Extrapulmonary abscess formation due to *Pseudomonas cepacia* in a cystic fibrosis patient

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JM LANGLEY, EL FORD-JONES, DC ARMSTRONG, R GOLD, S READ, H LEVISON. Extrapulmonary abscess formation due to *Pseudomonas cepacia* in a cystic fibrosis patient. Can J Infect Dis 1993;4(4):229-231. A 19-year-old immunocompetent cystic fibrosis patient with recurrent neck abscesses due to a multiresistant *Pseudomonas cepacia* is described. After 13 drainage procedures over a two-year period, a trial of interferon-gamma therapy to enhance monocyte function was attempted. The patient had one minor recurrence but has otherwise been symptom free for almost two years. *P cepacia* is an unusual cause of extrapulmonary abscess formation. Such abscesses may not present with classical signs of inflammation, are likely to be multiresistant and to require surgical drainage. Immunotherapy may be justified in the immunocompetent host when infection is refractory to medical and surgical therapy.

Key Words: Abscess, Cystic fibrosis, Interferon-gamma, *Pseudomonas cepacia*

Formation d'abcès extrapulmonaires attribuables à *Pseudomonas cepacia* chez un patient atteint de fibrose kystique

RÉSUMÉ: On décrit ici le cas d'un patient de dix-neuf ans atteint de fibrose kystique immunocompétent qui présente des abcès récurrents au cou attribuables à un *Pseudomonas cepacia* multirésistant. Après 13 drainages, sur une période de deux ans, un essai thérapeutique est tenté avec de l'interféron gamma afin d'améliorer la fonction des monocytes. Le patient a présenté une récurrence mineure mais a par ailleurs été libre de tout symptôme durant près de deux ans. *P Cepacia* cause rarement d'abcès extrapulmonaires. Ces abcès ne présentent pas le tableau caractéristique de l'inflammation et sont susceptibles d'être multirésistants et de nécessiter un drainage chirurgical. L'immunothérapie peut être justifiée chez l'hôte immunocompétent lorsque l'infection résiste au traitement médical et chirurgical.

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PSEUDOMONAS CEPACIA IS AN OPPORTUNISTIC RESPIRATORY tract pathogen in patients with cystic fibrosis (CF) that is associated with increased morbidity and mortality (1). The spectrum of disease associated with this organism ranges from asymptomatic respiratory tract colonization to rapid pulmonary deterioration with bacteremia (2). One case of hepatic abscess due to *P cepacia* has been reported in a CF patient (3,4). We report a case of recurrent neck abscesses due to a multiresistant *P cepacia* in a CF patient that resolved only after 13 drainage procedures and recombinant interferon-gamma (IFN- γ) therapy.

CASE PRESENTATION

A 19-year-old male with CF, pancreatic insufficiency, insulin-requiring diabetes mellitus, and chronic thrombocytopenia secondary to hypersplenism of unknown etiology, presented in 1988 with left neck swelling and fever of two weeks duration. There was no history of pharyngitis or pharyngeal trauma. He had severe obstructive airway disease (FEV₁ was 2.13, FVC was 3.63, FVC/FEV₁ was 59), and had been colonized with *P cepacia* for five years. On examination he was febrile (39°C orally) with gross swelling of the left neck. The weight for height ratio was 110%. A hard, nontender, nonerythematous 6 by 6 cm mass was palpable in the left cervical area, anterior to the ear and inferior to the mandible. The neck was supple and the oropharynx normal.

Hemoglobin was 15 g/dL, white blood cell count 10,000/mm³ with 82% polymorphonuclear cells, 13% lymphocytes, 4% monocytes and 1% eosinophils; erythrocyte sedimentation rate was 18 mm/h. Blood cultures were negative. An ultrasound showed a mass in the left neck, without cystic areas, extending anterior and posterior to the left ear.

Clindamycin (40 mg/kg/day) and cloxacillin (100 mg/kg/day) were administered by vein. The patient remained febrile and the mass enlarged. On the seventh hospital day an incision and drainage of the cervical abscess was performed. A Gram stain of the drainage showed 3+ pus cells and 3+ Gram-negative rods and grew *P cepacia*. The organism was susceptible to ceftazidime at 32 μ g/mL, but resistant to ampicillin, piperacillin, ticarcillin, gentamicin, tobramycin, amikacin, cotrimoxazole, cephalexin, imipenem, ciprofloxacin and chloramphenicol by in vitro disc susceptibility testing. Antimicrobial therapy was changed to ceftazidime (200 mg/kg/day) but fever continued. The patient began complaining of dysphagia, and on the 12th hospital day had an episode of acute upper airway obstruction while sleeping. A computed tomography scan showed a large soft tissue mass of the left neck distorting the airway with several fluid-filled cystic cavities surrounded by edematous tissue (Figure 1).

The retropharyngeal and lateral neck abscess cavities were drained orally and the posterior neck abscess

Figure 1) Computed tomography scan showing a large soft tissue mass of the left neck with several fluid-filled cavities (arrows) in the parapharyngeal space extending into the posterior triangle of the neck with nodal involvement of the position triangle. There is massive necrosis and cavitation in all involved areas. The pharyngeal constrictor muscles were displaced to the right and the airway distorted anterolaterally

drained externally under general anesthesia. More than 45 mL of pus was obtained, which grew only *P cepacia* with an identical antibiotic susceptibility pattern to the original isolate. Following this procedure the patient defervesced. Intravenous therapy with ceftazidime was continued for three months, by which time clinical inflammation had resolved and the ultrasound of the neck was normal.

Once the patient's infection had resolved, immune function tests were performed. Quantitative serum immunoglobulins including IgG subclasses, complement screen, nitroblue tetrazolium assay (5), neutrophil chemotaxis (6), ingestion and killing of *Staphylococcus aureus* (7) in vitro, and lymphocyte markers were normal.

Two months later the patient presented with a tender right sided cervical mass. Two successive anterior neck dissections for drainage of pus were performed. *P cepacia* with the same antibiogram as previous isolates, except for an increase in the minimal inhibitory concentration of ceftazidime to greater than 32 μ g/mL, was grown. Ceftazidime and rifampin were given for four weeks until inflammation had resolved. Six more epi-

sodes of neck abscess due to *P cepacia* occurred over the following six months which required drainage.

In an attempt to enhance monocyte function a trial of IFN- γ (0.05 mg/m²/dose three times weekly subcutaneously; Genentech) was given for four weeks then a higher dose (0.075 mg/m²/day three times weekly) was given for 10 months. Side effects related to IFN- γ included joint pain, low grade fever, headache and malaise. He remained well on this therapy except for one recurrence of a small neck mass. Since completion of IFN- γ he has had no recurrence of his neck abscesses. He continues to have bronchopulmonary colonization with *P cepacia*.

DISCUSSION

While chronic bronchopulmonary colonization infection with *P cepacia* occurs in CF patients, extrapulmonary spread is very uncommon. This is only the second patient in the literature to have abscess formation with this organism outside the lung; the previous patient had CF and a hepatic abscess and was treated at our institution (3,4). Both patients had lower respiratory tract colonization with this organism for several years before metastatic infection occurred.

The virulence mechanisms of *P cepacia* that might allow abscess formation are not clearly identified. Most strains degrade casein and gelatin and are lipolytic (2,8). Isolates have not been shown to produce elastase, exoenzymes or toxin A as does *Pseudomonas aeruginosa*, nor is culture supernatant active against cell cultures (9). CF patients are not predisposed to extrapulmonary abscesses (10).

Although our patient had no demonstrable immune defects we attempted to enhance monocyte activity with IFN- γ immunotherapy. This cytokine enhances oxidative metabolism of human neutrophils (11). IFN- γ has been licensed by the United States Food and Drug Administration since December 1990 for use in treatment of chronic granulomatous disease because of demonstrated clinical efficacy in decreasing the frequency of serious infections (12). IFN- γ has been shown to result in prolonged survival of normal human granulocytes in a functionally active state mediating oxidative burst, phagocytosis and bactericidal activity (13). We hypothesize that enhancement of normal phagocytic activity may have allowed our patient to overcome a recurrent infection for which we were unable to offer effective antimicrobial therapy. Neck abscesses have not recurred in the patient since November 1990, following two years of intermittent antibiotic therapy, 13 operations to incise and drain abscesses and a 10-month course of IFN- γ .

P cepacia is an uncommon cause of extrapulmonary abscess formation in CF patients and has not been reported as a cause of extrapulmonary abscesses in other hosts. These opportunistic infections may not have classical signs of inflammation, and empiric therapy should be directed towards a multiresistant organism until definitive microbiological diagnosis is available. Surgical drainage is essential because the organism is resistant to most antibiotics (14). Immunotherapy may be justified even in the immunologically intact host when infection is refractory to medical and surgical therapy.

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