Intrathoracic infections due to *Eikenella corrodens*

**SHAHROKH JAVAHERI, RICHARD M SMITH, DAVID WILTSE**

*From the Pulmonary Division and Department of Medicine, Veterans Administration Medical Center, University of Cincinnati College of Medicine; and the Pulmonary Division, Department of Medicine, Good Samaritan Hospital, Cincinnati, Ohio, USA*

*Eikenella corrodens*, a fastidious facultative anaerobic Gram negative bacillus, is part of the normal human oral flora. Although it has been implicated as the sole causative agent for certain infections, its pathogenetic importance remains uncertain. *E. corrodens* has been isolated in respiratory tract infections, including pneumonia, abscess, and empyema, where detailed bacteriological investigations have been performed, but only in association with other microbes. It was recently isolated by transtracheal or percutaneous aspiration from seven patients with pneumonia or lung abscess, but in each case several other organisms were cultured. The present report shows that *E. corrodens* can be the sole cause of respiratory tract infection. The organism has an unusual antibiotic sensitivity and the therapeutic importance of this is illustrated by our case histories.

**Case reports**

**CASE 1**
A 52 year old man complained of a flu like syndrome, cough with purulent green sputum, chills, and fever one week after a syncopal episode. The respiratory rate was 28, temperature 37°C, and blood pressure 94/80 mm Hg. He had extensive peribronchial and abdominal examination showed nothing abnormal. His white blood cell count was 17.3 x 10⁹/l with 90% neutrophils. A chest radiograph showed a left upper lobe abscess, which was not present on a chest radiograph obtained three weeks previously.

Gram stain of sputum showed many neutrophil leucocytes and occasional Gram positive cocci. After blood had been obtained for microbial cultures, he was treated with intravenous fluid and penicillin (12 million units daily). The next day he felt better and had an improved appetite. Later in the day, however, his blood pressure fell to 64/44 mm Hg when the rate of intravenous fluid administration was reduced. The hypotension was thought to be due to sepsis, so penicillin was stopped and he was treated with more fluid, dopamine, clindamycin (600 mg intravenously every six hours), and gentamicin.

Fever and chills recurred, and he remained febrile with a temperature up to 38.5°C for the next eight days. Bronchoscopy showed swelling of the left upper lobe bronchi; specimens were negative for malignant cells. On day 7 a Gram negative rod was cultured from one of the blood culture bottles, and this was identified as *E. corrodens* by morphological and biochemical criteria. The organism was resistant to clindamycin but sensitive to penicillin. All other blood cultures, both aerobic and anaerobic, were negative. Sputum grew normal flora. On day 9 ampicillin was given and gentamicin and clindamycin were stopped. He then became afebrile and felt better and his appetite improved. Repeated attempts to wean him from intravenous fluids resulted in hypotension. Extensive investigation revealed hypoadrenalism, for which fludrocortisone was administered.

Amoxycillin was stopped after three months, when the chest radiograph showed that the abscess had resolved. Cultures for acid fast bacilli and fungi were negative.

**CASE 2**
A 44 year old white man, with a history of alcoholism and seizures, complained of nausea, anorexia, fever, increasing shortness of breath, and bilateral pleuritic chest pain of two weeks' duration. He had a history of depression, and had been drinking excessively during the past two weeks. His temperature was 39.5°C, heart rate 140 beats/min, and respiratory rate 44/min. Breath sounds were diminished bilaterally and end inspiratory crackles were heard. The clinical examination otherwise showed nothing abnormal.

The white blood cell count was 25.9 x 10⁹/l with 75% neutrophil leucocytes. The arterial oxygen tension (PaO₂) was 38 and the carbon dioxide tension (PaCO₂) 20 mm Hg (5.1 and 2.7 kPa) and pH 7.45 in room air. A chest radiograph showed bilateral lower lobe shadings, a right lower lobe abscess cavity, and a pleural effusion. Gram staining of sputum showed many neutrophil leucocytes with mixed organisms. He was treated with oxygen, phenytoin, penicillin, and tobramycin.

Two days later the patient was still febrile. Penicillin treatment was discontinued and clindamycin was added. On the third day thoracentesis yielded 20 ml of non-purulent cloudy fluid with a white cell count of 13 x 10⁹/l, 90% being neutrophils. Sputum culture grew normal flora, and blood cultures were negative. Bronchoscopy showed that the orifices of the middle and right lower lobe bronchi were enlarged, oedematous, and narrowed.

He remained febrile with a high leucocyte count despite tube thoracostomy. On the 11th day he underwent thoracotomy. Removal of a large volume of non-puritid pleural fluid (1600 ml) revealed a large abscess in the right lower lobe.
Intrathoracic infections due to Eikenella corrodens

causing collapse of the middle lobe. Lobectomy and decon-
tication were performed, and two chest tubes left in situ.
Postoperatively he continued to have a leukocytosis and
fever while taking clindamycin.

The empyema fluid was submitted for aerobic and anaer-
obic cultures and grew *E. corrodens*, sensitive to ampicillin,
carbencillin, cephalothin, chloramphenicol, gentamicin,
tobramycin, and tetracycline. Cultures for acid fast bacilli
and fungi were negative. Clindamycin was discontinued and
ampicillin started. This resulted in clinical recovery with dis-
appearance of the fever and leukocytosis.

**Case 3**

A 72 year old white woman was admitted for investigation
of a peripheral lung mass on the chest radiograph. She was
a heavy smoker with chronic obstructive lung disease. A
limited thoracotomy showed squamous cell carcinoma of
the pleura. Five days later, when she developed fever and
a productive cough, the chest radiograph showed a pleural
effusion, with shadowing and loss of volume in the left
lower lobe. The sputum contained many neutrophils but grew
normal flora only and blood cultures remained negative. Yellow
fluid drained from the old chest tube site. On Gram staining
the fluid contained many leucocytes but no organisms; *E.
corrodens*, however, grew on culture. All other aerobic and
anaerobic cultures were negative. Intravenous penicillin was
given. *E. corrodens* was also sensitive to ampicillin, car-
bencillin, cephalothin, tobramycin, gentamicin, chlor-
amphenicol, and tetracycline. For the next three weeks her
course was punctuated by episodes of chills and fever. These
occurred at times when drainage from the pleural space was
diminished, and it responded to incision and drainage. A
second culture of the pleural fluid grew *E. corrodens* and
Haemophilus parainfluenzae. She was discharged from hospi-
tal while continuing treatment with an oral cephalosporin.

**Discussion**

We report three patients who presented with thoracic infec-
tion due to *E. corrodens*. Two had a primary lung abscess,
one in association with empyema; and the third, with car-
cinoma of the lung, presented with postoperative pneumonia
and empyema. Two had *E. corrodens* bacteraemia. This
report strongly suggests that *E. corrodens* was the sole cause
of infection in these patients.

Respiratory tract infections due to *Eikenella corrodens* are
not well recognised. Recognition of *E. corrodens* as the cause
of an intrathoracic infection is particularly important since,
as noted in this report, infections mimic anaerobic infections
but have different antibiotic sensivities. Anaerobic infec-
tions are effectively treated with clindamycin, whereas *E.
corrodens* is invariably resistant to this antibiotic, as shown
by our case reports.

We believe that the incidence of *E. corrodens* pleuro-
pulmonary infections has been underestimated. This is
because penicillin, to which *E. corrodens* is sensitive, is,
commonly used to treat aspiration pneumonia. *E. corrodens*
is characteristically difficult to grow and, as exemplified in
this report, only one of several cultures may be positive.
Consequently, the infections were present for some time before
the correct aetiological diagnosis was made. A pleuro-
pulmonary infection that is clinically presumed to be anaer-
obic but fails to respond favourably to clindamycin should
alert the clinician to the possibility that *E. corrodens* may be
the causative agent.

**References**