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Dr. Vishali Selvaraj
Post Graduate, Department of
Obstetrics and Gynaecology, Rajah
Muthiah Medical College and
Hospital, Annamalai University,
Tamil Nadu, India

Dr. A Mallika
Professor and Head, Department
of Obstetrics and Gynaecology,
Rajah Muthiah Medical College
and Hospital, Annamalai
University, Tamil Nadu, India

Effect of placental cord blood drainage in vaginal delivery on the blood loss during third stage of labor

Dr. Vishali Selvaraj and Dr. A Mallika

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Abstract

Background: LABOR is defined as a series of events that take place in the genital organs in an effort to expel the viable products of conception (fetus, placenta and membranes) out of the womb through the vagina into the outer world.⁽²⁾ Stage three of labor begins with expulsion of the fetus with expulsion of placenta and membranes.⁽²⁾ Postpartum hemorrhage is defined as excessive blood loss of about 500 ml following vaginal delivery and 1000ml following cesarean delivery, that which adversely affects the general condition of the patient with rise in pulse rate and fall in blood pressure.⁽¹⁾ PPH occurs in 5% of all deliveries and is responsible for a major part of maternal mortality. The present study was undertaken to assess the effect of draining cord blood of placenta after vaginal delivery as a part of management of stage three of labor in minimizing the blood loss during the third stage of labor thereby precluding postpartum hemorrhage.

Keywords: Third stage labor, postpartum, hemorrhage

Introduction

As we know that stage three of labor begins with expulsion of the fetus with expulsion of placenta and membranes and it occupies a very short duration, it is the most crucial period^[1], as complications during this stage may be hazardous to maternal life. Postpartum hemorrhage is defined as excessive blood loss of about 500 ml following vaginal delivery and 1000 ml following cesarean delivery. Postpartum hemorrhage accounts for over 27 percent of deaths. [UNICEF] is the major cause of maternal death worldwide, with an estimated mortality rate of 1, 40, 000 per year, or 1 maternal death every 4 minutes^[3]. Placental cord blood drainage is done prior to delivery of the placenta wherein the cut end of the umbilical cord that is clamped is released and the blood is drained. It reduces the blood volume in the placenta and causes it to shrink, so that the placenta will separate quickly and easily, thereby preventing postpartum hemorrhage.

Objective

1. To assess and compare the duration of stage three labor in the study and control group.
2. To assess and compare the volume of blood lost during stage three of labor in the study and control group.
3. Other parameters like age, BMI, parity, gestational age, induction and maternal hemoglobin [antenatal and postnatal] were associated with duration and the volume of blood lost during stage three of labor.

Methodology

It is a randomized clinical trial on 100 antenatal women admitted to labor ward at Government Cuddalore Medical College (Erstwhile Rajah Muthiah Medical College and Hospital). 100 pregnant women (randomly allocated into)

Study group 50

The placental end of the umbilical cord which was cut and clamped previously was released and was left open to drain the blood until the blood flow ceased and this blood was collected in a separate kidney tray.

Corresponding Author:
Dr. A Mallika
Professor and Head, Department
of Obstetrics and Gynaecology,
Rajah Muthiah Medical College
and Hospital, Annamalai
University, Tamil Nadu, India

Control group 50

The placental end of the umbilical cord remains clamped and is not released until placental separation.

Blood collection drape was applied in both the groups during delivery of the baby. After the delivery of the anterior shoulder of the baby: Injection Oxytocin 10 units IM was given. And then delivery of placenta was done by Brandt Andrews’s method of controlled cord traction in both the groups. In our study, the volume of blood lost was measured using a sterile calibrated blood collection drape.

Inclusion criteria

- a. Primi / multigravida (Up to third gravida)
- b. Age group between 18-35 years.
- c. Term, singleton, alive pregnancy.
- d. Cephalic presentation with normal AFI.
- e. Average size fetus (E.F. Wt 2-4kg)

- f. Expected to have spontaneous delivery. (Augmentation with oxytocin included)

Exclusion criteria

- a. Anaemia / preeclampsia / coagulation disorder complicating pregnancy.
- b. Over distended uterus (Hydramnios / multiple pregnancy / large baby).
- c. Antepartum hemorrhage.
- d. Induced labor.
- e. Instrumental delivery.
- f. Previous LSCS.
- g. Premature rupture of membrane.
- h. Retained Placenta.

Results

Table 1: Comparison of mean duration of stage III labor between the study and control group

Variable	Study group (n=50)		Control group (n=50)		T value	P value
	Mean	SD	Mean	SD		
Stage III labor (In minutes)	2.81	1.32	3.57	2.63	1.81	0.072

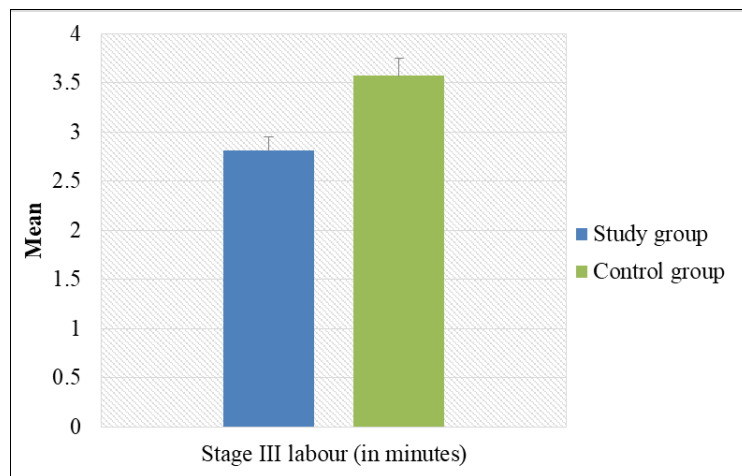


Fig 1: Bar chart showing comparison of mean duration of stage III labor between the study and control group

The mean duration of stage III labor among the study groups was 2.81 ±1.32 minutes and the control group was 3.57 ±2.63 minutes. The mean duration of stage III labor was higher in the

control group than in the study group with P value of more than 0.05.

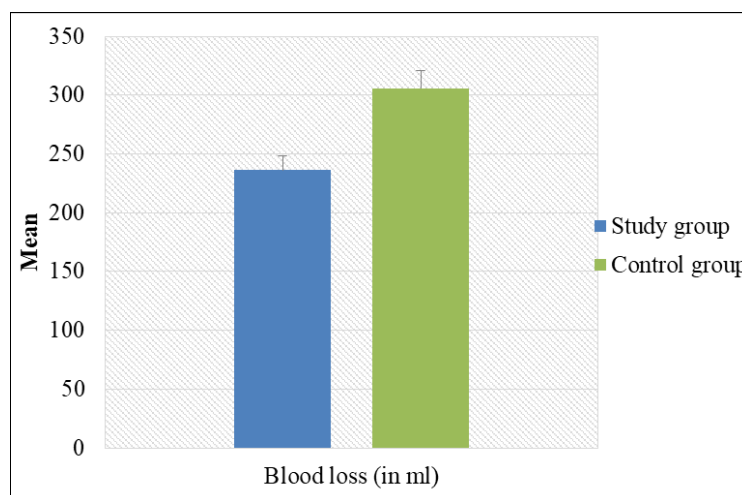


Fig 2: Bar chart showing comparison of mean blood loss between the study and control group

Table 2: Comparison of blood loss between the study and control group

Variable	Study group (n=50)		Control group (n=50)		T value	P value
	Mean	SD	Mean	SD		
Blood loss (in ml)	236.30	124.04	305.90	189.44	2.17	0.032

The mean duration of blood loss among the study groups was 236.30 ±124.04 ml and the control group was 305.90 ±189.44 ml. The mean blood loss was significantly lesser in the study group than in the control group with P value of less than 0.05.

Table 3: Distribution according to incidence of PPH between the study and control group

PPH	Study group		Control group		X ²	P value
	N	%	N	%		
Yes	1	2	3	6	1.04	0.307
No	49	98	47	94		

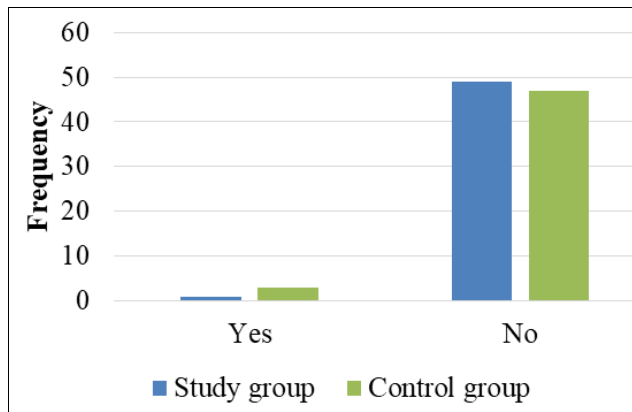


Fig 3: Bar chart showing distribution of incidence of PPH between study and control group

Among the participants in the study group, 2% had PPH and among those in the control group, 6% had PPH. The proportion of participants with PPH was higher in the control group than in the study group. The difference was not statistically significant.

Table 4: Distribution according to the blood transfusion required between the study and control group

Need for transfusion	Study group		Control group		X ²	P value
	N	%	N	%		
Yes	1	2	3	6	1.04	0.307
No	49	98	47	94		

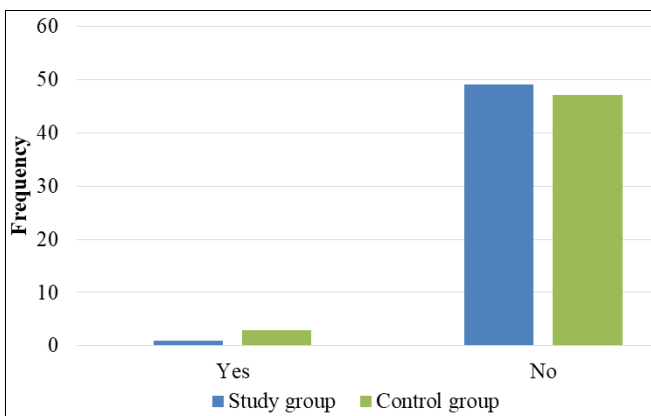


Fig 4: Bar chart showing distribution of blood transfusion required between study and control group

Among the participants in the study group, 2% had blood transfusion and among those in the control group, 6% had need for blood transfusion. The proportion of participants that required blood transfusion was higher in the control group than in the study group. The difference was not statistically significant.

Table 5: Comparison of mean difference in hemoglobin between the study and control group

Variable	Study group (n=50)		Control group (n=50)		T value	P value
	Mean	SD	Mean	SD		
Difference in Hb (gm%)	0.45	0.41	0.69	0.43	2.83	0.006

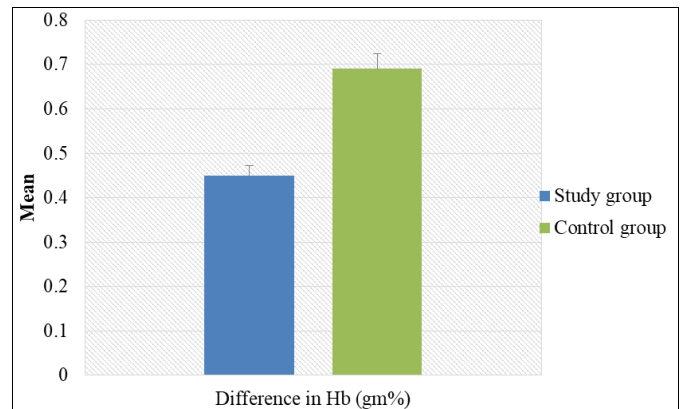


Fig 5: Bar chart showing comparison of mean difference in hemoglobin between the study and control group

The mean difference in hemoglobin among the study groups was 0.45 ±0.41 gm% and that of the control group was 0.69 ±0.43 gm%. The mean Hb difference was lesser in the study group than in the control group with P value of less than 0.05.

Discussion

A normal labor can become a successful delivery or an uneventful delivery leading to postpartum hemorrhage or other obstetric complication. Since PPH is the most dreaded complication and which can be managed medically or surgically effectively and a preventable cause of maternal death, stage three of labor has to be actively managed and prompt recognition of its complications should be anticipated and managed.

This study was conducted at Government Cuddalore Medical College (Erstwhile Rajah Muthiah Medical College and Hospital) to study the efficacy of placental cord blood drainage as a part of management of third stage of labor after vaginal delivery.

In this study placental cord blood was drained by releasing the previously clamped and cut cord in 100 vaginal deliveries and in another 100 vaginal deliveries, the cord remained clamped and it was not drained.

In our study stopwatch was used to monitor the duration of stage three of labor which is the time taken from the delivery of the newborn to the delivery of placenta with its membranes.

The mean duration of stage III labor among the study groups was 2.8 ± 1.32 minutes and that of the control group was 3.57 ± 2.63 minutes. The mean duration of stage III labor was higher in the control group than in the study group with P value of less than 0.05.

Several studies had similar reports. Gulati *et al.* showed that, in a study of 200 pregnant women, mean duration was 2.9 minutes in the study group and 5.72 minutes in the control group [4].

In a similar study conducted by Soltan H, Poulouse TA, Hutchon DR, 2011, published in Cochrane review, in 1257 women, placental cord blood drainage decreased the duration of stage three labor by a mean of 3 minutes [5], and the same was shown in French Cochrane review, 2012. In another Cochrane review 2009, study conducted by Hora Sotani, Fiona Dickinson, Ian M Symonds, the mean difference was 5.4 minutes [6].

In another study by Melal at Babylon University, 2010, mean duration was 5.3 minutes in study group & 8.9 minutes in control group [7].

Blood Loss during third stage

In our study, cord blood was drained and collected in a kidney tray and the volume of blood lost during stage three of labor was measured in a sterile blood collection drape that is calibrated.

The mean volume of blood lost among the study groups was 236.30 ± 124.04 ml and that of the control group was 305.90 ± 189.44 ml. It was significantly lesser in the study group than in the control group with P value of less than 0.05.

A study by Soltani H, Poulouse TA, Hutchon DR, 2011 & French Cochrane reviewed 2012 showed that draining the placental end of the umbilical cord decreased the volume of blood lost during stage three of labor by an average of 77 ml. [5]

Other similar studies that reduced the volume of blood lost during stage three of labor were Melal 2010, of about 184 ml in the study group & 249 ml in the control group [7].

Comparison of hemoglobin in antenatal and postnatal period: Routine hemoglobin measurement was done in all cases of experimental and comparison groups. Repeat hemoglobin was done 48 hours after delivery. Differences between antenatal and postnatal values were calculated in both the groups.

The mean difference in hemoglobin among the study groups was 0.45 ± 0.41 gm% and that of the control group was 0.69 ± 0.43 gm%. The mean Hb difference was lesser in the experimental group than in the comparison group with P value of less than 0.05.

A study by Melal Mohammed 2010 [7] and by Giacalone [8] in a sample of 200 women showed that the difference in hemoglobin (During antenatal & 2nd day postnatal period) was lesser in the experimental group than in the comparison group & the result was significant.

Post-Partum Haemorrhage and Blood transfusion

As per the standard definition of postpartum hemorrhage, it was calculated that any blood loss of equal to or more than 500 ml was considered as postpartum Hemorrhage.

Among the experimental group, 2% had PPH and among those in the comparison group, 6% had PPH. The incidence of PPH was higher in the comparison group than in the experimental group. The difference was not statistically significant but clinically significant. Among the participants in the experimental group, 2% required blood transfusion and among those in the comparison group, 6% required blood transfusion.

In a study by Sharavage *et al.*, J.N. Medical College, Belgaum the incidence of PPH was 3% in the experimental and 10% in

the comparison groups [9]. Another study by Gulati *et al.* reported that incidence of PPH was 6% in the experimental group and 12% in the comparison group [4].

Conclusion

1. Placental cord blood drainage reduces the duration of stage three of labor.
2. It reduces the volume of blood lost during the stage three of labor.
3. Incidence of postpartum hemorrhage is reduced in cord blood drainage {experimental} group [clinically significant though not reflected statistically] and the requirement for blood transfusion after delivery is also reduced in the placental cord blood drainage group {experimental}.
4. The decrease in hemoglobin after delivery is less with the placental cord blood drainage group.

Placental cord blood drainage

It is a simple, non-invasive and safe method which does not require any cost, equipment or effort and can be practiced even by midwives in rural settings as a part of management of the third stage of labor in reducing the blood loss during the third stage of labor.

Conflict of Interest

Not available

Financial Support

Not available

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