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Placental cord blood drainage after vaginal delivery as part of the management of third stage of labour: A systematic review of randomized controlled clinical trial

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Abstract
Background: Present study was undertaken to evaluate the effectiveness of placental cord blood drainage after vaginal delivery in reducing the duration and blood loss during third stage of labour in Primigravida between the age group of 18-35 years, with term, singleton alive pregnancy with vertex presentation, with average size fetus, without any complications, expected to spontaneous vaginal delivery.
Methods: It is a randomized clinical controlled trial on 100 pregnant women admitted in labour room at Department of Obstetrics and Gynecology, Zannana hospital, SMS Medical College Jaipur from April 2017 to July 2018. All women enrolled were subjected to history taking general and obstetric examination. In the study group, placental end of the previously clamped and cut umbilical cord was unclamped immediately after vaginal delivery, while remaining clamped in the control group.
Results: Duration of third stage of labour, blood loss during third stage, postpartum hemorrhage, need for blood transfusion and haemoglobin difference between antenatal and postnatal period was significantly reduced in the study group than control group.
Conclusions: Placental Cord blood drainage is simple, safe, non-invasive method which reduces the duration and blood loss of third stage of Labour.

Keywords: Placental cord blood drainage, POST-partum haemorrhage, third stage of labour

Introduction

Labor is a physiological process, often associated with morbidity and mortality most common cause being blood loss. Life-threatening obstetric hemorrhage occurs in approximately 1 per 1000 deliveries [1].

Postpartum hemorrhage is one of the leading causes of maternal death worldwide. It occurs in about 10.5% of births and accounts for over 130 000 maternal deaths annually [2]. India has maternal mortality rate of 4 in 1000 live birth as compared to 0.1-0.4 in 1000 live birth in developed country. PPH accounts for 35% of maternal mortality worldwide [3].

Postpartum hemorrhage (PPH) is defined as blood loss more than 500mL after vaginal delivery or >1000 mL after cesarean delivery. PPH has also been defined as either a 10% change in hematocrit between admission and post-partum period or a need for blood transfusion [4].

The third stage of labour is defined as the period from the birth of the baby to the expulsion of the placenta. Prolongation of the third stage of labour leads to an increased complication rate, particularly the incidence of postpartum haemorrhage [5].

Active and expectant management are regarded as two different approaches to the clinical management of the third stage of labour.

Active management consists of measures to reduce the duration of the third stage of labor and the blood loss that occurs during this stage. Uterotonics and immediate umbilical cord clamping are techniques that have been proposed [5]. Uterine massage is no longer recommended for the prevention of postpartum hemorrhage. In 2012, the World Health Organization recommended that the cord be clamped between one and three minutes after birth unless the baby is asphyxiated and requires resuscitation [6]. When umbilical cord clamping is delayed, the blood flow between the placenta and the baby through the umbilical cord continues [7], and the process is in some aspects, similar to that of placental cord blood drainage. However, the amount of blood returned to the infant varies with the time of clamping and the level at which the infant is held (i.e., above or below the mother's abdomen) before the clamping of the cord.

Therefore, delayed cord clamping reduce the volume of blood that remains in the placenta, but it seems likely that there will still be some blood left in the placenta. For this reason, placental cord blood drainage can also be performed after delayed cord clamping.

Removing the clamp at maternal side of the cord and draining of placental blood has been suggested for assisting expulsion of the placenta, because it is physiologically possible that releasing blood from the placenta would decrease its bulkiness allowing the uterus to contract and retract effectively leading to expulsion of placenta and decrease the span of 3rd stage of labor.

This study was done to assess the effectiveness of placental cord drainage during vaginal delivery which is simple, safe and noninvasive method of reducing the third stage of labor and decreasing the extent of blood loss [9].

Methods

It is a randomized clinical controlled trial on 100 pregnant women admitted in labour ward at Department of Obstetrics and Gynecology, SMS Medical College Jaipur April 2017 to July 2018, in the age group between 18-35 years, with term, singleton, and alive pregnancy.in vertex presentation with, average size fetus who were expected. Women were divided according to computer generated randomization table into 2 groups: -

- **Group-A(study):** where placental cord blood was drained (50 cases)
- **Group-B(control):** where placental cord blood was not drained (50 cases)

Inclusion Criteria

- Primi gravida
- Singleton term pregnancy
- Vertex presentation
- spontaneous vaginal delivery
- women with written and informed consent

Exclusion Criteria

- Hemoglobin less than 7 g/dL
- Over distended uterus
- Antepartum hemorrhage
- Instrumental delivery
- Coagulation disorders
- Medical disorders (chronic liver diseases, sickle cell anemia, pulmonary diseases, cardiac diseases, renal disease
- IUFD
- Malpresentations

Detail history regarding age, parity, socioeconomic status, and period of gestation, duration of leaking & bleeding PV was noted. A detailed history was taken including complications of present pregnancy. General physical examination & obstetric examinations was done.

Routine Investigations

ABO-Rh, Hb, VDRL, TSH, LFT, RFT PBF, Urine complete microscopy was done. Blood sample was send for cross matching.

All the patients in the study group were counselled regarding the procedure of cord drainage and an informed consent was obtained. Immediately after delivery, the linen soiled with amniotic fluid was removed and the plastic calibrated bag was placed beneath the woman's buttocks for accurate blood loss.

In the study group the placental end of the cut umbilical cord was unclamped immediately after it is cut and left open for blood to drain in a vessel until the blood flow ceased. In the control group the placental end of the cut umbilical cord remained clamped. Blood lost in the third stage was measured in calibrated plastic bag which is placed under woman's buttock.

Prophylactic intramuscular oxytocin 10 IU for active management of the III stage of labour was given immediately after delivery of baby. Blood lost in the third stage of labour was measured by collecting the blood in a calibrated plastic bag taking care that the blood from episiotomy wound did not get mixed with the uterine loss. If there was excessive bleeding due to uterine atony, appropriate measures were instituted.

The mops used for episiotomy were separated & discarded. The duration of the third stage was calculated using a stop watch. Once the uterus was well contracted and the active bleeding had stopped, the remaining blood in the vagina was removed and a sterile sanitary pad was given.

The women were kept under observation for the next two hours to watch for complications if any.

Blood transfusion was given whenever the blood loss was more than 1000 ml (or) if indicated by the clinical status of the patient. Blood Hb% was measured after 48 hours of delivery in both the groups and difference from that of the antenatal value was observed. The patients were carefully watched in the post-natal ward for 48 hours for any morbidity.

Results

Total 100 cases were enrolled for study 50 in group A (study) and 50 in group B (control). Mean age of control group was 22.28 and study group was 22.88., P value was 0.398 which is not significant.

Antenatal care between both groups was compared 80% of control group and 78% of study group were booked cases. P Value is 0.5885 which is not significant.

Study group A – 84% (42/50) were Hindu and the rest were Muslim .In the group B – 86% (43/50) were Hindu and the rest were Muslim. The religious status of the two groups did not exhibit statistically significant difference so both the group were comparable. that women belonging to urban areas in group A and group B was 72% and 70% respectively, and women belonging to rural areas in group A and group B were 28% and 30% respectively, with p value 0.1284 which was not statistically significant. In our study maximum women belonged to middle socio-economic status i.e., 60% cases in group A and 64% cases in group B while 40% in group A and 36% in group B were from lower socioeconomic status and none of them belonged to upper socio-economic status. 48% (24/50) of the women in the group A and 58% (29/50) of the women in the group B were in gestation age of 37-38 weeks. The period of gestation in the two groups did not differ significantly.

Table 1: Maternal demography

	Control group (n=50)	Study group (n=50)	P value (<0.05= significant
Maternal age (mean)	22.28	22.88	.398
Antenatal care			
Booked cases	80%	78%	.5885
Unbooked cases	20%	22%	
Religion			
HINDU	86%	84%	0.158
MUSLIM	14%	16%	
Residence			
Urban	70%	72%	0.1284
Rural	30%	28%	
Socio-Economic Status			
Lower	20%	18%	0.152
Middle	80%	82%	
Upper	00%	00%	

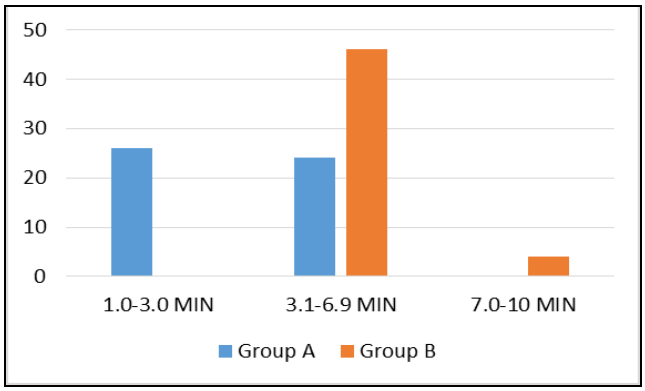

Fig 1: Duration of Third Stage (IN MIN)

Mean duration of third stage of labor in control group was 5.30 minutes and in study group was 3.50 minutes. P Value was <0.001 (t test) which is highly significant

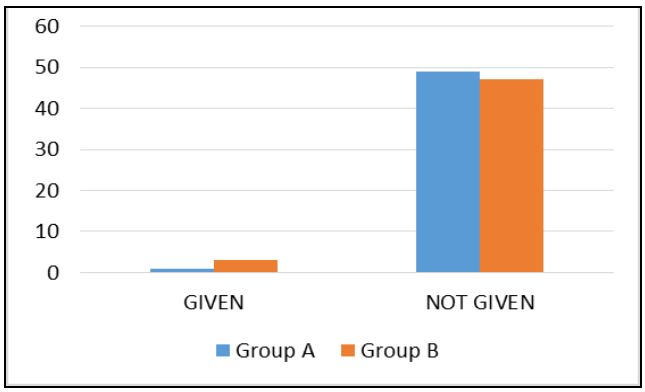

Fig 2: Blood Transfusion

10% of control group and none of study group had blood loss >500 ml. None of both groups had more than 1000ml of blood loss. 6.0% in control group and 2% in study group needed blood transfusion. P Value was 0.757, that is not significant.

Haemoglobin difference before and after delivery. was calculated in both control and study groups. The mean difference in Hb% in control group was 0.93. In study group, it was 0.20. P Value was calculated using t test. P value was <0.001 and it is highly significant.

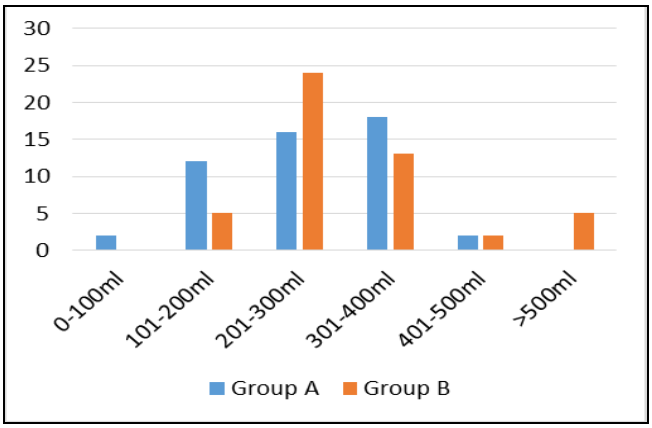

Fig 3: Blood Loss

Table 2: maternal outcome

	Control	Study	P value
Mean Duration of third stages of labor	5.30	3.50	0.001
Mean Blood loss during third stage	310.1	262.0	0.001
Mean Haemoglobin difference	.93	.20	0.0001
Post-partum haemorrhage	10%	0%	0.0037
Need for blood transfusion	6%	2%	0.757

Mean Blood loss during third stage of labour was 310.1 ml in control group and 262.0 ml in study group. P value was 0.001

Birth weight of the baby was compared. Average birth weight in control group was 2.60 kg and in study group was 2.86 kg. Standard deviation and P value were calculated using t test. P Value was 0.411 which is not significant.

Discussion

This study was conducted to study the efficacy of Placental Cord Blood drainage versus none as a part of management of third stage of labour after vaginal delivery.

In the present study, the age group of women varied between18-32 years which corresponds to the reproductive age of women. The mean age was 22.88 yrs in group A and 22.28 yrs in group B .Maximum percentage of women belonged to the age group of 20-29 years. (Table-1)

In a similar randomized controlled trial by Giacalone 2000 *et al.* [27], the mean age of women who entered the study was 25 years. In an another randomized controlled trial conducted at the Medical College Belgaum, Department of Obstetrics & Gynecology by Shravage 2007 *et al.* [26], the mean age of women was 23 years.

In our study majority of women were from urban area. In study group 72% from urban area and 28% from rural area. In control group 70% women from urban and 30% from rural area. Distribution of cases according to residence and socio-economic status found to be non-significant. In this study maximum number of women belonged to middle socio-economic status which could be due to free medical services in government hospitals . In the present study the proportion of women who received antenatal care was greater than those who did not. 78% received antenatal care in the study group & 80% in the control group. 'p' valve being not significant. This is due to increased awareness about JSSY scheme that more women are were booked.

The duration of third stage of labor that is from the delivery of the baby to the delivery of the placenta with its membranes was calculated in minutes using a stop watch. In the present study, in the group A 52% of cases had duration of their third stage up to 3 minutes. In the group B, there was no case in which duration of third stage of labor lasting less than 3 minutes. There was a bout 48% of cases in study group which had their duration of third stage of labor up to 7 min and in control group 92% of cases had duration of third stage of labor between range of 3 min to 7 min. There were no case in study group which had duration of their third stage of labor >7 min but in control group about 8% of cases had their duration of third stage of labor more than 7 min. The mean duration of the third stage of labor in the study group A was 3.5 minutes and in the group B was 5.3 minutes. In the present study the mean blood loss was 262.0 ml in the study group & 310.1 ml in the control group. 'p' value was <0.001. The result was comparable to that obtained in various trials (Table 2).

Shravage *et al.* (2007) [26] reported in their study that the average blood loss in the study group was 175.05 ml. In our study, the post-partum hemorrhage was calculated as any blood loss of greater than 500 ml, in otherwise hemodynamically stable women as per the definition of WHO. In the present study none of women in the study group had post-partum hemorrhage & 10% in the control group had post-partum hemorrhage. In our study, 2% of women study group & 6% of women in control group required blood transfusion, there was not any significance difference between the two groups. (Table 2)

In a similar study by Soltani *et al.* % (2011) [28], the requirement of blood transfusion did not differ significantly in two groups. None required blood transfusion in the study group and 1/250 required blood transfusion in the control group. The 'p' value was 0.5, hence not significant. In the present study, Hemoglobin level was measured at admission before delivery and 48 hours after the birth of the baby. The hemoglobin was measured using Sahli's hemoglobinometer in the laboratory. The mean Hb% in the study group A before delivery 9.78 and after delivery 9.58. The mean Hb% in the group B before delivery 9.98 and after delivery 9.05 .The fall in the Hb% is 0.20 in the study group A and 0.93 in the group B. The 'p' value was 0.0001 which is significant

Conclusion

Placental cord blood drainage is effective in reducing the duration of third stage of labor.

It reduces the mean blood loss during the third stage of labor. The incidence of PPH is decreased with using placental blood drainage. Placental blood drainage is a simple, safe and non-invasive method of managing the third stage of labor, that can be practiced even by midwives and para medical workers to reduce the complications of the third stage of labour in rural settings too.

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