

Branhamella catarrhalis Pneumonia

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The diagnosis of Branhamella catarrhalis pneumonia in five cases was established by culture of pulmonary secretions obtained by transtracheal aspiration. B catarrhalis caused an acute lobar pneumonia which usually responded promptly to appropriate antimicrobial therapy. Recognition that this organism may cause pneumonia in a nonimmunocompromised person should alert clinicians to consider it as a possible pathogen when Gram-negative diplococci are seen on smears of specimens from the lower respiratory tract.

B*ranhamella catarrhalis*, formerly *Neisseria catarrhalis*, has generally been regarded as a commensal of the upper respiratory tract flora. Recently, its recovery has been associated with exacerbations of chronic bronchitis.¹ It has been implicated as a cause of pneumonia in rare instances, usually in an immunosuppressed host and in patients with chronic obstructive lung disease.²⁻⁴ We present our experience with five cases of pneumonia caused by *B catarrhalis*.

Patients and Methods

Between July 1977 and January 1981, all cases of pneumonia, community or nosocomially acquired, were reviewed by the Infectious Disease Section at the VA Wadsworth Medical Center, Los Angeles, as part of a pneumonia surveillance program. Four cases of pneumonia due to *B catarrhalis* were observed during this time. An additional case had occurred before the surveillance period.

Clinical and Laboratory Features

The clinical features of the cases are summarized in Table 1. All patients were men who had been admitted to the medical service. Symptoms of dyspnea and productive cough were present from one to four days before pneumonia was diagnosed. In three patients the sputum was blood-tinged or rusty in color. Two patients had pleuritic pain. Prodromal symptoms and symptoms of concomitant viral infection, such as myalgia and rhinorrhea, were not observed. All patients were febrile to 38.3°C (101°F), or higher, and had acute pneumonia. Roentgenograms of the chest showed alveolar and bronchopneumonic infiltrates. Pleural effusion and cavitation were not seen. In three

cases the right lower lobe was involved; the right upper lobe and the left lower lobe were involved in one case each. Physical signs noted on examination varied from diffuse wheezes and rhonchi to localized signs of consolidation.

The diagnosis was established by culture of *B catarrhalis* from material obtained by transtracheal aspiration. Gram stain of these specimens showed polymorphonuclear leukocytes and Gram-negative diplococci. Gram-stained sputum smears of three of the cases were also reported to show polymorphonuclear cells and many Gram-negative diplococci. The diplococci were often found both intracellularly and extracellularly. Not uncommonly, it was initially suggested that these patients had pneumonia caused by *Neisseria meningitidis*.

Response to therapy was typically rapid, with defervescence and radiographic improvement occurring within 48 hours in four of our patients. The exception was one patient with concurrent legionnaires' disease. None of our patients had associated bacteremia, empyema, sinusitis, meningitis or endocarditis. All of them survived.

Selected Case Reports

CASE 1 (Patient 4, Table 1). This 63-year-old alcoholic man was admitted to hospital in December 1978 with fever and productive cough of a few days' duration. Five days earlier he had sustained a fracture of the left humeral head. His temperature was 39°C (102.2°F) taken orally; he appeared malnourished. Examination of the chest showed an increased antero-posterior diameter with diffuse hyperresonance and rhonchi; diminished breath sounds and egophony were

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TABLE 1.—Clinical Features of *Branhamella catarrhalis* Pneumonia

Patient	Age, Sex	Date of Onset	Underlying Processes	Other Pathogens Isolated	Initial Leukocyte Count cells/ μ l	Physical Signs at Presentation			Drug Therapy	
						T °C (°F)	Heart Rate beats/min	Respirations		Chest Findings
1*	24 ♂	Jun 1975	Hypogammaglobulinemia	<i>Haemophilus influenzae</i>	18,800	39.1 (102.4)	90	20	Diffuse rhonchi	Cefoxitin
2	72 ♂	Dec 1977	Congestive heart failure, COPD	None	15,900	38.3 (101.0)	130	30	Localized rales, egophony, decreased breath sounds	Ampicillin
3	62 ♂	Mar 1978	Concurrent legionnaires' pneumonia†	None	18,600	39.4 (103.0)	120	22	Localized rales, increased fremitus	Ampicillin, erythromycin
4	63 ♂	Dec 1978	Hemochromatosis, COPD, alcoholism	<i>H influenzae</i>	10,900	38.9 (102.0)	110	18	Diffuse rhonchi, localized egophony and decreased breath sounds	Bacampicillin hydrochloride
5	28 ♂	May 1980	Systemic lupus erythematosus, renal insufficiency, prednisone/azathioprine therapy	None	22,000	39.1 (102.4)	108	24	Diffuse wheezes, bilateral rales	Penicillin, erythromycin

COPD = chronic obstructive pulmonary disease; T = temperature.

*Previously described.¹²

†Documented serologically.

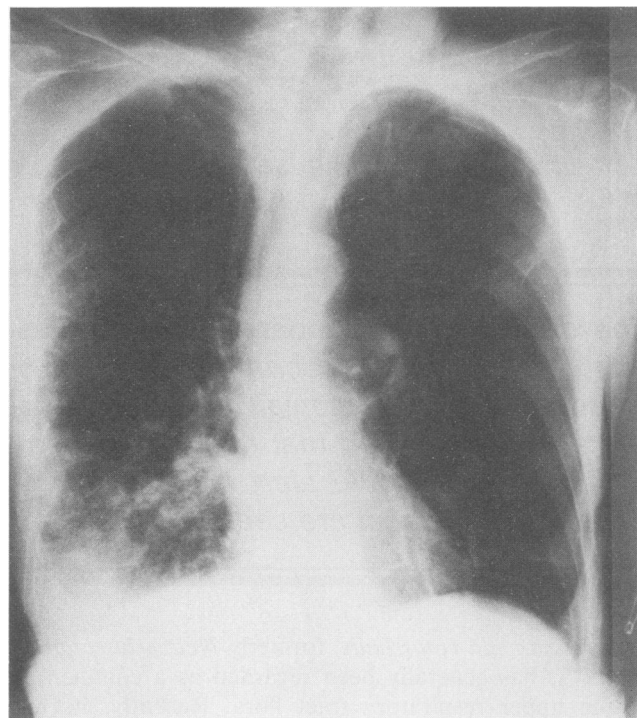


Figure 1.—Chest roentgenogram of patient 4 showing a right lower lobe infiltrate.

noted over the right lower lung. The chest roentgenogram is shown as Figure 1. Gram stain of a smear of transtracheal aspirate specimen showed many polymorphonuclear cells with large numbers of Gram-negative diplococci. A few Gram-negative coccobacillary forms were also noted. Culture of this material yielded a heavy growth of *B catarrhalis* and a moderate growth of *Haemophilus influenzae*. The patient received bacampicillin hydrochloride, 800 mg orally every 12 hours for ten days. Defervescence and a pronounced decrease in sputum production were noted after 48 hours of therapy. Another roentgenogram of the chest 12 days after admission to hospital showed only some mild right pleural thickening.

CASE 2 (Patient 5). This 28-year-old man with systemic lupus erythematosus and diffuse proliferative glomerulonephritis was being treated with azathioprine and prednisone before his admission to hospital. When seen he had poorly controlled hypertension and a four-day history of cough productive of blood-tinged sputum. The temperature was 39.1°C (102.4°F) taken orally. Examination of the chest showed diffuse wheezes and a few fine bilateral basilar rales. Serum creatinine was 6.6 mg per dl; blood urea nitrogen was 103 mg per dl. The chest roentgenogram done at the time of admission showed cardiomegaly, increased vascular markings and a bronchopneumonic right lower lobe infiltrate (Figure 2). Gram-stained smears of a sputum specimen and secretions obtained by transtracheal aspiration showed many polymorphonuclear leukocytes and Gram-negative diplococci. The patient was begun on a regimen of penicillin, 6 million units a day. He also received erythromycin initially because of the prevalence of

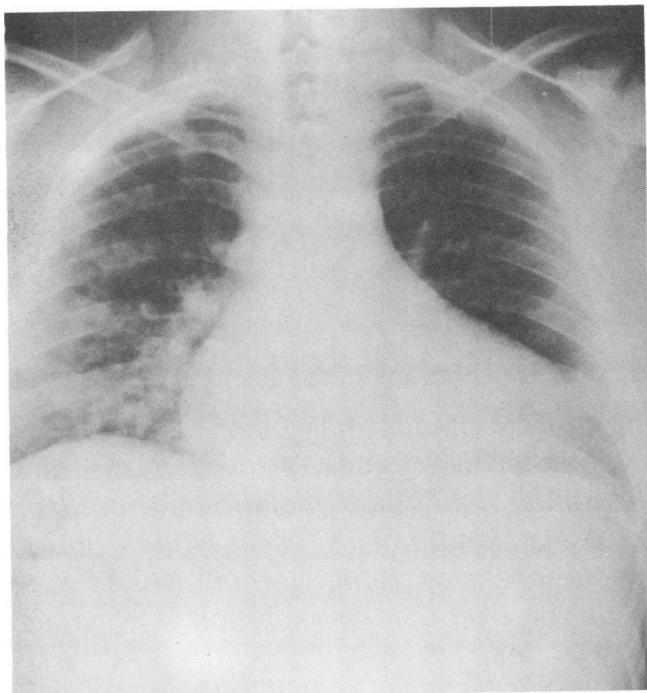


Figure 2.—Chest roentgenogram of patient 5 showing a bronchopneumonic infiltrate in the right lower lobe.

Legionella pneumonia in our hospital at that time. *B. catarrhalis* was obtained from both sputum and transtracheal aspirate in pure culture. The patient's fever subsided rapidly and pulmonary infiltrate cleared after 48 hours of therapy.

Discussion

B. catarrhalis appears as kidney-bean-shaped Gram-negative diplococci. Its microscopic morphology resembles that of the genus *Neisseria* from which it is genetically distinct. *B. catarrhalis* forms gray-white non-chromogenic colonies that grow best on chocolate agar under 10 percent carbon dioxide.

Rarely, this organism has been associated with septicemia,⁵ meningitis,⁶ endocarditis,⁷ otitis media⁸ and conjunctivitis.⁹ Recent reports of its recovery from transtracheal aspirates have implicated it in the pathogenesis of acute exacerbations of chronic bronchitis.¹ These reports have stressed the occurrence of such infections in patients with underlying chronic lung disease. Ninane and co-workers¹ have recovered *B. catarrhalis* from 15 of 190 transtracheal aspirate specimens from retired coal miners with exacerbations of chronic bronchitis. Fourteen of their isolates were obtained in pure culture.

One case of acute empyema has been reported.¹⁰ This involved a 74-year-old man with chronic lymphocytic leukemia whose empyema fluid specimen yielded a pure culture of *B. catarrhalis*. After nine days of antibiotic therapy, sterile fluid was obtained by repeat thoracentesis. A 64-year-old man with advanced IgA myeloma suffered a rapidly fatal *B. catarrhalis* pneumonia.² Recently, *B. catarrhalis* has been implicated as a causal agent of pneumonia in six additional patients.^{3,4}

In only one of these, however, was the organism cultured from secretions obtained directly from the lower respiratory tract by transtracheal aspiration.

Four of our patients had underlying medical illnesses, including two who had chronic obstructive lung disease. In addition, one was predisposed to recurring pneumonia because of hypogammaglobulinemia. Another had systemic lupus erythematosus and was receiving prednisone. One patient was previously healthy; he had concurrent legionnaires' pneumonia. In previous reports, *B. catarrhalis* has been recovered simultaneously with *H. influenzae* and *Streptococcus pneumoniae* from transtracheal aspirates. Two of our patients were simultaneously infected with *H. influenzae*.

We did not carry out β -lactamase testing on most strains. In fact, all of our patients responded to treatment with ampicillin or other β -lactam antibiotics. Acute bronchitis and pneumonia associated with β -lactamase-producing *B. catarrhalis* has been noted to respond to cefuroxime carbamate,¹ tetracycline⁴ and to a combination of amoxicillin and clavulanic acid.¹¹ Rapid β -lactamase testing should be done on all isolates while awaiting the results of susceptibility studies. In our clinical experience, ampicillin is effective for the treatment of pneumonia caused by susceptible strains.

Gram-negative diplococci are frequently seen in Gram-stained smears of expectorated material. Their presence may reflect contamination by saliva. However, the finding of large numbers of these organisms with morphology typical of *Neisseria* and associated with polymorphonuclear cells in a purulent sputum specimen is uncommon. Intracellular location of these organisms is even more suggestive. This encouraged us to confirm their presence in the lung by transtracheal aspiration. Nongonococcal and nonmeningococcal Gram-negative diplococci are often reported as "*Neisseria* species" by clinical laboratories. In view of the emerging body of evidence implicating *B. catarrhalis* as a pulmonary pathogen, efforts should be made to identify it specifically in specimens from the lower respiratory tract.

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