

Special considerations for the child with airway disease

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Individuals caring for the pediatric age group encounter a wide spectrum of complexities from the neonatal period to late adolescence. Growth, development, and psychosocial ambience must be considered when one approaches any health problem in this group, but especially in the diagnosis and treatment of allergic respiratory disorders.

EVALUATION OF RESPIRATORY DISORDERS IN CHILDREN

The patient's history is the most important part of the evaluation of allergic disease. Adults provide their own history and can integrate the details into a relevant clinical picture. In pediatric practice, the individual providing the history is more often a parent or guardian. Ideally, this historian is the mother, or most observant caretaker, and can provide an accurate account of the child's symptoms (Table I). How the issues listed in Table I affect the overall quality of life of the child is very important. An unknowledgeable or unobservant caretaker may not be able to provide important data. Even a very aware parent may not realize the impact of symptoms if they occur during the night and the parent is not awakened, or they occur at school, especially with exercise.¹

The symptoms of respiratory disorders must be assessed with several factors in mind. The average young child has 6 to 8 viral upper respiratory infections per year, each lasting 7 to 10 days. Otitis media and persistent otitis are very frequent problems in the pre-school-age child.² Congenital anomalies that might affect the development of respiratory symptoms must always be considered. Cystic fibrosis and gastroesophageal reflux are not uncommon and should also be considered. The possible significance of allergy in contributing to childhood respiratory disorders must be carefully teased out of this historical background. When the caregiver is vague or cannot recall details, the diagnostic process becomes more difficult.

Another prevalent difficulty is the reluctance of many physicians to entertain the diagnosis of asthma in the young child. Because up to 49% of children have at least one wheezing episode before 6 years of age, this hesita-

TABLE I. Issues related to the history of the pediatric patient

Details of pregnancy
Details of delivery
Early feeding history
Age at onset of symptoms
Nature/frequency of illnesses
Previous treatment modalities

tion is very easy to understand.³ However, there is clear evidence that failure to diagnose asthma results in undertreatment of this condition.⁴ Poorly managed asthma can have a significant impact on school performance, especially because the pattern of absences tends to consist of frequent, brief periods.⁵⁻⁷ Although many physicians compromise in this situation with the diagnosis of reactive airways disease, it is not clear whether this results in adequate care, since the underlying inflammatory component is not addressed; therefore, cases marked by episodes of wheezing may need to be treated as if they were asthma.

Very young children have smaller airways in proportion to their alveoli than do adults. Therefore, respiratory illness in this population may progress more rapidly to severe obstruction, desaturation, and respiratory failure. There is often much less tolerance for delay in caring for very young children. With adolescents, although the warning signals of a respiratory disorder may be present, problems with self image, self-esteem, and risk-taking may lead to denial of symptoms and postponement of effective treatment.⁸

The physical examination may or may not supply substantial information. It may be completely normal in children who suffer from intermittent respiratory disease. Telltale clues, such as a crease across the nose, may suggest allergic rhinitis, or an increased anteroposterior diameter of the chest may suggest inadequately treated asthma, with hyperexpansion of the chest being the only indication of this. The classic physical findings of a high, arched palate, dark circles under the eyes, and a constantly open mouth only identify children with nasal obstruction; they do not necessarily indicate an underlying allergic etiology.

Diagnostic testing of children is another area of difference from adults. It is not always recognized that infants, even newborns, can have a positive allergy skin test if they have produced a sufficient quantity of specific IgE.⁹ Most often, infants who are atopic and produce specific IgE direct it against food antigens. Indeed, food is the most significant and frequent source of allergens

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TABLE II. Management of childhood allergic respiratory disorders

Environmental control and other nonpharmacologic management modalities
Pharmacologic management
Allergen immunotherapy
Education

up to about the age of 2 years. Inhalant allergens then begin to sensitize children and become more significant. This has given rise to the popular but inaccurate assumption that children cannot be tested for allergies before 2 years of age. Inhalant allergens are less likely to be the allergic culprits in children under 2 years of age, but some of these children do become sensitized and have positive skin tests. Certainly, foods are important allergens, and can be evaluated by skin testing. Even though skin testing is valid in children under age 2 years of age the wheal-and-flare of a positive test are generally diminished in size as compared with the wheal-and-flare seen in tests in older children and adults.¹⁰

Although there are research devices for testing the lung function of infants and young children, it is rarely feasible to have accurate measurement techniques readily available until about the age of 6 years, when spirometry can usually be performed. Some children as young as 3 years of age may be able to perform peak flow maneuvers reliably and routinely, but this does not provide as much information as spirometry. As a result, an accurate history of symptoms, with an index of suspicion and acute clinical observation, are even more important in the younger age group.

MANAGEMENT OF RESPIRATORY DISORDERS IN CHILDREN

The approach to the management of childhood allergic respiratory disorders is very similar to that for adults (Table II). When the diagnosis suggests that allergens are important, a mainstay of allergy therapy is environmental control. In pediatrics, this assumes even greater importance than its obvious benefit of symptom reduction. There is at least some evidence that avoidance of allergens, and especially of some foods, dust mites, and animals, may prevent children with atopy from developing asthma or having more severe allergic disease later in childhood.^{11, 12} Dietary management of allergic infants and children must always be approached with a keen awareness of the nutritional needs of the growing child. Common sense and education of caretakers are critical. When dealing with dust- and animal-control measures, one must always remember that the child may have multiple significant environments. Many children spend lives split between at least two households, creating two complete sets of environments that must be assessed. Day care; school; before- and after-school care; babysitters, extracurricular activities such as sports, music, and dancing; and after-school employment may each provide an environment that needs to be factored into the

TABLE III. Medication considerations for the pediatric patient

Taste
Consistency
Tablet/capsule size
Dosing frequency

treatment plan. Effects of cigarette smoke in any of these locations may have a substantial impact on disease development and management.

The psychosocial needs of children must also be weighed, especially when making recommendations about pets, outside activities, and the rearranging of environments that may be perceived as draconian. Other areas of nonpharmacologic management of children with allergic disease include recommendations about exercise practices and leisure activities, and an emphasis on rest and the need for a high-quality diet, as well as consideration of family or individual counseling and the help of support groups and self-management programs.^{13, 14}

When devising a pharmacologic treatment strategy for airway disease in a child, one must remember that children inhabit a world in which they are rarely autonomous. If adults wish to establish a treatment regimen for illness, they usually carry their medications and implement the regimen without the intervention of authority figures. Children must negotiate the obstacles of a variety of environments with a myriad of supervisors. For young children, care must be given to provide written instructions that are readily comprehensible to a miscellany of caregivers, such as day-care providers, babysitters, parents and stepparents, and grandparents. These instructions must not only include those for a schedule of medications, but also may involve the education of each caregiver in the use of proper inhaler or nebulizer technique and proper administration of eye-drops, nose sprays, or other medications. For older children, permission forms need to be filled out for all official environments, such as camp and school, with precise instructions for use of both routine and as-needed medications. When as-needed medications are provided, care must be taken to ensure that all responsible parties understand the clinical indications for the use of these medications.

When choosing medications for the pediatric age group, one must consider several specific issues (Table III). Many children, even adolescents, cannot swallow a pill, and may refuse to take unpleasant-tasting medication. Thus, taste, consistency, and size of tablet, capsule, or liquid must be taken into consideration in medicating children orally, along with the standard concerns about amount of medication and dosing frequency. Many drugs that do not have labeling for use in children under the age of 12 years must be prescribed through necessity. Few drugs are labeled for use in children under the age of 2 years.¹ As a result, many drugs prescribed for infants may not have extensive efficacy and safety testing rele-

vant for that age group. In choosing medication for very young children, one needs to consider that drug delivery often requires giving nebulized products. No corticosteroid preparations for use in a nebulizer are currently available in the United States. This means that inhaled steroids must be delivered by mask and a holding chamber, with resulting uncertainty in dose delivery.

Among children and adolescents, improper use of inhalers is extremely common.¹⁵ Several studies suggest that a major determinant of poor medication compliance is incomplete or inadequate instruction in the use of the inhaled medications.¹⁶ With younger children, it is necessary to ensure that all caregivers understand the correct inhaler technique.

Allergen immunotherapy is an effective treatment for allergic disease. According to a survey conducted in 1980 and 1981, allergenic extracts were the most common drugs prescribed to children aged 11 to 14 years and the second most common drugs prescribed to the 15- to 20-year age group.¹⁷ Their use in very young children remains controversial.¹⁸ When performing a risk-benefit analysis of this form of therapy, one must consider the intrusive and potentially traumatic effects of regular attendance at an office to receive injections.

Additionally, in managing childhood disease, there are issues of growth and psychosocial development that differ from those in adult care. The entire period of childhood is one of tremendous physical and psychological growth, on which any chronic disease and respiratory disease, in particular, have a significant impact. The drugs used to treat these conditions must always be viewed from a risk-benefit perspective that differs from that used in adult disease. Corticosteroids may have a profound effect on linear growth and bone development. On the other hand, delayed and inadequate treatment of asthma may result in poor lung growth and in less linear growth.^{19, 20} The choices of whether to medicate and of which medications to use may have effects that persist into adulthood. Further, anything that interrupts the orderly program of education, both scholastically or psychosocially, whether drugs, chronic illness, medication schedules, or disruptive office visits, may have a lasting effect on developing children. Drugs that disrupt sleep or concentration may result in significant morbidity that transcends that of the physical disorder for which they are used.

CONCLUSION

Most disease-treatment protocols in use today are based on an estimate of disease severity. It may be

difficult to assess the severity of disease in children, not only in those who are very young, but also in the adolescent.^{1, 8} When one initiates a treatment regimen for a patient, it is hoped that the patient will be compliant with it. Even under the best of circumstances, this is fraught with difficulty. When there are multiple individuals entrusted with the care of a child, each sharing responsibility for proper environmental control, administration of medications, and recognition of symptoms, the problem becomes complex indeed.^{1, 8, 16, 19}

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