

THE ACCOSIATION BETWEEN POSTPARTUM HEMORRHAGE AND THE HEMOGLOBIN LEVELS

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ABSTRACT

In pregnant women, anemia is defined as a hemoglobin level that is lower than 11 g/dl. 1 It is a problem that affects public health, particularly in nations that are still developing.

The aim of this study was to examine the association between anemic women at labor and postpartum hemorrhage (PPH) during emergency cesarean delivery and to assess the hemoglobin (Hb) values at which the emergency hysterectomy is needed. Methods and patients: A cross-sectional study was carried out between (Aug. 1st 2012 and Jul. 30th 2013) at Al Thawra General hospital. Fifty-three cases were included in the study. Results: Postpartum hemorrhage was developed in 53 women (29.1%). Out of 53 women, 21 cases (39.6%) had severe uterine atony and required emergency hysterectomy and the remaining 32 cases (60.37%) responded to the conservative measures ($p < 0.03$). Most of the hysterectomized women 80.75% (17/21) had Hb levels 7 versus 12.5% of the nonhysterectomized patients [OR 29.75; 95% CI 6.564-134.53; $p < 0.01$]. There was a strong correlation between low Hb levels and blood loss [$r = -.619$; $p < 0.00$]. Conclusion: Our study supports the association between anemia (Hb<10) and the risk of PPH. We also provide evidence of the association between severe anemia and emergency hysterectomy.

Keywords: *Uterine atony, postpartum hemorrhage, anemia in pregnancy*

INTRODUCTION

In pregnant women, anemia is defined as a hemoglobin level that is lower than 11 g/dl (WHO). 1 It is a problem that affects public health, particularly in nations that are still developing. According to the World Health Organization (WHO), the prevalence of anemia during pregnancy in underdeveloped nations is greater than 50 percent. Anemia during pregnancy is most commonly caused by a nutritional deficiency in the diet, specifically a lack of iron and folates. However, anemia can also be caused by a number of other factors, including impaired absorption, chronic blood loss, increased requirement, concurrent medical disorders, and malaria. [4] It has been known for a long time that anemia raises the risk of postpartum hemorrhage

(PPH), and it is estimated that the two disorders together are responsible for 40-43% of maternal fatalities in Africa and Asia [6].

There are not many research that have been done that relate the risk of PPH with the amount of anemia, and those that have been done reveal a weak correlation. Recent findings from a few research have revealed a causal association between severe anemia and uterine atony, the primary cause of preeclampsia, which accounts for roughly 90 percent of the cases in most studies. [7-9]

Anemia is widespread in our region, particularly in more distant areas where it might be challenging to obtain prenatal care services. This is similar to the situation in other nations with a lower level of development. At the time of labor, it is not unusual to observe women who are untreated suffering from moderate to severe anemia. They frequently do not have hospital reservations and do not go to the hospital until significant obstetric difficulties have already arisen [10-14]. The purpose of this research was to determine the prevalence of preeclampsia (PPH) after emergency cesarean deliveries performed on women with low hemoglobin concentrations (Hb 10) and to determine the Hb level at which a hysterectomy by cesarean delivery is required.

MATERIALS AND METHODS

This study was a cross-sectional observational trial that was carried out over the course of a year (beginning January 1, 2018 and ending January 1, 2021) at the department of obstetrics and gynecology at Samarkand State Medical University. In the research, participants comprised all singleton pregnant women who were at least 38 weeks along in their pregnancies (as determined by early first-trimester ultrasonography), who delivered their babies through cesarean section, and who had moderate to severe anemia (Hb10g/dl) at admission. The World Health Organization uses the following scale to classify anemia: mild (Hb=10-10.9 g/dl), moderate (Hb 7-9.9), and severe (Hb 7).

Women who had risk factors for uterine atony, such as an overly inflated uterus, a history of past preeclampsia or preeclamptic hemorrhage (PPH), a predisposition to bleed, etc., were not included in the research. 53 female participants who satisfied the inclusion criteria were selected for this research. Each participant provided their informed permission, and the ethics committee at the hospital gave its stamp of approval.

The principles outlined in the Declaration of Helsinki were adhered to throughout the course of the research. We took note of the mother's age, number of children, gestational age, booking status, any past scars, as well as any pregnancy difficulties. Clinical examination and routine investigation were carried out, including the

determination of initial hemoglobin levels, urine analysis, and other tests as the situation warranted.

Following the hospital's policy for the prevention of postpartum hemorrhage (PPH), which requires the administration of 600 µg misoprostol (three tablets) rectally at the time of scrubbing in conjunction with an oxytocin infusion, the procedure was carried out (20 units in 500 ml normal saline solution infused over 30 min). In the event that additional uterotonic medicines are necessary, the administration of methylergometrine through injection (provided that there are no contraindications), an increase in the amount of oxytocin administered via infusion, or a local injection of any or both medications may be utilized as appropriate. A cesarean section was carried out as routine while the patient was under spinal anaesthetic. The calibrated as per procedure was used for all instances in order to quantify the blood loss that occurred during the intraoperative phase. Blood that was collected from within the drape was added to the blood that was already in the suction bottle, and then the total was tallied. After weighing the surgical swabs, the difference in weight between the moist and dry states was then added to the total. Every patient was given preventative antibiotics and a blood transfusion at some point. When conservative treatments, such as bimanual uterine massage, the administration of additional uterotonic drugs, compression sutures, and uterine artery ligation, were unsuccessful in restoring uterine tonus, a hysterectomy was done following discussion of the situation.

The rate of postpartum hemorrhage in these anemic patients was one of the outcome measures, along with the level of hemoglobin in those women who required hysterectomy, the estimation of blood loss, the amount of blood that was transfused, the amount of time that passed between delivery and the completion of the hysterectomy, and the type of hysterectomy.

Statistical analysis

R studio version 3.6.2 was utilized throughout the process of doing the data analysis. The values are presented as the mean standard deviation or as a percentage, depending on the context. The Chi-square test was utilized for the evaluation of the categorical variables, while the independent sample t-test was utilized for the evaluation of the associations between continuous variables. We determined the odds ratio as well as the confidence interval (CI) for 95%. The p value has to be less than 0.05 in order to be declared statistically significant.

Table 1 Maternal characteristics.

Variable	
Age, year	27.96 ± 4
Parity	

Pi	12 (22.6)
>1	41 (77.4)
Mean ± SD	2.64 ± 1.16
Gestational age (week)	38.7 ± 0.76
Booking status	
Yes	23 (43.4)
No	30 (56.6)
Indication for C/S	
Obstructed labor	15 (28.3)
Fetal distress	12 (22.6)
Prior scar	4 (7.5)
Malpresentation	8(15)
CPD	7 (13.2)
Preeclampsia/eclampsia	7 (13.2)

RESULTS.

The total number of deliveries that were tallied was 5840. At the time of admission, one woman in 91 had a Hb level lower than 11 g/dl. In this group, there were 27 women who got PPH as a result of uterine atony while undergoing cesarean section (Fig. 1). Table 1 displays information on maternal obstetrics as well as demographic data. Of the 26 women who developed uterine atony, 16 cases (61.5%) were successfully managed by conservative measures. This included the use of additional uterotonic drugs with a success rate of 50% (13/26), B-Lynch compressive sutures in one case (7.7%), uterine artery ligation in two cases (7.7%), and internal iliac artery ligation in only one case (1.8%). Additional uterotonic drugs had a success rate of 50% (13/26). In 42.3% (11/26) of cases, the patient suffered severe bleeding that prompted them to have immediate hysterectomy. The change was large enough to warrant statistical attention ($p < 0.01$) (Table 2). Table 2 presents the outcomes obtained by each of the two groups.

Variable	Hysterectomy (n = 11)	Conservative (n = 16)	P value
Surgical measures B-lynch	2 (9.52)	2 (6.25)	>0.05
Uterine artery ligation	1 (4.8)	3 (9.37)	>0.05
No. of units blood transfused	5.84 ± 2.4	4.05 ± 2.4	<0.01
Time till hysterectomy (min)	155.71 ± 52.4		NA
Time from atony to recovery (min)	-	62.43 ± 13.44	NA
Birth weight (g)	2938 ± 369.4	2981.2 ± 13.44	>0.05
DIC	7 (33.3)	1 (3.1)	>0.05
Admission to ICU	6 (28.6)	2 (6.25)	>0.05
Fever	5 (23.8)	2 (6.25)	>0.05

Length of hospital stay (day)	7.90 ± 1.673	7.03 ± 1.4	<0.01
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In a subsequent study, we compared individuals who had had hysterectomy with those who had not undergone the procedure in terms of Hb, blood loss, and parity. We discovered that 72.7% of hysterectomy patients (8/11) had hemoglobin levels over 7, whereas 87.5% of nonhysterectomy patients (14/16) had hemoglobin levels above 7. Despite the fact that there was no statistically significant difference (OR 5.25; 95% CI 1.03-15.31; p=0.03).

Individuals who had their ovaries removed by hysterectomy saw a mean blood loss of 1694 ± 268.1 ml, whereas patients who did not have their ovaries removed experienced a mean blood loss of 1253.12±281.1 ml. It was determined that there was a significant difference (p<0.01). There was a statistically significant increase in the amount of bleeding (> 1500 ml) in the hysterectomy group compared to the nonhysterectomy group [odds ratio (OR) 5.1; 95% (CI) 1.10-18.4; p = 0.02] (Table 3).

Variable	Hysterectomy(n =11)	No hysterectomy (n = 16)	OR 95% CI	P value
Hb level (g}dl)				
6-7	7 (72.7)	2(12.5)	5.25 (1.03-15.3)	<0.01
7.1-8	1(9.1)	3(18.75)		
8.1-9	1 (9.1)	8(50)		
9.1-10		3(18.75)		
Mean ± SD	6.319 ±0.7	8.56 ± 0.9		<0.01
Estimated blood loss (ml)				
> 1000-1500	1 (9.1)	7 (43.8)	5.1 (1.10-18.4)	<0.01
> 1500	10 (90.1)	19 (59.4)		
Mean ± SD	1694 ± 268	1253 ± 281		<0.05

In 10 of the instances (90.1%), the hysterectomy was performed through cesarean section. However, in one of the cases (9.1%), the hysterectomy was performed following abdominal closure because of continued vaginal hemorrhage.

The majority of patients had a subtotal hysterectomy (81.8%), making it the most prevalent kind of procedure. In the group that had their ovaries removed, 27.2% of the women had disseminated intravascular coagulopathy (DIC), while the conservative group had no incidences of this complication at all. There were a total of four patients from each of the two groups hospitalized to the critical care unit (ICU). In the course of our research, we found no instances of maternal death.

Discussion

According to the findings of the current study, 29.1% of women who were anemic had PPH as a result of uterine atony following cesarean birth. Studies conducted in the past have shown that severe anemia can reduce the ability of the myometrium to contract. This is because the anemia hinders the transfer of hemoglobin and oxygen to the uterus, which in turn causes tissue enzymes and cellular malfunction. [9,10]

This data demonstrates that the probabilities (or likelihood) of developing PPH owing to uterine atony increases significantly for individuals with a hemoglobin level of 7 or less, as opposed to those with a hemoglobin level of 7.1-10 ($p < 0.01$). This trend was not substantially different from that of women with a parity of more than one ($p > 0.05$), despite the fact that nulliparous women were linked with an 11.6% greater risk for having PPH in our patients. This finding is in line with the findings of previous studies. [11-16]

When compared to the findings of a previous study that investigated peripartum hysterectomy cases, the current study revealed a much reduced average amount of blood loss. Only 9 of the patients exhibited with uterine atony, whereas the other 8 presented with placenta previa and morbid adherent placenta with previa [12]. Differences in the elements that contribute to the population as a whole could help to explain some of the variety that would be expected. This shows that aggressive management of the third stage of labor is important in decreasing the amount of blood that is lost during labor.

It was shown that there was a substantial inverse link between Hb readings and blood loss, which suggests that the severity of anemia is inversely proportional to the amount of blood lost.

This result highlights the need to increase population awareness to utilize the available maternity care services along with the promotion of iron and folates supplementation for all pregnant women. Additionally, this result highlights the necessity of increasing the population awareness to utilize the available maternity care services. Screening for anemia and, thus, providing treatment for it should be standard practice as part of prenatal care, in particular in areas where malaria and other infectious illnesses are common [17-19]. It is important to highlight that the particular etiology of anemia was not investigated in this study.

It is possible that the type of hysterectomy performed might account for the variance. Only two out of seven patients (7.7%) in this research required a complete abdominal hysterectomy, in contrast to fifty-nine percent of patients in their study. The patient's general condition, the extent of blood loss, and the effectiveness of the conservative measures should direct the decision-making process, even though there

is no consensus regarding the appropriate timing for resorting to hysterectomy in atonic uterus. This is because there is no consensus regarding the appropriate timing for resorting to hysterectomy in atonic uterus. On the other hand, because anemic women have a low threshold for even little bleeding, [19-22] quick worsening in the patient's hemodynamic stability should be taken into consideration.

According to the findings that we obtained, we came to the conclusion that severe anemia with a hemoglobin level of 7 g/dl combined with continuing bleeding in spite of additional conservative interventions is a predictor of chronic myometrial contractility failure and calls for an early hysterectomy.

There have only been a few of research that look at the causal-relationship between severe anemia and PPH; nevertheless, there is no information on the specific Hb value at which the possibility of uterine atony might become imminent. Because to this work, obstetricians will have access to a brand-new, cutting-edge tool that will allow them to identify pregnant women who are at danger and, as a result, give them the appropriate level of care. Our finding has the potential to be of great importance and may help scholars better address the issue.

Limitations.

We utilized the sample size that was available, which might have been rather small and could not be representative of the entire population. Also, the women who gave birth via cesarean section were the only ones considered for the study. Women who gave birth vaginally were excluded from the analysis due to the fact that the majority of anemic women in this subgroup are low-income, come from rural areas, do not have prenatal care booked, and give birth at home, only going to the hospital when severe complications have already arisen. Because the purpose of this study was to evaluate women with hemoglobin levels lower than 10 g/dL, we also did not take into account the anemia prevalence. Mild anemia is rather frequent and has a tendency to have a less substantial influence on the difficulties that might arise during labor and delivery.

CONCLUSION

The results of this study provide credence to the hypothesis that there is a correlation between low hemoglobin levels at the time of birth and the possibility of PPH, which is an issue that is still being discussed. In addition, we present data suggesting a connection between severe anemia and severe uterine atony, the latter of which must be treated with an emergency hysterectomy.

In order to corroborate these findings, we need to do more research using a bigger sample size. In this particular subset of anemic women who go on to develop severe PPH as a result of uterine atony, an early choice to have a hysterectomy to save their

lives is possible, and it should be considered when other interventions are inadequate. **Conflict of interest.**

The author declared that there is no conflict of interest.

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