Clinical Science

CLINICAL CHARACTERISTICS OF COVID-19 IN CHILDREN AT THE INSTITUTE FOR PULMONARY DISEASES IN CHILDREN-SKOPJE

Tatjana Jakovska1, Angelcho Andonovski1, Eli Stojanova1, Biljana Kakaraskoska-Boceska2

1 Institute for Pulmonary Diseases in Children, Skopje, Republic of North Macedonia
2 Institute of Public Health of Republic of North Macedonia, Skopje, Republic of North Macedonia

Abstract

The aim of the paper was to evaluate clinical characteristics of COVID-19 in children and the success of the treatment. Material and methods: The study included 218 pediatric patients suspected for COVID-19 hospitalized at the Institute for Pulmonary Diseases in Children-Skopje, during the period from 16th of March to 19th of June 2020. All patients were tested for presence of SARS-CoV-2 virus in nasopharyngeal swab with real-time reverse transcription polymerase chain reaction (RT-PCR) in the Institute of Public Health of Republic of North Macedonia. Clinical symptoms, X-ray and laboratory findings were included in the study. Results: From 218 hospitalized patients, only 9 (4.13%) were positive for COVID-19 and 59% of them were males. Infants, with moderate pulmonary disease were 44.4% of the patients. Fever and gastrointestinal symptoms were present in 66.6% and 22.2% of the children, respectively. Macrolides were therapy of choice in 88% of the treated patients, 77% received intravenous therapy, 33% were on inhaled bronchodilator. Conclusions: A small number of children had COVID-19. All infected children were with mild to moderate pulmonary symptoms and reacted satisfactory to the treatment. However, the importance of transmitting the virus and influence over children’s health remains uncertain.
**Introduction**

Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) caused by SARS-CoV-1 virus. The most recently discovered severe acute respiratory syndrome coronavirus (SARS-CoV-2) causes so-called COVID-19, an infectious disease that causes enormous morbidity and mortality in the whole world. This new virus and disease were unknown before the outbreak in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting mostly elderly, but also children in many countries globally.

Compared to adults SARS-CoV-1, MERS-CoV and SARS-CoV-2 seem to affect children less commonly and cause fewer symptoms. Preliminary evidence suggests children are just as likely to become infected with SARS-CoV-2 as adults, but are less likely to be symptomatic or to develop severe symptoms. However, the importance of children in transmitting the virus and the importance of influence of this virus on child’s future health and wellbeing is still uncertain.

The aim of this paper was to evaluate clinical characteristics of COVID-19 and success of the treatment in children.

**Material and methods**

The study included 218 pediatric patients suspected for COVID-19, hospitalized at the Institute for Pulmonary Diseases in Children-Skopje, during the period from 16th of March to 19th of June. All patients were tested for presence of SARS-CoV-2 virus in the nasopharyngeal swabs using LightMix SarbecoV E-gene plus EAV control, TIB MOLBIOL and LightMix Modular Wuhan CoV RdRP-gene, TIB MOLBIOL. These tests present real-time reverse transcription polymerase chain reaction (RT-PCR) technology and were performed at the Institute of Public Health of Republic of North Macedonia in Skopje. We analyzed clinical symptoms, lung X-rays and laboratory findings in this study.

**Results**

From a total of 218 patients tested for SARS-CoV-2, 41% were females, and 59% males. According to age, all of them were from 5 days old to 15 years, but most of them belonged to the group under one year old (27.5%), from 1 year - 2 years were 22% and 14.6% from 2 years - 3 years. Most of them originated from Skopje (84.4%).

All COVID-19 patients had mild to moderate symptoms, 66.6% had high fever and pulmonary symptoms: increased cough, dyspnea, chest tightness, wheezing, sputum production, hemoptysis. 22% had gastrointestinal symptoms: diarrhoea, vomiting/nausea, abdominal pain. Most of the COVID-19 patients (44.4%) were one year old or younger.
Clinical characteristics of COVID-19 in our patients were:

- Pulmonary symptoms: increased cough, dyspnea, chest tightness, wheezing, sputum production, hemoptysis
- Fever/General symptoms: fever, fatigue, headache, arthralgia/myalgia
- Gastrointestinal symptoms: diarrhea, vomiting/nausea, abdominal pain
- Other symptoms: none of the above

But, most of the COVID-19 patients had high fever and pulmonary symptoms, and some of them had gastrointestinal and other symptoms (Graph 2).

Individual symptoms in patients are presented in graph 3.
Laboratory analysis in patients with COVID-19

Lymphopenia, neutrophilia, high CRP, and high procalcitonin levels may be associated with greater illness severity. We did not find elevated serum alanine aminotransferase and aspartate aminotransferase levels, elevated lactate dehydrogenase levels in our patients (table 1).

**Table 1.** Blood test results in positive patients with COVID-19

<table>
<thead>
<tr>
<th></th>
<th>HGB</th>
<th>RBC</th>
<th>WBC</th>
<th>LYM%</th>
<th>PLT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1</td>
<td>11.6</td>
<td>4.41</td>
<td>14.8</td>
<td>3.5</td>
<td>469</td>
</tr>
<tr>
<td>Patient 2</td>
<td>12.7</td>
<td>4.35</td>
<td>10.2</td>
<td>17.4</td>
<td>236</td>
</tr>
<tr>
<td>Patient 3</td>
<td>12.4</td>
<td>4.41</td>
<td>5.4</td>
<td>43.3</td>
<td>170</td>
</tr>
<tr>
<td>Patient 4</td>
<td>12.1</td>
<td>4.7</td>
<td>40.6</td>
<td>22.8</td>
<td>419</td>
</tr>
<tr>
<td>Patient 5</td>
<td>12.7</td>
<td>4.45</td>
<td>7.1</td>
<td>16.7</td>
<td>229</td>
</tr>
<tr>
<td>Patient 6</td>
<td>10.6</td>
<td>4.51</td>
<td>20.3</td>
<td>7.1</td>
<td>289</td>
</tr>
<tr>
<td>Patient 7</td>
<td>13.2</td>
<td>5.61</td>
<td>9.7</td>
<td>48.6</td>
<td>255</td>
</tr>
<tr>
<td>Patient 8</td>
<td>10.3</td>
<td>4.6</td>
<td>8.3</td>
<td>65</td>
<td>525</td>
</tr>
<tr>
<td>Patient 9</td>
<td>11</td>
<td>4.02</td>
<td>15.3</td>
<td>25.3</td>
<td>420</td>
</tr>
</tbody>
</table>

Urine culture - In only one Covid-19 patient, Escherichia coli ESBL+ was isolated.

Blood culture – All blood cultures remained sterile after incubation.

Chest X-rays of children with COVID-19 are presented in Picture 1 to Picture 3.

Chest x-ray of a 4-month-old child with COVID-19, with bilateral air-space consolidation.

All COVID-19 patients were treated with azithromycin, but because of moderate pulmonary disease many of them received intravenous third generation cephalosporins (77.7%), 34% inhaled bronchodilator and had symptomatic therapy (Table 2).

All COVID-19 patients reacted satisfactory to the treatment and they left the hospital in a stable condition.
Discussion

Children of all ages can become ill with coronavirus disease (COVID-19). But most of them who are infected do not become as sick as adults and some might not show any symptoms at all. Children also rarely experience severe illness with COVID-19. Children under the age of 1 (infants) are at higher risk of severe illness with COVID-19. This is likely due to their immature immune systems and smaller airways, which make them develop breathing issues with respiratory virus infections. A study of more 2100 children with suspected or confirmed COVID-19 in China showed that 11% of infants had a severe or critical illness, about 7% of children ages 1 to 5, 4% of those 6 to 10 years and 4% of those 11 to 15 years. During the stay in our hospital all patients had mild to moderate pulmonary and gastrointestinal symptoms. None of the treated patients needed oxygen therapy. All positive patients reacted well to the treatment and were discharged from hospital in a good condition.

Conclusion

This is the first published study of COVID-19 in children in the Republic of North Macedonia in which we found a small number of children with COVID-19. They had mild to moderate pulmonary symptoms and reacted well to the treatment. However, the importance of influence of this virus on child’s future health and wellbeing is still uncertain, also transmission of the virus from asymptomatic children to other people is unknown.

References