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The maternal side of placental cord blood drainage in the management of the third stage of labor: Rethink the basic step in minimizing the maternal blood loss

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Abstract

Introduction: Prophylactic approaches are essential for reducing blood loss and preventing postpartum hemorrhage in all women during delivery. A different method for accelerating uterine emptying is placental cord blood drainage.

Aims and objectives: To assess the effectiveness of placental cord blood drainage during active management of the third stage of labor in reducing the duration and blood loss in the third stage of labor.

Methodology: Prospective observational study. Women were recruited randomly into two groups. Following the delivery of the baby, in addition to active management of the third stage of labor, women in group A- the maternal side of the placental cord blood was drained to a bowl till the flow ceases following the delivery of the baby. In Group B the placental cord blood was not drained.

Results: The average duration of the third stage of labor was 4.90 ± 1.01 minutes in the study group and 7.23 ± 1.33 minutes in the control group. The average third stage blood loss was 203.4 ± 97.27 ml in the study group and 288.6 ± 111.66 mL in the control group.

Conclusion: Placental cord blood drainage during the third stage of labor can shorten the third stage duration and reduce the blood loss among women with vaginal deliveries.

Keywords: Postpartum hemorrhage, placental cord blood drainage, third stage of labor, prospective observational study

Introduction

The duration from the birth of the baby to the expulsion of the placenta is defined as the third stage of labor. Accurate and timely management of the third stage of labor is essential to prevent obstetric complications. Postpartum hemorrhage (PPH) is recognized as a major cause of maternal mortality and severe morbidity, particularly in low-income countries. Recent evidence from several developed countries indicates a rising incidence of PPH, especially atonic PPH. One of the problems with the diagnosis of PPH is its inherent subjectivity, which depends on the obstetrician's estimate of blood loss [1-7]. PPH is unpredictable and can occur even in low-risk pregnancies. Hence prophylactic approaches are essential for reducing blood loss and preventing PPH in all women during delivery [8].

Active management of the third stage of labor consists of measures to decrease the duration of the third stage of labor thereby reducing the blood loss. Uterotonics and umbilical cord clamping immediately after birth are techniques that have been proposed. Uterine massage is no longer recommended for the prevention of postpartum hemorrhage. Current recommendations state that cord clamping should be postponed because of the known benefits to the neonate [9, 10].

A different method for accelerating uterine emptying is placental cord blood drainage. This involves clamping and cutting the umbilical cord following delivery of the baby and then immediately unclamping the maternal end of the cord and allowing the blood to flow freely into a container until successful uterine emptying [11]. We conducted a pilot study to study the benefit of this novel technique in our population.

Materials and methods

The present study was a prospective observational study conducted in a tertiary care hospital of southern India over one year. We obtained approval from the institutional ethics committee

(IEC: 654/2017). After a detailed history taking, a general physical and obstetric examination was performed, informed written consent was taken from the patients. Women with a term low-risk pregnancy, vertex presentation with no significant medical or obstetric complications were included in the study. Those parturient whose hemoglobin was less than 10 gm/dl, history of antepartum hemorrhage, those requiring instrumental delivery, multiple pregnancy, malpresentation, large baby (more than 4 kg) and those with known coagulation disorders were excluded from the study. Brass V drape was used to estimate the blood loss in the third stage (fig 1). Women were recruited randomly into two groups. Following the delivery of the baby, active management of the third stage was done for all women irrespective of the groups. In addition to active management of the third stage of labor, women in group A, the maternal side of the placental cord blood was drained to a bowl till the flow ceases following the delivery of the baby, In Group B, the placental cord blood was not drained (50 participants in each group). Blood from the episiotomy site was mopped and discarded separately. The placenta was delivered by controlled cord traction, once signs of placental separations were seen. Duration of the third stage of labor and the amount of blood loss in each group were measured and analyzed. The pulse rate, blood pressure, and state of the uterus were noted immediately after delivery. The women were kept under observation for the next hour for any complications. Hemoglobin was repeated 24 hours post-delivery in all participants. Statistical analysis was done, calculating the mean and standard deviation. Test of significance used was unpaired 't' test. P-value < 0.05 was taken as significant.

Results

The demographic data of the study population in both groups were comparable, as shown in Table 1. Table 2 shows the duration of various stages of labor and other outcome variables. The average duration of the first and second stage of labor was comparable in the two groups.

The average duration of the third stage of labor was 4.90 ± 1.01 minutes in the study group and 7.23 ± 1.33 minutes in the control group. This difference was statistically significant with a p-value of < 0.001.

The average third stage blood loss was 203.4 ± 97.27 ml in the study group and 288.6 ± 111.66 mL in the control group. This difference was statistically significant (p-value < 0.001). There were two cases of atonic PPH in the control group and one case of PPH in a study group which were managed by medical management using other oxytocics like oxytocin, Prostaglandin F_{2α}, and Misoprostol. There were no cases of retained placenta in both groups.

All the participants had their hemoglobin checked before delivery and 24 hours after birth. The drop in hemoglobin among the controls was 1.86 ± 0.70 g/dl when compared to the study group, 0.99 ± 0.77 g/dl (p value < 0.001). However, none required blood transfusion. One case in the study group and three women in the control group received parenteral iron therapy for mild to moderate anemia.

Discussion

Similar to various studies in the past [11, 12, 13, 14, 15], the present study also found a statistically significant reduction in the duration of the third stage in the study group (4.90 ± 1.01 versus 7.23 ± 1.33 minutes). In a randomized clinical trial, including 49 women in the intervention group and 50 in a control group, there was a significant reduction in the duration of the third stage of

labor was found following placental cord blood drainage (5.1 ± 2.4 versus 7.0 ± 6.1 minutes) [12].

Giaccalone *et al.* reported a study comparing 239 women in whom placental cord drainage was done in 238 women with expectant delivery of the placenta. The median value of the duration of the third stage of labor was 8 minutes in whom placental cord drainage was done and 15 minutes in the control group where the cord was clamped and placenta delivered with controlled cord traction [13].

A Cochrane review analyzed the effects of placental cord drainage in the active management of the third stage of labor. Three clinical trials with 1257 low-risk women were evaluated. However, in addition to placental cord drainage, all trials included other methods such as immediate umbilical cord ligation and controlled cord traction as part of active management of the third stage of labor. Postpartum use of oxytocics also varied between studies. Placental cord drainage was found to reduce the third stage of labor by around three minutes, with a slight reduction in blood loss [11]. However, the authors of the meta-analysis warned that the results should be interpreted with caution since the decrease in the duration of the third stage of labor was small, and the studies were heterogenous.

The results of our study showed that the blood loss in the third stage of labor was reduced in the study group where placental cord blood was drained (203.4 ± 97.27 ml) when compared to the control group (288.6 ± 111.66 ml) with a significant p-value of < 0.001. Several studies in the past give varied results about blood loss. A study describes 200 women randomized to placental drainage versus maintaining the cord clamped [16]. The amount of blood loss was smaller in those with placental cord blood drainage (175 versus 252ml). Controlled cord traction and methylergometrine were used in both groups. Different methods of management of the third stage of labor probably explain this difference. In the second study [17], which included a larger sample size of 485 women, blood loss was one of the primary outcomes analyzed. They found that blood loss was lower with placental cord drainage (207 versus 277ml, $p < 0.001$).

Mean reduction in postpartum hemoglobin was estimated in this study. Cases who had placental cord drainage had a hemoglobin drop of 0.99 ± 0.77 gm/dl when compared to control 1.86 ± 0.70 gm/dl, p-value < 0.001. Roy *et al.* in their study, included 200 patients randomized to placental drainage in addition to active management or active management only. This study showed that blood loss was significantly lower in the placental drainage group. They also observed that the change in maternal hemoglobin before and after labor, and the percentage of the patient who had PPH was lower with placental drainage [15].

Placental cord blood drainage is simple, non-invasive, and does not result in adverse events. Thus, it may be easy to popularize. These advantages lend support to the use of placental cord blood drainage as a form of active management during the third stage of labor.

However, the limitations of our study were that the women included were with low-risk pregnancies, and the sample size is too small to generalize the result. Therefore, larger sample sizes, as well as the inclusion of high-risk women and use of different practices during delivery, may be necessary to identify the actual effect of this procedure.

Conclusion

Placental cord blood drainage during the third stage of labor can shorten the third-stage duration and reduce the blood loss among women with vaginal deliveries. Maternal side placental cord

drainage is a simple and non-invasive procedure that should be considered after cord clamping. Further studies regarding the

physiological processes and effects of placental cord drainage in additional circumstances need to be investigated.

Table 1: Demographic characteristics of the two study groups (N=100)

Demographic characteristics	Control group (n=50)	Study group (n=50)	p value
Maternal age (Mean±SD)	29.22 ± 4.10	28.52 ± 4.08	0.254
Height (Mean±SD)	159.68 ± 6.82	157.85 ± 4.97	0.128
Weight (Mean±SD)	61.36 ± 5.81	59.28 ± 6.1	0.137
Gestational age (Mean±SD)	38.78 ± 0.95	38.54 ± 0.88	0.134
Primigravida	24	22	0.135
Multigravida	26	28	0.135

Table 2: Duration of labor and other outcome measures in two study groups (N=100) Mean ± SD

Outcome measures	Control group (n=50)	Study group (n=50)	p value
First stage of labor in hours	8.67 ± 2.08	8.86 ± 2.53	0.681
Second stage of labor in minutes	25.24 ± 9.85	24.45 ± 8.83	0.364
Third stage of labor in minutes	7.23 ± 1.33	4.90 ± 1.01	< 0.001
Blood loss during third stage (Mean±SD) in ml	288.6 ± 111.66	203.4 ± 97.27	< 0.001
Need for postnatal parenteral iron transfusion	3 cases	1 case	0.010
Hemoglobin difference (Mean±SD) in g/dl	1.86±0.70	0.99±0.77	< 0.001



Fig 1: Image shows placental cord blood drainage into a bowl following delivery of the baby.

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