

Bacteremia Associated with *Haemophilus influenzae* Type e Biotype 4

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Haemophilus influenzae type e biotype 4 was isolated from a single antemortem blood culture obtained from a 60-year-old, white male with abdominal carcinomatosis.

Historically, *Haemophilus influenzae* has been implicated as the etiological agent in a variety of human diseases (6, 9, 11). Twenty-six cases of bacteremic *H. influenzae* pneumonia have been described in the literature; strain typing indicated that 20 were type b, 3 were type f, 1 was type c, 1 was type d, and 1 was unencapsulated (8). Recently, *H. influenzae* type e has been isolated from patients with multiple clinical presentations (1, 3, 7, 10). To our knowledge this is the first instance in which *H. influenzae* type e biotype 4 has been isolated from blood.

CASE REPORT

A 60-year-old, white male was admitted for evaluation of decreasing frequency of bowel movements, thin-caliber stools, and lower abdominal pain. On admission, the patient was afebrile. The leukocyte count was 19,500 cells per mm³ (91 segmented neutrophils, one band, six lymphocytes, and two monocytes). A chest X ray demonstrated no pulmonary infiltrates.

On hospital day 7, the patient underwent laparotomy for a mass in the left upper quadrant of the abdomen, at which time numerous hepatic and small bowel serosal metastases of a poorly differentiated adenocarcinoma were found. Postoperatively, the patient experienced respiratory difficulty. On postoperative day 10 (hospital day 16), a chest X ray demonstrated a right lower lobe infiltrate. Nasopharyngeal aspiration yielded a moderate amount of brownish-yellow secretions that subsequently was cultured. A Swan-Ganz catheter was inserted to monitor pulmonary venous pressure. The temperature of the patient began to rise, and it peaked at 102.8°F (39.3°C). The blood pressure of the patient declined, and his respiratory status deteriorated. He developed asystole and expired on postoperative day 11 (hospital day 17). Preliminary findings at autopsy included intense congestion of the lower lobes of both lungs and diffuse abdominal carcinomatosis secondary to carcinoma of the pancreas.

RESULTS AND DISCUSSION

A quantitative culture of urine submitted on hospital day 4 yielded 10,000 to 50,000 *Proteus*

morgani bacteria per ml. A urine culture from postoperative day 10 (hospital day 16) yielded 10,000 to 50,000 *Klebsiella pneumoniae* bacteria per ml. *Escherichia coli* and *P. mirabilis* were isolated from the single culture of nasopharyngeal secretions. Blood drawn through the Swan-Ganz catheter on postoperative day 10 yielded *H. influenzae*, using as the growth medium chocolate agar containing brucella agar base (Baltimore Biological Laboratory [BBL], Cockeysville, Md.), 1% IsoVitaléX (BBL), and 5% sheep erythrocytes. The organisms exhibited typical tinctoral and morphological characteristics on Gram stain, fastidious growth requirements, and an X- and V-factor requirement (11), as determined on brain heart infusion agar (BBL) with X-, V-, and X- and V-factor strips (BBL). Hemolysis was negative on 5% rabbit blood agar (4). Serological typing by slide agglutination with *H. influenzae* polyvalent antisera and types a through f antisera (Difco Laboratories, Detroit, Mich.) showed the isolate to be type e. Beta-lactamase activity could not be demonstrated by the method of Rosenblatt and Neumann (Program Abstr. Intersci. Conf. Antimicrob. Agents Chemother. 15th, Washington, D.C., Abstr. no. 388, 1975). The modified Kirby-Bauer technique (2) demonstrated the sensitivity of the isolate to ampicillin, chloramphenicol, and erythromycin. The isolate was subjected to taxonomic biotyping by the method of Kilian (5). The use of this schema (Table 1) permitted the identification of this organism as *H. influenzae* biotype 4.

At autopsy, blood from a congested region of the lung was submitted to the laboratory for culture. Four microorganisms were present: *P. mirabilis*, *E. coli*, *K. pneumoniae*, and a fourth organism, which on Gram stain was morphologically and tinctorally consistent with *Haemophilus* species. Because of the *P. mirabilis*, the fourth organism could not be isolated in pure culture, and no further analyses were possible.

TABLE 1. *Abbreviated biochemical characteristics of H. influenzae biotypes*

| <i>H. influenzae</i> biotype | Indole production | Urease activity | Ornithine decarboxylase activity |
|------------------------------|-------------------|-----------------|----------------------------------|
| 1 | + | + | + |
| 2 | + | + | - |
| 3 | - | + | - |
| 4 | - | + | + |
| 5 | + | - | + |

The first three microorganisms presumably represented agonal colonization, whereas the suspected *Haemophilus* species may have played a role in producing the pulmonary infiltrate.

This case report demonstrates the increasing importance of *H. influenzae* type e biotype 4 in the etiology of human disease. Physicians and clinical microbiologists need to be more aware of the possibility of the presence of this microorganism in blood cultures.

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