Thorax 1988;43:929–30

Pneumonia due to *Branhamella catarrhalis*

S CAPEWELL, D T McLEOD, M J CROUGHAN, F AHMAD, MARGARET A CALDER, A SEATON

From the Chest Unit and the Department of Bacteriology, City Hospital, Edinburgh

ABSTRACT In 12 of 451 patients diagnosed as having pneumonia in a single hospital over 18 months the causative organism appeared to be *Branhamella catarrhalis*.

Branhamella (previously *Neisseria*) *catarrhalis* is an aerobic Gram negative diplococcus. It has been traditionally regarded as an oropharyngeal commensal and until recently was only rarely identified as a pathogen in cases of sinusitis, laryngitis, otitis media, endocarditis, and meningitis.[1,2]

Recently we and others have observed an increasing number of *B catarrhalis* bronchopulmonary infections, predominantly in patients with chronic lung disease.[1-4] Pneumonia due to *B catarrhalis* has been considered a rarity, even in patients with compromised immunity,[5] and only one of four recent reviews of community acquired pneumonia included *B catarrhalis* as a pathogen.[6-9]

Pneumonia due to *B catarrhalis* may not be rare. We describe 12 cases occurring in one hospital in only 18 months.

Methods

We reviewed all patients with pneumonia and a pure culture of *B catarrhalis* in sputum seen in the City Hospital from November 1982 to April 1984. The diagnosis of pneumonia was based on "an acute respiratory infection associated with fresh radiographic shadowing."[7]

A purulent part of each sputum specimen received was examined with a Gram film, inoculated on blood agar and heated blood plates (containing bacitracin 10 000 units/l), and incubated in 8% carbon dioxide for 18 hours. Only moderate or profuse growth on the primary plate was reported. *B catarrhalis* was presumptively identified by the presence of extraleucocyte and intraleucocyte Gram negative diplococci in the Gram film, by their colonial and morphological appearance, and by positive catalase and oxidase reactions. The identification was confirmed with rapid carbohydrate utilisation tests. All strains of *B catarrhalis* were tested for deoxyribonuclease activity and production of β lactamase. Tests of sensitivity to standard antibiotics were performed by the disc diffusion method. Mixed infections were excluded. This bacteriological screening of sputum in the bacteriology laboratory has not been altered for some years.

Address for correspondence: Dr Simon Capewell, Department of Tuberculosis and Chest Diseases, Llandough Hospital, Penarth, Cardiff CF6 1XX.

Accepted 28 July 1988

Results

Of 185 patients in whom *B catarrhalis* bronchopulmonary infection was identified from November 1982 to April 1984,[1,2] 12 (six male) had pneumonia. All patients were elderly (mean age 76 (range 69–87) years) and had some underlying disease, including chronic bronchitis and emphysema in eight, senile dementia in two, asthma in three, and influenza in one. Four patients were having maintenance oral prednisolone.

During the same period 451 patients with pneumonia were admitted to the City Hospital.

Nine of the 12 patients with *B catarrhalis* infection had acquired pneumonia in the community. Symptoms of lower respiratory tract infection had been present for 2–14 days before hospital admission. Seven strains were β lactamase positive and two β lactamase negative (table). Two of the nine patients had received amoxycillin and one ampicillin before admission; all three failed to respond to treatment and in each case the strain of *B catarrhalis* was β lactamase positive. After admission two patients received co-trimoxazole, one erythromycin and five ampicillin initially. In three of these patients strains were β lactamase positive and Augmentin (amoxycillin plus clavulanic acid) or co-trimoxazole was subsequently chosen. Seven patients recovered and two died.

Three cases of pneumonia were nosocomial; all three strains produced β lactamase. The patients had been in hospital for two to four weeks and all had been given ampicillin (inappropriately) initially. One patient subsequently improved with tetracycline and two with co-trimoxazole. One 73 year old man became reinfected and later died.

Clinical features All 12 patients were dyspnoeic and had a "loose" cough producing moderate volumes of apple green sputum. Only four patients had fever (37·6–39°C). Three had pleuritic pain and one had haemoptysis.

Radiology Consolidation was bilateral in three cases, lobar in five, lobular in two, and at least segmental in the remaining two (table). Cavitation or empyema did not occur.

Laboratory findings The initial Gram film of sputum typically showed numerous pus cells with Gram negative diplococci; profuse growth of *B catarrhalis* occurred in the primary plate in 10 cases, with moderate growth in two. Ten of the 12 isolates were β lactamase producers. Serological tests for atypical organisms and pneumococcal capsular antigen were done in seven patients but gave negative results in each. Blood cultures were uniformly negative.

Seven patients were very hypoxaemic, with an arterial oxygen tension below 8·0 kPa. The white blood cell count was normal (4–11 $\times$ 10^9/l) in six patients and modestly raised in the remaining six (range 12·4–16·8 $\times$ 10^9/l).

Details of pneumonia due to Branhamella catarrhalis

Age (y)	Sex	Underlying disease	Affected lobe(s)	β Lactamase
Community acquired pneumonia				
74	M	CB	RLL	+
87	M	CB + E	RUL	+
70	M	CB	RLL	−
69	M	CB	LUL, extensive	+
76	M	CB	Lingula	+
78	F	CB	RLL, patchy	−
72	F	Asthma	LLL	+
83	F	Asthma	RUL, LLL, extensive	+
80	F	Asthma	RLL, patchy	+
Nosocomial pneumonia				
73	M	CB + E	RLL	+
84	F	CB, dementia	LLL	+
84	F	Dementia, influenza	Bilateral bronchopneumonia	+

CB—chronic bronchitis; CB + E—chronic bronchitis and emphysema; RUL—right upper lobe; RLL—right lower lobe; LUL—left upper lobe; LLL—left lower lobe.

Discussion

Twelve cases of *Branhamella catarrhalis* pneumonia occurred in one hospital during 18 months. This represented almost 7% of all *B catarrhalis* bronchopulmonary infections during this time.[1,2] Our findings suggest that *B catarrhalis* pneumonia is not rare. It was first described in 1933[10]; more recently the number of reports has increased. In many cases the diagnosis was confirmed by transtracheal aspiration, which thus eliminated the possibility of oropharyngeal contamination.[3,4,11]

We suspect that in many cases of *B catarrhalis* pneumonia the diagnosis has been missed because *B catarrhalis*, when isolated in sputum culture, has been dismissed as a "mere" oropharyngeal commensal. Its pathogenic potential, particularly in susceptible patients, is not always appreciated.[1] The most likely predisposing factors in our patients were age, underlying chronic pulmonary disease, and long term corticosteroid treatment.

B catarrhalis is not a fastidious organism and can survive in moist sputum at 22° and 36°C for over three weeks. This may explain the frequency of nosocomial *B catarrhalis* bronchopulmonary infections.[1,2]

The diagnosis of *B catarrhalis* pneumonia should be straightforward. The clinical presentation usually suggests an acute pneumonic illness and in our patients sputum was often copious, easily expectorated, and characteristically apple green. Gram staining of sputum was frequently diagnostic.[1,3]

Although most strains of *B catarrhalis* are now β lactamase producers, the choice of effective antibiotic is wide and includes co-trimoxazole, erythromycin, tetracycline, amoxycillin plus clavulanic acid, and ciprofloxacin.[2]

We thank Miss Joyce Holywell for typing the manuscript.

References

1 McLeod DT, Ahmad F, Power JT, Calder MA, Seaton A. Bronchopulmonary infection due to *Branhamella catarrhalis*. *Br Med J* 1983;**287**:1446–7.
2 McLeod DT, Ahmad F, Capewell S, *et al.* Increase in broncho-pulmonary infection due to *Branhamella catarrhalis*. *Br Med J* 1986;**292**:1103–5.
3 Ninane G, Joly J, Kraytman M. Bronchopulmonary infection due to *Branhamella catarrhalis:* 11 cases assessed by transtracheal puncture. *Br Med J* 1978;i:276–8.
4 Thornley PE, Aitken J, Drennan CJ, MacVicar J, Slavin NJ. *Branhamella catarrhalis* infection of the lower respiratory tract: reliable diagnosis by sputum examination. *Br Med J* 1982;**285**:1537–8.
5 Srinivasan G, Raff MJ, Templeton WC, *et al. Branhamella catarrhalis* pneumonia. Report of two cases and review of the literature. *Am Rev Respir Dis* 1981;**123**:553–5.
6 Levy M, Dromer F, Brion N, Leturdu F, Carbon C. Community-acquired pneumonia. Importance of initial non-invasive bacteriologic and radiographic investigations. *Chest* 1988;**92**:43–8.
7 McFarlane JT, Finch RG, Ward MJ, Macrae AD. Hospital study of adult community-acquired pneumonia. *Lancet* 1982;ii:255–8.
8 Berntsson E, Blomberg J, Lagergard T, Trollfors B. Etiology of community-acquired pneumonia in patients requiring hospitalisation. *Eur J Clin Microbiol* 1985;**4**:268–72.
9 British Thoracic Society Research Committee and Public Health Laboratory Service. Community acquired pneumonia in adults in British hospitals in 1982–1983: a survey of aetiology, mortality, prognostic factors and outcome. *Q J Med* 1987;**62**:195–220.
10 Robbelen A. Der *Micrococcus catarrhalis* als Erreger einer lobaren Pneumonia. *Z Hyg Infectionsk* 1933;**115**:705–9.
11 Johnson MA, Drew WL, Roberts M. *Branhamella (Neisseria) catarrhalis*—a lower respiratory tract pathogen. *J Clin Microbiol* 1981;**13**:1066–9.