

A Short Review of Pediatric Respiratory Presentation in COVID-19

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Abstract

As the novel coronavirus infection has involved the whole world, and children are the victims as adults, and yet there are many obscure points about this global problem, this review study is aimed to evaluate its clinical and paraclinical presentations particularly in young ages.

In this review, we performed using PubMed and Google scholar database and motor of search. The meta-analysis, reviews and case series done on COVID-19 patients especially on youngsters under 18 years, were considered.

Fever and cough are prevalent in children involvement like adults. Pneumonia is the most common complication in novel coronavirus. Children have better prognosis and severe disease in this group is rare. Bilateral patchy densities and ground-glass opacities are prevalent in chest CT scan of pediatric COVID-19. Although there are some differences between pediatric and adult COVID-19, similarities between respiratory signs and symptoms in these two groups are prominent.

Keywords: COVID-19; SARS-cov-2; Coronavirus; Children.

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Introduction

At the end of the year 2019 a viral infection named novel coronavirus (also called COVID-19) appeared and concerned all people over the world. China was the first country involved and Wuhan, Hubei Province was the center of infection. Lower respiratory tract is target of this virus. The virus is considered to be transmitted by respiratory droplets.(1, 2)

In outbreak of COVID-19 infection children patients were not as common as adults. For this fact, some theories were suggested:

1. Children have fewer outdoor activities and travels so they have fewer contact.
2. Because of not fully developed immune system (both humoral and cellular) in children, there is absence of severe immune responses to viral disease.
3. There is immaturity of ACE2 receptors in children while COVID-19 involves the ACE2 receptors for going inside the cells.
4. More exposure to respiratory syncytial virus(RSV) may cause higher levels of immunoglobulins.(2, 3) There may be an increase in the number of pediatric patients in the future.

Many large populations of adult patients are studied and there are numerous reports about the clinical manifestation of COVID-19 near this group, on the other hand, there are few published data for pulmonary involvement about COVID-19 infection in children and they are mostly case series.

CT scan of thorax and real-time reverse transcriptase polymerase chain reaction assay (RT-PCR) are the well-known methods for detection of the disease, although false negative reports may exist due to technical errors. There was a male-dominated tendency for COVID-19 pneumonia in some studies (4, 5). In the present study, we investigate COVID-19 infection presentation in children.

Methods

This study was approved by Ethics Committee. In PubMed database and Google scholar motor engine, we selected the papers containing below words: Children, Coronavirus, COVID-19 and SARS-cov-2. There were some studies about symptoms, diagnostic tests, complication and management of COVID-19 pneumonia.

Although we used World Health Organization reports, we extracted similar adding up and focused on children groups.

Results

Pulmonary complication is the most common involvement in COVID-19 infection. In one study fever (84%) and cough (65%) were the most common symptoms and respectively fatigue (42%) and sputum production (27%). The other respiratory signs and symptoms were shortness of breath (27%), sneezing (26%), nasal congestion, rhinorrhea (24%), and hemoptysis (2%) (6). In another study done on children under 18 years, 73% of their symptoms were fever, cough and shortness of breathing (56%, 54% and 13% respectively), whereas 93% of adult patients suffered of these symptoms (fever 71%, cough 80% and shortness of breathing 43%). Among involved children, 5.7-20% became hospitalized, although this percentage for infants was significantly higher (15%-60%). There were small groups of affected children admitted in PICU or died under 1 year-old, 15-60 % hospitalized and 1% death, while between 1 and 9 year-old 5-20 % hospitalized and no mortality were seen (7, 8).

However radiologic findings in children infected by COVID-19 are not specific, they are very common (80%) (9). Most findings are patchy consolidation and ground glass haziness, especially in periphery of two lungs 60%. Lymphadenopathy and plural effusion are not common (10). Gold standard of diagnosis is detecting viral particles in nasopharyngeal or throat swab. If the first sample was negative, it is recommended the second sample of upper or lower respiratory tract be examined. Although serology is one of the diagnostic tests, it should not be done in early phase. Meanwhile cross reaction with other coronaviruses has been reported (10).

Discussion

The most common complication of novel coronavirus is pneumonia. We have little accurate information about COVID-19 and every day new studies with new information are published all over the world. There are many papers about symptoms, methods of diagnosis and treatment of COVID-19. None of them are accepted completely. Another problem is differences between children and adults. Fortunately pediatric patients have milder infection and better prognosis (8).

Incubation period of COVID-19 in all age groups are similar, while clinical signs and symptoms in children and adults differ in incidence, severity and diversity. Transmission mainly can be done by respiratory droplets and conjunctiva. Exposure to high concentration of aerosols increases the rate of contamination (11). In both groups fever and cough have been more common, respectively, even though respiratory tract involvement

in elders were more intensive. Severe disease is more common in infants with higher rate of mortality and its amount is declining by increasing age till 18 (9).

Diagnosis in children is more challenging considering the hardship of nasopharyngeal sampling and also similarity of clinical features of COVID-19 and other respiratory or gastrointestinal viral infections.

It is recommended that pulmonary function tests be postponed in patients suspicious for COVID-19 in order to avoid spreading infection unless it is inevitable (8).

Bronchoscopy has no indication as the first step of diagnosing COVID-19, as the medical team would be at risk, however in case of negative result in nasopharyngeal sample, it is suggested (10).

Conclusion

In conclusion pulmonary complication is the most common involvement in COVID-19 infection. Radiologic findings in children infected by COVID-19 are not specific, but they are very common. Gold standard of diagnosis is detecting viral particles in nasopharyngeal or throat swab.

Conflict of Interest

The authors declare that there is not any conflict of interest.

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