

COVID-19 in an Infant with Congenital Adrenal Hyperplasia: A Case Report

Global Pediatric Health
Volume 7: 1–3
© The Author(s) 2020
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/2333794X20958933
journals.sagepub.com/home/gph



Haya Azouz, MD¹ , Peter Gerrits, MD¹, Julie Surhigh, MD¹, and Shabana Kalladi Puthanpurayil, MD¹

In the midst of current SARS-CoV-2 pandemic, little is known about the implications of this new virus on patients with underlying chronic comorbidities. Herein, we present a case of a 5-week-old infant with congenital adrenal hyperplasia who acquired SARS-CoV-2 and recovered with minimal medical support.

Received June 8, 2020. Received revised August 19, 2020. Accepted for publication August 21, 2020.

Highlights

What do we already know about this topic?

CAH patients need stress dosing in case of infection or stress.

How does your research contribute to the field?

COVID doesn't pose higher risk in CAH infants compared to other stressors.

What are your research's implications towards theory, practice, or policy?

Whereas COVID may be worrisome in infants with underlying CAH, outcome may be favorable if the infant is diagnosed and treated properly.

Introduction

SARS-CoV-2, the novel coronavirus that originated in Wuhan, China in December 2019, has caused a pandemic that has affected more than 2.3 million individuals by April 20, 2020.¹ About 22% of those affected are less than 18 years old and most presented with fever, cough, and shortness of breath. Unlike 10% to 33% of the adult population, only 5.7% to 20% of known pediatric patients with SARS-CoV-2 infection required hospitalizations.² Despite the overall seemingly favorable prognosis in pediatrics, few cases have been reported in infants with underlying medical disorders.

We present a case report of an infant with a prior diagnosis of congenital adrenal hyperplasia (CAH) who was found to have SARS-CoV-2 infection.

Case Report

A 5-week-old infant with CAH presented to the Emergency Room (ER) with fever and fussiness.

He was born at 40 weeks gestation via C-section for failure to progress to a G1P1 mother with negative prenatal serologies. APGAR scores were 8 and 9. Initial newborn course was complicated by hypoglycemia, respiratory distress and tachypnea which resolved by day 2 of life.

On day 3 of life, the newborn screening test was positive for congenital adrenal hyperplasia. Pediatric endocrinology was consulted. Cortisol level obtained on day 2 of life was 1.2 mcg/dL (2.9–19.4 mcg/dL) and 17-hydroxyprogesterone was 813 ng/dL (85–250 ng/dL). An ACTH [Cortrosyn™] stimulation test was performed and confirmed the diagnosis with 1-hour post-stimulation 17 hydroxyprogesterone level of 17836 ng/dl [85–250 ng/dL] and cortisol level of 3.9 mcg/dl. The infant was initiated on hydrocortisone therapy at 30 mg/m² per day, fludrocortisone 0.1 mg daily and Sodium chloride (table salt) 2 grams divided in several feedings.

The infant presented to the ER at 5 weeks of age with fever and increased fussiness. There was no respiratory distress, diarrhea, vomiting, rash, or decreased feeding. His father reported symptoms of cough and a runny nose for a few days prior to this. On physical examination, he was afebrile with oxygen saturation of 100%. He was noted to be irritable and his skin was mottled (Figure 1). He did not

¹Beaumont Health, Royal Oak, MI, USA

Corresponding Author:

Haya Azouz, Pediatric residency, Beaumont Health, 3601 W. 13 Mile Road, Royal Oak, MI 48073-6769, USA.
Email: Haya.Azouz@beaumont.org



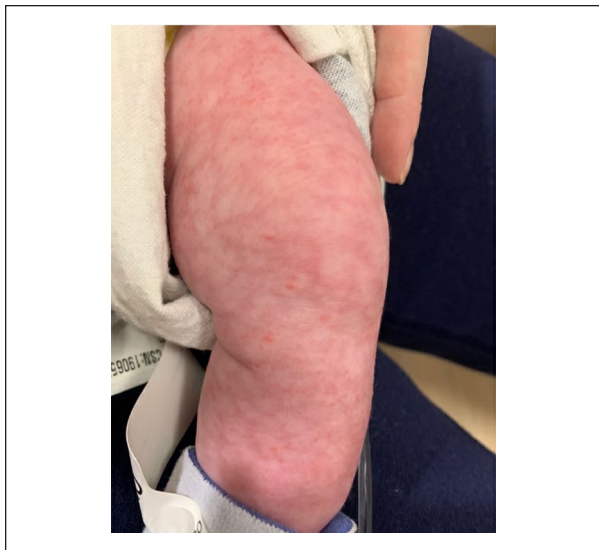


Figure 1. Mottling of skin on left leg.

have chest retractions, tachypnea, or nasal flaring. Laboratory results revealed WBC 7.2 bil/L (5-19.5 bil/L), neutrophils 2.1 bil/L (1-9 bil/L), lymphocytes 2.5 bil/L (2.5-16.5 bil/L), monocytes 2 bil/L (0.4-1.4 bil/L), Na 136 mmol/L (134-144 mmol/L), potassium 5.9 mmol/L (4-6 mmol/L), HCO₃ 22 mmol/L (20-28 mmol/L), glucose of 110 mg/dL (60-99 mg/dL), BUN 8 mg/dL (3-17 mg/dL), creatinine 0.33 mg/dL (0.1-0.36 mg/dL), and CRP 1.9 mg/L (0-7.9 mg/L). SARS-CoV-2 by Nucleic Acid Amplification (NAA) was detected on nasopharyngeal swab. Pediatric infectious disease specialists were consulted. Blood culture, urinalysis, and urine culture were negative. Chest x-ray demonstrated mild streaky bilateral perihilar streaks with no focal consolidation or pleural effusions. Costophrenic angles were clear with unremarkable lung apices and bronchoalveolar marking.

He was placed on triple maintenance hydrocortisone for stress dosing every 8 hours along with fludrocortisone 0.15 mg daily. He received a normal saline bolus and was then placed on maintenance IV fluids. He was transferred to the Pediatric Intensive Care Unit (PICU) and Pediatric infectious disease specialists were consulted. Over the course of his admission, he remained hemodynamically stable. He fed appropriately and did not require respiratory support. He was discharged 2 days after admission and his stress hydrocortisone dose was weaned down to his home regimen. At the time of this submission, he has been home for 4 weeks and doing well.

Discussion

Since the start of the SARS-CoV-2 pandemic, several studies have been published pertaining to clinical presentation in various age groups, possible management options and its implications in patients with other comorbidities.

To our knowledge, this is the first case report of SARS-CoV-2 infection in an infant with underlying adrenal insufficiency secondary to CAH. Our patient presented with fever and irritability that was worrisome given his age, the current pandemic and his underlying adrenal insufficiency. He was admitted to rule out sepsis given his age. Laboratory analysis revealed normal leucocyte count, CRP and electrolytes for age. He remained clinically stable and did not require any respiratory support. During his illness, his clinical presentation was limited to fever, runny nose, fussiness, and skin mottling. Interestingly, a prior case report of a 2-week-old infant with SARS-CoV-2 noted skin and soft tissue infection.³

In a study conducted on 2143 pediatric patients in China, more than 90% of pediatric patients were asymptomatic or had mild disease presenting with cough and fever without desaturation or gastrointestinal involvement.⁴ Fever among these children was noted to be 38-39 C. Few patients (<3%) had oxygen saturation below 92nd percentile.⁵ In patients with severe illness defined as dyspnea, central cyanosis, or oxygen desaturation, 10% were in infants < 1 year old compared to prevalence of 3% in 16 to 17 year olds.^{4,5} Most children who required intensive care had other comorbidities including: intussusception, leukemia, and hydronephrosis.⁵ In a study conducted on 66 children, 69% had normal leucocyte count. Neutrophilia, neutropenia, lymphopenia, and elevated inflammatory markers like CRP were less common.^{5,6}

Our case suggests that SARS-CoV-2 in an infant may demonstrate a fairly stable clinical course even in the presence of underlying adrenal insufficiency. In a longitudinal assessment of 156 patients with CAH, gastrointestinal and upper respiratory illnesses were the predominant reasons for stress dosing, adrenal crises, and hospital admissions.⁷ It was also noted that stress dosing was more common in children compared to adults which could potentially be attributed to the fact that parents tend to be more vigilant about their children's presentation and need for management compared to adults treating themselves.⁷ Our patient had an uneventful course of illness and responded well to stress dosing that was started appropriately at the onset of illness. Recent studies in adult population have demonstrated a role for dexamethasone in the management of severe COVID-19 infections requiring hospitalizations. According to Horby et al⁸, dexamethasone use decreased 28-day mortality in patients requiring oxygen or mechanical ventilation.¹ Thus, while our patient was placed on hydrocortisone due to adrenal insufficiency, it may have also contributed and ameliorated response to SARS-CoV-2 infection.

Author Contributions

HA, PG, JS & SK: contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted

manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Haya Azouz  <https://orcid.org/0000-0002-2321-5528>

Informed consent

This is to confirm that a written informed consent for patient information and images to be published was provided by the parent who is a legally authorized representative on the behalf of the patient.

References

1. *COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University* (JHU). <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>
2. CDC COVID-19 Response Team. Coronavirus disease 2019 in children — United States, February 12–April 2, 2020. <https://www.cdc.gov/mmwr/volumes/69/wr/mm6914e4.htm>
3. Patek P, Corcoran J, Adams L, Khandhar P. SARS-CoV-2 infection in a 2-week-old male with neutropenia. *Clin Pediatr (Phila)*. 2020;59(9-10):918-920.
4. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, Tong S. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. *Pediatrics*. 2020; doi: 10.1542/peds.2020-0702.
5. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. *Acta Paediatr*. 2020;109(6):1088-1095.
6. Henry BM, Lippi G, Plebani M. Laboratory abnormalities in children with novel coronavirus disease 2019. *Clin Chem Lab Med*. 2020;58(7):1135-1138.
7. El-Maouche D, Hargreaves CJ, Sinaii N, Mallappa A, Veeraraghavan P, Merke DP. Longitudinal assessment of illnesses, stress dosing, and illness sequelae in patients with congenital adrenal hyperplasia. *J Clin Endocrinol Metab*. 2018;103(6):2336-2345.
8. Horby P, Lim WS, Emberson JR, et al. Dexamethasone in hospitalized patients with Covid-19 – preliminary report. *N Engl J Med*. Epub ahead of print 17 July 2020;doi:10.1056/NEJMoa2021436.