured as a pure growth from both sputum samples as well as the bronchial aspirate.

The chronic presentation of pneumonia caused by *K. pneumoniae* is an uncommon clinical entity while that due to *K. oxytoca* is a distinct rarity as it has been documented only once before. Physicians, especially in high tuberculous prevalent areas, should be aware that the chronic form of the disease due to *Klebsiella* species can have a presentation akin to that of pulmonary tuberculosis.

Conflict of interest

The authors declare no conflict of interest.

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