



REVIEW ARTICLE

Exacerbation of asthma and airway infection: is the virus the villain?☆☆



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Abstract

Objective: To review the available literature on the association between acute viral respiratory tract infection and the onset of asthma exacerbations, identifying the most prevalent viruses, detection methods, as well as preventive and therapeutic aspects.

Sources: A search was conducted in PubMed, Lilacs, and SciELO databases, between the years 2002 and 2013, using the following descriptors: asthma exacerbation, virus, child, and acute respiratory infection.

Summary of the findings: A total of 42 original articles addressing the identification of respiratory viruses during episodes of asthma exacerbation were selected, mostly cross-sectional studies. There was a wide variation in the methodology of the assessed studies, particularly in relation to the children's age and methods of collection and viral detection. The results indicate that, in up to 92.2% of exacerbations, a viral agent was potentially the main triggering factor, and human rhinovirus was the most frequently identified factor. The pattern of viral circulation may have been responsible for the seasonality of exacerbations. The association between viral infections and allergic inflammation appears to be crucial for the clinical and functional uncontrolled asthma, but few studies have evaluated other triggering factors in association with viral infection.

Conclusions: Respiratory viruses are present in the majority of asthmatic children during episodes of exacerbation. The involved physiopathological mechanisms are yet to be fully established, and the synergism between allergic inflammation and viral infection appears to determine uncontrolled disease. The role of other triggering and protective agents is yet to be clearly determined.

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PALAVRAS-CHAVE

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respiratório

Exacerbação da asma e infecção das vias aéreas: o vírus é o vilão?**Resumo**

Objetivo: Rever a literatura disponível sobre a relação entre infecção viral aguda do trato respiratório e o desencadeamento de exacerbações da asma, identificando os vírus mais prevalentes, os métodos de detecção, bem como os aspectos preventivos e terapêuticos.

Fonte dos dados: Foi realizada uma busca nas bases de dados PubMed, SciELO e Lilacs utilizando os descritores: asma, exacerbação, vírus, criança e infecção respiratória aguda, entre os anos de 2002 e 2013.

Síntese dos dados: Foram selecionados 42 artigos originais que tratavam da identificação de vírus respiratórios durante episódios de exacerbação da asma, em sua maioria estudos transversais. Houve ampla variação na metodologia dos trabalhos avaliados, principalmente em relação à idade das crianças e métodos de coleta e detecção viral. Os resultados apontam que, em até 92,2% das exacerbações, um agente viral foi potencialmente o principal fator desencadeante, sendo o rinovírus humano o mais identificado. O padrão de circulação viral pode ter sido responsável pela sazonalidade das exacerbações. A associação entre infecção viral e inflamação alérgica parece ser determinante para levar ao descontrole clínico-funcional da asma, porém poucos estudos avaliaram outros fatores desencadeantes em associação com a infecção viral.

Conclusões: Os vírus respiratórios estão presentes na maioria das crianças asmáticas durante os episódios de exacerbação. Os mecanismos fisiopatológicos envolvidos ainda não estão totalmente estabelecidos e o sinergismo entre a inflamação alérgica e infecção viral parece determinar o descontrole da doença. O papel dos outros agentes desencadeantes e protetores não estão claramente determinados.

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Introduction

Asthma is a chronic, genetically-determined disease, whose prevalence in the pediatric population ranges between 19.0% and 24.3% among Brazilian adolescents and schoolchildren, respectively.¹ From the physiopathological viewpoint, it is characterized by chronic inflammation with the involvement of several cell types, associated with airway hyperresponsiveness, with episodes of reversible airflow limitation. It is clinically manifested by recurrent exacerbations, also called "asthma attacks" or, more appropriately, acute asthma, characterized by progressive worsening of dyspnea, coughing, wheezing, chest tightness, or a combination of these.²

The loss of clinical and functional asthma control usually occurs gradually, but it can occur abruptly in a subgroup of patients.² It is one of the main causes of emergency consultations, having been responsible, in 2007, for 195 deaths in children younger than 19 years in Brazil.³ Public policies have been developed to promote both scientific knowledge about the disease and its management, as well as to organize assistance programs in public health, which include, among others, the dispensing of medications. However, exacerbations continue to represent a significant number in statistics, with great impact on public and private healthcare systems.²

The multifactorial origin of the clinical-functional lack of disease control is well known; since the early 1970s, respiratory viruses have been associated with the triggering of asthma exacerbations in adults and children.³ In the 1990s, the development of more sensitive and specific molecular techniques allowed for the increase in respiratory virus detection and therefore, ways to better explain this

association. Studies using reverse transcriptase polymerase chain reaction (RT-PCR) as the detection technique, isolated or combined with traditional methods, observed positivity for respiratory viruses in up to 92.2% of episodes of acute asthma exacerbation in children.⁴

Considering the possibility of a causal relationship between respiratory virus infection and the triggering of asthma attacks in children, the implications of this association, as well as the possibility of specific prophylaxis and therapy for these agents, special attention to this subject is justified. Therefore, this literature review aimed to analyze articles, published between 2002 and 2013, assessing the association between asthma exacerbation and acute viral airway infection.

Methods

A search was conducted in the PubMed, Lilacs and SciELO databases, using the descriptors: "Asthma Exacerbation", "Viral Infection", and "Child", resulting in a total of 283 references for that period. After selecting the articles published in Portuguese, English, Spanish, or French, 195 articles remained. After reading the titles and abstracts, 42 original articles that assessed respiratory tract viral infection in asthmatic children during exacerbation were selected. Some articles of historical importance or review articles that included the three descriptors were added to generate the bibliography of this review. The list of references was inserted into Endnote X6 (Thompson Corp., CA, USA), a bibliographic citation management software.

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