

## Epiglottitis Caused by COVID-19 Infection in a Four-Year-Old Boy

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### Abstract

**Background:** Epiglottitis is an inflammatory disease involving the epiglottis, vallecula, arytenoid cartilage, and aryepiglottic wrinkles. Acute epiglottitis is relatively rare, but it can quickly lead to a life-threatening airway obstruction. Diagnosis of epiglottitis is clinical, but radiography and direct vision of the epiglottis can also help with the diagnosis. Clinical manifestations of epiglottitis include fever, sore throat, and in the event of imminent airway obstruction, symptoms of muffled sound, falls, tripod position, and stridor might be presented as well. Epiglottitis can be caused by some bacterial agents or viruses such as adenovirus and measles. COVID-19 was first detected in December 2019 in a group of patients with severe respiratory symptoms in Hubei Province, China. Common symptoms include fever, cough, fatigue, difficulty breathing, and loss of smell and taste. Although COVID-19 disease has a variety of manifestations, only one case of epiglottitis following COVID-19 disease has been reported in adults. However, no cases of epiglottitis have been reported in children with COVID-19.

**Case presentation:** The patient, a 4-year-old boy, came to our center and the patient's family complained about shortness of breath and progressive lethargy of the child from 10 days ago. Since last week, he had been sleeping in a sitting position due to the aggravation of shortness of breath. On physical examination, respiratory distress, tachypnea, subcostal retraction, tail stridor, and crackle was heard in both lungs. Diagnosed with suspected bronchoscopy epiglottitis; and a large, swollen, and cherry-red epiglottis was observed. Based on the patient's history of respiratory symptoms and the prevalence of COVID-19, a reverse pharyngeal polymerase (RT-PCR) transcript test was requested for COVID-19 and the COVID-19 infection was positive. The patient was intubated due to decreased oxygen scorching and was treated with antibiotics due to the diagnosis of epiglottitis and recovered.

**Conclusion:** In this article, we reported the case of a 4-year-old child with epiglottitis in the context of COVID19. To the best of our knowledge, no case of epiglottitis had been, previously, reported in children with COVID19. Therefore, in our opinion, epiglottitis can probably be one of the manifestations of COVID19 in children.

**Key Words:** Children, COVID-19, Epiglottitis.

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## 1- INTRODUCTION

Epiglottitis is an inflammatory disease involving the epiglottis, vallecula, arytenoid cartilage, and aryepiglottic wrinkles (1). The cause of epiglottitis is usually a bacterial or viral infection, followed by inflammation and edema of the epiglottis and supraglottic structures (2).

Coronavirus (COVID-19) was first detected in December 2019 in a group of patients with severe respiratory symptoms in Hubei Province, China (3, 4). The clinical manifestations of COVID-19 in children are similar to those of other viral infections. Children present with a mild illness such as the flu, which sometimes progresses to acute respiratory distress syndrome, pneumonia, and multiple organ failure despite the respiratory tract being the primary target of SARS-CoV-2 (3).

Although the most common symptom of COVID-19 is pneumonia, some patients have experienced involvement of other major organs. One of the most common organs involved in COVID-19 infection is the upper respiratory tract (5). The most commonly reported complication following COVID-19 in children is fever and respiratory distress. To date, however, to the best of our knowledge, no cases of epiglottitis have been reported in children with COVID-19.

## 2- CASE PRESENTATION

During the outbreak of COVID-19, the patient, a 4-year-old boy, came to our center in 2021 and the patient's family complained about shortness of breath and progressive lethargy of the child from 10 days ago. During this time, the disease had progressed, so that from the week before the visit, the child's shortness of breath intensified while lying down and the child slept in a sitting position. The child's mother also complained of a runny mouth and anorexia during this period.

The patient was the fifth child in the family and was born with a normal vaginal delivery. All the required vaccinations were completed during his first 4 years and the patient had growth retardation and child growth indices including height, weight, and head circumference were below 5%; but the patient's motor development and speech were normal. He was a resident of Saravan, a small city in Iran; his parents were not relatives and had no family history of specific diseases. The family had not followed health and quarantine protocols.

On initial examination, the patient's heart rate was 120, respiratory rate was 38, and blood oxygen was 90%. The patient had no fever. On examination the child was lethargic, had respiratory distress, tachypnea, mouth breathing, and nasal flaring. Inspiration stridor was heard in the upper part and crackles in the lower part of both lungs.

For more investigation, necessary laboratory tests were requested and the results were as follows:

CBCdiff: (WBC=11300 cmm, Neut=68.7%, Lymph=25.4%), Hb=9 g/dL, Plt=434000 MI, CRP=2+, ESR=14 mm/h, LDH=364 U/L, CPK=21 U/L, ABG: (ph=7.29, pco<sub>2</sub>=68.6 mmhg, po<sub>2</sub>=52 mmhg, hco<sub>3</sub>=32.6 mEq/L).

Blood culture was reported negative.

Two hours after admission, the patient was transferred to the pediatric intensive care unit. After observing the tests and due to respiratory distress, the child was intubated. During intubation, the glutes were swollen and erythematous, and there was spasm of the endotracheal tube, which made intubation difficult. Antibiotics including ceftriaxone and clindamycin were administered experimentally during intubation, due to the acute and progressive condition of the patient. Due to the diagnostic suspicion, laryngoscopy was performed on epiglottitis two days

after hospitalization, in which edema and erythema of the glottis were observed and samples of secretions from the upper respiratory tract were sent for culture and staining.

Bronchial lavage cultures=Staph aureus

Though, staphylococcus aureus may represent an upper respiratory tract infection at the time of sampling, however, given that staphylococcus is more acute and blood culture was negative, this diagnosis was less relevant to us.

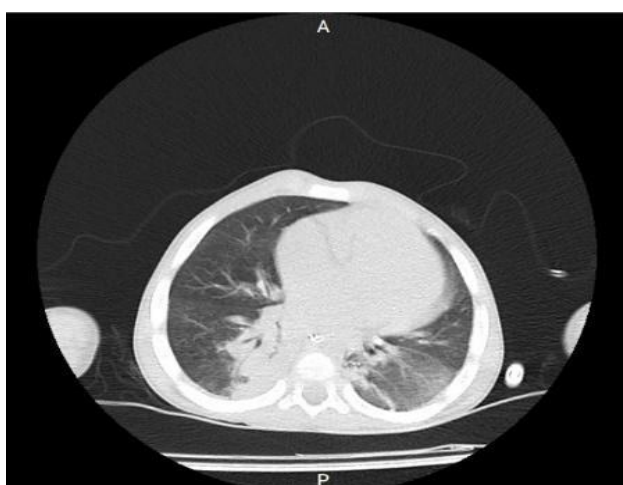
Furthermore, during direct bronchoscopy, swollen and red cherry epiglottitis was seen,

which was in favor of epiglottitis, and due to the patient's course and positive coronary test for the patient, epiglottitis in the field of coronary artery was considered.

Due to the history of respiratory distress and the prevalence of COVID-19, a pharyngeal RT-PCR test was requested for COVID-19, from which a positive and surprising result was obtained. He was quarantined for COVID-19 due to a diagnosis of epiglottitis. On CT scan, the patient underwent peripheral lung reticulonodular (**Fig 1** and **2**) and was prescribed to take Remdesivir injection.



**Fig 1:** Axial non enhanced chest CT image shows bilateral areas of ground-glass opacities (arrows) in a peripheral distribution



**Fig 2:** Axial non enhanced chest CT image shows ground-glass opacities, with superimposed septal thickening (arrows) in both lungs

Following the diagnosis of epiglottitis and culture response, antibiotics started at the time of admission were continued and the duration of antibiotic treatment included 7 days of injectable treatment and then 7 days of oral treatment. After receiving medication and supportive treatments, the tube was removed from the patient 5 days later and the patient's respiratory distress improved and he was transferred to the pediatric ward on the sixth day. He was monitored in the pediatric ward for two days and received treatment. After 8 days from the date of hospitalization, the patient was discharged in a good general condition.

### 3- DISCUSSION

COVID-19 was first detected in Wuhan, China, and subsequently led to a worldwide pandemic that not only did it carry a high mortality rate, but also imposed a great socio-economic burden on societies. The most common symptoms of coronavirus disease are fever, dry cough, and shortness of breath, while its less common symptoms are fatigue and sore throat (6, 7).

The corona virus attaches to the angiotensin-converting enzyme (ACE2) receptor at the apical surface of the ciliated respiratory epithelium and enters the cells. This enzyme is concentrated in the epithelial cells of the respiratory tract, and COVID-19 disease is more severe in the lungs and end airways (6).

Although the most common symptom of COVID-19 is pneumonia, studies have shown that the disease has spread to other major organs besides the respiratory tract, including the central and peripheral nervous systems (5). Glottic oedema has been also seen as a presenting feature of COVID-19 in an infant (6).

Epiglottitis is an inflammatory disease involving the epiglottis, vallecula, arytenoid cartilage, and aryepiglottic wrinkles. Acute epiglottitis is relatively

rare but can quickly lead to life-threatening airway obstruction. Diagnosis of epiglottitis is clinical, but radiography and direct vision of the epiglottis can also help with the diagnosis. Direct visualization of the epiglottis using diagnostics is the gold standard laryngoscopy. Lateral neck radiographs are used for emergency screening in patients with suspected acute epiglottitis (1, 2).

The most common age of infection is between 2 to 6 years, but with Haemophilus influenzae B (HiB) vaccination, epiglottitis has increased in adults. Important causes of epiglottitis are streptococci, including Streptococcus pneumoniae and viral infections, as well as S. aureus as a possible cause (2, 8).

Clinical manifestations of epiglottitis include fever and sore throat, and in the event of imminent airway obstruction, it may present with muffled sound, falls, tripod position, and stridor (2). Treatment of epiglottitis includes management of a patent airway and empiric antibiotic therapy until targeted therapy from cultures can be implemented.

In September 2020, in a case study of acute epiglottitis on a 60-year-old man with Acute Respiratory Syndrome - Coronavirus 2 (SARS-CoV-2), Alexander Fondau and his colleagues reported that the case with coronavirus had respiratory failure; and required rapid cricothyroidotomy (9).

However, so far epiglottitis in children has not been reported in the context of COVID-19, and in this article a 4-year-old child with symptoms of epiglottitis in the context of COVID-19 is reported; in general, our opinion is that epiglottitis can be considered as one of the complications of COVID-19.

### 4- Author Contributions

Definite diagnosis of case and Critical revision of the manuscript: Mehran

Karimi; definite diagnosis of case and Critical revision of the manuscript: Abdolmanan Jafari; contributing in case management and writing the article: Ali Shahzeidi

### 5- Acknowledgments

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### 6- Conflict of Interests

None.

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