

Hemophilus influenzae Type B Cellulitis in Adults

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Cellulitis due to *Hemophilus influenzae* type B is a rare but treatable event in adults. Herein is described a 67-year-old woman with anterior neck cellulitis caused by *H. influenzae* type B, documented by positive blood culture results. Six additional cases reported in the literature are reviewed. The following clinical syndrome emerges: the patient is usually older than 50 years of age, and pharyngitis develops first, followed by the onset of high fever and rapidly progressive anterior neck swelling, tenderness, and erythema associated with dysphagia. Because the causative organism may be resistant to ampicillin, the early use of chloramphenicol is recommended along with a beta-lactamase-resistant penicillin or cephalosporin (to cover other potential pathogens), or an appropriate third-generation cephalosporin that would also adequately cover all possible pathogens.

In 1977, Drapkin et al [1] described the first three cases of *Hemophilus influenzae* type B cellulitis in adults. Three additional reports [2-4] have since been published describing the following characteristic clinical picture: the patient exhibits the rapid onset of high fever, dysphagia, and cellulitis of the anterior neck, which if misdiagnosed can lead to serious morbidity. This report describes an additional case of *H. influenzae* type B cellulitis, comparing and contrasting the clinical findings with those of the six previously described cases and summarizing an up-to-date therapeutic approach to adult patients with a serious infection of the neck.

CASE REPORT

A 67-year-old woman with a history of mild obstructive pulmonary disease was admitted to the Wayne County General Hospital with a temperature of 39°C, an exquisitely tender, erythematous area over her anterior neck, and dysphagia. Seven days earlier, a cough productive of yellow sputum, rhinorrhea, and watery eyes had developed. The day prior to admission, she noted fever without chills or rigors. On the day of admission, she awoke noting erythema and tenderness over her anterior neck and complained of pain on swallowing. She denied hoarseness or dyspnea. There were no symptoms to suggest either hypofunction or hyperfunction of the thyroid gland. Nothing in her history suggested any impairment of her host defense mechanisms.

On physical examination, her temperature was 39°C, pulse 120 beats per minute, respirations 20 per minute, and blood pressure 130/72 mm Hg. She had a 15 by 15 cm ill-defined, slightly indurated, erythematous area of cellulitis on the anterior surface of her neck, which was warm and exquisitely tender. The thyroid was not palpable. Her pharynx was moderately injected, but there was no lymphadenopathy. Her tympanic membranes were normal. Results of examination of her lungs, heart, and abdomen were normal as were results of neurologic examination.

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TABLE I Hemophilus influenzae Type B Cellulitis in Adults

Patient Number	Reference	Age and Sex	Duration of Illness (hours)	Admission Temperature	Symptoms	Location of Cellulitis	Cellulitis Aspiration	Cultures		Underlying Disease	Outcome
								Blood	Throat		
1	[1]	59M	48	39.7°C (103.4°F) orally	Sore throat, dysphagia, dyspnea	Anterior neck	Positive	Positive*	Positive	Chronic obstructive pulmonary disease, right lower lobe pneumonia with effusion	Resolution with ampicillin
2	[1]	66F	12	40.3°C (104.6°F) rectally	Sore throat, dysphagia	Anterior neck	Negative	Positive	ND	NR	Resolution with ampicillin
3	[1]	74M	72	38.3°C (101.0°F) orally	Sore throat, dysphagia, dyspnea	Anterior neck	ND	Positive	Positive	Chronic obstructive pulmonary disease	Cardiac tamponade, pericardial window, improving with ampicillin and streptomycin
4	[2]	56M	24	39.4°C (103.0°F) orally	Shaking chills	Anterior thorax, left axilla	Negative	Positive†	ND	Undifferentiated lung carcinoma, lymph node biopsy	Resolution with cephalothin
5	[3]	63F	48	40.3°C (104.6°F) rectally	Dysphagia	Anterior neck	ND	Positive†	Positive†	NR	Cardiopulmonary arrest during ampicillin therapy, stable with clindamycin and gentamicin
6	[4]	31M	48	NR	NR	Abdomen	Negative	Positive	ND	Had 17-month-old child with presumed otitis media	Resolution with cefoxitin
7	Present report	67F	24	39°C (102°F) orally	Sore throat, dysphagia	Anterior neck	ND	Positive	Positive	Chronic obstructive pulmonary disease	Resolution with cefazolin

* Hemophilus influenzae type B isolated.

† Beta-lactamase-positive (i.e., ampicillin-resistant).

ND = not done; NR = not recorded.

Laboratory studies revealed a peripheral white blood cell count of 17,300/mm³ with 78 percent segmented neutrophils, 8 percent band neutrophils, 10 percent lymphocytes, and 3 percent monocytes. Results of serum multiple analysis profile were normal. Findings on chest and lateral neck roentgenography were normal. Results of a radioactive iodine uptake test were normal at 10 percent. Serum triiodothyronine resin uptake, thyroxine, and thyroid-stimulating hormone levels were all within normal limits.

Blood, throat, and sputum were cultured and the patient was administered intravenous cefazolin at a dose of 1 g every six hours. Blood culture results reported 24 hours later were positive for *H. influenzae* type B sensitive to ampicillin, cefazolin, and chloramphenicol. Results of sputum culture were also positive for the identical organism. Defervescence occurred after 24 hours, and resolution of her cellulitis was complete in 36 hours.

COMMENTS

Although this report describes and reviews cellulitis due to *H. influenzae* type B in adults, it is useful briefly to review the syndrome in children. In 1953, Alexander [5] described the first case of *H. influenzae* type B cellulitis in a child. Since then, numerous cases have been reported in children. The child is typically between six months and three years of age and experiences the rapid onset of symptoms of temperature greater than 39°C and cellulitis of the face and/or neck [6,7]. The area of cellulitis usually involves one cheek and less often the orbit. A characteristic purple-red discoloration has been described in about half the cases. Results of blood cultures are positive 75 percent of the time. The cause of the cellulitis is thought to be due either to local mouth trauma with subsequent soft tissue invasion or to lymphatic spread from ipsilateral otitis media [8]. Most cases of orbital cellulitis are associated with underlying ethmoid or maxillary sinusitis.

The six adult patients with *H. influenzae* type B cellulitis described previously and the patient described herein are summarized in **Table I**. Two patients (Patients 4 and 6) were somewhat atypical. Patient 4 [2] had had supraclavicular lymph node biopsy performed several months earlier, revealing undifferentiated carcinoma of the lung, followed by chemotherapy and radiation therapy. He presented two months later with cellulitis of the left anterior chest, a site contiguous to his lymph node biopsy. Purulent discharge therefrom yielded *Staphylococcus aureus*; yet, *H. influenzae* type B grew on blood culture. Patient 6 [4], a 31-year-old man, was unique in that the location of the area of cellulitis was the abdomen and for which no source was obvious; interestingly, the patient had a 17-month-old child being treated at the time for otitis media.

The five other patients (including our own) demonstrated several common features: the patient was older than 50 years of age and pharyngitis developed first, followed by the onset of high fever and rapidly progressive anterior neck swelling, tenderness, erythema, and dys-

phagia. Three of the five patients had underlying chronic obstructive pulmonary disease, one of whom (Patient 1) also had right lower lobe pneumonia. In each case, results of blood cultures were positive for *H. influenzae* type B as were results of respiratory tract cultures when obtained. Only one patient (Patient 3) exhibited the characteristic purple-red discoloration of the lesion described frequently in children. Intravenous antibiotic therapy usually resulted in prompt resolution of the neck swelling and dysphagia. Two patients had respiratory stridor on admission, and each was treated with corticosteroids in addition to antibiotics. Patient 1 showed a rapid response and required no further treatment. Patient 3 required intubation on the third hospital day, and a pericardial effusion (culture-negative) developed on the fifth day, requiring surgical drainage. He eventually recovered.

Two of the seven patients (Patients 4 and 5) were infected with beta-lactamase-producing (ampicillin-resistant) strains of *H. influenzae*. In Patient 5, stridor was not present on admission nor was there an increase in the retropharyngeal space on lateral neck radiography. She began to receive intravenous ampicillin but remained febrile and exhibited progressive disorientation, bradycardia, and eventual cardiopulmonary collapse; she was resuscitated but had major neurologic deficits. Gentamicin and clindamycin were substituted with clinical response in 12 hours.

H. influenzae type B cellulitis should be suspected in middle-aged to elderly persons presenting with fever, anterior neck swelling, tenderness, erythema, and dysphagia. The incidence of *H. influenzae* type B cellulitis in adults is unknown; however, as Drapkin et al [1] pointed out, the three patients they described presented over a 15-month-period, indicating that this syndrome is probably more common than previously reported.

Initial therapy must be prompt. In all patients with cellulitis or other acute infections of the neck and/or upper airway, physicians must first be sure that gas formation and/or purulent collections are not present, for such would dictate aggressive surgical drainage and debridement. A prompt decision needs to be made regarding the need for emergent intubation or tracheotomy. Since the usual pathogens are streptococci and *S. aureus*, penicillinase-resistant penicillins (e.g., nafcillin, oxacillin) are usually chosen; those drugs, unfortunately, are of variable efficacy against *H. influenzae* type B. This report highlights the fact that the possibility that *H. influenzae* type B may be involved should be considered and, further, that some strains produce beta-lactamase and are ampicillin-resistant (about 20 percent at the University of Michigan Hospitals). Taking all this into consideration, we would recommend that any patient with cellulitis of the head or neck who appears toxic and/or in danger of airway compromise be given chloramphenicol (to cover *H. influenzae*) plus full doses of a penicillinase-resistant

penicillin or a first-generation cephalosporin (to cover other pathogens). Second- (cefuroxime or cefaclor) or third- (ceftriaxone, ceftizoxime, or cefotaxime) generation cephalosporins, which are known to be effective against beta-lactamase-producing strains of *H. influenzae* type B [9], are also options and, in fact, are quite adequate agents against the gram-positive cocci that may be involved (including strains of *S. aureus* sensitive to the beta-lactam antibiotics). Thus, these cephalosporins would be effective when used as single agents. In highly penicillin-allergic patients, trimethoprim/sulfamethoxazole will also provide adequate, alternative coverage of all potential pathogens. In instances in which strains of beta-lactamase antibiotic-resistant (methicillin-resistant) *S. aureus*

could be involved, vancomycin should be added to the aforementioned regimens [10].

Finally, it is now evident that *H. influenzae* type B can infect multiple members of a family; thus, the American Academy of Pediatrics Committee on Infectious Diseases now recommends that rifampin prophylaxis be provided for the entire family of an index case if the household includes a child in the susceptible age group (less than four years old) [11].

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