Research Letters

Effect of Honey Supplementation on the Phagocytic Function during Nutritional Rehabilitation of Protein Energy Malnutrition Patients

Protein-energy malnutrition (PEM) is associated with a significant impairment of cell-mediated immunity, phagocyte function, complement system, secretory immunoglobulin A antibody concentrations and cytokine production [1]. Honey is a natural substance with a lot of benefits for nutrition and health especially enhancement of the immune system. This study was thus designed to evaluate the effect of honey intake during the nutritional rehabilitation of patients with PEM on their phagocytic function.

Thirty PEM patients and 20 matching controls were enrolled in the study and the patients were randomly assigned to either one of two groups. Both groups entered conventional nutritional rehabilitation program for 2 weeks with the first group receiving honey in addition while the second received placebo. The honey used in the study was a pure multifloral honey which was subjected to microscopic examination and culture for Clostridium Botulinum spores. The honey had normal physical and chemical properties according to Crane [2]. It was given in a dose of 2ml/kg/day in 2 divided doses and each dose was diluted in water before ingestion.

History taking, clinical examination and routine laboratory tests were done for enrolled cases as well as assessment of Candida killing activity by cytomorphological methods in the phagocytes to assess the Phagocytic index [3].

The rate of change of the anthropometric measurements and routine laboratory tests was better in the PEM patients supplemented with honey compared to the non-supplemented group. The initial phagocytic index was significantly lower in both PEM groups as compared to the control group, with no significant difference between them. This finding agrees with Forte et al. [4] who reported a decrease in the process of ingestion and digestion during phagocytosis in malnourished patients. Additionally, Teshima et al. [5] showed alteration of the respiratory burst and phagocytosis of macrophages under protein malnutrition.

After nutritional rehabilitation, the phagocytic index was significantly higher in both PEM groups compared to initial values, but was still significantly lower than the control group. This is probably attributed to the short duration of rehabilitation and further follow up would most probably reveal less significant difference.

However, after nutritional rehabilitation phagocytic index values in the group who received honey supplementation was significantly higher than those who did not receive honey supplementation and its rate of change was significantly higher in the honey supplemented group. Thus addition of honey to nutritional rehabilitation program of PEM patients has a positive immune-modulatory effect on the phagocytic function. This finding is supported by Chepulis [6] who stated that honey may have a beneficial effect on phagocytosis and lymphocyte numbers. Moreover, Mesaik et al. [7] recently reported an immune-modulatory potential of honey in the course of phagocytosis.

From the results of the current study it is evident that addition of honey to the nutritional rehabilitation program of PEM patients offers a more rapid recovery to their phagocytic function in addition to its beneficial effect on the growth parameters. It is thus prudent to advise the use of honey during nutritional rehabilitation program of such patients to decrease the morbidities they face during this critical period. Nevertheless, further larger scale studies are recommended to highlight the effect of honey on other aspects of the immune system in PEM patients.

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References


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Pediatric impact of the H1N1 pandemic in Istanbul

Emerging in Mexico in April 2009, the swine-originated influenza A H1N1 strain was announced as the pandemic factor of the 21st century by the World Health Organization (WHO) [1]. In order to explore the impacts of pandemic influenza (PI) on the child population in Istanbul, 187 patients presenting with flu-like conditions were investigated for PI in the 2009–10 winter season. These patients had presented to the Pediatric Outpatient Clinic of Cerrahpasa Medical School with complaints of dyspnea, tachypnea, or persistent vomiting. A multiplex polymerase chain reaction (M-PCR) method was used to determine PI from nasopharyngeal secretions at the Virology Laboratory of Cerrahpasa Medical School. We ascertained the existence of PI in 63 cases between 5 November and 15 December 2009.

Thirty-seven patients (58.7%) were male and 26 (41.3%) were female with a median age of 5.3 years (range, 4 months to 17 years). Forty-six patients (73%) had an underlying condition (13 hematological, 9 asthma, 9 metabolic-endocrinological, 5 nephrological, 3 primary immune deficiency, 2 congenital heart disease, 2 neurological, 1 epidermolysis bullosa, 1 bile duct atresia and 1 prematurity). None of the patients had ever had a flu vaccination. The major symptoms were fever (98.4%), cough (84.1%), rhinitis (49.2%) and sore throat (20.6%). Our data was similar to that of Jain et al. [2] (95, 88 and 38%, respectively). The average duration of fever was 2.24 days (range, 1–14 days). One of the patients without fever was diagnosed with Guillain–Barre Syndrome (GBS). Chest X-rays of 29 cases (46%) showed pneumonitis, and 6 of these patients presented with acute asthma exacerbations.

Excluding the patients with hematono-cological conditions (n = 11), lymphopenia (<1500/mm³) was found in 14 (26.9%) of the remaining 52 patients, which was similar to the ratio (27%) found by Coşkun et al. [3] in adult PI patients. All patients were administered oseltamivir, except for 4 patients who had no symptoms at diagnosis. All 7 patients who required mechanical ventilation had an underlying condition and 5 of them died. The median age of these patients was 4.9 years (range, 6 months to 16 years) and the median duration of ventilation was 7 days (1–14 days) (Table 1).

According to our data, PI had a peak in November and no more cases were observed after 15 December 2009 (Fig. 1). In a study performed in Turkey for influenza surveillance in the 2007–08 winter season, influenza A had a peak in January and 6.3% of the 337 subjects had H1N1 [4].

As reported by Stowe et al., GBS encountered in one case (1.6%) demonstrated that the influenza-linked GBS risk was greater than that associated with the vaccine (relative incidences were 7.4 and 0.76, respectively) [5].

PI caused acute asthma exacerbations in asthmatic children and acute bronchiolitis in babies. We

### Table 1

<table>
<thead>
<tr>
<th>Case no</th>
<th>Age (years)</th>
<th>Underlying disorder</th>
<th>Days of ventilation</th>
<th>Antibiotics</th>
<th>Antiviral</th>
<th>Additional finding</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5</td>
<td>Asthma</td>
<td>10</td>
<td>Ampicillin/sulbactam</td>
<td>Oseltamivir</td>
<td>ARDS</td>
<td>Recovered</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Niemann Pick</td>
<td>2</td>
<td>Ampicillin/sulbactam</td>
<td>Oseltamivir</td>
<td>Metabolic acidosis</td>
<td>Died</td>
</tr>
<tr>
<td>3</td>
<td>0.5</td>
<td>Prematurity</td>
<td>7</td>
<td>Vancomycin, ceftriaxone</td>
<td>Oseltamivir</td>
<td>DIC, metabolic acidosis</td>
<td>Recovered</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>Operated astrocytoma</td>
<td>7</td>
<td>Meropenem</td>
<td>Oseltamivir</td>
<td>DIC</td>
<td>Died</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>AML relapse</td>
<td>1</td>
<td>Imipenem, teicoplanin, t-amphotericin B, voriconazole</td>
<td>Oseltamivir</td>
<td>Fungal pneumonia</td>
<td>Died</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>Lysuniric protein int.</td>
<td>8</td>
<td>Vancomycin, cefotaxime</td>
<td>Oseltamivir</td>
<td>DIC</td>
<td>Died</td>
</tr>
<tr>
<td>7</td>
<td>0.5</td>
<td>Operated atresia</td>
<td>14</td>
<td>Vancomycin, cefazidime</td>
<td>Oseltamivir</td>
<td>Aspiration pneumonia</td>
<td>Died</td>
</tr>
</tbody>
</table>

ARDS: acute respiratory distress syndrome; DIC: disseminated intravascular coagulation; AML: acute myeloid leukemia.