

Demographic Characteristics, Clinical Features, and Laboratory-Workup of Pediatric Patients Infected With COVID-19 at Setif, Algeria

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ABSTRACT

Introduction: Since the outbreak of SARS-COV-2 in 2019, many studies have focused on the features of this infection in adults, nonetheless, the demographic, clinical, and laboratory characteristics of children with Covid-19 are not well-documented.

Objective: To identify clinical features, and laboratory workup of paediatric sufferers infected with Covid-19.

Materials & Methods: This was a retrospective study, which included laboratory-confirmed Covid-19 cases of 30 paediatric patients who consulted the Public Hospital Establishment El Eulma, Setif, Algeria, from April, 2020 to August, 2021. Data were recorded on a questionnaire in which demographic characteristics, clinical features, lab workup and treatment were interrogated, and outcome data were analyzed.

Results: 17/30 patients were of 2-15 years of age, 12/30 patients were of 1 month to < 2 years of age, while 1/30 patient was less than one month of age. 43% of cases had a Covid-19 close contact history. The entire paediatric cases showed mild to moderate clinical features. Upon presentation, the most preponderant symptoms were fever (24/30:80%) and cough (18/30:60%). Laboratory data revealed lymphopenia among 27/30 (90%) cases, although the C-reactive protein and D-Dimer levels were raised in most cases. 19/30 had pathological findings on their Chest X-ray radiographs. The treatment modality widely used was antibiotics in most patients (28/30:93%).

Conclusion: Covid-19 was contagious in children of all ages. Compared to adult patients, clinical symptoms were typically less severe, even though the outcome of the disease has been moderately favourable with no fatality.

Key-Words: SARS-CoV-2, Covid-19, Paediatrics, Clinical features, Laboratory workup.

Introduction

In December 2019, at Wuhan, Hubei Province, China, cases of pneumonia of unknown origin were reported¹⁻². The disease extended its reach internationally to numerous nations across six continents as well as locally to other areas of China³. World Health Organization (WHO) classified the pandemic a public health emergency of global significance on January 31, 2020⁴. The virus was named the 2019 novel corona virus by the World Health Organization (WHO) on February 11, 2020⁵. Little was known about SARS-CoV-2 at the start of the pandemic.

By analogy with other respiratory illnesses like influenza, Covid-19 was assumed to be highly contagious and can rapidly spread from person to person⁶, especially among children, leading to school closures and physical distancing measures. The data collected in different countries have provided a better understanding of the epidemiology of Covid-19, including children who have been infected, although current reports indicate that most paediatric cases are mild compared with subjects in adults⁷. Children who have Corona virus infection may not exhibit any symptoms or have a fever, cough, nasal congestion, diarrhoea, headache, fatigue, and runny nose as the common manifestations⁷⁻⁸⁻⁹. Haematological tests indicated leukopenia, lymphopenia, and high C-reactive protein (CRP) levels⁹, whereas radiological studies showed pathological findings on Chest X-rays⁹. According to disease severity, paediatric patients' classification showed that most of the patients were asymptomatic and in a mild disease

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state; some had a moderate disease, while a few cases had severe disease⁹.

Paediatric sufferers have been pronounced everywhere globally, specifically with asymptomatic and slight infections¹⁰. Therefore, as children were also at risk of becoming infected with Covid-19 and information on paediatric patients is limited, so evaluation of the transmission patterns, clinical characteristics, and laboratory confirmed Corona virus paediatric sufferers with in this area was aimed to raise awareness, provide prompt treatment to children with Covid-19 and contribute to a comprehensive understanding of the characteristics of Covid-19.

Materials & Methods

Between April, 2020, to August, 2021, Corona virus infection in 30 paediatric patients was confirmed by pharyngeal swab Covid-19 nucleic acid test at Public Hospital Establishment El Eulma, Setif, Algeria. It was a retrospective, single-centre study. Data enrolled was gathered from medical records of the Covid-19 positive patients. Data regarding demographic characteristics, clinical features, laboratory workup, and radiological findings were gathered on a self-structured questionnaire. It was computed, organized, and analyzed through spreadsheet software (MS-EXCEL®). The study design was reviewed and approved by the medical research board and ethical committee. Data were anonymously analyzed in this retrospective study; thus, informed consent was waived.

Based on clinical manifestations, laboratory results, and chest radiograph imaging, the disease severity was determined and was classified as asymptomatic illness and symptomatic illness (i.e., illness that range from mild to severe):

- 1- Asymptomatic infection: No clinical symptom or sign was present; the chest x-rays were typical, nonetheless, the nucleic acid test result for Corona virus was positive.
- 2- Mild: Upper respiratory tract infection symptoms being present, pharyngeal congestion, and without any anomalies on auscultation.
- 3- Moderate: Patients who complained of frequent fever, cough, and pneumonia were included.
- 4- Critical/severe: Respiratory support (invasive or non-invasive) necessitated intense care due to the apparent hypoxemia.

Results

Demographic characteristics of paediatric Covid-19 cases: Between April 2020 and August 2021, 30 paediatric laboratory-confirmed Covid-19 patients had reported to Public Hospital Establishment El Eulma, Setif, Algeria. Out of these cases, 43 percent of the cases (n = 13) were female, whereas 57 percent (n = 17) were male. Confirmed cases were 7.5 years old on average. Of the total cases, 1(3.33%) patient was of 1-30 days, 12(40%) patients were in between 1 month to < 2 years of age, while 17 (56.67%) patients were 2-15 years of age. All patients were symptomatic (n=30,100%). Only 13 (43%) patients had a history of exposure or contact with Covid-19 confirmed cases, while the rest, 17(56.67%) were unexposed.

Clinical Features of paediatric Covid-19 cases: Fever was the most frequent symptom (80%; n = 24). The average temperature ranged from 38.0 to 38.7 degrees. Cough was the second most prevalent symptom (60 percent; n = 18). The additional typical symptoms included diarrhoea (26.67%), nausea/vomiting (23.33%), dyspnea (20%), anosmia (6.67%), and ageusia (3.33%). All the patients were symptomatic, although asymptomatic cases were absent. When the symptomatic cases were categorized based on the severity of the illness, 23 (76%) cases had mild disease, and 7 (23%) had moderate illnesses. However, no one had the severe or critical form of the disease.

Laboratory Findings of paediatric Covid-19 cases: Compared with the standard lymphocyte reference range (i.e., 1000-4000 per mm³), 27 paediatric patients (90%) had decreased lymphocyte count (i.e., less than 1000/mm³), while 3 patients (10%) had in between 1000mm³-4000mm³. In 17cases (56.67%) C-reactive protein (CRP) levels were high (i.e., >14.40 mg/L). In 19 cases (63.33%) there were pathological findings on their Chest X-ray radiographs, while the rest of the 11 cases (36.67%) were without any anomaly. D-Dimer levels higher than 500 ng/ml in 25 cases (83.33%), while five cases (16.67%) had normal D-Dimer levels (i.e., reference range ≤ 500 ng/mL).

Hospitalization and Treatment modalities used in paediatric Covid-19 cases: All the laboratory-confirmed Covid-19 children were hospitalized and treated in the isolation ward; every case was cured and recovered. Eleven patients were hospitalized for 5 days, thirteen cases for 5-10 days, similarly 5 suffers for 11-20 days, while 1 patient was hospitalized for > 20 days. We also traced utilized treatment modalities, and the treatment modality which was given in the

majority of cases included antibiotics (93%, n=28); other varieties of treatments which were given included corticosteroids therapy (26%, n=8), anticoagulants (26%, n=8), vitamins therapy (26%, n=8), and oxygen therapy (10%, n=3).

Discussion

Worldwide propagation of the Corona virus focuses on our serious endeavours to distinguish efficient ways of prevention and foster ideal clinical management. Even though there is more than adequate data accessible for grown-up Corona virus patients, our insight and investigation into the study of paediatric Corona virus disease transmission and clinical qualities are very restricted. Thus, in this unique situation, we performed this retrospective study on lab-confirmed Covid-19 paediatric patients to evaluate epidemiological features, clinical characteristics, and laboratory findings of paediatric Covid-19.

Median age of the 30 paediatric Corona virus confirmed cases was 7.5 years; these patients' ages ranged from 1 day to 15 years old. Likewise, almost the same age range was reported among the other studies on the Covid-19 paediatric population¹¹⁻¹²⁻¹³. Similarly, in the current study, 43% of patients had a history of exposure or contact with Covid-19 confirmed cases. This finding was in resemblance to the studies of Fang et al.¹⁴, Wei et al.¹⁵, and Wang et al.¹⁶ and also corresponded with the present literature¹¹⁻¹²⁻¹³. The difficulties in implementing personal hygiene practises and infection control precautions may be responsible for these findings, especially for this age group. Because new-borns under the age of one year cannot wear masks; thus, they require special safeguard measures. Adult caregivers should wear masks and wash their hands before touching new-borns. Therefore, caution should be practised in contact between paediatric and suspected or laboratory-confirmed Covid-19 adult patients to prevent Covid-19 infection.

Similar to the reported literature¹⁶⁻¹⁷⁻¹⁸⁻¹⁹⁻²⁰⁻²¹⁻²², in the present research, the most prevalent symptoms were fever (80%) and cough (60%). The additional symptoms that were present included diarrhoea, nausea/vomiting, and dyspnoea. However, no one had the severe or critical form of the disease. Guo et al. reported that the majority of paediatric Corona virus cases had mild to moderate clinical characteristics, and only a small number went on to acquire severe or critical illnesses¹⁹. Consequently, the

outcomes of our research were consistent with the literature, which claimed that children with Corona virus typically exhibit mild or no symptoms. Potential causes of children's Covid-19 symptoms, which tend to be mild, include: First, children's lungs contain a variety of viruses that can inhibit SARS-CoV2 growth. Second, as children aren't exposed to air pollution or cigarette smoke; thus, they have healthier lungs. Lastly, children don't yet have a fully developed immune system. Thus, infection with Corona virus won't result in production of inflammatory factors in large amounts, which lessens the risk of an inflammatory storm and the harm caused by autoimmunity to the lungs.

Laboratory workup in the current study revealed that 90% of cases had lymphopenia with high C-reactive protein (CRP) levels in 56.67% of patients and elevated D-Dimer levels in 83.33% of cases. There is a significant amount of data about the laboratory results in children with Corona virus, which suggested leukopenia and lymphopenia, with increased C-reactive protein levels¹⁶⁻²⁰⁻²³⁻²⁴. According to the observed lymphopenia, Corona virus, like other viral diseases, influences the direction of cytopenia, while the increased C-reactive protein levels indicate immune responses that provoke inflammation and lung injury. Thus, C-reactive protein levels could signify disease severity and be a significant marker for disease monitoring. According to the radiological imaging findings, abnormal signs were present in about 63.33 percent of children's chest X-rays. Abnormal radiological findings and Ground Glass Opacities were observed on imaging of Covid-19 patients.¹⁹⁻²¹⁻²³⁻²⁴ This suggests that lung tissue is affected chiefly during infection with Covid-19, and therefore radiological findings can be used in screening and diagnosis of Covid-19 infection.

Majority of the patients (93%) were treated with antibiotics. In addition, some patients (26%) received corticosteroids and anticoagulants, while a few patients received vitamins (26%) and oxygen therapy (10%). There were no recommended treatments for Corona virus; thus, these supportive treatment regimens were followed for the affected patients to minimize inflammatory lung damage and prevent secondary infections and other complications²⁵⁻²⁶.

Study Limitations

Our study has few limitations. First is the retrospective design of this study. Second, the interpretation of our findings might be limited by the

small sample size. Third, this retrospective study may not have captured all signs and symptoms. Thus, further studies are needed to corroborate the epidemiology, symptomatology, and specific treatment modalities of Covid-19 among paediatrics.

Conclusion

Covid -19 in children differs from adults in terms of clinical manifestations and laboratory findings. Our findings may help in the development of preventive and curative measures for paediatric Covid -19 patients.

Competing interests

The authors of the study have no conflict of interest.

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- A. Conception/Study/Designing/Planning
- B. Active Participation in Active Methodology
- C. Interpretation/ Analysis and Discussion