

Pleuropulmonary Infection Associated with *Eubacterium brachy*, a New Species of *Eubacterium*

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A new species of *Eubacterium* was isolated from a case of pleural effusion. A case history and description of the organism are given.

Anaerobic bacteria are well established and relatively common pulmonary pathogens; they are the most common isolates in empyema fluid (1, 2). They may be frequently overlooked in the usual clinical practice, and, due to difficulties inherent in obtaining appropriate specimens for diagnosis, these infections are often not documented even when suspected (1, 3).

Bacteria involved in anaerobic pleuropulmonary disease usually originate endogenously. They can arise from the commensal anaerobic flora of the host's normal mucocutaneous surfaces, from extrapulmonary sites of anaerobic suppuration, or from the anaerobic flora of bronchiectatic lesions (1).

In studies done by Bartlett and Finegold (1, 3) over a 15-year period, the most important background factor for anaerobic pleuropulmonary infection was documented or suspected aspiration. The second most common factor was periodontal disease.

This report describes the isolation of a new species of *Eubacterium*, *E. brachy* sp. nov. (4), in cultures taken of empyema fluid.

The patient was a 29-year-old male with a 2-month history of chest pain and cough. He had been treated previously for muscular spasm with muscle relaxants, without relief. He had also developed intermittent chills and fever throughout the 2-month period. His appetite was diminished, and his urine had darkened in color.

On examination, the patient was noted to have marked rales in the left base, decreased respirations, and asymmetry on deep inspiration. The chest X ray revealed a lingular infiltrate with marked pleural effusion on the left side.

The peripheral leukocyte count was 16,000. Cold agglutinins were less than 1:2. Protein electrophoresis showed an elevated alpha globulin, and liver enzymes revealed slight elevation of alkaline phosphatase. The patient had no previous history of lung disease, including asthma, tuberculosis, or bronchitis.

A thoracentesis specimen was obtained under ultrasound guidance. Twenty milliliters of

grossly purulent, foul-smelling material was removed for cultures. A chest tube was placed and left for drainage for approximately 2 weeks. Initially, a foul-smelling purulent fluid was obtained from the tube; however, the tube did not drain well after the first few days. The patient's chest X rays showed marked improvement in the infiltrates and some decrease in the amount of the fluid during the period of hospitalization.

The patient was initially treated with erythromycin with no radiographic change in his X ray. The antibiotic was changed to intravenous penicillin and later to oral penicillin. The patient was discharged on day 25 of hospitalization in improved physical condition. Oral penicillin therapy was discontinued after approximately 6 weeks, at which time the patient showed no further symptoms. The chest X ray taken at that time continued to show a residual pleural thickening.

Direct Gram stain of the fluid obtained from thoracentesis showed 4+ polymorphonuclear leukocytes, 4+ thin, gram-negative rods with tapered ends, and 4+ gram-positive coccobacilli. The gram-negative rod was identified as *Fusobacterium nucleatum*. The gram-positive coccobacillus had characteristics unlike those of known species and was subsequently identified by the Anaerobe Laboratory, Virginia Polytechnic Institute and State University, as being similar to other strains for which they were proposing the name *E. brachy* (4).

All of our initial anaerobic isolation and subsequent biochemical testing was performed on prereduced anaerobically sterilized media (Carr-Scarborough Microbiologicals, Stone Mountain, Ga.) according to the methodology of Holdeman et al. (5).

Initial growth of the organism was obtained on brain heart infusion agar roll tubes supplemented with rabbit blood and in chopped-meat carbohydrate broth. The organism grew slowly, with visible colonies appearing after 4 days of incubation. The isolate also grew on brain heart infusion agar roll tubes without the rabbit blood

supplement, but only after several additional days of incubation.

The organism was nonsaccharolytic, producing no acid in all carbohydrates tested (amygdalin, arabinose, cellobiose, erythritol, esculin, fructose, glucose, inositol, lactose, maltose, mannitol, mannose, melezitose, melibiose, raffinose, rhamnose, ribose, salicin, sorbitol, starch, sucrose, trehalose, and xylose). It did not reduce nitrates to nitrites, nor did it hydrolyze starch or esculin. The results of gelatin hydrolysis and indole production were equivocal after 5 days of incubation; however, this may have been a matter of misinterpretation, since all strains tested by Holdeman et al. (4) were negative for both reactions. Acetic, isobutyric, isovaleric, and isocaproic acids were detected by gas chromatography of cultures in chopped-meat carbohydrate, peptone yeast, and peptone yeast glucose broths. Holdeman et al. (4) noted that because of the fermentation products and the occurrence of short cells in chains, this species resembled *Peptostreptococcus anaerobius*. However, initial differences were observed in the poor growth in the usual media and the definite rod-shaped cellular morphology in the Gram stain.

The isolate was susceptible to penicillin G, ampicillin, carbenicillin, cephalothin, tetracycline, clindamycin, chloramphenicol, erythromycin, and minocycline when tested with the broth-disk method of T. D. Wilkins (5).

The strains investigated by Holdeman et al. (4) were isolated from 35% of the cases of human periodontitis they studied. The organism was isolated only once from supragingival areas adjacent to the subgingival areas of disease. The frequencies of occurrence and the concentration of *E. brachy* and two other proposed new species

of *Eubacterium* (*E. timidum* and *E. nodatum*) in the subgingival samples suggest that these three species may contribute significantly to the disease state in moderate and severe periodontitis. It was also noted that these organisms increased in both incidence and concentration in subgingival samples from sites with severe versus moderate periodontitis. As mentioned above, periodontal disease has been reported to be the second most common predisposing factor in pleuropulmonary infection (1, 3).

Laboratories may run into difficulties in the isolation of this organism due to its slow growth rate. Confusion could result because of its resemblance to *P. anaerobius*. There is a definite need here to look carefully at the initial Gram stain of the clinical material and attempt to isolate all morphotypes seen.

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