

SARS-CoV-2-induced croup in paediatric patients in Aseer region, south-western, Saudi Arabia: two case reports

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SUMMARY

Croup is a relatively mild and self-limiting disease but may occasionally be associated with severe morbidity in young children. While Para influenza is known to be the most common etiologic agent, other viruses can also cause croup that may be more severe. We report two cases (20 months, 3 years old) with classic symptoms and signs suggestive of croup, one case had severe croup that required admission to paediatric intensive care unit, the other one had moderate croup who admitted to the paediatric general ward in March and April 2021. Both were diagnosed with severe acute respiratory syndrome coronavirus (SARS-CoV-2) by polymerase chain reaction testing from nasopharyngeal samples that were negative for all other pathogens including the most common etiologies of croup. In conclusion, croup is one of the respiratory symptoms of novel SARS-CoV-2 in children therefore; the presence of clinical manifestations of croup indicates the need for COVID-19 screening.

Key words: SARS-CoV-2, croup, nasopharyngeal

INTRODUCTION

Croup is a common respiratory tract infection characterized by fever, barking cough, stridor and hoarseness of voice with various degree of respiratory distress. The disease usually occurs between 7 and 36 months of age [1, 2]. It occurs predominantly in late fall and early winter seasons. Croup is self-limiting illness that typically resolves over several days. The severity of croup relates to the child's degree of respiratory status and work of breathing [3]. Para influenza virus is the most common etiologic agent in croup, which accounts for approximately one-half to two-third of the cases [4-6]. Other viruses such as influenza, adenovirus, rhinovirus and respiratory syncytial virus have been also reported to be the causative pathogens [7].

Children with the novel Coronavirus (COVID-19), an infection caused by severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) are usually asymptomatic or mildly symptomatic. The most common symptoms are coryzal in nature including fever and cough [8]. Most children are clinically stable, but a small percentage can progress to acute respiratory distress syndrome or multi-organ system dysfunction [9]. Few cases of croup secondary to COVID-19 have been reported in adults and children [10-12].

We report two cases with classic symptoms and radiologic sign suggestive of croup secondary to SARS-CoV-2 infection, one case had severe croup that required admission to Paediatric Intensive Care Unit (PICU), the other case had moderate croup who admitted to the paediatric general ward of Abha Private Hospital, South-western Saudi Arabia in March and April 2021.

CASE REPORTS

Case 1

A 20-month-old previously healthy girl was brought to the Emergency Room (ER) due to fever, cough, and stridor. Her mother had tested positive for COVID-19

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and the child's symptoms started 4 days after her mother's test. The condition started with history of fever up to 39°C and runny nose. The child started to have barking cough, hoarseness of voice and noisy breathing on the second day of illness with no drooling, gastrointestinal or urinary manifestations. Symptoms were worsening and she brought to ER the next morning with shortness of breath and exacerbation of cough. On ER arrival, she was febrile (39°C), heart rate was 150/min, respiratory rate was 52/min, blood pressure was 110/75 mmHg and had a 90% oxygen saturation in room air. She had hoarseness and inspiratory stridor at rest with subcostal retractions, barking cough, no wheeze. Other systems examination was unremarkable. One dose of nebulized adrenaline was given with no improvement, the child became lethargic and oxygen saturation dropped down to 70%. She was intubated and transferred to the PICU. Investigations: Haemoglobin was 10.1 g/dL, total leucocytic count was 15,230 cells/mm³, and platelet count was 160,000 /mm³. C-Reactive Protein (CRP) level was elevated at 48 mg/dL and erythrocyte sedimentation rate was 55 mm at 1 hour. Inflammatory markers like serum ferritin, lactate dehydrogenase and D-dimer were elevated. The nasopharyngeal swab reverse transcription Polymerase Chain Reaction (PCR) for COVID-19 was positive. A respiratory pathogen nucleic acid amplification panel was negative for other viral etiologies including other types of coronavirus, influenza, Para influenza, respiratory syncytial virus, rhinovirus and enterovirus. X-ray neck radiographs revealed subglottic narrowing (Steeple sign) with no radio-opaque foreign body. Chest radiograph showed patchy opacities in both lower lobes represent early pneumonia. Patient was connected to mechanical ventilation and IV dexamethasone was given for croup while IV cefotaxime and oxacillin were given for possible secondary bacterial infection and pneumonia. Treatment of coronavirus was given according to the protocol of Ministry of Health, Saudi Arabia. She was on mechanical ventilation for 5 days and then successfully extubated. She remained afebrile, had no stridor and her general condition improved then discharged from the PICU. One week later in the follow up visit, she was well without any symptoms or complications.

Case 2

A 3-year-old boy was brought to the hospital for harsh cough and shortness of breath for 2 days. He developed fever, runny nose and poor feeding 2 days ago. His mother noticed that he had a barking cough and noisy breathing last night. The physical examination revealed an otherwise healthy child with persistent inspiratory stridor and subcostal retractions at rest. His vital signs include a heart rate of 135/min, a respiratory rate of 48/min, a blood

pressure of 95/55 mmHg, and an axillary temperature of 37.2°C. There was no cyanosis and pulse oximetry oxygen saturation (SpO₂) was 88 in room air and he was diagnosed as a case of grade II croup. Oxygen was administered and IV dexamethasone given. The patient was admitted to the Paediatric General Ward of the hospital for close observation and further management. Investigations: Complete blood cell count revealed; haemoglobin was 11.5 g/dL, the total white blood cell count was 7500 cells/mm³, with 57% neutrophils and 20% lymphocytes and platelet count was 190,000 /mm³. CRP level was elevated at 24 mg/dL. Inflammatory markers like serum ferritin, lactate dehydrogenase and D-dimer were normal. The nasopharyngeal respiratory PCR panel (BioFire® Film Array® Respiratory RP 2.1) was positive for COVID-19 and negative for all other pathogens. Neck radiographs showed subglottic narrowing (Steeple sign) however, chest radiograph did not show any abnormal findings. The child was treated with nebulized adrenaline and IV dexamethasone for 3 days. Stridor and cough resolved by 72 hours. The patient was observed for complications of COVID-19 infection for another 2 days then discharged with stridor only with execration and good general condition. On follow up, the mother reported no symptoms within one week after discharge from the hospital.

DISCUSSION

Croup is a common disease that occurs in young children and is most commonly due to viral etiology [12, 13]. The diagnosis of croup is mostly clinical and determining the etiology is rarely helpful [11, 12]. Usually, viral croup is a self-limiting that typically resolves within 3 to 7 days in most cases [11]. Although croup is a relatively mild illness in majority of cases; significant airway obstruction, respiratory distress and rarely death can occur [14].

In our case report, the two children with croup, one of them had severe respiratory distress and required PICU care while the other case had mild respiratory distress and required ward admission for further management. Interestingly, both cases were secondary to SARS-CoV2 infection. The two cases were tested with PCR-based pathogen panels that screened for the most common etiologies of croup and both cases were positive for SARS-CoV2.

In this pandemic, however, identifying if croup is associated with SARS-CoV2 infection assumes novel importance for counselling inpatient and outpatient families on quarantine and home isolation precautions [15]. Inpatient interventions for croup suggesting potentially more severe pathophysiology with COVID-19 croup versus previously described croup [16]. One of our cases with COVID-19 croup did not developed pneumonia however, the other one

displayed signs of pneumonia or lower respiratory tract infection as has been seen in the majority of symptomatic adult and paediatric cases of COVID-19.

A case series of 171 paediatric patients with COVID-19 in Wuhan, China, revealed that 65% of patients presented with pneumonia and 19% presented with upper respiratory tract illness [9]. Unlike most cases of croup, which is more common in late fall and winter [17], our patients developed croup during spring as in Pitstick's study [11].

Our limited experience with this newly described COVID-19 croup condition suggest that cases present

with significant pathology and might not improve as rapidly as those with typical croup.

CONCLUSION

Our cases indicate that SARS-CoV-2 can cause croup in paediatric patients in Saudi Arabia. We recommend that infants and children presenting with symptoms concerning for croup be screened for COVID-19 so that appropriate isolation precautions be taken to limit disease transmission. Given the novelty of SARS-CoV-2, further studies are needed to determine the proper management of croup induced by this virus.

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