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# Discontinuation of Routine Postpartum Complete Blood Count in Uncomplicated Vaginal Deliveries

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## ABSTRACT

**Introduction:** The aim of this prospective study is to assess the clinical utility and safety of discontinuing routine Complete Blood Count (CBC) testing in uncomplicated vaginal deliveries with a focus on identifying potential benefits, risks, and overall cost-effectiveness of this practice. This routine CBC is used to assess for postpartum anemia and the need for a blood transfusion but is currently performed regardless of initial blood count on admission or estimated blood loss during delivery. However, recent evidence suggests that routine CBC testing may not significantly impact clinical outcomes in low-risk pregnancies. In this study, we hypothesize that routine postpartum CBC testing is not indicated following uncomplicated vaginal delivery if hemoglobin upon admission is >10 g/dL and if estimated blood loss during delivery is <500mL.

**Methods:** A postpartum complete blood count (CBC) is currently obtained from all obstetric patients at Cabell Huntington Hospital who have had a successful vaginal delivery. A prospective study was performed on 88 consecutive patients presenting to Cabell Huntington Hospital Labor and Delivery. A protocol was instituted whereby a postpartum-day-1 CBC was not indicated on patients undergoing vaginal delivery with an admission hemoglobin of >10 g/dL and an estimated blood loss at the time of delivery of <500mL. Comparisons were made with 85 consecutive historical controls in the preceding months.

**Results:** Analysis of the case series revealed no difference in blood transfusions, symptomatic anemia, postpartum complications, or maternal length of hospital stay before and after the institution of the protocol. There was a significant difference (p=<.01) in reducing the number of blood draws (1.67±.12 versus 2.37±.12) when applying the protocol to all eligible patients.

**Conclusion:** The findings from this prospective study have the potential to inform evidence-based postpartum care guidelines for low-risk pregnancies. If discontinuing routine CBC testing in uncomplicated vaginal deliveries is proven to be safe and cost-effective, it could lead to more efficient healthcare resource allocation, reduced healthcare costs, and improved patient experience. This study contributes valuable insights to the ongoing efforts in optimizing postpartum care protocols and may influence future clinical practice guidelines for low-risk pregnancies.

## KEYWORDS
postpartum, complete blood count, vaginal delivery

## INTRODUCTION

Postpartum hemorrhage is a leading cause of maternal mortality and complicates approximately 3% of all deliveries.[1] To mitigate the complications from unrecognized postpartum blood loss, many institutions have routine post-delivery order sets that include a complete blood count after delivery. At our

institution, regardless of the mode of delivery or risk factors, a postpartum complete blood count (CBC) is typically obtained on postpartum day 1 to assess for anemia and the need for blood transfusion.

We hypothesize that no clinical benefit is provided by obtaining a routine postpartum CBC following uncomplicated vaginal delivery with a starting hemoglobin of >10 g/dL and an estimated blood loss (EBL) of <500mL. Our study aimed to evaluate the necessity of performing this routine postpartum-day-1 blood counts on low-risk patients and to assess patient safety with the discontinuation of this order.

## METHODS

A prospective study was performed on birthing persons that delivered at Cabell Huntington Hospital from November 17, 2021, to March 17, 2022. A protocol was instituted on January 17, 2022, whereby 1 day postpartum, a CBC was no longer routinely ordered. Inclusion criteria were all those who successfully had a vaginal delivery during the study timeframe. Exclusion criteria for this protocol were defined as cesarean delivery, operative vaginal delivery, postpartum hemorrhage at the time of vaginal delivery (estimated blood loss of >500 mL), admission hemoglobin of <10 g/dL, chorioamnionitis, preeclampsia, and signs or symptoms of anemia. The comparison and study groups consisted of patients presenting to Labor and Delivery within a 4-month period, 2 months before and 2 months after protocol implementation. Rather than grouping participants by risk of postpartum hemorrhage, a consecutive period was used to generalize results to all patients presenting to Cabell Huntington Hospital. Demographic and outcome information was extracted from each patient's electronic medical record (EMR). Due to the need for EMR access, patients who received prenatal care from Marshall University physicians were included in the study. Comparisons and p-values were by one-way ANOVA and Chi-square test of independence (JMP Pro from SAS, Cary, NC, Version 15.2.1). The study was approved by the Institutional Review Board at Marshall University (1821176-2).

## RESULTS

There were no differences in age, Body Mass Index (BMI), gravidity, parity, length of hospital stays, or admission hematocrit before and after institution of the protocol (Table 1). There was a difference in admission hemoglobin (p=<.01), at 11.85±.12 g/dL and 11.27±.12 g/dL for the pre- and post-intervention groups, respectively. There was also no difference between groups in the postpartum

| | Pre-Intervention (85) | Post-Intervention (88) | p-value |
|---|---|---|---|
| Age | 27.84±.57 | 27.29±.56 | 0.49 |
| Body Mass Index (kg/m$^2$) | 34.43±.77 | 33.58±.76 | 0.43 |
| Gravidity | 2.27±.15 | 2.35±.14 | 0.70 |
| Parity | 1.88±.11 | 1.93±.11 | 0.76 |
| Length of Hospital stay (days) | 2.62±.12 | 2.78±.12 | 0.37 |
| Admission Hematocrit (%) | 35.76±.32 | 34.74±.32 | 0.02 |
| Admission Hemoglobin (g/dL) | 11.85±.12 | 11.27±.12 | <.01 |
| Postpartum Hematocrit (%) | 31.50±.12 | 31.37±.41 | .80 |
| Postpartum Hemoglobin (g/dL) | 10.28±.13 | 10.07±.14* | .28 |
| History of Post-partum Hemorrhage | 0 | 1 (1.1%) | 0.24 |

*70 patients in this group

**TABLE 1:** Maternal Information. Reported mean ± SE for continuous variables or n (%) for categorical variables. 95% Confidence Interval.

hemoglobin, hematocrit, or history of postpartum hemorrhage.

When comparing postpartum information, there was no difference in estimated blood loss at the time of delivery, anemia symptoms, blood transfusions, or postpartum complications between the groups (Table 2). Before the protocol institution, there were 6 patients with clinical symptoms of anemia; three patients felt lightheaded while standing, 1 patient reported mild intermittent dizziness on postpartum day 2, and 2 patients had syncopal episodes on the postpartum unit that resolved without intervention. Two patients experienced delayed obstetrical hemorrhage. After the protocol institution, 1 patient felt dizzy and lightheaded while standing; this also resolved without intervention.

Importantly, there is a significant difference (p=<.01) in the number of blood draws when applying the protocol to all eligible patients in the pre-intervention (2.37±.12) and post-intervention (1.67±.12) groups.

## DISCUSSION

Due to the increased morbidity associated with postpartum hemorrhage, routine complete blood counts for hemoglobin and hematocrit levels are regularly obtained at our hospital. Our study found that in selected patients, discontinuation of a routine postpartum CBC did not compromise patient care, and there was no increased risk of adverse outcomes.

In Alabama, Rose's Law was implemented in 1998, requiring every health benefit plan that provides maternity coverage to pay for a CBC on the mother upon admission and discharge from the hospital.[2] This law was passed after a mother passed away 10 days postpartum after being discharged from the hospital following a postpartum hemorrhage.

Other institutions have examined if routine postpartum CBC for low-risk patients is indicated. Ton et al. instituted a 30-day protocol in which a postpartum-day-one CBC was only collected from patients meeting certain criteria, and postpartum blood draws were decreased by 50%.[3] No patients experienced signs or symptoms requiring a CBC, and none required blood transfusion or iron therapy. Dar et al. suggested that a postpartum CBC should be obtained based on risk factors or patient complaints as opposed to hemoglobin level.[4] Their study demonstrated that of 138 patients receiving postpartum blood transfusions, all had at least 1 risk factor of postpartum hemorrhage or symptomatic anemia. None received transfusion based on hemoglobin level alone.

From October 2021 to August 2022, 2,186 deliveries were performed at Cabell Huntington Hospital. Of these deliveries, 1,416 were vaginal deliveries. Of the

| | Pre-Intervention | Post-Intervention | p-value |
|---|---|---|---|
| Estimated Blood Loss at Time of Delivery (mL) | 254.64±20.99 | 316.37±20.63 | .03 |
| Anemia Symptoms | 5 (5.8%) | 1 (1.1%) | .07 |
| Blood transfusions | 0 (0%) | 2 (2.2%) | .09 |
| Post-delivery Complications | 2 (2.3%) | 0 (0%) | .09 |
| Total Number of CBCs During Admission Meeting Criteria | 2.37±.12 | 1.67±.12 | **<.01** |

**TABLE 2:** Postpartum Information. Reported mean ± SE for continuous variables or n (%) for categorical variables. 95% Confidence Interval.

173 patients included in the study, 140 (81%) met the criteria to forego a routine postpartum CBC. The gross charge of a CBC with an automated differential is $95.50. According to our protocol, if 81% of all vaginal deliveries at Cabell Huntington Hospital (1,147 deliveries) did not have a routine CBC ordered, this could result in a potential savings of $109,538.50 per year.

The advantages of our study include using historical controls from our own institution to compare our intervention. As the study was performed at a single site, the data is useful in helping determine optimal care for our patients while also addressing safety concerns with discontinuing a routine CBC after vaginal delivery. The primary disadvantage of our study is poor adherence to the proposed changes due to provider preference and the EMR order set. Of the 88 total patients examined in the post-intervention protocol, 59 met the criteria to forego a postpartum CBC. However, as the CBC is part of a postpartum order set in the EMR, and the routine CBC order must be unchecked when initiating and signing orders, 70 patients still had a CBC drawn.

Permanently instituting discontinuation of routine postpartum CBC in uncomplicated vaginal deliveries should be considered at our study hospital. After the initiation of our protocol, there was no increase in postpartum complications, and this change could decrease blood draws and lab costs without compromising patient safety. For best compliance, these changes should be incorporated into the existing EMR order set to ensure that only patients meeting the criteria have a routine CBC ordered postpartum.

## CONCLUSION

Based on the findings of this case study, discontinuing routine postpartum CBC testing in uncomplicated vaginal deliveries appears to be a safe and cost-effective approach. However, further prospective studies with larger sample sizes are warranted to validate these results and establish evidence-based guidelines for postpartum monitoring in low-risk deliveries. Implementing such evidence-based practices can optimize healthcare resources and improve patient care in obstetric settings.

## AUTHOR AFFILIATIONS

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