

The retrospective evaluation of pneumonia and bronchitis cases in infants and small children with atopic dermatitis in the practice of a family doctor – personal observations

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Received 01.12.2010
Accepted 19.05.2010
Advances in Medical Sciences
Vol. 55 • 2010
DOI: 10.2478/v10039-010-0029-0
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ABSTRACT

Purpose: The purpose of the work is to estimate the occurrence of lower respiratory tract infections in infants and small children with atopic dermatitis and to compare them with a group of children at the same age without features of allergy.

Material and methods: The study has been conducted on the basis of the retrospective analysis of medical documentation of individual history of disease among children born in 2005 – 2008 treated in an outpatient clinic.

Results: Children suffering from atopic dermatitis are more prone to pneumonia and bronchitis. They are also more often hospitalized due to these reasons. Also, this group of patients is more liable to wheezing in the time of infection.

Conclusions: Infants and small children with atopic dermatitis are more prone to lower respiratory tract infections. Recurrence of infections within the respiratory system may be an important risk factor for asthma.

Key words: atopic dermatitis, child, pneumonia, bronchitis

INTRODUCTION

More and more researchers are interested in allergic diseases because of their continuously increasing prevalence [1-4]. Atopic dermatitis which is very common especially in infants and small children is one of such diseases. In the etiology of atopic dermatitis genetic, immunological and environmental factors are taken into consideration [5-8]. Less frequently the problem of atopic dermatitis and the coexistence of viral infections is discussed [9,10]. The aim of our work was to examine the cases of lower respiratory tract infections in children with atopic dermatitis.

The infections of the respiratory system are the most common medical problem in this age group and are also the most frequent reasons why patients visit a family doctor. The youngest children have most often common cold infections, which may appear even several times a year [11,12]. Attending the nursery and kindergarten increases the risk of being infected with common respiratory system diseases.

On the whole such diseases do not cause diagnostic or therapeutic problems, but their recurrence is the source of parents' concern and it causes the family doctors and paediatricists to search the reasons of this phenomenon [13,14]. Due to the immaturity of defensive mechanisms in children, infections may change into serious lower respiratory tract infections. Such infections are often accompanied by so called wheezing- the whistling breathing, which is caused by bronchitis obturation [15,16]. It causes the dyspnoea and great anxiety among parents. The family doctor has to decide carefully whether a child with pneumonia should be hospitalized or treated at home. It is a very difficult decision.

MATERIAL AND METHODS

The analysis was conducted in a group of children born in 2005 – 2008 who were the patients of an outpatient clinic of the Polish Mother's Memorial Hospital in Lodz. 365 patients

Figure 1. The percentage of the occurrence of pneumonia and bronchitis in the lower respiratory tract infections and the frequency of whistling in children with atopic dermatitis.

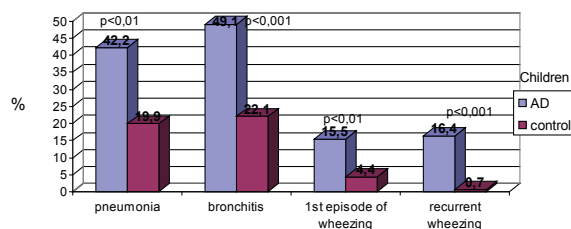
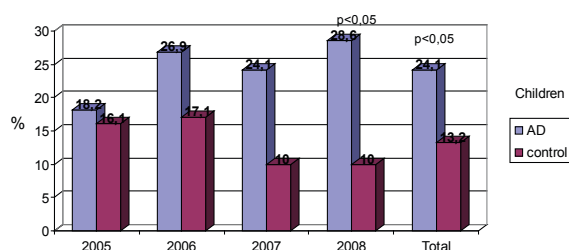


Figure 3. The percentage of children diagnosed with x-ray test because of pneumonia in children with atopic dermatitis in comparison to the control group.



were divided into two groups.

The analyzed group consisted of 116 infants and small children with at least once diagnosed atopic dermatitis. The control group consisted of 136 children without allergy features.

The control group did not include children with any atopic symptoms.

The study was based on the retrospective analysis of the individual medical documentation from an outpatient clinic in the Polish Mother's Memorial Hospital.

The analysis was conducted using the data from interview and physical examinations, the results of additional examinations and the information taken from hospital record.

The analysis of the occurrence of the respiratory tract infections in children with atopic dermatitis and in the control group included:

- frequency of pneumonia, bronchitis and whistles
- frequency of the x-rays tests of the chest
- frequency of hospitalization caused by infections

In statistical analysis the CHI-Square test and the Fisher's exact test were used. The results were obtained using the statistical package (STATISTICA).

RESULTS

The estimation of the occurrence of pneumonia, bronchitis and whistles

The medical documentation was verified by the fact that the child was at least once ill with pneumonia or bronchitis. It was

Figure 2. The percentage of children who suffered from an episode of the infection of respiratory system in children with atopic dermatitis in comparison to the control group.

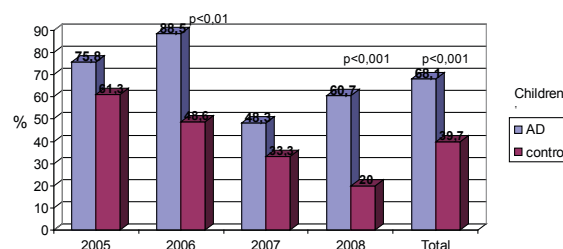
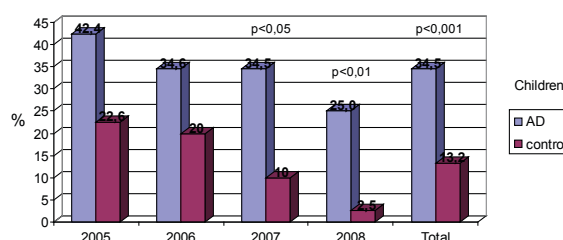


Figure 4. The percentage of hospitalization due to infections in children with atopic dermatitis (100%) and the control group (100%) born in a particular year.



shown that in the group of children with atopic dermatitis, the lower respiratory infections were more frequent than in the control group. Both pneumonia ($p < 0.01$) and bronchitis ($p < 0.001$) were diagnosed. Analyzing the specific age group this difference was more visible in children born in 2006 ($p < 0.01$) and infants born in 2008 ($p < 0.001$).

Since the occurrence of bronchitis asthma in children with atopic dermatitis is more frequent, the frequency of whistles accompanying the infections were also analyzed. Not only were they more frequent ($p < 0.001$) but also more often appeared as single episodes ($p < 0.01$), (Fig.1, Fig.2).

Pneumonia in the examined group and the frequency of x-ray tests of the chest

The frequency of pneumonia diagnosed as a result of the chest x-ray test was analyzed. It was shown that in the group of all children with atopic dermatitis, pneumonia was diagnosed with x-ray test in 28 cases, which constituted 24,1% of the examined group and was statistically significant compared with the control group 13,8%. The statistical significance $p < 0.05$. Examining children with atopic dermatitis born in each year separately the significant difference $p < 0.05$ was only visible among infants born in 2008, (Fig.3).

Hospitalizations because of different infectious reasons

The most frequent reason of hospitalizations in two groups were the infections of the lower respiratory tract. It constituted 40% of all cases. The results are comparable with the data from publications [17].

In the group of children with atopic dermatitis the average number of hospitalization was visibly higher and

was statistically significant ($p < 0,001$). The children with atopic dermatitis are more frequently hospitalized because of pneumonia ($p < 0,01$) and spastic bronchitis (Fig.4).

DISCUSSION

The analysis presented here coincides with the Swedish studies performed by Bohme et al., which demonstrated the relationship of atopic dermatitis not only with the presence of other atopic diseases, but also with an increase in the incidence of pneumonia, otitis media and applied antibiotic therapy [18].

However, a large study of children with atopic dermatitis by Canadian researchers, Kramer et al., did not show a significant difference in the incidence of respiratory tract infections in the first year of life when compared to children without allergy. Their findings argue against the hygiene hypothesis which connects a frequent incidence of allergy with decreased exposure to infections in early infancy [19]. The results of our studies showing an increased number of infections in children with atopic dermatitis also argue against the hygiene hypothesis [1].

A study by Kummeling et al. found that various environmental factors, including infection ones, in early infancy may lead to atopic manifestation, however, further research is required [20]. Similar observations were made by Peebles. He showed that respiratory tract infections in infancy caused by RSV are connected with asthma and allergy symptoms in later childhood [21].

In small children infection factors particularly often cause bronchospasm. It may be related to stimulating activity of some pathogens which leads to the secretion of Th2 cytokines by T lymphocytes [22]. Since bronchial asthma is common in children with atopic dermatitis, we examined the frequency of sibilant rales during infection. The results showed an increased rate of both multiple rales ($p < 0,001$) and single episodes ($p < 0,01$).

Although the tendency to bronchial obturation in small children may result from physiological functional and anatomical immaturity of the respiratory system, coexisting atopic disease may be an intensifying factor.

The studies by Zheng et al. confirm this observation. The authors describe the relationship between early respiratory tract infections and an increase in sibilant rales, especially in children at high risk of atopy [23]. Children with atopic dermatitis who wheeze during infections, especially when the problem reoccurs, may be at higher risk of developing bronchial asthma at a later time. This fact is underlined in many publications because the disease may begin the atopic march [24,25].

In our studies we underline the incidence of pneumonia diagnosed after radiological examinations. The analysis shows that pneumonia in infants, especially those with atopic

dermatitis, may be difficult to diagnose. The symptoms of pneumonia in infancy are not clear enough. An accelerated breath and feeding difficulties are often the only symptoms of pneumonia in infancy. Pneumonia in newborns and infants in the first quarter of life is an absolute indication for hospital admission because of possibility of systemic infection development and the necessity of parenteral treatment.

A higher number of hospital admissions of children with atopic dermatitis shows that this group of patients cause more diagnostic and therapeutic problems than children without allergy. It may be due to anatomic and functional immaturity of the immunity system in the smallest children. The development of the atopic process and the relationship with Th2 profile polarization are often underlined by many authors [26-28].

CONCLUSIONS

Children with atopic dermatitis are more prone to infectious diseases of the lower respiratory tract. They are more often hospitalized due to infections of the respiratory system than infants without atopic dermatitis. Reoccurrence of respiratory system infections in this children is an important risk factor for bronchitis asthma. Moreover, they are more likely to have other atopic diseases. Those children should be examined more frequently.

The thorough examination of children with atopic dermatitis may be of great help in the fight against the atopic march and, what is more, can be an element of the prevention of atopic dermatitis and respiratory system diseases development.

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