CASE REPORT

Airway Obstruction in Children with COVID-19 Presenting with Stridor

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Abstract

We report three cases who presented with symptoms of upper airway obstruction that were secondary to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection. These children showed no signs of lung parenchymal involvement initially. Our first patient presented with stridor with significant upper airway obstruction and respiratory failure and required emergency intubation followed by tracheostomy. The second child presenting as croup had only partial response to dexamethasone and adrenaline. The third child, who had presented with airway obstruction turned out to have a retropharyngeal collection, was found to be infected with SARS-CoV-2 on RT-PCR from a nasopharyngeal swab. Our cases represent the new presentation of coronavirus disease 2019 (COVID-19) in pediatric patients.

Keywords: Airway obstruction in COVID-19, Case report COVID-19-associated tracheitis, Pediatric COVID-19.

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Background

Infections causing upper airway obstruction in children can lead to croup, epiglottitis, and exudative tracheitis. Viral laryngotracheitis or croup is the most common infectious cause of upper airway obstruction in children. The organism responsible for croup is parainfluenza type I. Epiglottitis is caused by *Haemophilus influenzae* type b while exudative tracheitis is caused by *Staphylococcus aureus*, *Moraxella catarrhalis*, and *Streptococcus pneumoniae*.[1]

The pandemic of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is ongoing worldwide.[2,3] Different presentations of pediatric COVID-19 have been described. Most of the pediatric confirmed cases are asymptomatic or with mild upper respiratory symptoms. A minor percentage can progress to acute respiratory distress syndrome (ARDS) or multiorgan system dysfunction.[4] Other manifestations include rhinorrhea, nausea, vomiting, fatigue, diarrhea, dehydration, abdominal pain, headache, pharyngitis, rash, myalgia, cyanosis, tachypnea, apnea, and other presentations.[5–7] We report three cases who presented with symptoms of upper airway obstruction that were secondary to SARS-CoV-2 infection. Appropriate informed consents were obtained from parents of all children considered for study.

Case Description

Case 1—Tracheitis

A 1.5-year-old male child presented to the emergency department with a fever of 2 days and stridor with fast breathing for 1 day. He was tachycardic (140/minute), tachypneic (48/minute), febrile (101.2 F) with oxygen saturation of 88% on room air. On physical examination, he was tachypneic, with severe subcostal retraction, nasal flaring with decreased breath sounds, no wheeze, and had poor sensorium. The child was intubated emergently and ventilated, keeping an ENT surgeon and anesthetist anticipating difficult airway. The tracheal tube could not be negotiated >1 cm below the vocal cords. Purulent secretions were noted in the glottis. Later elective tracheostomy was done. He was having leucopenia (3,700/cm^3) with neutrophilic predominance (72%) and lymphocyte

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of (28%) with CRP 46 mg/dL with normal liver and renal functions. Chest radiograph did not reveal steeple sign or lung parenchymal involvement (Fig. 1). RT-PCR for SARS-CoV-2 was positive. On the second day, the child worsened with the development of fluid refractory septic shock needing vasoactive medication. Second-line antibiotics were started because of septic shock. On the third day, his respiratory status deteriorated with the development of

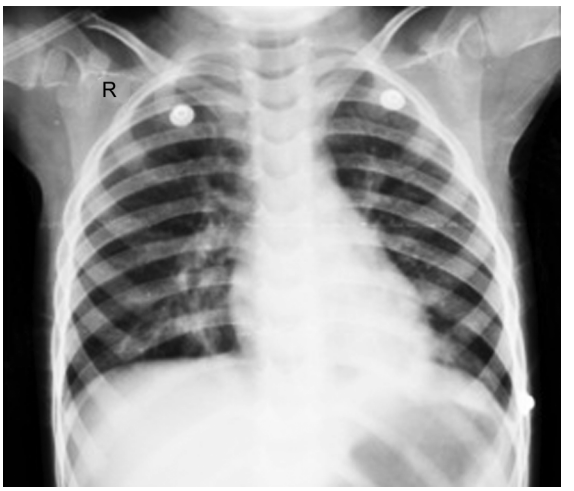

Fig. 1: Chest radiograph on day 1—no steeple sign

refractory hypoxemia needing high PEEP (Fig. 2). Blood culture and tracheal secretion culture turned out to be sterile. The child succumbed to illness due to catecholamine refractory septic shock and severe ARDS.

Case 2—Croup

An 18-month-old boy presented in the pediatric outpatient department with 4 days history of fever, rhinorrhea, and stridor for 1 day. He was tachycardic (170/minute), tachypneic (56/minute), febrile (100 F) with a saturation of 92% in room air. The child had tachypnea, severe subcostal retraction with nasal flaring, and inspiratory stridor. One dose of dexamethasone and epinephrine nebulization was given with partial response. Later he was shifted to PICU for ongoing management. There was no leukocytosis (13,200/μL) with 5,700/μL neutrophils and 2,900/μL lymphocytes. The CRP was elevated at 92 mg/dL. Chest and neck radiograph obtained with subglottic narrowing (Fig. 3). He gradually improved with dexamethasone and epinephrine nebulization, needed oxygen via nasal prongs with mild inspiratory stridor only while crying. Nasopharyngeal swab RT-PCR for SARS-CoV-2 was positive. He had an uneventful hospitalization and was discharged from the hospital after 2 days.

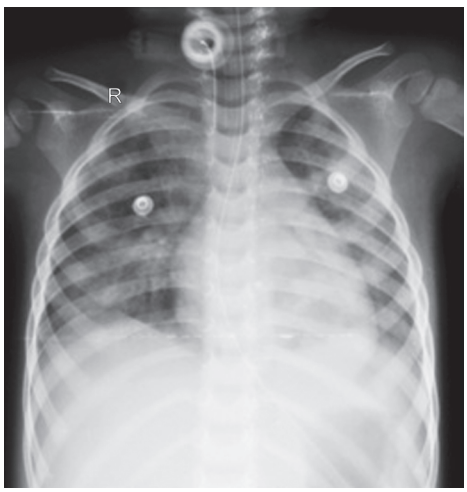

Fig. 2: Appearance of bilateral lung infiltrates

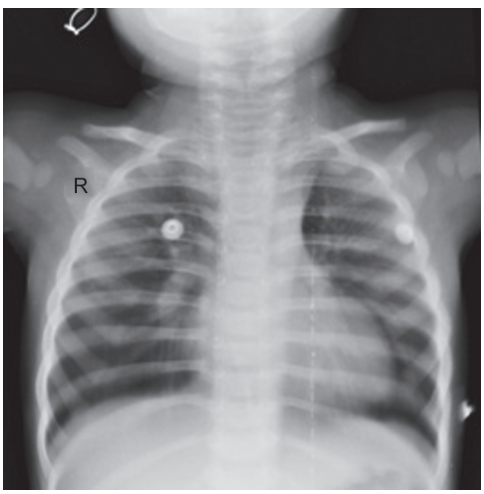

Fig. 3: Chest/neck radiograph showing steeple sign

Case 3—Retropharyngeal Abscess

A previously healthy 4-month-old male child, presented with complaints of stridor for 7 days and fever for 7 days. The child was referred from the peripheral healthcare facility, where he received intravenous antibiotics for 5 days. He was tachycardic (160/minute), tachypneic (62/minute), and febrile (100 F). Physical examination findings were suggestive of tachypnea, excessive salivation, severe subcostal retraction, nasal flaring, and biphasic stridor with decreased breath sounds. Throat examination revealed a bulge over the posterior pharyngeal wall. There was leukocytosis (TC: 17,200/μL) with neutrophil 6,000/μL, lymphocyte 3,000/μL, and platelet of 660,000/μL. CRP was 12 mg/dL. CT neck showed features of retropharyngeal abscess of 3 × 4 cm (Fig. 4). Incision and drainage of the retropharyngeal abscess was done by an otorhinolaryngologist. Culture sensitivity from drained abscess and blood showed no growth. Nasopharyngeal swab for RT-PCR was positive for SARS-CoV-2. The child was discharged from the hospital after 5 days with complete recovery.

Discussion

Our cases indicate that COVID-19 infections can cause laryngotracheitis leading to life-threatening airway obstruction. These children showed no signs of lung parenchymal involvement initially, which is the primary symptom in pediatric and adult complicated SARS-CoV-2 illness. There are reports of airway obstruction associated with less encountered viral pathogens (HSV, HZV, and HIV).[8–10] A report by vander Hoek et al. suggested that croup can be secondary to coronavirus infections.[11] Coronavirus disease 2019 pediatric case series from China showed that most cases had mild illness and only three patients in the Wuhan cohort required intubation and mechanical ventilation.[4] In January 2021, Pitstick et al.[12] reported a 14-month-old boy with laryngotracheitis secondary to SARS-CoV-2, who improved with racemic epinephrine and dexamethasone that is used commonly for croup. Venn et al.[13] reported three children presenting with airway obstruction secondary to SARS-CoV-2 out of which a 9-year-old child needed ventilator support and Heliox therapy. Our first patient presented with stridor with significant upper airway obstruction and respiratory failure and required emergency intubation followed by tracheostomy and mechanical ventilation. In this case, we had to coordinate with other specialties including otorhinolaryngologist,

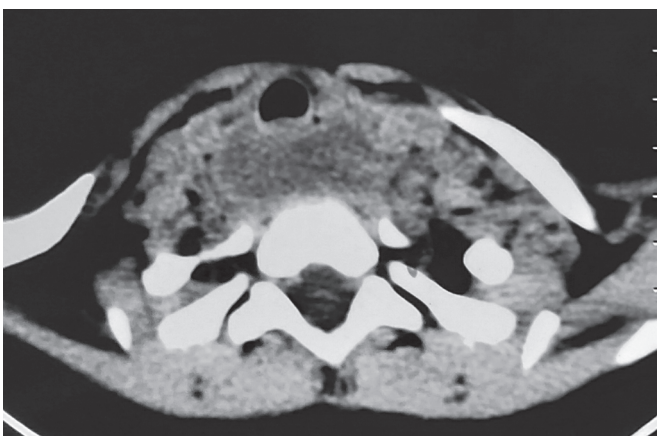

Fig. 4: CT neck showing retropharyngeal abscess

anesthetists keeping in mind possible contagious SARS-CoV-2, especially high aerosol-generating airway procedure like tracheostomy. After tracheal intubation and non-invasive ventilation, tracheostomy represents the third-highest risk of transmission of COVID-19 to staff.[14] Experiences from SARS highlight the need to delay or avoid tracheostomies in this group of patients whenever possible.[15–17] But in children who present with severe obstruction leading to airway obstruction where "Can Not Intubate Can Not Oxygenate" (CICO) situation arises, there is no option other than surgical airway. The second child presenting as croup had only partial response to dexamethasone and adrenaline. The third child, who had presented with airway obstruction turned out to have a retropharyngeal collection, was found to be infected with SARS-CoV-2 on RT-PCR from a nasopharyngeal swab. The abscess might be due to secondary bacterial infection after SARS-CoV-2. Again incision and drainage of the retropharyngeal abscess was challenging in presence of COVID-19 which was done in all precautions to restrict its spread to healthcare personnel.

Conclusion

Upper airway obstruction with fever can be a manifestation of SARS-CoV-2 and the need for etiological evaluation in children presenting with croup, where otherwise it was not helpful before the COVID era. Our cases represent the new presentation of COVID-19 in pediatric patients. We recommend that pediatric patients presenting with upper airway obstruction symptoms be tested for COVID-19 so that isolation precautions can be taken to restrict disease transmission.

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