

Self-limited focal epilepsy in a young child with SARS-CoV-2: serendipity or causal association?

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Short Report

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Abstract

Neurological manifestations have been reported in adults with COVID-19. In children with COVID-19, data on neurological symptoms are scarce. A 4-year-old girl was assisted at home for prolonged afebrile seizures. She was unresponsive, with a conjugate eye right deviation lasting > 20 minutes. Intravenous midazolam was administered. Before arrival in our Emergency Department, EMS providers excluded risk factors for COVID-19, such as fever, respiratory symptoms, other signs of viral infections, or recent contacts with suspected COVID-19 cases. Upon her arrival, seizures had resolved, GCS was 12. Temperature was 36,6°C. Chest was clear (SatO₂ 100%). Blood tests did not show signs of infection. We collected a nasopharyngeal swab, which tested positive for SARS-CoV-2. The patient rapidly recovered her neurological function. A pediatric neurological examination and video-EEG recording produced a possible diagnosis of self-limited focal epilepsy, with temporo-occipital spikes. Family history revealed her father had occasional seizures during fever episodes, at 14 and 21 years. The child was discharged home, scheduling further neurological investigations once the swab was negative. Our case emphasizes that keeping a high suspicion for SARS-CoV-2 infection is pivotal in hot spots, regardless of the absence of typical COVID-19 symptoms. As for the seizures episode, we know infections and fever are leading seizure precipitating factors in children. To our knowledge, this is the first case of focal status epilepticus in new onset focal self-limited epilepsy in an afebrile child with SARS-CoV-2. We speculate that SARS-CoV-2 infection may have triggered the onset of self-limited focal epilepsy in our patient.

Introduction

Occurrence of central nervous system (CNS) involvement and neurological manifestations in patients with severe COVID-19 have been reported in adult patients.(1,2) However, acute symptomatic seizures have been rarely observed.(3) In children with COVID-19, scant data on the prevalence of neurological symptoms and seizures are presently available.(4)

Case Presentation

A 4-year-old girl, previously healthy, was transported to our Pediatric Emergency Department (PED) by the Emergency Medical System (EMS), for nocturnal onset of prolonged afebrile seizures at home. On first examination, the young girl was unresponsive, with a conjugate eye deviation to the right lasting for more than 20 minutes. A single dose of intravenous midazolam (0,3 mg/kg) was administered on site, and then the child was brought to our PED.

Before arrival, as per protocol, EMS providers contacted the PED physician on duty, explicitly excluding distinct risk factors for COVID-19 disease. In particular, there was no history of fever, respiratory symptoms or other suggestive signs for viral infections. Both the child and her close relatives had no contacts with suspected or confirmed COVID-19 cases in the previous two weeks. Nonetheless, as resuscitation efforts may require healthcare professionals to work closely with each other and with the

patient, the child was hospitalized in a separate COVID-19 area, while all PED personnel assisting the patient used full personal protection equipment (PPE) for prevention of COVID-19.(5)

A prudent behaviour was also warranted by the possible lack of accurate information gathered in emergency circumstances, such as those likely found at home by the EMS staff. Moreover, since infection is one of the most frequent causes of seizure in children, COVID-19 was included as a possible cause or trigger for the reported seizures.

Upon her arrival in the emergency room, seizures were already resolved, although the Glasgow coma score was 12. Body temperature was 36,6°C. Chest was clear to auscultation (SatO₂ 100% in room air), heart sounds were normal, and the abdomen was soft. We collected a nasopharyngeal swab for testing the presence of SARS-CoV-2. The child remained confined in a dedicated COVID-19 area within our Observation Unit while waiting for the infectious screening result. Of note, medical history revealed that the child's father had occasional seizures during fever episodes, at the age of 14 and 21, even though no specific investigations were made. The patient rapidly recovered her neurological function, and we performed no intervention but continuous monitoring of vital parameters. Blood tests did not show evident signs of infection (WBC, CRP and procalcitonin were within normal range). Instead, somewhat surprisingly, the nasopharyngeal swab tested positive for SARS-CoV-2. We immediately warned local EMS headquarters to sanitize the previously used ambulance for possible SARS-CoV-2 contamination, as well as to inform all rescue members, in order to start their surveillance for COVID-19 symptoms.

A few hours after admission, we obtained a pediatric neurological examination and video-EEG recording, which produced a possible diagnosis of self-limited focal epilepsy with temporo-occipital spikes.(Figure) As clinical conditions quickly improved, the child was discharged home, scheduling further diagnostic investigations once the swab would have repeatedly tested negative for SARS-CoV-2. Local surveillance system for COVID-19 was alerted while we recommended the entire family to start the coronavirus quarantine.

Conclusion

Our case emphasizes that keeping a high suspicion for SARS-CoV-2 infection is pivotal in hot spots, such as the Veneto region, regardless of the absence of typical COVID-19 symptoms. The precautionary patient's isolation in the dedicated COVID-19 area and the use of adequate PPE avoided the possible spread of the infection to other patients, their caregivers and all PED personnel caring for the child.

As for the seizures episode, we know that infections and fever are leading seizure-precipitating factors in children.(6) To our knowledge, this is the first case of self-limited seizures in an afebrile child with SARS-CoV-2. At present, we can only speculate that SARS-CoV-2 infection may have triggered the onset of self-limited focal epilepsy in our patient. However, further studies are needed to exclude a causal relationship between SARS-CoV-2 infection and the onset of idiopathic seizures in children.

Declarations

We declare no competing interests.

All authors contributed equally to writing the manuscript.

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References

1. Helms J, Kremer S, Merdji H, et al. Neurologic Features in Severe SARS-CoV-2 Infection. *N Engl J Med*. 2020 Apr 15. doi: 10.1056/NEJMc2008597. [Epub ahead of print]
2. Asadi-Pooya AA, Simani L. Central nervous system manifestations of COVID-19: A systematic review. *J Neurol Sci*. 2020 Apr 11;413:116832. doi: 10.1016/j.jns.2020.116832. [Epub ahead of print]
3. Lu L, Xiong W, et al. New-onset acute symptomatic seizure and risk factors in Corona Virus Disease 2019: A Retrospective Multicenter Study. *Epilepsia*. 2020 Apr 18. doi: 10.1111/epi.16524.
4. CDC COVID-19 Response Team. Coronavirus Disease 2019 in Children - United States, February 12-April 2, 2020. *MMWR Morb Mortal Wkly Rep*. 2020 Apr 10;69(14):422-426. doi: 10.15585/mmwr.mm6914e4.
5. Edelson DP, Sasson C, Chan PS, et al. Interim Guidance for Basic and Advanced Life Support in Adults, Children, and Neonates With Suspected or Confirmed COVID-19: From the Emergency Cardiovascular Care Committee and Get With the Guidelines®-Resuscitation Adult and Pediatric Task Forces of the American Heart Association in Collaboration with the American Academy of Pediatrics, American Association for Respiratory Care, American College of Emergency Physicians, The Society of Critical Care Anesthesiologists, and American Society of Anesthesiologists: Supporting Organizations: American Association of Critical Care Nurses and National EMS Physicians. *Circulation*. 2020 Apr 9. doi: 10.1161/CIRCULATIONAHA.120.047463. [Epub ahead of print]
6. Stanuszek A, Wnękiewicz E, Kuźniar E, et al. Seizure-Precipitating Factors in Relation to medical Recommendations: Especially Those Limiting Physical Activity. *J Child Neurol*. 2015 Oct;30(12):1569-73. doi: 10.1177/0883073815574334. Epub 2015 Mar 25.

Figures

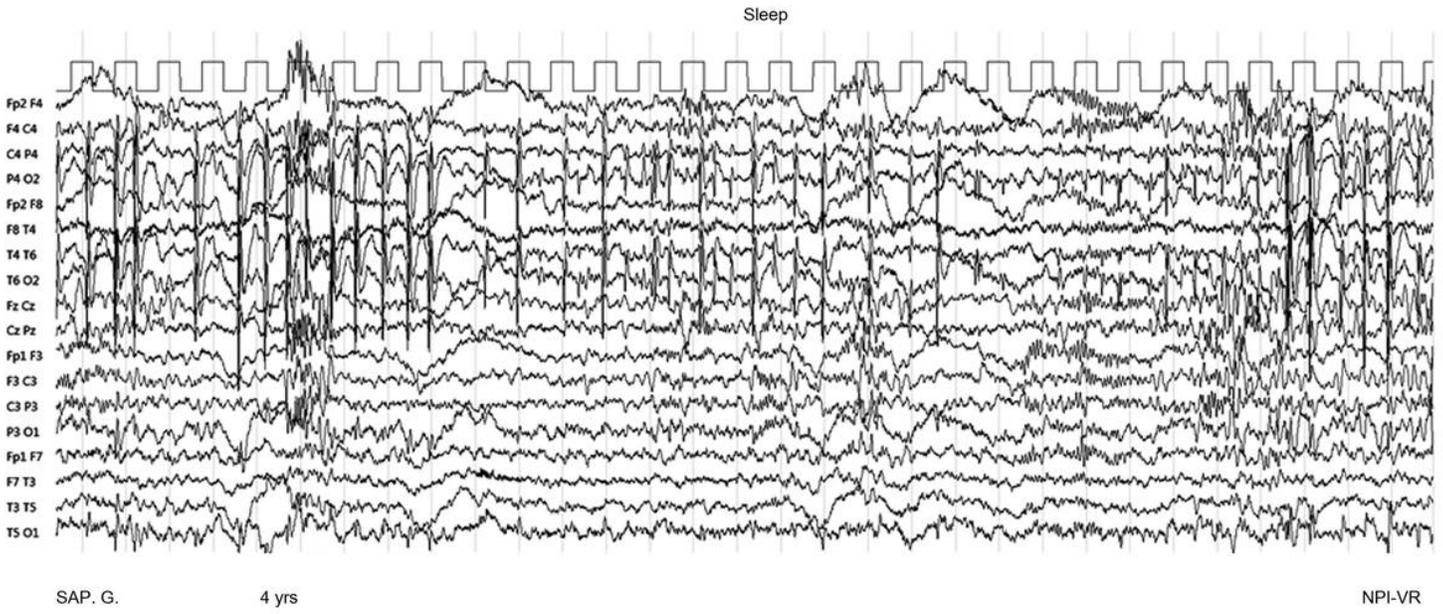


Figure 1

Note on temporo-occipital right region subcontinuous slow spikes-slow waves complexes