The Evolution of the COVID-19 Pandemic in Pediatric Patients with Sickle Cell Disease: From Alpha to Omicron

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Introduction

- In March 2020, COVID-19 was declared a global pandemic caused by SARS-CoV-2
- Sickle Cell Disease (SCD) was classified as a risk factor for severe COVID-19 disease in both adult and pediatric patients.
- There was a need for consistent management guidelines and strategy in treating SCD patients with COVID 19.
- Complications of SCD treated in the ED include vaso-occlusive crises (VOC), or pain crises, and acute chest syndrome (ACS).

OBJECTIVE:

- To describe the one-year experience of demographics, clinical presentation and management of COVID-19 in children, and young adults with SCD at Children's National Hospital (CNH).

Methods

- Single-center, observational cohort study, with the creation of a SCD COVID-19 registry.
- Children (age <18 years) and young adults (age ≥18 years with SCD and confirmed SARS-CoV-2 positive PCR.
- Evaluated at CNH between March 2020 – January 2023.
- Data collected from the electronic medical record:
  - Demographics
  - COVID 19 Disease severity (per SECURE registry criteria) and transmission patterns
  - Laboratory markers

Results

Table 1: Demographics and Clinical Characteristics of the Entire SCD and COVID-19 Cohort

	All Patients N= 191	Alpha (N= 70, 37%)	Delta (N= 40, 21%)	Omicron (N=81, 42%)	P-value
Age, Median (IQR) N (%)	11.0 (5.0-17.0)	13.5 (6.0-18.0)	9.5 (5.0-17.0)	11.0 (4.0-16.0)	0.406
Children, <18 y/o N (%)	145 (76%)	47 (67%)	31 (78%)	67 (83%)	0.080
Adolescents, ≥18 y/o N (%)	46 (24%)	23 (33%)	9 (23%)	14 (17%)	
Gender N (%)					
Female	100 (52%)	37 (53%)	24 (60%)	39 (48%)	0.468
Male	91 (48%)	33 (47%)	16 (40%)	42 (52%)	
Genotype N (%)					
Hgb SS	132 (69%)	51 (73%)	26 (65%)	55 (68%)	0.347
Hgb SC	35 (18%)	11 (16%)	7 (18%)	17 (21%)	
Hgb Sβ^0 Thal	14 (7%)	7 (10%)	2 (5%)	5 (6%)	
Hgb Sβ$^+$ Thal	9 (5%)	1 (1%)	4 (10%)	4 (5%)	
Hgb S/HPFH	1 (1%)	0 (0%)	1 (3%)	0 (0%)	
Outpatient Disease Modifying Therapies N (%)					
Chronic Blood Transfusion	25 (13%)	6 (9%)	8 (20%)	11 (14%)	0.229
Hydroxyurea	104 (54%)	43 (61%)	18 (45%)	43 (53%)	0.238
Crizanlizumab	11 (6%)	5 (7%)	4 (10%)	2 (2%)	0.202
Voxelotor	6 (3%)	2 (3%)	2 (5%)	2 (2%)	0.754

Results

Figure 1: Common Presenting Symptoms, by Dominant Era

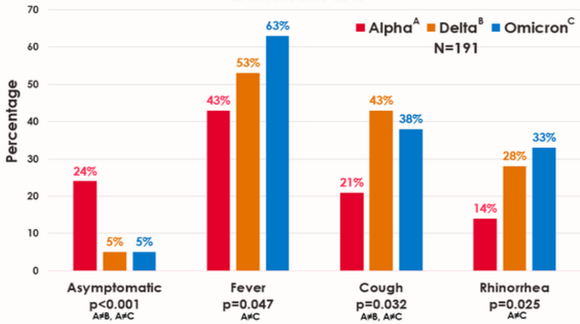
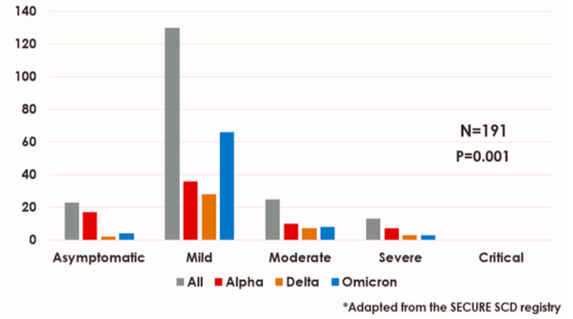


Figure 2: Clinical Severity of SCD during COVID-19 Period



*Adapted from the SECURE SCD registry

Conclusions

- In our cohort, we saw no mortality within pediatric and young adult SCD patients w/ COVID-19
- Similar morbidity patterns (ACS, Pain/VOC) between SCD pediatric and young adult patients w/COVID-19.
- Hospitalized patients were more likely to have fever, oxygen requirement, VOC and ACS.
- ACS patients were more coagulopathic, anemic, and hypoxic requiring blood transfusions.
- No Hydroxyurea (HU) use was associated with being hospitalized and higher acuity
- Future studies will characterize long COVID symptoms in pediatric and young adults w/ SCD.

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