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Frequency and clinical outcome of respiratory viral infections and mixed viral-bacterial infections in children with cancer, fever and neutropenia.

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Abstract

BACKGROUND:

The role of respiratory viral infections (RVIs) as a cause of overall fever and neutropenia (FN) episodes in children with cancer has been less characterized than bacterial infections. We conducted a study aimed to determine the frequency of RVI in children with low compared with high risk for invasive bacterial infection (IBI) FN episodes and compare the clinical outcome of RVI and mixed RV-bacterial infections.

METHODS:

Prospective, multicenter study in children with cancer and FN admitted to pediatric hospitals in Chile between May 2009 and January 2011. Children were evaluated by clinical examination and laboratory tests, including bacterial cultures and their risk for IBI. Nasopharyngeal sample was obtained for the detection of 17 respiratory viruses using polymerase chain reaction-DNA microarray platform.

RESULTS:

A total of 331 episodes of FN in 193 children were enrolled of whom 55% were male, with the median age of 7 years and 61% had a hematological malignancy. A viral and/or bacterial pathogen was detected in 67% (224/331) episodes. Overall, RVIs were associated with 57% of FN of which one-third were mixed RV-bacterial infections. Bacterial infection was detected in 29% (97/331). Children classified at admission as high risk for IBI had a similar overall proportion of RVI compared with low-risk group. Respiratory syncytial virus (31%) and rhinovirus (23%) were the most frequently detected respiratory viruses, followed by parainfluenza (12%) and influenza A (11%). Children detected with any respiratory virus had fewer days of hospitalization and a significantly lower probability of hypotension and admission to pediatric intensive care unit irrespective of their risk classification status at admission when compared with children with mixed RV-bacterial or bacterial infections ($P < 0.05$). All children with a sole RVI had favorable outcome.

CONCLUSIONS:

RVIs were the most frequently detected agents irrespective of their initial risk assessment for IBI. The clinical outcome of mixed RVI was similar to sole RVI episodes as well as for bacterial infections compared with mixed viral-bacterial infections. Systematic and early detection of RVI in children with cancer and FN might help to optimize their management by reducing hospitalization and antimicrobial use.

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