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Neuroscience and Respiration

Mieczyslaw Pokorski *Editor*

Respirology

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Preface

The book series *Neuroscience and Respiration* presents contributions by expert researchers and clinicians in the field of pulmonary disorders. The chapters provide timely overviews of contentious issues or recent advances in the diagnosis, classification, and treatment of the entire range of pulmonary disorders, both acute and chronic. The texts are thought as a merger of basic and clinical research dealing with respiratory medicine, neural and chemical regulation of respiration, and the interactive relationship between respiration and other neurobiological systems such as cardiovascular function or the mind-to-body connection. The authors focus on the leading-edge therapeutic concepts, methodologies, and innovative treatments. Pharmacotherapy is always in the focus of respiratory research. The action and pharmacology of existing drugs and the development and evaluation of new agents are the heady area of research. Practical, data-driven options to manage patients will be considered. New research is presented regarding older drugs, performed from a modern perspective or from a different pharmacotherapeutic angle. The introduction of new drugs and treatment approaches in both adults and children also is discussed.

Lung ventilation is ultimately driven by the brain. However, neuropsychological aspects of respiratory disorders are still mostly a matter of conjecture. After decades of misunderstanding and neglect, emotions have been rediscovered as a powerful modifier or even the probable cause of various somatic disorders. Today, the link between stress and respiratory health is undeniable. Scientists accept a powerful psychological connection that can directly affect our quality of life and health span. Psychological approaches, by decreasing stress, can play a major role in the development and therapy of respiratory diseases.

Neuromolecular aspects relating to gene polymorphism and epigenesis, involving both heritable changes in the nucleotide sequence, and functionally relevant changes to the genome that do not involve a change in the nucleotide sequence, leading to respiratory disorders will also be tackled. Clinical advances stemming from molecular and biochemical research are but possible if the research findings are translated into diagnostic tools, therapeutic procedures, and education, effectively reaching physicians and patients. All that cannot be achieved without a multidisciplinary, collaborative, bench-to-bedside approach involving both researchers and clinicians.

The societal and economic burden of respiratory ailments has been on the rise worldwide leading to disabilities and shortening of life span. COPD alone causes more than three million deaths globally each year. Concerted efforts are required to improve this situation, and part of those efforts are gaining insights into the underlying mechanisms of disease and staying abreast with the latest developments in diagnosis and treatment regimens. It is hoped that the books published in this series will assume a leading role in the field of respiratory medicine and research and will become a source of reference and inspiration for future research ideas.

I would like to express my deep gratitude to Mr. Martijn Roelandse and Ms. Tanja Koppejan from Springer's Life Sciences Department for their genuine interest in making this scientific endeavor come through and in the expert management of the production of this novel book series.

Opole, Poland Mieczyslaw Pokorski

Contents

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Growth, Nutritional Status, and Pulmonary Function in Children with Chronic Recurrent Bronchitis

Wioleta Umławska and Anna Lipowicz

Abstract

Bronchitis is a common health problem in children. Frequent bronchitis in infancy increases the risk of developing chronic respiratory diseases. The aim of the study was to assess the level of growth and the nutritional status in children and youths with special regard to the level of body fatness assessed by measuring skin-fold thickness. Relationships between somatic development, pulmonary function and the course of the disease were also explored. The study was carried out using anthropometric and spirometric measurements and also information on the severity and course of the disease in 141 children with chronic or recurrent bronchitis. All of the subjects were patients of the Pulmonary Medicine and Allergology Center in Karpacz, Poland. The mean body height did not differ significantly between the children examined and their healthy peers. However, the infection-prone children had excessive body fatness and muscle mass deficiency. The increased level of subcutaneous adipose tissue occurred especially in children with short duration of the disease, i.e. a maximum of 1 year. The functional lung parameters were generally normal. The presence of atopic diseases such as allergic rhinitis or atopic dermatitis did not impair the course of the children's somatic development. Also, long-term disease or the presence of additional allergic diseases did not impair lung function in the examined children. Taking appropriate preventive measures is recommended to achieve and maintain normal body weight in children who receive therapy due to bronchitis.

Keywords

Anthropometry • Body composition • Bronchitis • Children • Fatness • Somatic growth • Spirometry

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1 Introduction

Recurrent bronchitis is a common health problem in children. Studies indicate that approximately 30 % of children in the first year of life suffer from at least once episode of obstructive bronchitis (Martricardi et al. 2008; Wright 2002). Obstructive bronchitis leads to long-term changes in the bronchial tree, including bronchial hyper-reactivity and a tendency of the bronchi to obstruct during subsequent infections. Relapses of the disease are reported on average in 30–90 % of children, especially in the first years of life. In subsequent years, the number of bronchial obstruction incidents usually decreases and amounts to 30 % on average in school-age children (Krych et al. 2005).

Frequent bronchitis in infancy increases the risk of developing chronic respiratory diseases (Illi et al. 2006; Horak et al. 2003). Children who in the first years of life suffer from recurrent or chronic bronchitis accompanied by wheezing have an increased risk of bronchial asthma (Stern et al. 2008). The risk of bronchial asthma is increased by simultaneous atopy (Horak et al. 2003).

The results of population studies prove a clear link between body weight and the level of fatness and the incidence of chronic respiratory diseases (Jędrychowski et al. 1998; Must 1996). Studies conducted in a group of more than 70,000 people within the Italian National Health Survey demonstrated a U-shaped type of relationship between body weight and the incidence of chronic respiratory disorders; the disorders occur more frequently in both underweight and overweight subjects (Negri et al. 1988). This relationship has also been confirmed by previous observations of the nutritional status of patients with bronchitis (Viola et al. 2008; Somerville et al. 1984). Currently, however, most studies, both cross-sectional and longitudinal, show that excessive body weight increases the risk of bronchial asthma, wheezing and chronic lower respiratory tract infections (von Mutius et al. 2001).

The assessment of the nutritional status and the level of growth in children with chronic bronchitis, in contrast to bronchial asthma, is the subject of relatively few auxological studies. Previous studies on the somatic development of children with bronchitis have mostly been performed among preschool-aged children, and the results are inconclusive. Some studies indicate the lack of disorders, while others point to growth deficiencies (Pawlińska-Chmara and Wronka 2007; Ford et al. 2001; Dumas et al. 1997).

Literature data also suggest that atopy *per se*, often coexisting in the course of recurrent respiratory infections, may temporarily or permanently disrupt the somatic development (Sant'Anna et al. 1996). In children with allergic diseases such as allergic rhinitis or atopic dermatitis, the incidence of short stature is from 3 to even 5 times higher than that observed in the general population. However, the reason for this phenomenon remains unclear (Baum et al. 2002).

In light of these often conflicting studies, it was considered appropriate to investigate a group of children diagnosed and treated for chronic or recurrent bronchitis. The aim of the study was to assess the level of growth and the nutritional status in children and youths, with special regard to the level of body fatness assessed by measuring skin-fold thicknesses. Relationships between somatic development, pulmonary function and the course of the disease were also explored.

2 Methods

The study protocol was approved by the Institute of Mother and Child Ethics Committee, and written informed consent was obtained from the parents of each subject.

The study was carried out using anthropometric measurements and information on the severity and course of the disease in 141 children with chronic or recurrent bronchitis. The sample comprised 77 boys and 64 girls, from 6 to 18 years of age (Table 1). All of the subjects were patients of the Pulmonary Medicine and Allergology Center in Karpacz, Poland. The study lasted from May 2005 to October 2005.