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Case Report

Manual Exchange Transfusion Role in the Management of a Pregnancy Compromised by Sickle Cell Disease in a Tertiary Hospital in Burkina Faso: A Case Report

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Abstract

Sickle cell disease in pregnant women can lead to potentially serious complications for both the mother and fetus. Its management remains a major public health challenge, particularly in resource-limited regions. Here, we report the management of a case at the Regional University Hospital (RUH) of Ouahigouya. A 30-year-old patient with 2 pregnancies, 1 miscarriage following a vaso-occlusive crisis. The current pregnancy was monitored at a peripheral health center until 25 weeks of gestation when the patient experienced a vaso-occlusive crisis, prompting her evacuation to the CHUR-OHG. Electrophoresis of hemoglobin revealed 53% hemoglobin S fraction and 47% hemoglobin C fraction, with mild anemia at 9.6g/dl. After symptomatic treatment and hydration, the first crisis improved; however, due to the succession of crises, manual exchange transfusion was discussed and indicated by the care team. Initially, this exchange was not performed due to a lack of blood products. Thanks to the opening of the new transfusion center in the region, the required blood bags were available for the procedure. Manual exchange transfusion was performed, using AA red blood cell concentrate. The immediate aftermath of the exchange transfusion was straightforward, and the patient was able to carry her pregnancy to term without further complications. Delivery was by caesarean section, at 38 weeks of gestation. The newborn, a female, had Apgar scores of 9/10 and 10/10, with a weight of 2600 grams. Postoperative recovery was uneventful with no vaso-occlusive crises.

Keywords

Sickle Cell Disease, Pregnancy, Vaso-Occlusive Crises, Manual Exchange Transfusion

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1. Introduction

Sickle cell disease, a genetic condition causing chronic anemia, remains a major public health challenge, particularly in resource-limited regions, significantly impacting maternal and child health [1-3]. Women with sickle cell disease face increased risks during pregnancy, with potentially serious complications for both the mother and fetus [2, 3]. Managing pregnancies in these women is crucial to prevent maternal and fetal complications. Indeed, pregnancy poses a high-risk situation for women with sickle cell disease, particularly during the third trimester, delivery, and postpartum, due to chronic hypoxia and vaso-occlusive phenomena in the maternal-fetal microcirculation [2, 3]. Risks include increased incidence of hypertension, preeclampsia, infections, and maternal death for the mother, and high rates of growth restriction, prematurity, and fetal death for the fetus. Moreover, pregnancy often exacerbates sickle cell disease [2]. Manual versus automated exchange transfusion emerges as a promising strategy in resource-limited countries, albeit controversial, to improve obstetric outcomes [2, 4-8]. However, this must be balanced with transfusion side effects, including the risk of alloimmunization and delayed hemolytic reactions [9-11]. This study aims to evaluate its effectiveness in a specific context in Burkina Faso, thus providing essential data to guide clinical practices and public health policies in resource-limited settings and hopes to pave the way for better management of pregnancies in this vulnerable population.

2. Case Presentation

This concerned a 30-year-old patient, pregnant with her second pregnancy. The first pregnancy was monitored at a health center and ended in a miscarriage following vaso-occlusive crises. The patient is a known carrier of sickle cell disease but was not under regular medical care. She reported intermittent painful osteoarticular crises since childhood, with an increase in frequency and intensity of crises during periods of high heat and cool weather. Apart from childhood vaccinations received as part of the expanded vaccination program, she had only received vaccinations against tetanus and meningitis. There was no history of previous blood transfusion.

Her current pregnancy was diagnosed at 8 weeks of gestation, and she had three visits to the health center in her neighborhood for prenatal care. Following a painful osteoarticular crisis at around 25 weeks of gestation, she was transferred to the obstetrics and gynecology department of the RUH in Ouahigouya for better management. She underwent electrophoresis with fraction dosage, etiological investigation, and assessment of her condition. The patient had 53% hemoglobin S fraction and 47% hemoglobin C fraction. She had mild anemia at 9.6g/dl. The identified etiology was insufficient hydration in the current hot climate. She received hydration and pain management treatment, resulting in symptom improvement. An exchange transfusion was considered but it was not feasible.

Three weeks after her discharge from the hospital, the patient experienced another vaso-occlusive crisis and was hospitalized. No infection was found. Hydration and pain management treatment were administered. Exchange transfusion was discussed by the care team but not performed due to a lack of blood product. Upon returning home, the patient again experienced increasingly severe vaso-occlusive crises after two weeks. Given her condition, we recommended a manual exchange transfusion. Thanks to the opening of the new transfusion center in the region, the necessary blood bags were available for the procedure. Manual exchange transfusion was performed, using AA red blood cell concentrate. The immediate aftermath of the exchange transfusion was straightforward, and the patient was monitored at the RUH de Ouahigouya. Fractional hemoglobin measurement revealed a decrease in hemoglobin S, which was at 31%. She was able to carry her pregnancy to term without further complications. Delivery was by caesarean section, at 38 weeks of gestation. The newborn, a female, had Apgar scores of 9/10 and 10/10, with a weight of 2600 grams. Postoperative recovery was uneventful with no vaso-occlusive crises.

3. Discussion

This case study highlights the importance of access to blood transfusion services in managing pregnancies in women with sickle cell disease. Manual exchange transfusion has proven effective in reducing vaso-occlusive crises, preventing obstetrical complications, and ensuring favorable outcomes for both the mother and fetus. The earliest studies on manual exchange transfusion date back to the 1960s, demonstrating its efficacy despite some side effects [12-14]. In developed countries, manual exchange transfusion has been replaced by automated exchange and has become an established practice in managing pregnancies complicated by sickle cell disease. These technological advancements and sufficient medical resources enable the procedure to be performed safely and effectively. Clinical protocols are well established, and medical teams are trained in the practice of exchange transfusion, ensuring optimal outcomes for patients [8, 15-21].

General advice given to pregnant women with sickle cell disease is to drink plenty of water, avoid extreme temperatures, and seek immediate medical attention if they begin to feel unwell. However, they often do not report early due to these constraints in accessing healthcare, and when they do present to the hospital, they are often at an advanced stage of complications [4].

Studies conducted in Burkina Faso in 2016 and 2019 by Zaman é et al. illustrate these differences between developed and developing country contexts [7, 22]. Although these

studies have shown that manual exchange transfusion can be an effective therapeutic option in an African context, they have also highlighted specific challenges faced by local clinicians, such as the lack of access to compatible blood bags and limitations in diagnostic resources.

As a result, managing sickle cell disease during pregnancy in developing countries and particularly in our context remains a major challenge. Although manual exchange transfusion may offer potential benefits, its effectiveness is often hindered by the structural and systemic obstacles faced by these countries.

It is therefore essential to work towards reducing these barriers by strengthening the capacity of healthcare systems in the most affected regions. This requires ongoing commitment to the development of medical infrastructure, training of healthcare personnel, and improving access to safe and quality blood products.

4. Conclusion

This case study highlights the critical management challenges and potential complications associated with sickle cell disease in pregnant women, particularly in resource-limited countries. The case presented at the Regional University Hospital of Ouahigouya underscores the importance of timely intervention and access to appropriate medical resources. The establishment of a new transfusion center in the region played a pivotal role in ensuring the availability of necessary blood products for the exchange transfusion, ultimately contributing to a positive outcome for both the mother and newborn. Further investigation into the long-term health outcomes for both the mother and newborn following manual exchange transfusion in similar cases would provide valuable insights for clinical practice and guideline development meanwhile waiting to catch up with developed countries in the use of automated exchange transfusion.

Abbreviations

RUH	Regional University Hospital

Consent

The patient provided written informed consent for the publication of her data in the manuscript.

Author Contributions

Djerma Corneille Ydris: Conceptualization, Project administration, Supervision, Writing – original draft, Investigation, Validation, Writing – review & editing, Formal Analysis, Methodology

Sanogo Moussa: Conceptualization, Writing – original draft, Validation, Writing – review & editing, Formal Analysis

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Data Availability Statement

All data are already included in this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

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