BACTERIAL TRACHEITIS AMONG CHILDREN HOSPITALIZED FOR SEVERE OBSTRUCTIVE DYSPNEA

Epiglottitis and bacterial tracheitis are both capable of causing life-threatening airway obstruction. Through a retrospective study we have evaluated the principal clinical and bacteriologic characteristics of bacterial tracheitis in this area.

Materials and methods. Makassed Pediatric Department, located in a general hospital, is the referral pediatric center, with a Pediatric Intensive Care Unit for a population of 400,000 (Jerusalem surroundings and the southern area of the West Bank).

Hospital records between January 1, 1986 and January 4, 1989 were reviewed. Diagnostic criteria for bacterial tracheitis were obstructive dyspneu requiring endotracheal intubation to maintain the airway and a gush of pus and a dramatic improvement of the respiratory distress after intubation. Three negative criteria were verified: absence of significant lung pathology; absence of a preexisting congenital tracheal malformation; and absence of foreign body inhalation. In all cases direct laryngoscopy revealed a normal or mildly congested epiglottis.

Results. Six patients, 2 females and 4 males, were diagnosed to have bacterial tracheitis. Their age ranged between 15 months and 13 years (Table 1). All cases occurred in the cold season (November to April). One 9-year-old female patient had epiglottitis during the same period.

Clinical picture of bacterial tracheitis. Prodromal period. Twelve hours to 5 days before admission all patients were reported to have signs of upper respiratory infection and fever. Inspiratory stridor and barking cough progressively increased later on. A few hours before admission voice modification with hoarseness was noted in all cases. Aphonia was noted in two patients on admission.

Status on admission and initial management. Patient 3 required intubation in the emergency room because of severe
cyaanosis and bradycardia. All other patients had severe respiratory distress with tachypnea and suprasternal, intercostal, and subcostal retraction, and four children were cyanotic. Three patients were intubated soon after admission in the operating room. The other two cases were intubated in the pediatric intensive care unit 1 and 5 hours after admission. These two cases were initially diagnosed as having reactive airway disease and received subcutaneous adrenalin without benefit.

All patients had diminished breath sounds bilaterally and 2 had bilateral wheezes. On admission the body temperature was >37.8°C in five cases; Patient 5 developed fever after admission. Patient 1 had persistent tachycardia and low blood pressure on arrival. Drooling was absent in all cases. Spontaneous hyperextension of the neck was not noted in any case. Patient 1 had questionable neck stiffness but cerebrospinal fluid was normal. None of these patients had signs of immunodeficiency, malnutrition, chronic lung disease or malignancy. Patient 5 had mild mental retardation. Two patients (Patients 1 and 6) had started a course of orally administered antibiotics less than 24 hours before admission.

In each case at the time of intubation, the epiglottis was described as normal or mildly congested. When the tube was inserted a copious amount (20 to 50 mL) of pus was obtained through the endotracheal tube. Intubation was followed by a dramatic improvement of the respiratory distress.

After the initial few minutes of bagging with 100% oxygen, the tube was kept in place with FiO₂ around 40%. Assisted ventilation and muscle paralysis were used only in Patient 2 who resisted intubation. Initial antibiotic coverage consisted either of cloxacillin, 100 mg/kg/day, and chloramphenicol, 50 to 70 mg/kg/day, or ampicillin, 200 mg/kg/day, and cloxacillin. Treatment was modified later according to the organism cultured from the trachea. Antibiotics were given iv throughout hospitalization and then completed for 10 days orally (Patients 2, 3 and 5) at home.

**Investigations.** Blood gases were done in 5 patients before intubation. Hypercapnia was noted in 3 and pH <7.3 in 4. Immediate Gram stain and samples for culture of tracheal aspirate were taken after intubation. Gram-stained smears obtained from five patients showed sheets of pus cells, mucus and fibrin filaments. Gram-positive cocci were seen in three patients and Gram-positive diploocci in one patient. In one case the thickness of the preparation did not permit any definite conclusion. Direct growth of *Staphylococcus aureus* was noted in three cases. *Viridans Streptococcus*, beta-hemolytic *Streptococcus*, Group A and *Haemophilus influenzae* were noted once each. *H. influenzae* serotyping was not done. Blood cultures were negative in five cases. Only Patient 3 had a positive blood culture for *Streptococcus pneumoniae*. White blood count revealed leukocytosis with many immature forms. Later chest radiograph was done in 4 patients and the epiglottis was normal. The anterior aspect of the trachea showed fine mucosal irregularities in two cases. Chest roentgenograms showed bilateral patchy infiltrates in all cases.

**Tube management and extubation.** Frequent endotracheal aspirations were necessary in all cases during the first 24 hours. Extubation was possible after 36 to 72 hours. Patient 4 was extubated 48 hours after admission, but 4 hours later the respiratory distress worsened and he was reintubated for an additional 3 days. An obstructed tube was changed twice in Patient 1. Dexamethasone was used in 4 cases, mainly to alleviate signs of obstruction after extubation. Duration of treatment did not exceed 24 hours.

**Mortality.** All cases survived. They were discharged within 2 weeks after admission.

*Sequelea.* Two weeks after discharge, patients were seen in the outpatient clinic; their respiratory status was judged normal in five cases. Patient 1 had persistent mild stridor and bronchoscopy revealed the presence of a small subglottic polyp formation which was resected with good clinical results.

**Discussion.** Bacterial tracheitis, usually described as a rare condition, is briefly mentioned in the major pediatric textbooks. Controversy exists about its terminology. Various terms such as infective laryngotracheobronchitis, pseudomembranous group or bacterial tracheitis have been used, and whether it should be considered as a new entity is not settled. From the few recent publications concerning this entity, it seems that the condition is serious, with a high mortality rate and difficulty in diagnosis. In one series all reported patients had Down's syndrome.

This series documents that bacterial tracheitis is the predominant cause of life-threatening obstructive dyspnea of infectious origin in our community. Cases occur in winter as already reported in other regions.

The prodromal period found in all cases favors a secondary superadded infection following a viral or even another bacterial infection of the respiratory tract. Few clinical clues may help in differentiating this condition from croup or epiglottitis. Usually viral croup does not have a progressive worsening course. In a child with a deteriorating general condition, increasing signs of respiratory distress with suprasternal and sub-costal retraction following a picture of upper respiratory tract infection bacterial tracheitis must be considered.

The absence of drooling, neck hyperextension and the presence of cough were useful signs to distinguish this condition from epiglottitis. Drooling was noted in more than 50% of cases of epiglottitis, whereas the absence of spontaneous cough taken alone was the most sensitive predictor of acute epiglottitis in a recent series. 10

Lateral neck roentgenograms are of pure academic interest in an emergency situation. Normal epiglottis and the presence of fine irregularities of the mucosa of the anterior aspect of the trachea with subglottic narrowing can be helpful in distinguishing epiglottitis from bacterial tracheitis in some situations.

Regarding management we think that the well-established rules concerning the management of suspected epiglottitis must be respected. 11 According to the clinical situation immediate intubation in the emergency room or in the operating room must be done as soon as possible.

Gram-stained smears and cultures are to be taken immediately after the insertion of the endotracheal tube. Intubation alone will be probably sufficient without assisted ventilation in most cases. Antibiotic treatment must initially cover *S. aureus*, *H. influenzae* and streptococci. Later on antimicrobial therapy should be guided by results of cultures and susceptibility testing. Recently *Branhamella catarrhalis* was reported as a cause of bacterial tracheitis. 12

Antishock measures might be necessary in some cases. Toxic shock has been described as a complication of bacterial tracheitis. 13 Significant wheezes were noted in two cases and suggested the possibility of severe bronchospasms initially. There was a lack of response to subcutaneous adrenalin and the presence of severe suprasternal retraction and generalized toxicity.

In conclusion bacterial tracheitis is more common than epiglottitis in this area. We do not have a satisfactory explanation for this phenomenon. The relative paucity of epiglottitis could not be explained by the incidence of *H. influenzae* infections. Unpublished data from the same department showed that *H. influenzae* type b caused more than
50% of bacterial meningitis during the same period. The consideration of bacterial tracheitis as a differential diagnosis in cases of severe croup suspicion of epiglottitis and even in some cases of severe reactive airway disease must be emphasized in comparable socioeconomic communities.

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MYCOPLASMA HOMINIS PNEUMONIA AND PLEURAL EFFUSION IN A POSTPARTUM ADOLESCENT

Extragenital infection caused by genital mycoplasmas, in particular Mycoplasma hominis, is uncommon. Madoff and Hopper reported 11 cases of extragenital infections including infections of the central nervous system, joints and wounds and invasion of the blood associated with manipulation of the genital tract or trauma in men and women who were immunocompetent or immunocompromised hosts. That report included one case of empyema with simultaneous isolation of Klebsiella pneumonia. We report a case of pneumonia and pleural effusion caused by M. hominis in a 16-year-old postpartum patient.

Case report. Presentation of illness. A 16-year-old gravida 2, para 1, abortus 1, female, delivered a term infant vaginally. Pregnancy was uncomplicated except for hypertension. Mother and infant were discharged 2 days after delivery.

Four days postpartum the patient had chest pain associated with inspiration and right shoulder pain. Five days postpartum she was feverish and dyspneic and developed a productive cough with mucopurulent sputum. Six days postpartum she was evaluated at another hospital where she had an oral temperature of 100 F. A right middle lobe infiltrate was identified on chest radiograph. The attending physician prescribed ampicillin (500 mg) to be taken orally four times a day.

During the next 72 hours she had chills and prostrate sweating. Her temperature was 101 F and dyspneic and cough worsened. Nine days postpartum she was evaluated at Boston City Hospital where she was in moderate respiratory distress with a temperature of 103 F.

She had intercostal retractions and diminished breath sounds in the right posterior chest. Laboratory data included an arterial blood gas on 40% face mask showing a pH of 7.44, carbon dioxide content of 32 mm Hg and an oxygen content of 122 mm Hg. The erythrocyte sedimentation rate was 140 mm/hour. A chest radiograph revealed a right lower lobe infiltrate with a right pleural effusion. The patient underwent a thoracentesis from which 50 ml of serosanguinous fluid were obtained. The fluid pH was 7.50, glucose 6 mg/dl, protein 4 g/dl, and amylase 50 units/ml and lactate dehydrogenase 947 units/ml. There were 559 white blood cells/mm³ and 1352 red blood cells/mm³. Gram- and acid-fast-stained smears were negative. An intradermal purified protein derivative test and control skin tests were done and therapy was started with 2 g ceftriaxone given intravenously once daily.

Hospital course. On the second hospital day a ventilation profusion scan was performed which revealed a large defect in the right lung in the same area as the pleural effusion. The possiblity of an infant could not be ruled out. During the next 72 hours the patient remained febrile with a maximum temperature of 102 F. On the fifth hospital day because of persistent fever and no significant change in the clinical status, a repeat thoracentesis was performed. Three hundred ml of fluid were removed. Chemistry revealed a glucose of 22 mg/dl and a lactate dehydrogenase-use of 1469 units/ml. There were 175 white blood cells/mm³ with 65% segment forms and 89 red blood cells/mm³.

Based on the typical fried egg appearance of an isolate on chocolate agar from the admission pleural fluid culture, a preliminary diagnosis of M. hominis pneumonia was made on the fifth hospital day. Cindamycin, 300 mg four times a day given intravenously, was prescribed in place of ceftriaxone. M. hominis was also isolated from the second pleural fluid. The pathogen was definitely identified as M. hominis by the growth inhibition test.

By the fifth hospital day the patient no longer was oxygen-dependent and was without evidence of respiratory distress. The physical examination, however, was still significant for the absence of breath sounds in the area of the right lower lobe. Subsequent chest radiographs on the 7th and 12th hospital days were unchanged. The erythrocyte sedimentation rate remained elevated at 137 mm/hour. On the 12th hospital day a computed tomogram of the chest confirmed the presence of a right loculated pleural effusion. The patient remained intermittently febrile.

In light of the above findings as well as the persistence of fever, a closed tube thoracotomy was attempted on the 13th hospital day. The tube was unable to be inserted because of a pleural rind. The patient became afebrile on the 29th hospital day and was given tetracycline to be taken orally 500 mg four times a day and discharged home on the 22nd hospital day to complete a 6-week course of therapy.

Follow-up. Ten days after discharge, the patient was reevaluated. She admitted to poor compliance secondary to the