



ORIGINAL ARTICLE

## Acute respiratory viral infections in pediatric cancer patients undergoing chemotherapy<sup>☆</sup>



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### KEYWORDS

Cancer;  
Children;  
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### Abstract

**Objective:** to estimate the prevalence of infection by respiratory viruses in pediatric patients with cancer and acute respiratory infection (ARI) and/or fever.

**Methods:** cross-sectional study, from January 2011 to December 2012. The secretions of nasopharyngeal aspirates were analyzed in children younger than 21 years with acute respiratory infections. Patients were treated at the Grupo em Defesa da Criança Com Câncer (Grendacc) and University Hospital (HU), Jundiaí, SP. The rapid test was used for detection of influenza virus (Kit Biotrin, Inc. Ireland), and real-time multiplex polymerase chain reaction (FTD, Respiratory pathogens, multiplex Fast Trade Kit, Malta) for detection of influenza virus (H1N1, B), rhinovirus, parainfluenza virus, adenovirus, respiratory syncytial virus, human parechovirus, bocavirus, metapneumovirus, and human coronavirus. The prevalence of viral infection was estimated and association tests were used ( $\chi^2$  or Fisher's exact test).

**Results:** 104 samples of nasopharyngeal aspirate and blood were analyzed. The median age was  $12 \pm 5.2$  years, 51% males, 68% whites, 32% had repeated ARIs, 32% prior antibiotic use, 19.8% cough, and 8% contact with ARIs. A total of 94.3% were in good general status. Acute lymphocytic leukemia (42.3%) was the most prevalent neoplasia. Respiratory viruses were detected in 50 samples: rhinoviruses (23.1%), respiratory syncytial virus AB (8.7%), and coronavirus (6.8%). Co-detection occurred in 19% of cases with 2 viruses and in 3% of those with 3 viruses, and was more

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**PALAVRAS-CHAVE**

Câncer;  
Criança;  
Vírus;  
Infecções do trato  
respiratório

frequent between rhinovirus and coronavirus 43. Fever in neutropenic patients was observed in 13%, of which four (30.7) were positive for viruses. There were no deaths.

**Conclusions:** the prevalence of respiratory viruses was relevant in the infectious episode, with no increase in morbidity and mortality. Viral co-detection was frequent in patients with cancer and ARIs.

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### Infecções respiratórias virais agudas em pacientes pediátricos com câncer em tratamento quimioterápico

#### Resumo

**Objetivo:** estimar a prevalência da infecção pelos vírus respiratórios em pacientes pediátricos com câncer e infecção respiratória aguda (IRA) e/ou febre.

**Métodos:** estudo transversal, de janeiro de 2011 a dezembro de 2012. Foram analisadas secreções de aspirado da nasofaringe de menores de 21 anos, com quadro respiratório agudo, atendidos nos hospitais Grendacc e HU, Jundiaí, SP. Foi aplicado o teste rápido para detecção dos vírus influenza (Kit Biotrin®) e a reação em cadeia da polimerase multiplex em tempo real (Kit multiplex/Fast Trade®) para detecção dos vírus: influenza (A, H1N1, B), rinovírus, parainfluenza, adenovírus respiratório, vírus respiratório sincicial, parechovírus, bocavírus, metapneumovírus humano e coronavírus humano. Foi estimada a prevalência de infecção viral e usados testes de associação ( $\chi^2$  ou teste exato de Fisher).

**Resultados:** foram analisadas 104 amostras de aspirado de nasofaringe e sangue. A mediana para a idade foi  $12 \pm 5,2$  anos; masculino (51%); cor branca (68%); IVAS de repetição (32%); uso prévio de antibiótico (32%); tosse (19,8%); e contato com IVAS (8%). Apresentavam-se em bom estado geral 94,3% dos pacientes. A leucemia linfocítica aguda (42,3%) foi mais prevalente. Foram detectados vírus respiratórios em 50% das amostras: rinovírus (23,1%), vírus sincicial respiratório A/B (8,7%) e coronavírus (6,8%). Ocorreu codetecção em 19% entre dois vírus, e de 3% entre três vírus, sendo a mais frequente entre rinovírus e coronavírus 43. Febre em neutropênicos foi de 13%, sendo quatro (30,7%) com vírus positivo. Não houve óbitos.

**Conclusões:** a prevalência de vírus respiratórios foi importante no episódio infeccioso, sem aumento da morbimortalidade. As codetecções foram frequentes em pacientes com câncer e IRA.

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## Introduction

In both developed and developing countries, respiratory diseases contribute to the high proportion of morbidity and mortality in childhood. It is estimated that 25% to 33% of deaths observed in children younger than five years are caused by acute respiratory infections (ARIs) and their complications.<sup>1</sup>

In Brazil, the expectation of new cases of childhood cancer is 9,300 cases per year in children younger than 15 years. Among these, the most common are acute lymphoblastic leukemia (ALL) and central nervous system (CNS) tumor, followed by Hodgkin's lymphoma (HL) and non-Hodgkin's lymphoma (NHL).<sup>2</sup> The very presence of the disease may be a factor of immunosuppression, especially in ALL and lymphomas. Conversely, treatment with chemotherapy interferes with patients' immune response capacity;<sup>3</sup> infection is the most common complication associated with cancer and its treatment, representing the main cause of death rather than the cancer itself.<sup>2</sup>

Acute viral respiratory infections are the most common causes of febrile episodes in children younger than five years, even in children treated with antineoplastic drugs.<sup>4,5</sup>

Many studies, concepts, and protocols are well established for the management of fever episodes in children with cancer. However, there are still doubts regarding the true incidence and the role of viral agents in respiratory infections in these patients.<sup>6-10</sup> Few studies have been published on this subject in the past; little attention has been given in the literature to new viruses such as human coronavirus (hCoV) and metapneumovirus (hMPV A/B) in immunocompromised pediatric patients.<sup>10,11</sup>

This study aimed to determine the frequency of infection caused by respiratory viruses in patients younger than 21 years with cancer and acute respiratory infection, and to identify whether there is a subgroup that has severe ARI.

## Methods

An observational, cross-sectional study was performed. Nasopharyngeal aspirate samples from patients younger than 21 years with cancer and fever (measured or reported) and respiratory symptoms of ARI were collected using a standardized protocol. The clinical records were collected from medical records by one of the authors.

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