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CORRESPONDENCE

Outcomes of COVID-19 in Pregnant Women with Sickle Cell Disease in India: A Case Series

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Dear Editor,

Both, sickle cell disease (SCD) and COVID-19 are known to adversely impact pregnancy [1, 2]. Whether COVID-19 modifies the risk of SCD in pregnancy is currently unknown. PregCovid registry (https://pregcovid.com/) collects information on pregnant and postpartum women with COVID-19 through the network hospitals in Maharashtra, India. A total of 1582 pregnant and post-partum women with COVID-19 were admitted to six COVID-19 hospitals of the PregCovid registry in Nagpur, Chandrapur, Akola, Yavatmal, and Mumbai from April 2020 to January 2021. We analyzed the data on women with sickle cell anemia (HbSS, $n = 6$), sickle cell trait (HbS, $n = 24$), HbS with β thalassemia ($n = 1$) was compared with women with COVID-19 but without any sickle cell disease ($n = 1551$) from the same study cohort. A preliminary analysis indicated that there were no major differences in presentations amongst women with SCD (sickle cell anemia, sickle cell trait, and HbS -β thalassemia) and hence the data was pooled and presented as women with SCD as a single group ($n = 31$, Table 1).

In our study, one woman with SCD had a vaso-occlusive crisis. A significantly higher proportion of women with SCD had symptomatic COVID-19 presentation (OR = 2.4, 95% CI = 0.97–5.99, $p = 0.059$). This proportion is also higher than previously reported in pregnant women in Maharashtra [3]. Amongst the COVID-19 related symptoms with running nose (OR = 22.8, 95% CI = 2.9–176.8, $p = 0.003$), diarrhea (OR = 9.1, 95% CI = 0.8–104, $p = 0.076$) and myalgia (OR = 6.8, 95% CI = 0.63–72.5, $p = 0.094$) were more prevalent in the SCD group as compared to non SCD group. Further, gestational hypertension (OR = 4.06, 95% CI = 1.35–12.3, $p = 0.033$) and IUGR (OR = 15.1, 95% CI = 3.95–57.4, $p = 0.002$) were at significantly higher proportions in the SCD group than non-SCD group. A significantly higher number of women with SCD required blood transfusion (OR = 4.3,

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95% CI = 1.9–9.9,p = 0.001) and non-invasive mechanical ventilation (OR = 15.21, 95% CI = 3.0–76.4, p = 0.012) as compared to the non-SCD group. Maternal mortality was also higher in women with COVID-19 and SCD (3.2%) as compared to the non-SCD group (0.9%).

Our results indicate an increased risk of pregnancy complications and adverse outcomes (including death) in women with SCD and COVID-19 than non-SCD. This increased risk is not due to the anemia as the numbers of women with Hemoglobin < 11 g/dl were similar in both groups. Despite low hemoglobin, most women had oxygen saturation > 95% and had no lung involvement (Supplementary Table 1) suggesting that respiratory issues or anemia are not the cause of adverse pregnancy outcomes in SCD with COVD-19. In our cohort, one woman with sickle cell trait and COVID-19 who was infected at 27 weeks of gestation, had a severe presentation, required ICU admission due to low oxygen saturation (79%), and died (Supplementary Table 1). This observation was similar to the findings reported in the black non-pregnant population with sickle cell trait and COVID-19 [4]. The severe disease leading to death in sickle cell trait and COVID-19 could be explained by the fact that 40% of the hemoglobin in sickle cell trait individuals is hemoglobin S [5] and hypoxia, as well as cell iron overload, are common features of COVID-19 [6] leading to severe disease and mortality. Further research is needed to understand the impact of COVID-19 on pregnant women with SCD and ascertain the causes of poor pregnancy outcomes in women with COVID-19 and SCD.

With the burden of COVID-19, the results of our study will help the obstetricians practicing in regions with a high

Table 1 Clinical characteristics and complications in women with sickle cell disease (SCD) and non-SCD with SARS-CoV-2 infection

Parameters	SCD	Non-SCD	*P*-value
Baseline characteristics			
Number of women	31	1551	
Median maternal age in years (range)	27 (23–30)	26 (23–30)	0.88
Gestation age or delivery in weeks (range)	37 (35–39)	38 (36–38)	0.96
Anemia (Hb levels < 11 g/dl)	21 (68%)	768 (51%)	0.07
Clinical characteristics			
Symptomatic	6 (19%)	140 (9%)	0.05
Fever	4 (13%)	96 (6%)	0.12
Dry cough	2 (6.4%)	63 (4%)	0.36
Running nose	2 (6.4%)	3 (0.2%)	0.003
Diarrhea	1 (3.2%)	3 (0.2%)	0.07
Myalgia	1 (3.2%)	4 (0.2%)	0.09
Dyspnea	2 (6.4%)	31 (2%)	0.13
Obstetrics characteristics			
Vaginal delivery	15 (62%)	631(49.4%)	0.20
Caesarean section delivery	9 (37.5%)	647 (50.6%)	0.20
Ongoing pregnancy	7 (22.5%)	214 (14%)	-
Pregnancy complications	(n = 24)	(n = 1278)	-
Preeclampsia	2 (8.3%)	61 (4.7%)	0.35
Oligohydramnios	2 (8.3%)	89 (6.9%)	0.86
Antepartum hemorrhage	1 (4.1%)	13 (1.0%)	0.24
Gestational hypertension	4 (16.6%)	60 (4.7%)	0.03
Gestational diabetes mellitus	1 (4.1%)	24 (1.8%)	0.39
Preterm labour	3 (12.5%)	61 (4.7%)	0.12
Still birth	1 (4.1%)	45 (3.5%)	> 1.0
IUGR	3 (12.5%)	12 (0.9%)	0.002
Acute respiratory distress syndrome	1 (4.1%)	9 (0.7%)	0.18
Maternal death	1 (3.2%)	11 (0.7%)	0.21
Treatment			
Blood transfusion	8 (25.8%)	115 (7.4%)	0.001
Noninvasive Mechanical Ventilation	2 (6.4%)	7 (0.5%)	0.01

P value is by Fishers Exact test and values < 0.05 are significant

prevalence of SCD. In Maharashtra, the Vidarbha region and the associated tribal belt is the high-risk zone for both SCD [7] and COVID-19. The poor outcomes in pregnant women with SCD and COVID-19 demand the immediate attention of obstetricians and policymakers in regions with a high burden of SCD and developing management strategies for these high-risk pregnancies. Adequate provision of blood and medicines used for the management of women with SCD will be essential to circumvent some adversities in pregnant women with COVID-19. This study should also act as a primer for generating more evidence from other parts of the world to address the COVID-19 related complications while assessing pregnant women with SCD.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s12288-021-01482-1.

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Declarations

Conflict of interest The authors declare no competing financial interests.

Availability of data and material All the data is presented in the manuscript and supplementary table.

Code availability Not applicable.

Ethics Approval The study was approved by the Ethics Committees of all participating Institutes and ICMR-NIRRH (IEC no. D/ICEC/Sci-53/55/2020 dated 04.06.2020).

Consent to Participate The waiver of consent was granted by IEC.

Consent to Publish Not applicable.

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