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Case Report

Therapeutic phlebotomy in antenatal and postnatal period of pregnancy

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ABSTRACT

Polycythemia during pregnancy is an uncommon but a high-risk condition that requires careful monitoring and individualized management to prevent maternal and fetal complications. This case report describes a pregnant woman diagnosed with polycythemia in the first trimester, managed successfully with therapeutic venesection under close monitoring. The procedure was well tolerated with no adverse effects on maternal or fetal health, and the pregnancy ended in the delivery of a healthy infant at term. A second venesection was performed postpartum due to persistent elevation of hematocrit. This case illustrates the safety and efficacy of venesection in pregnant patients with polycythemia, emphasizing the importance of multidisciplinary care and regular hematological evaluation throughout the antenatal and postpartum period.

Keywords: Pregnancy outcomes, Polycythemia in pregnancy, Hematocrit

INTRODUCTION

Therapeutic phlebotomy, also referred to as venesection or bloodletting, is a medical procedure involving withdrawal of specific quantity of blood from a patient's circulation.[1] This technique serves as an important treatment strategy for certain hematologic and iron-related disorders, particularly those in which reducing the volume of red blood cells or serum iron levels is essential to alleviate symptoms and prevent complications. It is especially beneficial in conditions where excessive erythrocytosis or iron overload contributes to disease pathology.

Currently, therapeutic phlebotomy is a widely accepted intervention for several clinical conditions. These include hereditary hemochromatosis, characterized by systemic iron overload; polycythemia vera, a myeloproliferative neoplasm marked by elevated red cell mass and hyperviscosity; porphyria cutanea tarda, a disorder involving heme metabolism; sickle cell disease, particularly in managing iron overload and reducing hemoglobin concentration.[2] In each of these cases, phlebotomy offers a non-pharmacologic approach to reducing disease burden by either lowering iron stores or decreasing blood viscosity. If left untreated, polycythemia-whether primary or secondary-can lead to serious, potentially life-threatening complications especially in pregnancy. In pregnancy, venesection is generally not preferred as it can lead to sudden hypovolemia, reduced utero-placental perfusion, and fetal compromise.[3]

In this case report, we present a case of polycythemia during pregnancy, in which therapeutic phlebotomy was performed in a carefully monitored clinical setting without any complications, resulting in significant clinical improvement.

CASE REPORT

A 27-year pregnant patient of weight 66 kg came to our hospital at 9 weeks and 5 days of gestation (G2/A1) with complaint of headache for 1 week. She had history of intermittent fever for the last 2 months. She had past surgical history of burns contracture release surgery of left

upper limb done in 2009. She had past obstetric history of anembryonic gestation of 8 weeks for which medical termination of pregnancy was done in 2020. On admission, routine investigations were done which showed, hemoglobin 17.2 g/dl, red blood cell count 5.37 cells/cu.mm, hematocrit 51.6% and platelet count 3.06 lakhs. On physical examination patient was afebrile, pulse rate was 86/min, blood pressure was 110/80 mmHg. No pallor, icterus, cyanosis, clubbing, lymphadenopathy or pedal edema and on systemic examination of central nervous system, cardio vascular system, respiratory system was normal. In view of elevated hemoglobin and hematocrit and associated symptoms, patient was admitted and hematologist opinion obtained. In view of polycythemia, myeloproliferative neoplasm associated mutation studies were done. BCR/ABL translocation assay, JAK 2 EXON 12,10, V617F, MPL Exon 10, CARL Exon 9 were not detected. In view of pregnancy, bone marrow aspiration was not done. The hematologist advised for therapeutic venesection, since medical treatment such as hydroxyurea and other chemotherapeutic agents were not preferred during pregnancy due to their teratogenic effects on fetus. Although therapeutic phlebotomy is generally performed as an outpatient procedure, in this case, the patient was admitted for the procedure to allow fetal monitoring and continuous observation of maternal vitals. After admission, (at 9 weeks and 6 days of gestation), therapeutic venesection was performed under continuous monitoring of vitals in the ward adjacent to labour room. 350 ml of blood was safely withdrawn from the patient. Patient tolerated the procedure. No adverse events were noted during the procedure. After the procedure, fetal heart was shown to be normal by ultrasound. Fetal well-being was reassured indicating there was no compromise of placental blood flow. Patient was symptomatically better the next day and hence discharged with hemoglobin of 15 g/dl and hematocrit 46.4%. At 37 weeks and 2 days of gestation, patient was delivered with a boy baby by elective lower segment caesarean section (LSCS) of weight 3.1 kg. Baby was found to be healthy at birth. On routine follow up after 2 months of delivery i.e., in the lactation period, patient's routine investigation showed hemoglobin 16.3 g/dl and hematocrit was 48.7%. In view of polycythemia, hematologist opinion was obtained advised for second procedure of therapeutic venesection. At blood bank, 450 ml of blood was withdrawn from the patient in out-patient basis. Patient's pre-procedure and post-procedure vitals were found to be stable. Patient tolerated the procedure. No adverse events were noted during the procedure.

DISCUSSION

The management of polycythemia during pregnancy presents a clinical challenge due to serious maternal and fetal complications, necessitating individualized, evidence-based approaches as highlighted in various case studies and literature**.**

Aggarwal and colleagues mentioned the complexity in managing polycythemia vera (PV) in a pregnancy case. The two goals of management in this case, was to reduce hematocrit below 45%, and to minimize thrombotic risk with low-dose aspirin, proved effective in maintaining stable hematological parameters and contributed to a favourable obstetric outcome. The patient delivered a healthy baby at 36 weeks after spontaneous labour, with no major maternal or neonatal complications.[4]

Based on the article by Subtil et al, the risks associated with polycythemia in pregnancy are significant and often under-recognized due to the disease's potential to exist in a preclinical phase. The authors describe how polycythemia, even before clinical diagnosis, can lead to severe complications such as intrauterine growth retardation (IUGR), placental infarction, perinatal death, and maternal thromboembolism. Their case report suggests that previous pregnancy losses were probably linked to unrecognized polycythemia, a finding that parallels observations in our case.[5]

Dilek and colleagues describe a rare case of PV in pregnancy. The authors highlight that PV, a myeloproliferative disorder characterized by excessive red blood cell production, poses a heightened risk of thrombotic complications during pregnancy, including venous thromboembolism, pregnancy-induced hypertension, and even fetal loss. Despite these risks, the reported case showed a favorable outcome through conservative management involving low-dose aspirin and close fetal monitoring, without the need for phlebotomy during pregnancy-which contrasts our case, where phlebotomy was performed.[6]

Robinson et al conducted a comprehensive analysis of 18 pregnancies in women with PV, offering one of the most detailed evaluations of maternal and fetal outcomes. Their findings clearly demonstrate that uncontrolled PV during pregnancy results in high rates of complications, including miscarriages, stillbirths, IUGR, and neonatal death. In contrast, pregnancies managed with strict hematocrit control through venesection, low-dose aspirin, and low molecular weight heparin (LMWH) resulted in significantly better outcomes. Among the actively managed group, most pregnancies progressed to term with healthy live births, and complications were notably reduced.[7]

Pata et al reported a rare case of polycythemia vera in pregnancy where hydroxyurea (HU), a cytoreductive agent, was continued into the first trimester. The patient, who had been on HU for 18 months before conception, had stopped the medication upon pregnancy confirmation but she already used it up to the 8th week of gestation. Despite concerns over HU's teratogenicity, the pregnancy proceeded without complications, and a healthy, full-term infant was delivered. No congenital anomalies or perinatal complications were observed, and both maternal and neonatal outcomes were favourable. While this case

suggests that early exposure to HU in pregnancy may not always lead to adverse fetal effects, the authors caution that its use should still be avoided during the first trimester unless absolutely necessary.[8-10]

CONCLUSION

Polycythemia, either primary or secondary, during pregnancy can increase thrombotic tendency and it can lead to spontaneous abortion in the first trimester, late pregnancy loss and IUGR, preterm delivery, and still birth. Treatment options of polycythemia were administering chemotherapeutic agents (e.g., busulfan, hydroxyurea, chlorambucil) and radioactive phosphorous and erythrocytapheresis. Due to their teratogenic and harmful effects on fetal development, radioactive and cytotoxic therapies are contraindicated in pregnancy, making venesection, a safe treatment for polycythemia. Low-risk cases may be managed conservatively with low dose aspirin (40-100 mg once daily) and therapeutic phlebotomy, while high-risk patients may benefit from pegylated IFN-α and close monitoring.

Venesection during pregnancy should be performed only when the benefits clearly outweigh the risks. It requires multidisciplinary coordination between Obstetrician, Hematologist, and Transfusion medicine specialist with careful maternal and fetal monitoring, dose adjustment based on weight and trimester, and individualized risk assessment. Hence, therapeutic phlebotomy is considered a safe treatment option for polycythemia during pregnancy when performed under close and continuous monitoring.

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