

Comparison of Initial and Follow-Up Lung Changes in Children with COVID-19 Infection by Using Low Dose HRCT. Study in Bahawalpur City

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Received: September 21, 2020; **Published:** October 06, 2020

Abstract

Objective: To discuss the initial and follow up lung changes on low dose high resolution computed tomography (HRCT) of coronavirus disease 2019 (COVID-19) in pediatric age group of Bahawalpur city.

Methods: Eighteen COVID-19 positive children (ages between 4 to 12 years) admitted to Corona ward of Bahawal Victoria Hospital were included in study. All had positive history of family exposure. No prior significant medical history in all cases. All patients underwent initial HRCT and follow-up chest HRCT on 14th day depending upon clinical status. The main CT features on initial CT chest were recorded followed by follow up CT chest.

Result: On initial low dose HRCT, the main abnormalities observed were ground glass haze 82%, patchy consolidation with air bronchograms 10%, interlobular septal thickening 6% and crazy paving pattern along with pleural thickening 1%. Most commonly involved lung zones were bilateral lower zone and right lower lobe most commonly effected. On follow up low dose HRCT scans most of the children 13 show complete resolution of initial findings. In 5 children consolidations were seen even after 14 days. 1 child developed respiratory distress syndrome and was put on ventilator but showed full recovery. No death documented.

Conclusion: Low dose HRCT scan is an investigation of choice to accurately assess the initial findings and disease transformation during follow-up in pediatric age group.

Keywords: High Resolution Computed Tomography (HRCT); Coronavirus Disease 2019 (COVID-19); CT

Introduction

Out of nowhere on 31st December 2019, cases of pneumonia of unknown origin was reported in Wuhan, China to the World Health Organization (WHO). Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was the causative agent [1]. On 11th March 2020 WHO declared coronavirus disease 2019 (COVID-19) a global pandemic [2].

In Pakistan, the first case of COVID-19 was reported on 26th February 2020. By 12th April 2020, Pakistan had 5038 confirmed cases of COVID-19 and 86 deaths. Province of Punjab has experienced the highest number of cases (N = 2425) [3]. Children and adolescents younger than 20 years of age constitute 10.6% of the total reported confirmed cases of COVID-19 in Pakistan as of July 8, 2020, with a mortality of 0.3% for those aged 10 years or younger and 0.5% for those aged 11 - 20 years [4]. Study showed that children have so far accounted for 1% - 5% of diagnosed COVID-19 cases, they often have milder disease than adults and deaths have been extremely rare.

Citation: Sadia Riaz., et al. "Comparison of Initial and Follow-Up Lung Changes in Children with COVID-19 Infection by Using Low Dose HRCT. Study in Bahawalpur City". *EC Paediatrics* 9.11 (2020): 21-23.

Diagnostic findings have been similar to adults, with fever and respiratory symptoms being prevalent, but fewer children seem to have developed severe pneumonia. Elevated inflammatory markers were less common in children, and lymphocytopenia seemed rare [5]. No other pediatric data is available for Bahawalpur City. Our research is the first in this course.

Low dose HRCT was done with 1.5-mm-collimation, 2-second, 120-kVp. Scans were obtained at 50 mA at selected identical levels in the chest. Studies have shown that the low-dose and conventional scans were equivalent in the evaluation of vessels, lobar and segmental bronchi, and anatomy of secondary pulmonary lobules, and in characterizing the extent and distribution of ground glass haze, patchy consolidation with air bronchograms, interlobular septal thickening and crazy paving pattern along with pleural thickening [6]. Low dose HRCT being ideal for pediatric age group.

Materials and Methods

Total of eighteen COVID-19 positive children ages between 4 to 12 years admitted to Corona ward of BVH Hospital were included in study. There were 9 females and 9 male patients included in study. All had positive history of family exposure to COVID-19. There was no prior significant medical history in all cases. Children with other illnesses were excluded. Children with negative COVID-19 test were excluded. All patients underwent initial HRCT and follow-up chest HRCT on 14th day depending upon clinical status. The main CT features on initial CT chest were recorded followed by follow up CT chest.

Results

Ground glass haze was the most common finding on initial low dose HRCT (82%). Other findings were patchy consolidation with air bronchograms 10%, interlobular septal thickening 6% and crazy paving pattern along with pleural thickening 1%. No sex predilection noted both equally involved. Most commonly involved lung zones were bilateral lower zone and right lower lobe most commonly effected. On follow up low dose HRCT scans most of the children (13) show complete resolution of initial findings. In 5 children consolidations were seen even after 14 days. 1 child developed respiratory distress syndrome and was put on ventilator but showed full recovery after treatment. No death documented.

Discussion

COVID-19 is generally a mild disease in children, including infants. However, a small proportion develop severe disease requiring ICU admission and prolonged ventilation, although fatal outcome is overall rare. In mid-December 2019, a disease caused by infection with severe acute respiratory syndrome coronavirus-2, which began in Wuhan, China, has spread throughout the country and many countries around the world [7]. The number of children with coronavirus disease-2019 (COVID-19) has also increased significantly. Although information regarding the epidemiology of COVID-19 in children has accumulated, relevant comprehensive reports are lacking. A study done by Yuanyuan Dong, Xi Mo, Yabin Hu., *et al.* showed there were 728 (34.1%) laboratory-confirmed cases and 1407 (65.9%) suspected cases. The median age of all patients was 7 years (interquartile range: 2 - 13 years) and 1208 case patients (56.6%) were boys. More than 90% of all patients had asymptomatic, mild or moderate cases [8]. Another study by Suriya Rehman, Tariq Majeed., *et al.* shows that children have equal chances of becoming infected with SARS-CoV-2 as adults, although would have milder symptoms or completely asymptomatic on follow up scans [9].

Conclusion

The COVID-19 disease has emerged as a pandemic and the current data reveals that children do not develop serious disease as compared to adults. Pakistan being developing country lacks proper quarantine facilities has resulted in spread of disease in children as schools were closed immediately after outbreak. In all cases severity of disease was mild to moderate. Low dose HRCT played a pivotal role in diagnosis of initial and follow up chest findings.

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Volume 9 Issue 11 November 2020

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