Research Letters

Human Bocavirus in Very Young Infants Hospitalized with Acute Respiratory Infection in Northeast Brazil

Summary

A cross-sectional study was carried out over a period of 12 months to investigate the occurrence of human bocavirus (HBoV) infection in infants hospitalized for respiratory infections in a teaching hospital in Salvador, Brazil, and to describe the clinical manifestations of this infection. Nasopharyngeal aspirates were collected from the children and immunofluorescence and polymerase chain reaction were performed to investigate the presence of respiratory viruses. HBoV was detected in 4 out of 66 patients. Two of the HBoV-positive infants were co-infected with other viruses. The principal clinical findings in HBoV-positive children were: nasal obstruction, catarrh, cough, fever and dyspnea. This study revealed HBoV infection in children aged <2 months, suggesting that the infection may occur at a very early age.

Introduction

Human bocavirus (HBoV) was first identified in 2005 in Swedish children with acute respiratory infection (ARI) [1]. Since then, HBoV has been found in 1.5–17% of patients with respiratory infections in various countries [1–12]. The occurrence of HBoV infection in infants aged <6 months appears to be low [1, 3, 12, 13]. This study investigated the occurrence of HBoV infection in infants aged <7 months hospitalized with ARI.

Methods

This was a cross-sectional study carried out over a 12-month period between 31 March 2006 and 31 March 2007. Children under 7 months of age, who were hospitalized at the *Professor Hosannah de Oliveira* pediatric hospital in Salvador, Brazil with a diagnosis of respiratory infection, were included. A questionnaire was applied to collect clinical data and laboratory results. Nasopharyngeal aspirate (NPA) was collected to investigate respiratory viruses. The presence of adenovirus, respiratory syncytial virus (RSV), influenza viruses and parainfluenza viruses was investigated by indirect immunofluorescence (IIF) using a commercially available kit (Chemicon® Temecula, CA, USA). The presence of HBoV and human rhinoviruses (HRVs) was investigated using polymerase chain reaction (PCR). DNA extraction was performed in the NPA using a commercial kit (Wizard® Genomic DNA Purification Kit, Promega® Madison, WI, USA), and RNA extraction was carried out using Trizol® (Invitrogen® Carlsbad, CA, USA). HBoV was detected by PCR using the product of DNA extraction.

Results

During the study period, NPA from 66 children was tested for respiratory viruses using IIF and PCR. Forty children (60.6%) tested positive for at least one agent. Twenty-nine children (43.9%) tested positive for one virus, 10 (15.2%) for two and 1 (1.5%) for three different viruses. HRV (24 cases) and RSV (14 cases) were the viruses most frequently detected. Four children (6.1%) tested positive for HBoV, two of whom were found to be simultaneously infected with other viruses: RSV and enterovirus in one case, and HRV in the other. Their ages ranged from 43 to 191 days. All four children had nasal obstruction and rhonchi, while three had productive coughs, dyspnea, fever and chest indrawing and rales at lung auscultation. Two patients had acute diarrhea. A summary of clinical data and laboratory results is shown in Table 1.

Discussion

The frequency of HBoV in infants with ARI in the present study is in agreement with findings reported from various other studies [1–11]. Two children were <2 months of age, suggesting that the infection may occur at a very early age. Clinical findings in children with HBoV in this study were very similar to those previously described [3–7]. This study was carried out in hospitalized children; hence presumably more severely ill patients were evaluated. However, only one HBoV-positive patient had radiological findings consistent with pneumonia. In this study, two of the four children with HBoV infection had diarrhea. It is possible that HBoV infection may involve both the respiratory and gastrointestinal tracts [14, 15]. In spite of the limited sample size, the present study highlights the fact that HBoV may be present in very young infants hospitalized with ARI.

Funding

Brazilian Ministry of Health; The National Council for Scientific and Technological Development and the Foundation for the Support of Research in the State of São Paulo.

TABLE 1
Clinical data and laboratory results of four hospitalized infants with respiratory infection and positive test for HBoV by PCR

Characteristic	Case 1	Case 2	Case 3	Case 4
Sex	Female	Female	Male	Male
Age (days)	191	43	54	150
Month and year of hospitalization	May/2006	May/2006	July/2006	August/2006
Birth weight (g)	3700	1480	2730	2630
Clinical diagnosis at admission	Bronchiolits	ARI[a]	Bronchiolits	Pneumonia
Duration of symptoms before hospitalization (days)	3	1	12	9
Signs/symptoms				
Rhinorrhea	Yes	Yes	No	Yes
Nasal obstruction	Yes	Yes	Yes	Yes
Cough	Yes	No	Yes	Yes
Fever	Yes	No	Yes	Yes
Cyanosis	No	No	No	No
Chest wall retraction	Yes	No	Yes	Yes
Rales	Yes	No	Yes	Yes
Wheezing	Yes	No	Yes	Yes
Dyspnea	Yes	No	Yes	Yes
Diarrhea	Yes	No	No	Yes
Highest temperature during hospitalization (°C)	38	37	37.5	38.3
Respiratory rate at hospitalization, breaths/min	56	54	78	60
Maximal respiratory rate, breaths/min	68	86	78	60
Chest X-ray	Normal	Normal	Normal	Intersticial infiltrate and atelectasis
Antibiotic treatment before hospitalization	Yes	No	No	Yes
Antibiotic treatment during hospitalization	No	No	Yes	Yes
Length of oxygen therapy (days)	2	No	No	2
Viral coinfection	Yes[a]	Yes[b]	No	No
Leukocytes count (cells/mm^3)	13 200	7400	11 100	19 800
Blood culture	Not done	Negative	Negative	Not done
Erythrocyte sedimentation rate (mm/h)	42	35	42	21
C-reative protein (mg/l)	Not done	<6	<6	>6
Hospitalization duration (days)	9	9	4	5

[a]Co-infection with RSV and enterovirus.
[b]Co-infection with rhinovirus.
ARI, Acute Respiratory Infection.

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doi:10.1093/tropej/fmp026
Advance Access Published on 28 April 2009

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Acknowledgements

The authors would like to thank the hospital staff, parents and children whose support and collaboration made this study possible.

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Nutritional Quality and Osmolality of Home-made Enteral Diets, and Follow-up of Growth of Severely Disabled Children Receiving Home Enteral Nutrition Therapy

Summary

This study evaluated the nutritional quality of home-made enteral diets and their effect on growth parameters. Thirty pediatric patients receiving only homemade enteral diets were enrolled. Samples of milk-based (MB) and soup-based (SP) feeds were taken for chemical analises. The chidren's anthropometric indexes were assessed. In the MB, the measured values for the macronutrients and energy corresponded to approximately 70% of the prescribed values. Conversely, the SP measured values corresponded to less than 50% of the prescribed values, except for carbohydrate. The prevalence of underweight was 30% (9/30) at the time of entry into home nutritional therapy and declined to 20% (6/30) at the time of the study ($p = 0.007$). Stunting increased throughout the follow up, from 30% (9/30) to 53% (16/30; $p = 0.511$). Obesity prevalence fell from 17% (4/23) to 9% (2/23; $p < 0.001$). Despite their inconsistent levels of macronutrients and energy, home-made enteral diets had no negative effect on the patients' weights.

Key words: Enteral feeding, Home health care.

When nutritional support is required for months or even years, home-based-enteral nutrition has been considered the best solution for the impaired children and their families [1]. In hospital settings, the use of blended whole food in enteral tube feedings showed that no commercial enteral diets delivered less than the desired amounts of nutrients [2], which may result in clinical and nutritional implications for patients. The aims of this study were to evaluate the nutritional quality of home-made enteral diets and their effects on growth parameters.

Thirty patients, cared for by three private care firms, were enrolled in this study. All patients were bed-ridden with 27 requiring mechanical ventilation. Since the cost of the enteral diets were not reimbursed by the insurance companies, the families were responsible for their purchase. Due to the high cost of commercially manufactured enteral feeding, most families chose to use home-made enteral diets. Nutrients were delivered via a nasointestinal tube (two patients) or a feeding tube inserted through a gastrostomy (28 patients). Infusion pumps were not available for any patient. The patients' mean age at the time of the study, was 79 months (range from 15 to 159 months). The mean duration of the home enteral nutrition therapy was 14 months (range from 4 to 39 months). Adjustments in the calorie and protein contents and volume of the feeds were made according to the nutritional status of the children.

The dietitians prescribed similar diets. Samples of milk-based (MB) and soup-based (SB) feeds were analyzed for moisture, protein, fat, dietary fiber, ash and osmolality [3]. The expected nutrient content of both types of feed was calculated from food composition tables. Percentage ratios of expected values/measured values were calculated for macronutrients and energy. Weight-for-age, height-for-age and body mass-for-age indexes were assessed in relation to the reference population [4].

Table 1 presents the analytical results. The concentration of protein, lipid, carbohydrate, fiber and the energy values of the SB feed were significantly lower than those of the MB feed. The osmolality was also significantly lower. The SB feed contained significantly more water. In the MB feed, the measured values for the macronutrients and energy corresponded to ~70% of the prescribed values; SB feed presented measured values that corresponded to >50% of the prescribed values, except for carbohydrate. Nevertheless, the prevalence of underweight