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Randomised prospective study of placental blood drainage for the prevention of postpartum hemorrhage

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Abstract
Aims and objectives: 1).To evaluate the effectiveness of placental blood drainage via the umbilical cord in reducing the duration of blood loss in the third stage of labour. 2.) To assess the effect of placental blood drainage for the prevention of postpartum haemorrhage.
Materials and methods: This was a prospective study on 200 women having vaginal delivery admitted to the labor ward at RIMS RAICHUR.
Results: The average duration of the third stage of labour was 5.32+/-0.83 minutes in the study group and 9.30+/-0.001 minutes in the control group. The difference was highly significant (p<0.0001).
The average amount of blood loss in the third stage was 210.6+/-14.39 ml in the study group and 259.2+/-11.22 ml in the control group. The difference was significant (p<0.0001).
Discussion: Placental cord drainage involves the clamping and cutting of the umbilical cord after delivery of the baby and immediately unclamping the maternal side of the cord and allowing the blood to drain freely.
Conclusion: Placental cord blood drainage is a safe and effective method of reducing the duration of the third stage of labour and decrease the incidence of Postpartum haemorrhage.

Keywords: Randomised prospective study, placental blood drainage, prevention, postpartum hemorrhage

Introduction

Postpartum hemorrhage is defined arbitrarily and is related to the amount of blood loss in excess of 500ml following birth of bay (WHO).As the effect of the blood loss is important rather than the amount of blood lost, the clinical definition which is more practical states that any amount of bleeding from or into the genital tract following the birth of the baby up to the end of the puerperium, which adversely affects general condition of the patient evidenced by the rise in pulse rate and falling blood pressure is called postpartum hemorrhage. The third stage of labour is the most crucial stage. It starts from the expulsion of the baby to the complete expulsion of the placenta and membranes. Any delay in the separation and expulsion of the placenta can result in increase in the rate of complications such as postpartum hemorrhage, sepsis and shock. The most common complication of third stage of labor is postpartum hemorrhage which the major cause of maternal morbidity and mortality in developing and resource poor countries.even in the developed countries postpartum hemorrhage is the major cause of maternal mortality if third stage of labor is not manages effectively.
Causes of postpartum hemorrhage are atonic uterus, malnutrition, prolonged labor, mismanaged third stage of labour.
However majority of PPH cases occur in women with no known risk factors hence all pregnant women are at risk for this catastrophic event. Two methods of management of third stage of labour are:

1) Expectant management
2) Active management (widely preferred)

The underlying principle in active management is to excite powerful uterine contractions within one minute of delivery of the baby (WHO) by giving parentral oxytocic, early clamping and cutting the cord as well as controlled cord traction. The traditional or expectant mainly involves maternal effort assisted by gravity or early clamping or controlled cord traction.
It has been recommended that prophylactic oxytocin admistration immediately after the delivery of the baby decreases the incidence of PPH. Controlled cord traction is defined as pulling on the cord while applying counter pressure on the uterus to assist the delivery of the placenta. Recently, a Cochrane review was done and it was recommended that the incidence of PPH and the duration of the third stage of labour were reduced when controlled cord traction is applied.

However, it will be uncomfortable for mothers, and proper training is required for the staff to perform Controlled Cord Traction.

In Brandt Andrewsmaneuver clamp is applied on both sides of the cord and it is cut and then wait till there are signs of separation of placenta while the uterus remains contracted.

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 labour. Most of the parentral oxytocic drugs (methergin, oxytocin, carboprost) which are used to prevent and manage postpartum haemorrhage require proper storage facilities. In resource poor settings access to such paretral drugs are limited.

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 labour and decreasing the extent of blood loss.

Aims and objectives

1. To assess the usefulness of placental cord drainage shortening the duration of third stage of labour.
2. To assess the efficacy of placental cord drainage for the prevention of postpartum haemorrhage.

Materials and methods

The present study was a prospective study done on 200 parturient women (JULY 2017 – DECEMBER 2017) who underwent vaginal delivery admitted to the labour ward at Rims Raichur. The inclusion criteria were

Full term singleton pregnancy with vertex presentation who are expected to have spontaneous vaginal delivery.

The exclusion criteria were

1. Hemoglobin less than 8g/dl
2. Overdistended uterus (hydramnios, multiple pregnancy, and large baby)
3. Antepartum haemorrhage
4. Induced labour
5. Instrumental delivery
6. Known coagulation disorders.

After taking a complete history, general physical and obstetric examination were done. Patients who fulfilled inclusion criteria, Informed consent was taken.Labour process was monitored and after the delivery of the baby, two clamps applied to the umbilical cord and cut and the baby handed over to the paediatrician. Then patients were randomized into study and control group.In the study group, the clamp at the placental end was removed and the blood was allowed to drain till the flow stopped. In the control group, placental end of the cut umbilical cord was not removed. Blood lost in the third stage was collected in a clean metal bowl which was kept at the tail end of a Kelley's pad which was used during delivery. Once the signs of placental separation were seen, placenta was delivered by controlled cord traction. The duration of placental separation and expulsion of placenta was noted using a stopwatch. 10 units oxytocin in 500 mL of saline drip was started if there was more bleeding noted from the uterine cavity due to atony. If uterine bleedin was not controlled then, prostadin (PGF2 α) 250 mcg was given intramuscularly. The blood collected in the metal bowl was measured using a measuring jar. Care was taken not to mix the drained blood from the cord with the blood lost during the third stage. Immediately after delivery patient vitals were monitored such as pulse rate, blood pressure, and tone of the uterus. Fourth stage of labour was monitored for one hour and any complications were noted. Blood transfusion was done in indicated cases.

The duration of the third stage of labour and the amount of blood loss were the primary outcome measures whereas the incidence of PPH, retained placenta and the requirement for blood transfusion were the secondary outcome measures. Mean and standard deviation of the parameters were calculated and t-test was used for statistical analysis. P value < 0.05 was taken as significant.

Results

Both the study study group and control groups were well matched with respect to baseline characteristics. The average time taken for the third stage of labour was 5.32+/-0.83 minutes in the study group and 9.30+/-0.001 minutes in the control group. The difference between the two groups was highly significant (p<0.0001).

The mean blood loss in the third stage was 210.6+/-14.39 ml in the study group and 259.2+/-11.22 ml in the control group. The difference was highly significant (p<0.0001).

Postpartum haemorrhage occurred in 2 cases in the control group. 1 patient required blood transfusion. There were no cases of PPH noted in the study group.

Baseline characteristics of study and control group

Parameters	**Study group**	**Control group**	**p-value**
Age(yrs)	25.67±2.74	25.66±2.64	0.98,NS
Parity	1.54±0.7	1.55±0.7	0.92,NS
Gestational age(weeks)	38.94±0.92	38.93±0.91	0.94,NS
Hb (gm/dl)	10.48±1.2	10.57±1.23	0.61,NS

Outcome of the study

Parameters	Study group	Control group	p-value
Length of 3rd stage of labour(min)	5.328+/-0.83 min	9.30+/-0.001min	<0.0001,HS
Amount of blood loss(ml)	210.6±14.39	259.2±11.22	<0.0001,HS
PPH	0	2	
Blood Transfusion	0	1	

Discussion

After the delivery of the baby the clamping and cutting of the umbilical cord was done.After handing over the baby to the paediatrician, removing the clamp on the maternal side of the cord and allowing the blood to drain freely.

Giacalone[1] reported a study comparing 239 women, in whom placental cord drainage was done with 238 women with spontaneous vaginal delivery. The median value of duration of third stage of labour was 8 minutes in whom placental cord drainage was done 15 minutes in the control group where the cord was clamped and placenta delivered with controlled cord traction.

Sharma *et al.* [3] reported a study on 958 women having vaginal delivery, who were classified as the study group (478 women) and controlled cord traction method as control group (480 women) for placental delivery. The mean duration of third stage of labour was 3.24 minutes and 3.2 minutes in the placental drainage group in contrast to 8.57 min and 6.2 min in controlled cord traction method in primigravida and multigravida respectively.

Gulati *et al*. [2] studied 200 pregnant women to assess the placental blood drainage during spontaneous vaginal delivery as a method of reducing the duration of third stage and decreasing the amount of blood loss and concluded that duration of third stage of labour in the control group was 5.72 minutes and in the study group it was 2.94 minutes. Amount of blood lost in the third stage of labour was noted. It was 247.59 ml in the control group and 193.63 ml in the study group. Incidence of postpartum haemorrhage was observed and it was 12% in the control group and 6% in the study group. Retained placenta was noted in 4% in the control group and in 0% in the study group.

The Cochrane database of systemic reviews [4] studied the effect of placental cord drainage on the third stage of labour. They selected the randomized trials involving placental cord drainage as a variable in the prevention of PPH and reducing the time taken for the separation and expulsion of the placenta and concluded that cord drainage results in statistically significant reduction in the duration of the third stage of labor.

Shravage J and Shilpa P conducted the study found that the duration of 3rd stage was five minutes in the study group and 7.4 minutes in the control group. The average blood loss was 175 ml in the study group and 252 ml in the control group.

The results of the above studies are similar to the results of our study.

It has been suggested that placental cord drainage may decrease the fetomaternal transfusion which can occur with placental separation as there is small risk that the baby's blood cells may get into the maternal circulation and stimulate antibody production (isoimmunization).

More atudies are required to assess the effect of placental blood drainage on maternal and neonatal outcome.

Great efforts were taken to measure the blood loss carefully, but the measurement remains open to inaccuracies due to inclusion of some amniotic fluid and omission of some blood that can spatter on drapes and gowns. This can especially affect the measurement of lesser amounts of blood loss. However, the likely measurement error should be random and will therefore reduce the power, but not bias the results.

Conclusion

Placental cord blood drainage is a very safe and effective intervention of decreasing the time taken for separation and complete expulsion of the placenta and reducing the incidence of Postpartum haemorrhage due to atonic uterus. As there is no extra cost or instruments involved, it may be especially relevant in resource poor settings. Still more studies are required to assess the effect of placental blood drainage on maternal and neonatal outcome.

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