



ORIGINAL ARTICLE

Association between clinical variables related to asthma in schoolchildren born with very low birth weight with and without bronchopulmonary dysplasia



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KEYWORDS

Asthma;
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dysplasia;
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Abstract

Objective: To assess the prevalence, spirometry findings and risk factors for asthma in schoolchildren who were very low birth weight infants with and without bronchopulmonary dysplasia.

Methods: Observational and cross-sectional study. The parents and/or tutors answered the International Study of Asthma and Allergies in Childhood questionnaire. The schoolchildren were submitted to the skin prick test and spirometry assessment.

Results: 54 schoolchildren who were very low birth weight infants were assessed and 43 met the criteria for spirometry. Age at the assessment (bronchopulmonary dysplasia=9.5±0.85; without bronchopulmonary dysplasia=10.1±0.86 years) and birth weight (bronchopulmonary dysplasia=916.7±251.2; without bronchopulmonary dysplasia=1171.3±190.5g) were lower in the group with bronchopulmonary dysplasia ($p<0.05$). The prevalence of asthma among very low birth weight infants was 17/54 (31.5%), being 6/18 (33.3%) in the group with bronchopulmonary dysplasia. There was an association between wool blanket use in the first year of life ($p=0.026$) with the presence of asthma at school age. The skin prick test was positive in 13/17 (76.5%) and 23/37 (62.2%) of patients with and without asthma, respectively. The schoolchildren with asthma had lower z-score values of forced expiratory flow between 25% and 75% of forced vital capacity ($n=16$; -1.04 ± 1.19) when compared to the group of patients without asthma ($n=27$; $-0.380.93$) ($p=0.049$). There was no difference between the spirometry variables in the groups regarding the presence or absence of bronchopulmonary dysplasia.

Conclusions: Very low birth weight infants with and without bronchopulmonary dysplasia showed a high prevalence of asthma (33.3% and 30.6%, respectively). Pulmonary flow in the small airways was lower in children with asthma.

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PALAVRAS-CHAVE

Asma;
Displasia
brônquica;
Nascimento
prematuro

Associação entre variáveis clínicas relacionadas à asma em escolares nascidos com muito baixo peso com e sem displasia broncopulmonar

Resumo

Objetivo: Avaliar prevalência, espirometria e fatores de risco para asma em escolares que foram recém-nascidos de muito baixo peso com e sem displasia broncopulmonar.

Métodos: Estudo observacional e transversal. Aplicou-se aos pais e/ou responsáveis o questionário International Study of Asthma and Allergies in Childhood. Foi feito teste cutâneo de hipersensibilidade imediata e espirometria nos escolares.

Resultados: Avaliados 54 escolares que foram recém-nascidos de muito baixo peso e 43 preencheram critérios para espirometria. A idade na avaliação (displasia broncopulmonar=9,5±0,85; sem displasia broncopulmonar=10,1±0,86 anos) e o peso de nascimento (displasia broncopulmonar=9167±2512; sem displasia broncopulmonar=1171,3±1905g) foram menores no grupo com displasia broncopulmonar ($p<0,05$). A prevalência de asma entre os recém-nascidos de muito baixo peso foi de 17/54 (31,5%); no grupo com displasia broncopulmonar, de 6/18 (33,3%). Houve associação entre uso de cobertor de lã no primeiro ano de vida ($p=0,026$) com presença de asma na idade escolar. O teste cutâneo de hipersensibilidade imediata foi positivo em 13/17 (76,5%) e 23/37 (62,2%) nos grupos com e sem asma, respectivamente. Os escolares com asma apresentaram menores valores em z-score do fluxo expiratório forçado entre 25% e 75% da capacidade vital forçada ($n=16$; $-1,04\pm 1,19$) comparados com os do grupo de pacientes sem asma ($n=27$; $-0,38\pm 0,93$) ($p=0,049$). Não houve diferença entre as variáveis da espirometria no grupo com relação à presença ou não de displasia broncopulmonar.

Conclusões: Os recém-nascidos de muito baixo peso, com e sem displasia broncopulmonar, apresentaram prevalência elevada de asma (33,3% e 30,6%, respectivamente). Os fluxos pulmonares das pequenas vias aéreas foram menores nos escolares com asma.

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Introduction

Since 1960, with the improvement of perinatal care, there has been a reduction in mortality of newborns (NB) with birth weight (BW) of less than 1500g, termed very low birth weight (VLBW) infants.¹ In contrast, there has been an increase of complications of prematurity, the most serious of which is bronchopulmonary dysplasia (BPD), the earliest chronic obstructive pulmonary disease that affects humans.¹

During this period the prevalence of BPD is high, and it increases in lower gestational ages and smaller infants.² BPD affects 30% of VLBW infants <1000g, 52% of those weighing between 501 and 750g, and 7% of those weighing between 1251 and 500g.^{2,3}

The manifestations of prematurity include immune imbalance, increased susceptibility to viral infections,^{4,5} and allergen absorption.⁶ Infants with BPD present chronic lung inflammation, which predisposes them to infections and hospitalizations. These risk factors may be associated with the prevalence of wheezing in infants² and asthma in childhood and adolescence.⁷⁻¹⁴

Children with BPD have a high prevalence of recurrent wheezing.⁶ In contrast, the effects of BPD in the onset of atopy, asthma, and/or recurrent wheezing at older ages is controversial.^{3,4,9,13,15,16} The effect of BPD in lung function in the long term has been evaluated in numerous age groups, including newborns,¹⁷ infants,¹⁸ preschoolers,¹⁹ schoolchildren,⁷⁻¹¹ adolescents,¹²⁻¹⁴ and adults.²⁰⁻²² Studies have shown reduced lung volumes in different age groups, but with low association to clinical symptoms. This fact has not been explained in the literature.

Asthma is a disease of great importance in global public health.²³ The prevalence ranges from 2.1% to 32.2% and from 4.1% to 32.1% in children and adolescents, respectively.²³ However, studies have not been able to determine which is the main risk factor for childhood asthma in VLBW infants, whether prematurity itself or BPD.

Considering that preterm infants have been increasingly presenting a favorable outcome and that there are few studies in Brazil on asthma prevalence in preterm infants with and without BPD,^{7,22} this study aimed to determine the presence of asthma and atopy in children born with VLBW at school age and to assess lung function by spirometry, according to the presence or absence of BPD.

Method

This was an observational and cross-sectional study approved by the Institutional Review Board of the University Hospital under No. 569/2010 and No. 605/2010. All parents and/or guardians signed an informed consent. Initially, all records of VLBW infants born between October 2000 and November 2004 at the university hospital were selected. Deaths and cases with chronic diseases, genetic diseases, vascular ring, diaphragmatic hernia, pulmonary sequestration, chest wall deformity, and ciliary dyskinesia were excluded.

The diagnosis of BPD was established in infants who, after 28 days of life, had respiratory failure and depended on oxygen at over 21% concentration to maintain partial pressure

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