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Blood 142 (2023) 3904–3906

The 65th ASH Annual Meeting Abstracts

POSTER ABSTRACTS

114.SICKLE CELL DISEASE, SICKLE CELL TRAIT AND OTHER HEMOGLOBINOPATHIES, EXCLUDING THALASSEMIAS: CLINICAL AND EPIDEMIOLOGICAL

Risk Factors for Postnatal Complications in People with Sickle Cell Disease: A Preliminary Analysis

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Introduction: Sickle cell disease (SCD) is the most common hemoglobin variant worldwide, and its systemic influence, driven by acute on chronic ischemia-reperfusion injury and hemolysis-induced vasculopathy, results in diffuse end-organ damage capable of inducing significant pain and disability (Malowany et al, 2012). In studies to date, the rate of postnatal complications has been variably defined and has been shown to range between 13-25% (Camous et al, 2008; Silva et al, 2018; Oteng-Nim et al, 2015; Koshy et al, 1995). While some studies assessed the influence of type of anesthesia (neuraxial vs. general) on postnatal sickling episodes, (Bakri et al, 2015; Camous et al, 2008; Koshy et al, 1995) only one small study of 55 pregnant people assessed potential risk factors for postnatal maternal complications (Della-Moretta et al, 2021).
Aim: To characterize the frequency of postpartum complications in people with SCD and to determine potential risk factors for their occurrence.
Methods: A retrospective cohort study of pregnant people with SCD who delivered at Mount Sinai Hospital between 2000 and 2018 was performed. The primary outcome of an adverse maternal postnatal outcome was a composite end-point of vaso-occlusive pain, acute chest syndrome, infection (blood, urine, lungs), ICU admission, and new onset hypoxia that occurred after delivery. Patient characteristics and maternal and fetal outcomes were collected on the basis of clinical and biological plausibility. For multi-fetal pregnancies, data from a randomly chosen single infant was included in the analysis. Variables with more than 10% of data missing were excluded from this study. A 'complicated' vaso-occlusive event (VOE) is defined as a VOE requiring admission plus another concurrent SCD-related complication.
Results: A total of 201 pregnancies from 145 pregnant people are included in this analysis. Seventy-four (36%) of these pregnancies had a postpartum complication that met the criteria for the primary outcome (see Table 1). Of these, 35% were VOEs and 4% acute chest syndrome. When comparing the differences between those who experienced a SCD-related postnatal complication as defined above, compared to those who did not, there was a significant difference in the following: HbSS genotype (75% vs 39%, $p<0.001$), pulmonary complications prior to pregnancy (42% vs 28%, $p=0.037$) as well as during pregnancy (15% vs 3.9%, $p=0.006$), history of simple transfusions pre-dating pregnancy (78% vs 57%, $p=0.003$), hemoglobin levels at different time points throughout the pregnancy and delivery (see table 4), suspected chorioamnionitis (14% vs 5.9%, $p=0.05$), infection present 30 days before delivery (15% vs 5.5%, $p=0.03$), vaso-occlusive event in the third trimester (46% vs 31%, $p=0.03$). Also, for a postnatal morbidity event, there was no difference in the proportion who received exchange transfusions prior to pregnancy (15% vs 11%, $p=0.4$), nor in those who received prophylactic exchange transfusions during the pregnancy (8.1% vs 4.7%, $p=0.4$). Fetal outcomes and post-partum interventions are also described in table 2.
Conclusion: This study is the largest cohort of sickle cell disease patients to date, in which risk factors and postnatal outcomes are described. We have identified several risk factors that may contribute to the likelihood of experiencing an SCD-related postnatal complication. A regression analysis will be performed to establish the individual contribution of these risk factors to the primary outcome.

Disclosures Kuo: *Agios Pharmaceuticals:* Consultancy, Research Funding; *Alexion Pharmaceuticals:* Consultancy; *Bristol Myers Squibb:* Consultancy, Honoraria; *Forma Therapeutics:* Consultancy; *Pfizer:* Consultancy; *Bioverativ/Sanofi/Sangamo:* Membership on an entity's Board of Directors or advisory committees; *Novo/Nordisk:* Consultancy, Honoraria; *Vertex Pharmaceuticals:* Consultancy.

Characteristic	N = 74/201[1]
Overall postpartum complication rate	36.8%
Bloodstream infection	6 (3%)
Lung infection	10 (5%)
Urinary tract infection	6 (3%)
Vaso-occlusive event	
New onset postpartum	25 (12%)
Ongoing- onset peripartum	47 (23%)
Hypoxia	21 (10%)
Unknown	1
Acute chest syndrome	8 (4%)
ICU admission	4 (2%)
Mortality	0%

[1]n (% of overall cohort)

Table 1: Breakdown of postpartum complications

	Postnatal complications		
Previous medical history- key features			
Characteristic	**Absent, N = 127[1]**	**Present, N = 741**	**p-value[2]**
Cardiac complications	2 (1.6%)	5 (6.8%)	0.10
Pulmonary complications	35 (28%)	31 (42%)	0.037
Venous thromboembolism	2 (1.6%)	6 (8.1%)	0.053
Simple transfusions	73 (57%)	58 (78%)	0.003
Exchange transfusions	14 (11%)	11 (15%)	0.4
Admissions for vaso-occlusive events in the previous year	37 (29%)	28 (37.4%)	0.2
Hydroxyurea use	29 (23%)	23 (31%)	0.2
Key complications arising throughout pregnancy			
Cardiac complications	5 (3.9%)	7 (9.5%)	0.13
Pulmonary complications	5 (3.9%)	11 (15%)	0.006
Acute chest syndrome	5 (3.9%)	10 (14%)	0.013
Renal complications	9 (7.1%)	4 (5.4%)	0.8
Suspected chorioamnionitis	7 (5.5%)	10 (14%)	0.049
Infection 30 days prior to delivery	7 (5.5%)	11 (15%)	0.025
Prophylactic exchange transfusions	6 (4.7%)	6 (8.1%)	0.4
Hypertensive disorders of pregnancy (PIH and pre-eclampsia)	6 (4.7%)	8 (11%)	0.10
Key third trimester complications			
Vaso-occlusive events (VOE)	39 (31%)	34 (46%)	0.030
VOE preceding delivery	24 (19%)	49 (66%)	<0.001
Simple transfusions	17 (13%)	27 (36%)	<0.001
Exchange transfusions	8 (6.3%)	10 (14%)	0.084
Key obstetric outcomes			
Induced labour (% of all deliveries)	46 (36%)	35 (47%)	0.12
Caesarean delivery	49 (39%)	44 (59%)	0.004
Assisted vaginal delivery (% of vaginal deliveries)	70 (56%)	29 (39%)	0.003
Emergency Caesarean deliveries (% of Caesarean deliveries)	35 (71%)	39 (89%)	0.040
VOE – hypoxic during delivery	1 (0.8%)	15 (20%)	<0.001
VOE- acute chest syndrome during delivery	1 (0.8%)	5 (6.8%)	0.026
Key neonatal outcomes			
Preterm birth (before 37 weeks)	20 (16%)	23 (31%)	0.011
Neonate death	1 (0.8%)	0	>0.9
Low birth weight (<2500 g)	24 (20%)	16 (23%)	0.6
Resuscitated at birth	19 (15%)	21 (30%)	0.016
Admitted to NICU	16 (13%)	24 (33%)	<0.001
Laboratory characteristics			
Haemoglobin at 12 weeks (g/L)	94 (82, 106)	86 (78, 95)	0.009
Nadir haemoglobin in third trimester	88 (72, 96)	75 (65, 82)	<0.001
Nadir haemoglobin postpartum (g/L)	88 (72, 96)	75 (65, 82)	<0.001
Haemoglobin at delivery (g/L)	94 (82, 104)	81 (75, 97)	<0.001
Postpartum interventions			
intravenous patient controlled analgesia	4 (3%)	28 (38%)	<0.001
Narcotics use	49 (39%)	67 (91%)	<0.0001
Transfused post-partum	4 (3.1%)	28 (38%)	<0.001

[1]n (%); Median (IQR)

[2]Fisher's exact test; Wilcoxon rank sum test; Pearson's Chi-squared test

Table 2: Key baseline demographics, past medical history, complications that arose within the pregnancy and specifically in the third trimester, laboratory parameters, obstetric complications, neonatal outcomes and postpartum interventions according to the presence of a postnatal morbidity outcome.

Figure 1

https://doi.org/10.1182/blood-2023-190328