Original Article

Drainage Of Placental Cord Blood In Dealing With The Third Stage Of Labor

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Abstract

Background Cord drainage in the third stage of labour involves unclamping the previously clamped and divided umbilical cord and allowing the blood from the placenta to drain into an appropriate receptacle. **Aim** To evaluate the efficacy of placental blood drainage after spontaneous vaginal delivery as a part of active management of third stage of labour, versus no placental blood drainage. **Methods** Prospective interventional case control study that was conducted on a total of 100 women with term pregnancy (at or beyond 37-weeks gestation) with a single live fetus in cephalic presentation who had vaginal delivery. The study was conducted between July 2021 and July 2022 at obstetrics and gynecology department of Damanhur Medical National Institute. All patients in the study were counselled regarding cord blood drainage procedure, and informed consent was obtained. Immediately after spontaneous vaginal delivery, after clamping and cutting the cord—the cord was unclamped and the blood was drained until the flow ceased. **Results** Duration of third stage of labor, amount of blood loss and post-partum hemorrhage (PPH) occurrence were significantly decreased in cases group. There was no significant difference in hemoglobin level before delivery. However, there was significant decrease in hemoglobin level after delivery in controls compared with cases. **Conclusion** Placental blood drainage as part of active management of the third stage of labour was effective in reducing blood loss, labour duration, and incidence of PPH. Therefore, placental blood drainage is a simple, safe, and non-invasive method of managing the third stage of labour,

Keywords: Placental blood drainage, Labor, Third stage, Hemorrhage.

INTRODUCTION

The third stage of labour begins immediately after the birth of the baby and ends with the expulsion of the placenta and fetal membranes **(1).** It is preceded by contraction and retraction of the uterus to reduce the uterine size and expel the placenta with minimal haemorrhage. The third stage of labour can be managed actively or by expectant management, where the umbilical cord remains attached to the baby until after delivery of the placenta; blood within the placental compartment drains into the baby **(2).** Placental cord drainage involves clamping and cutting the umbilical cord after the birth of a baby and then, immediately unclamping the maternal side of the cord so the blood can drain freely into a container **(3).**

The third stage of labour is generally managed using two different approaches: 'active management' and 'physiological or expectant management. The former method involves administering an oxytocic drug, clamping and cutting the cord, and controlling cord traction **(4).** The type and timing of the oxytocic drugs, route of administration, and timing of the cord clamping may vary considerably between practitioners. The latter form of management mainly involves maternal effort assisted by gravity and/or putting the baby to the breast without using artificial oxytocics or early clamping or controlled cord traction. In this type of management, if clamping was required due to maternal request or any other reason, it is usually done after cord pulsation is stopped **(5).**

Placental cord drainage has been suggested as a way of minimizing the impact of cord clamping on the third stage of labour for mothers. It involves the clamping and cutting of the umbilical cord after the delivery of the baby. Immediately after delivery unclamping the maternal side of the cord is done and the blood from the placenta is allowed to drain freely into a container. It has been suggested that draining blood from the placenta would reduce its bulkiness, allowing the uterus to contract and retract, thus aiding delivery **(6).**

The present study was designed to evaluate and compare the efficacy of placental blood drainage after spontaneous vaginal delivery as a part of active management of third stage of labour, versus no placental blood drainage.

Material and Methods

This was a prospective interventional case-control study carried out on a total sample of 100 women patients with term pregnancy (at or beyond 37 weeks gestation) with a single live fetus in a cephalic presentation who had a vaginal delivery. The study was conducted between July 2021 and July 2022 at the obstetrics and gynaecology department of Damanhur Medical National Institute. The study was approved by the review and research ethics committee at Damanhour Medical National Institute (Approval number HD000162).

Inclusion criteria Singleton pregnancy, Vertex presentation, Gestational age of 37 weeks (or) more, No major medical (or) obstetric complications and Spontaneous vaginal delivery.

Exclusion criteria Hemoglobin (Hb) < 7 gm/dl, History of Antepartum haemorrhage (APH), Instrumental delivery, Multiple pregnancies, Malpresentations, Large baby (more than 3.5 kg), Polyhydramnios, Known coagulation disorders and Previous surgeries on the uterus.

Informed consent All the patients and the attendees gave written informed consent. The patients were prospectively randomized equally into two groups (50 each in the study and control groups).

*Group A***:** 50 subjects managed with drainage of placental cord blood.

*Group B***:** 50 subjects were not managed with drainage of placental cord blood.

All the patients in the study group were counselled regarding the procedure of cord blood drainage, and an informed consent was obtained. Immediately after spontaneous vaginal delivery, after clamping and cutting the cord—the cord was unclamped and the blood was drained until the flow ceased.

Prophylactic oxytocic for AMTSL was administered. In the control group, the clamped cord was not released. Placenta was delivered by controlled cord traction in the both the groups. Blood lost in the third stage of labour was measured by collecting the blood in a disposable conical measuring bag (Brass V drape). Blood from episiotomy wound or perineal tears were mopped and the mops were discarded. If there was excessive bleeding due to uterine atony, appropriate measures were instituted.

The blood collected in the calibrated bag was measured. The duration of the third stage was calculated using a stopwatch. The patient's post-delivery pulse rate and blood pressure were noted. The women were kept under observation for the next 2 hr to watch for complications, if any. Blood Hb gm% was measured after 48 h of delivery in both the groups and difference from that of the antenatal value was observed. After collecting all the data, the data were tabulated in a master chart and analyzed

Statistical Analysis

IBM SPSS version 22.0 was used to analyses computer-generated data. To express quantitative data, percentages and numbers were employed. Before utilizing the median in nonparametric analysis or the interquartile range in parametric analysis, it was required to perform Kolmogorov-Smirnov tests to ensure that the data were normal. We used the (0.05) significance threshold to establish the significance of the findings. The Chi-Square test is used to compare two or more groups. The Monte Carlo test may be used to adjust for any number of cells with a count less than 5. Fischer Chi-Square adjustment was applied to tables demonstrating non continuous data.

Results

The duration of the third stage of labor was significantly decreased in patients managed with drainage of placental cord blood compared with patients who did not receive such intervention **(Table 1).**

Additionally, the amount of blood loss **(Table 2)** and post-partum hemorrhage (PPH) occurrence **(Table3)** declined considerably in case group compared with controls.

It should be noted that prior to delivery, we did not see any significant difference in hemoglobin level among two groups. However, a significant decrease in hemoglobin level after delivery was observed **(Table 4)** in controls (group B) compared with cases (Group A).

A statistical correlation analysis between the intervention in our study and different outcome parameters revealed a significant negative correlation between duration of third stage, amount of blood loss and PPH with drainage of placental cord blood **(Table 5).**

Discussion

A Cochrane review evaluated the effects of placental cord drainage in 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 procedures such as immediate umbilical cord ligation and controlled cord traction as part of the management of the third stage of labor. Furthermore, postpartum use of uterotonics 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 **(7).** The authors of the meta-analysis warned, however, that the results should be interpreted with caution, since the reduction in the duration of the third stage of labor was small and the studies were heterogenous.

Previous studies suggested that placental cord drainage reduces the duration of the third stage of labor and blood loss **(8, 9).** In a randomized clinical trial, including 49 women in the intervention group and 50 in a control group, a significant reduction in the duration of third stage of labor was found following drainage (5.1±2.4 versus 7.0±6.1minutes) **(10).** In this study, the duration of the third stage of labor was close to the previous studies.

Another randomized clinical trial compared 239 women submitted to placental cord drainage plus controlled cord traction and 238 women submitted to expectant management. The median duration of the third stage of labor was significantly shorter in the intervention group (8 versus 15 minutes; $p<0.001$) **(11).** That study did not evaluate placental cord drainage alone but, rather, in association with controlled cord traction, a procedure not routinely recommended by WHO **(12).** It is difficult to estimate the value of each one of these procedures alone, hence impossible to compare those results with other studies.

Considering blood loss volume, previous results vary. One old study describes 200 women randomized to placental drainage versus maintaining the cord clamped **(13).** The volume of blood loss was smaller in the first group (175 versus 252ml). Controlled cord traction and methylergometrine were used in both groups. Different management of the third period of labor probably explains this difference. It is also important to point out that the volume difference found in the first study is not clinically significant. In the second study **(14)** with a larger sample size (485 women), blood loss was one of the primary outcomes analyzed. The authors found that blood loss was lower with placental cord drainage (207 versus 277ml, $p<0.001$).

Again, although statistically significant it is unlikely that losing 70ml less blood volume is clinically relevant. In another study, blood loss was evaluated based on postpartum hemoglobin levels, mean reduction in hemoglobin and percentage of cases in which hemoglobin decreased >3g/dl. Although the mean reduction in hemoglobin was greater in women not submitted to placental cord drainage, mean postpartum hemoglobin levels and frequency of women with postpartum hemoglobin <10g/dl were similar in both groups **(11).** This difference did not persist, however, when only those women without episiotomy and with an intact perineum were evaluated. It is possible that the different types of management adopted may have affected the findings.

Finally, in the study that included 200 patients randomized to placental drainage in addition to active management or active management only, results showed that blood loss was significantly lower in the placental drainage group. Another observation was that the change in maternal hemoglobin before and after labor and the percentage of patient that experienced postpartum hemorrhage was lower with placental drainage **(8).** About this study, some issues need to be pointed out, as the routine use of controlled cord traction and the lack of information about the moment of cord clamping.

Close to our results the incidence of PPH was 1 % in the study group versus 9 % in the control group in Roy et al. **(8)** study, the difference being statistically significant. In another study by Gulati et al. **(15),** the incidence of postpartum haemorrhage was 6 % in the study group as compared to 12 % in the control group. There was a statistically significant difference in the incidence of PPH noted by Shravage & Silpa **(13)**, 3 % in the study group and 10 % in the control group.

A recent meta-analysis including 9 studies and 2653 patients found that the duration of third stage of labor is shortened (2,28 minutes) although blood loss was the same **(6).** A new finding was the reduction of 3% in postpartum hemorrhage. This finding is surprising since there is no reduction in blood loss. Since there studies were very heterogenous, caution is needed before drawing definitive conclusions. The meta-analysis suggests that placental drainage is a simple and noninvasive procedure that seems to add to the management of patients, but more studies are still necessary to clarify its importance.

Close to our results a RCT involving 500 patients, the median value of duration of III stage of labour was 8 min in the study group and 15 min in the control group. In another study by Gulati et al. **(15),** 200 pregnant women were

evaluated and a significant difference in the mean duration was noted—5.72 min in the control group and 2.94 min in the study group. The average blood loss in the third stage, in Roy et al**. (8)** study was 227.5 ml in the study group and 313.3 ml in the control group, the difference being statistically significant. In a similar study by Gulati et al. **(15),** the amount of blood lost in the III stage of labour was 193.63 ml in the study group and 247.59 ml in the control group.

Close to our study there was a significant change in the Hb gm% in Roy et al. **(8)** study (0.6 gm% in the study group vs. 1.1 gm% in the control group). But, in a study by Soltani et al. **(7)**, there was no significant change in mean Hb gm% after birth, it being 1.2 gm% in the study group and 1.3 gm% in the control group.

Conclusion

Placental blood drainage as part of active management of third stage of labour was effective in reducing the duration, the blood loss, and also the incidence of PPH. Placental blood drainage is a simple, safe, and non-invasive method of managing the third stage of labour, which can be practiced.

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Table (1) Duration of third stage of labor

Duration of third stage (s)	Group A (N = 50)	Group B (N = 50)	P. Value
Mean	220.6	326.7	<0.0001*
SD	78.5	96.2	

Duration of third stage of labor was significantly decrease in cases group.

Table (2) Amount of blood loss

Blood loss (ml)	Group A (N = 50)	Group B (N = 50)	P. Value
Mean	218.6	320.4	<0.0001*
SD	63.3	85.7	

Amount of blood loss was significantly decreased in cases group.

Table (3) Postpartum hemorrhage

PPH	Group A (N = 50)	Group B (N = 50)	P. Value
Yes	2 (4%)	46 (92%)	<0.0001*
No	48 (98%)	4 (8%)	

PPH: Post-partum hemorrhage

PPH occurrence was significantly decreased in cases group.

Table (4) Change in hemoglobin levels (gm%) before and 48 h after delivery

Hb %	Group A (N = 50)	Group B (N = 50)	P. Value
Before delivery	10.6 ± 0.67	10.32 ± 0.78	0.05998
After delivery	9.6 ± 0.66	8.7 ± 0.75	<0.05*
Decrease in Hb	5 (10%)	8 (16%)	0.372

There was no significant difference in Hb level before delivery. However, there was significant decrease in Hb level after delivery in controls compared with cases.

Table (5) Correlation between drainage of placental cord blood and different parameters.

	r	P. Value
Duration of third stage	-.696**	<0.0001
Amount of blood loss	-.717**	<0.0001
PPH	-.881**	<0.0001
Decrease in Hb	-0.08921	0.37745

Duration of third stage, amount of blood loss and PPH were of significant negative correlation with drainage of placental cord blood.