Bacterial Tracheitis and the Child With Inspiratory Stridor

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Traditionally the presence of inspiratory stridor and upper respiratory tract disease in a child has led the primary care physician to consider croup, epiglottitis, and foreign body aspiration in the differential diagnosis. The following case demonstrates the importance of considering another condition, bacterial tracheitis, in the child with upper airway distress.

Case Report

A 30-month-old boy with a history of atopic dermatitis and recurrent otitis media, currently receiving trimethoprim-sulfamethoxazole, presented to the emergency room late at night with a one-day history of low-grade fever and cough and a three-hour history of inspiratory stridor. He was in moderate to severe respiratory distress with a respiratory rate of 60/min, a pulse rate of 120 beats/min, and a rectal temperature of 37.6° C. Lateral neck roentgenogram revealed a normal epiglottis and no evidence of a foreign body. Physical examination revealed bilateral retracted tympanic membranes, a normal oropharynx, sternal and intercostal retractions, inspiratory stridor, and a few scattered wheezes. The remainder of the examination was unremarkable. Chest roentgenogram was normal, and the white blood count was $12.5 \times 10^3/\mu L$ with 63 polymorphonuclear leukocytes, 7 band forms, 25 lymphocytes, and 5 monocytes.

The child was admitted to the hospital with a presumptive diagnosis of croup and was treated with mist, hydration, and racemic epinephrine. Initially he improved slightly, but approximately eight hours after admission he was in marked respiratory distress and had a fever of 39.4° C. At this time he had a brief seizure. After this episode his arterial blood gases on room air were P_{O_2} 38 mmHg and P_{CO_2} 45 mm Hg, and pH 7.38. Direct laryngoscopy was performed, revealing copious purulent secretions below the chords. This material was removed by suction, and an endotracheal tube was placed. He was treated with oxygen, frequent suctioning, and intravenous nafcillin and chloramphenicol. Culture of the purulent tracheal secretions subsequently grew alpha and gamma streptococci and Hemophilus influenzae resistant to ampicillin. Blood cultures were negative. Improvement occurred over the next few days. White blood cell count was $10 \times 10^3/\mu L$ with 57 polymorphonuclear leukocytes, and 20 band forms on the third day. He was extubated on the fourth day, switched to oral cefaclor on the sixth day, and discharged on the seventh day. On follow-up one month after discharge he was well.

Discussion

This patient initially presented with typical croup but turned out to have a more serious, life-threatening illness. Recent reports indicate that bacterial tracheitis may represent a re-emerging condition that should stimulate a rethinking of

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the management of the child with upper airway distress.

Before the advent of antibiotics, severe infection of the trachea, characterized by subglottic edema and purulent tracheal secretions, was recognized as a serious disease with mortality as high as 50 percent. With the availability of antibiotics, the morbidity and mortality associated with bacterial infection of the upper airway has dropped. In the child with inspiratory stridor, clinical attention in recent years has been directed toward differentiating acute epiglottitis from the more common and more benign viral croup.

In 1979 Jones et al[1] reported eight children, encountered in a university setting over a 14-month period, with severe bacterial infection of the trachea. Each child had upper airway obstruction with a normal epiglottis on radiographic examination. When standard therapy failed to produce improvement or the children deteriorated, bronchoscopy was performed. In all cases, purulent secretions were found, and Staphylococcus aureus was cultured from the material in six cases. Each patient was treated with parenteral antibiotics and received intensive care. Seven required intubation or tracheostomy. Two suffered cardiorespiratory arrest and were resuscitated.

Since 1979 additional reports of bacterial tracheitis have helped construct a clinical picture of the condition and provide insight into its recognition and management.[2-6] The ages of reported cases have ranged from one month to 11 years, with a mean around 2.5 years. Inspiratory stridor and cough are relatively consistent clinical manifestations. Frequently nonspecific upper respiratory tract symptoms are present for several days prior to the onset of distress, which may be fairly sudden. Fever is often, but not invariably, present. On examination the child appears to have croup. Roentgenograms of the upper airway may be normal or may show subglottic narrowing consistent with croup or a shaggy border of the tracheal air column. There is usually a mild to moderate leukocytosis, and relatively severe hypoxemia is common. There is some evidence that measurement of C-reactive protein may be useful in distinguishing bacterial tracheitis from croup.[7]

As bacterial tracheitis is a very serious, life-threatening condition, recognition and appropriate

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treatment are crucial. Any child with the croup syndrome who fails to respond to the usual therapeutic measures should be assessed for the disease. Leukocytosis and a high fever should further raise suspicion of bacterial tracheitis. The diagnosis depends on visualization by laryngoscopy or tracheoscopy of purulent tracheal secretions. Performance of this diagnostic and therapeutic procedure should not be delayed when the condition is suspected.

Treatment of bacterial tracheitis requires an intensive care environment; access to the airway via an endotracheal tube or tracheostomy is essential for adequate clearance of secretions and assurance of air flow. Accidental extubation or occlusion by thick secretions are major risks in this situation and require careful management. In addition, parenteral antibiotic therapy should be directed to the likely pathogens, Staphylococcus aureus, Hemophilus influenzae, and hemolytic streptococci.

The recent reemergence of this pre-antibiotic era disease is unexplained. It is unlikely that the even rare occurrence of such a serious disorder would have escaped comment in the literature over a period of several decades. The incidence has thus probably increased significantly in recent years, and there is some evidence that the condition may be as frequent as acute epiglottitis.[1] In some series complication and mortality rates for bacterial tracheitis have been higher than those for epiglottitis.[5] Physicians have been appropriately sensitized to the dangers of epiglottitis; a similar awareness of bacterial tracheitis seems warranted.

References

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