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Human rhinovirus and human respiratory enterovirus (EV68 and EV104) infections in hospitalized patients in Italy, 2008–2009☆,☆☆

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ABSTRACT

The epidemiology of picornavirus infections along with associated risk factors for lower respiratory tract infections (LRTI) and duration of virus shedding were investigated in 985 hospitalized patients in the period October 2008–September 2009. One-third of patients were human rhinovirus (HRV)–positive. Of 336 HRV-associated episodes, 153 (45.5%) were sustained by HRV-A, 31 (9.2%) by HRV-B, and 93 (27.7%) by HRV-C, while 7 episodes showed multiple HRV types and 52 were sustained by undefined HRV species. Independent risk factors for LRTI included high viral load and age less than 5 years. Twenty (2.1%) patients were enterovirus (EV)-positive (12 had EV-68, 7 EV-104, and 1 E-13 infection). Half of the EV-positive patients had a LRTI and were younger with respect to patients with upper RTI (median 18 months versus 37 years; $P < 0.001$). HRVs are often the cause of LRTI in children less than 5 years, frequently in association with a high viral load.

1. Introduction

Human rhinoviruses (HRVs) of both species A and B have been considered for several decades to be responsible for less severe upper respiratory tract infections (URTI). More recently, the discovery of a third species, HRV-C, and its reported association with lower respiratory tract infections (LRTI) (Lamson et al., 2006; Lau et al., 2009; McErlean et al., 2008; Piralla et al., 2009), including asthma exacerbations (Khetsuriani et al., 2008; Linsuwanon et al., 2009a; Miller et al., 2009a; Miller et al., 2009b) and otitis media (Savolainen-Kopra et al., 2009), have raised concerns regarding the pathologic potential of HRV in respiratory infections.

In addition, human enteroviruses (EV), classified together with HRVs in the same genus, *Enterovirus*, within the Picornaviridae family, have been associated with respiratory infections (Piralla et al., 2010; Tapparel et al., 2009). Despite the lower frequency of HEV detection with respect to HRV, the potential severity of the infections caused by EVs has been recently reported (Imamura et al., 2011; Jacques et al., 2008; Kaida et al., 2011; Rahamat-Langendoen et al., 2001).

Human picornavirus infections in a hospitalized patient population during 1 year of surveillance were studied. Molecular epidemiology of circulating picornavirus was described elsewhere (Piralla et al., 2011). The present study reports i) the clinical characteristics of patients with picornavirus infection, ii) the risk factors for LRTI, and iii) the duration of viral shedding.

2. Materials and methods

2.1. Study design and patients

All subjects admitted to the hospital with a diagnosis of acute respiratory infection (ARI) in the period from October 2008 to September 2009 were included in the study. For each case of ARI, respiratory samples (nasopharyngeal aspirates [NPAs] or bronchoalveolar lavage) were collected at admission and the discharge visits. Whenever possible, viral shedding was assessed during the hospitalization period and during routine medical visits following discharge. Forms for recording clinical symptoms and immune status were carefully filled in at the first medical visit and updated at following visits.

Respiratory samples were aliquoted and processed as previously reported (Rovida et al., 2005; Sarasini et al., 2006). The samples were analyzed for the presence of 17 respiratory viruses, including HRV and EV as previously described (Piralla et al., 2009; Piralla et al., 2011).

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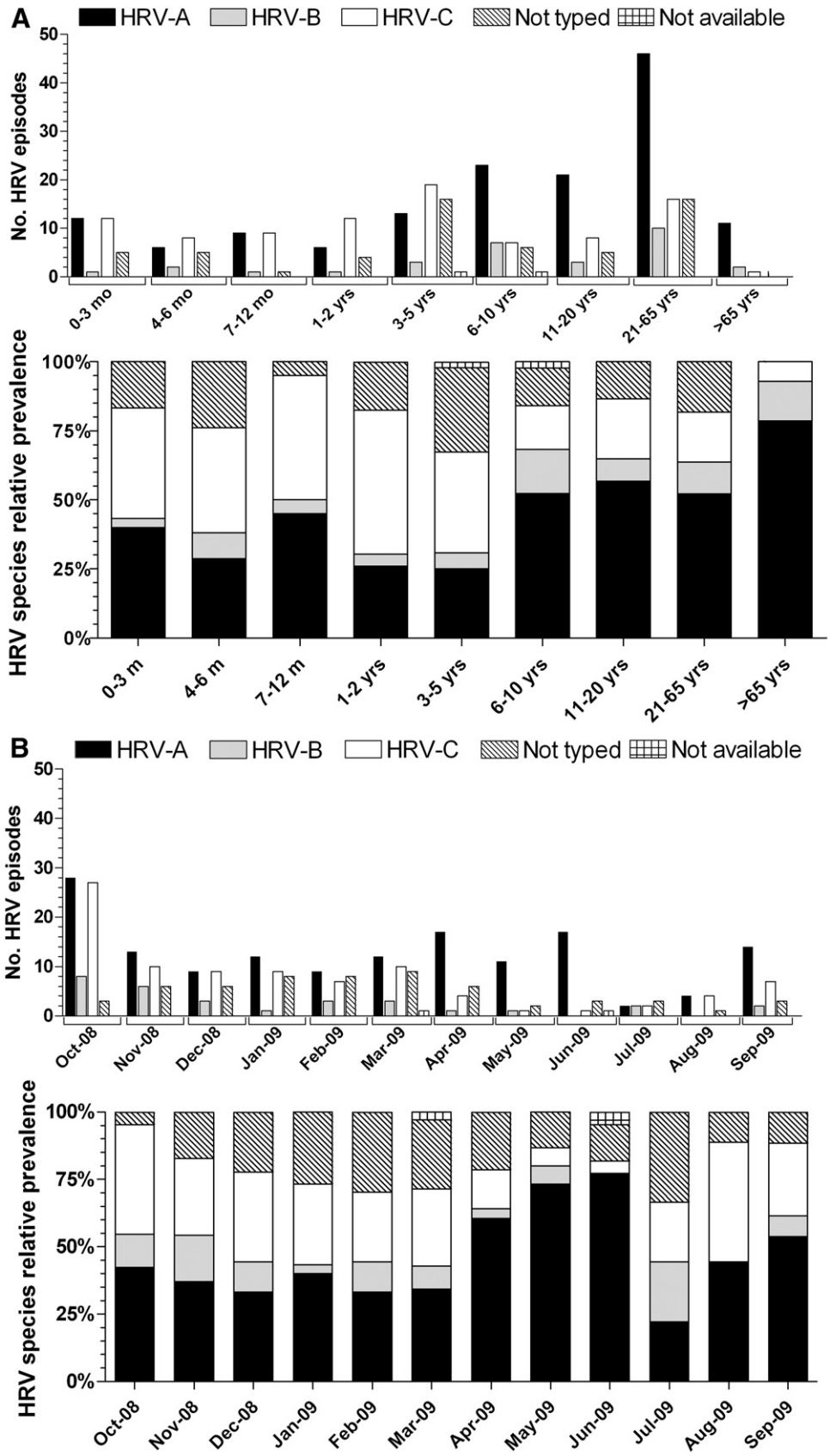

Fig. 1. Prevalence of HRV species A, B, and C during the 1-year surveillance period. The number of HRV episodes for each HRV species and the relative percentages are reported for different age categories (A) and months (B).