

## Role of placental blood drainage as a part of active management of third stage of labour after spontaneous vaginal delivery

Maryam Binte Afzal,<sup>1</sup> Natasha Bushra,<sup>2</sup> Khadija Waheed,<sup>3</sup> Aleena Sarwar,<sup>4</sup> Nukhbat ullah Awan<sup>5</sup>

### Abstract

**Objective:** To compare the duration of 3rd stage of labour and blood-loss in patients with and without placental cord blood drainage following normal vaginal delivery.

**Methods:** The quasi-experimental study was conducted at the Services Hospital, Lahore, Pakistan, from October 4, 2015, to April 4, 2016, and comprised pregnant women aged 18-40 years with any parity having gestation >36 weeks and haemoglobin >7.0gm. The subjects were divided into two groups. In one group, routine active management of third stage of labour was done and placental end of the umbilical cord was left open to drain blood in a kidney tray till flow ceased. In the other group, the placental end of the cord was left clamped and spontaneous expulsion was carried out by controlled cord traction. Data was analysed using SPSS 22.

**Results:** Of the 200 females, 100(50%) were in each of the two groups. The overall mean age was 29.22±6.84 years. The mean baseline haemoglobin in placental cord drainage group was 11.48±0.89 and that in the control group was 11.40 ± 0.91 (p>0.05). The mean duration of third stage of labour in placental cord drainage group was 5.67±1.81 hours and in control group it was 8.44±2.50 hours (p<0.001). The mean blood-loss in placental cord drainage group was 174.69±13.69ml compared to 196.25±15.06ml in the control group (p<0.001).

**Conclusion:** In the management of the third stage of labour with the cord drainage method, results showed significant reduction in postpartum blood-loss and the duration of the third stage in normal vaginal birth patients.

**Keywords:** Postpartum, Blood loss, Cord drainage, Third stage of labour. (JPMA 69: 1790; 2019)

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### Introduction

Labour is a physiological process, but it is often associated with morbidity and mortality, with the most common cause being blood-loss.<sup>1,2</sup> The third stage of labour is defined as the period from the birth of the baby to the expulsion of the placenta.<sup>3,4</sup> Blood-loss during delivery occurs due to the separation of placenta. This is a high-risk time period, because the blood-loss more than normal can result in serious morbidity and sometimes mortality. Increased blood-loss can be due to several reasons, but in most cases, uterine atony is the underlying mechanism. Thus, it is important to decrease the duration of third stage of labour and to minimise the blood-loss. Active management of the third stage of labour reduces the duration and amount of blood-loss, as heavy bleeding can endanger the life of the mother.<sup>5</sup> Active management of the third stage reduces risk of postpartum haemorrhage (PPH) from 15% to 5%. Moreover prolongation of the third stage of labour leads to an increased complication rate; the incidence of PPH is increased, and there is also increased risk of infections.<sup>3,6</sup> Around 5-8% of obstetric patients suffer major loss of blood in the postpartum period, especially in rural communities, where there is high incidence of anaemia in

pregnancy. Anaemic patients have decreased iron stores in their body, thus their uterine muscles fail to contract efficiently in the postpartum period, thereby increasing the risk of PPH. Moreover, inadequate facilities of safe blood transfusion services and lack of refrigeration to store oxytocin, and inability of birth attendants to administer parenteral oxytocin, worsens the outcome of PPH.<sup>2</sup> PPH is the most common cause of maternal mortality, especially in under-developed countries and accounts for about 25% of maternal deaths.<sup>1</sup>

Active management of the third stage of labour is highly effective and is recommended for the reduction of PPH risk.<sup>1</sup> Active management involves the use of oxytocic drugs or early cord clamping (especially before cord pulsation ceases) or controlled cord traction (CCT).<sup>3,5,7</sup> The CCT process entails waiting for the spontaneous separation and expulsion of the placenta without artificial intervention though it can be aided by gravity or nipple stimulation.<sup>3,8</sup>

Some studies have revealed that after the delivery of the baby, continuous uterine contraction and retraction lead to reduction of uterine size, the placenta becomes inelastic, and it gets separated from the uterus.<sup>1</sup> Cord drainage makes the placenta smaller and compact which enhances early separation and delivery with less blood-loss.<sup>9</sup> Placental cord drainage is an effective method for reducing the duration of third stage of labour, moreover it also decreases blood loss.<sup>10</sup> Oxytocin can be given at the

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<sup>1,2</sup>Services Hospital, Lahore, <sup>3,5</sup>King Edward Medical University, Lahore, <sup>4</sup>Lady Aitchison Hospital Lahore, Pakistan.

Correspondence: Khadija Waheed. Email: khadijaw@yahoo.com

delivery of anterior shoulder of baby or after the expulsion of placenta.<sup>11</sup> Placental cord drainage (PCD) is a simple, safe, cost-effective and non-invasive method for to keep away PPH, which is the most common dreadful complication after delivery. Other than mortality, PPH may result in inadequate lactation, iron deficiency anaemia, coagulopathy and exposes patient to the hazards of blood transfusion.<sup>12</sup> The current study was planned to compare the outcome of the third stage of labour in patients with and without PCD following normal vaginal birth.

## Subjects and Method

The quasi-experimental study was conducted at the Department of Obstetrics and Gynaecology Unit III of the Services Hospital, Lahore, Pakistan from October 4, 2015, to April 4, 2016. The sampling technique used was non-probability consecutive. The sample size was estimated with 95% confidence level, 80% power of test with a reported mean  $\pm$  standard deviation (SD) blood-loss<sup>4</sup> following normal vaginal birth. Subjects included were pregnant women aged 18-40 years with any parity having gestation >36 weeks assessed by last menstrual period (LMP) and haemoglobin (Hb) >7.0gm assessed by complete blood count (CBC) were taken in this study. Females with antepartum haemorrhage assessed by history and examination, multiple pregnancies assessed by ultrasound, known coagulation disorder assessed by history and coagulation profile, over-distended uterus (polyhydramnios, macrosomia) assessed by ultrasound, and intra-uterine death assessed by ultrasound were excluded.

Approval was obtained from the institutional ethics committee, and informed consent was taken from all patient. Demographic details of each patient, including name, age and parity, were noted. A detailed history and routine

examination was performed. Patients were divided into two equal groups. In one group, routine active management of the third stage of labour was done and the placental end of the umbilical cord was left open to drain blood in a kidney tray till the flow ceased followed by delivery of the placenta. In the other group, the placental end of the cord was left clamped and spontaneous expulsion was carried out by CCT. The duration of the third stage of labour was defined in minutes, after delivery of the foetus to the expulsion of the placenta, measured with a stopwatch. Primary PPH was defined in terms of mean blood-loss measured during the third stage of labour by using standard criteria for visual assessment of blood-loss.<sup>13</sup> Blood-loss measured by the following methods were added together to get total blood-loss: soiled sanitary towel=30ml, saturated sanitary towel=100ml, standard absorbency pad=350cc, large swab=500cc, kidney tray=500cc, floor spilling=1500cc, PPH on bed=2000cc. The women were kept under observation for one hour after delivery to look for any complications.

Data was analysed using SPSS 22. Quantitative variables like patient's age, baseline Hb levels, duration of the third stage of labour and blood-loss were presented as mean $\pm$ SD. Qualitative variables like parity were presented as frequencies and percentages. Normality of data was seen using one-sample Kolmogorov Smirnov test. If data was normal, independent sample t-test was applied, otherwise Man Whitney U test was applied for comparing mean or median of age, Hb, duration of the third stage of labour and blood-loss, taking  $p=0.025$  as statistically significant. Chi-square test was applied to compare rate of PPH between the groups, taking  $p=0.025$  as statistically significant.

## Results

Of the 200 females, 100(50%) were in each of the two

Table-1: Comparison of age, Hb, Duration of 3rd stage of labour and blood loss in both study groups.

		Mean	S.D	Median	IQR	p-value
Age (years)	Placental cord drainage (n=100)	28.18	6.77	29.50	12.0	0.025 <sup>b</sup>
	Control (n=100)	30.25	6.78	32.00	11.00	
	Total (n=200)	29.22	6.84	30.00	11.75	
Hb	Placental cord drainage (n=100)	11.48	0.89	11.50	1.58	0.525 <sup>a</sup>
	Control (n=100)	11.40	0.91	11.3	1.57	
	Total (n=200)	11.44	0.90	11.4	1.50	
Duration of 3rd stage (min)	Placental cord drainage (n=100)	5.67	1.81	6.00	3.00	<0.001 <sup>b</sup>
	Control (n=100)	8.44	2.50	8.00	5.00	
	Total (n=200)	7.06	2.58	7.00	3.00	
Blood loss	Placental cord drainage (n=100)	174.69	13.69	175.00	22.75	<0.001 <sup>a</sup>
	Control (n=100)	196.25	15.06	197.5	28.00	
	Total (n=200)	185.47	17.97	184.00	26.00	

<sup>a</sup>Independent sample t-test was applied. <sup>b</sup>Mann Whitney U -test was applied (as the distribution) was not normal  
SD: Standard deviation. IQR: Interquartile range. Hb: Haemoglobin.

Table-2: Comparison of PPH in both study groups.

		Study groups		Total (n=200)
		Placental cord Drainage (n=100)	Control (n=100)	
PPH	Yes	15(15.0%)	20(20.0%)	35(17.5%)
	No	85(85.0%)	80(80.0%)	165(82.5%)
Total		100(100.0%)	100(100.0%)	200(100.0%)

Chi-square test = 0.866, p-value = 0.352 (in significant).

PPH: Postpartum haemorrhage.

groups. The overall mean age was  $29.22 \pm 6.84$  years. The median age in the control group was higher compared to PCD group ( $p < 0.05$ ). The mean baseline Hb in PCD group was  $11.48 \pm 0.89$  and that in the control group was  $11.40 \pm 0.91$  ( $p > 0.05$ ). The mean duration of the third stage of labour in PCD group was  $5.67 \pm 1.81$  minutes and in the control group it was  $8.44 \pm 2.50$  minutes. The median duration of the third stage of labour was statistically lower in PCD group ( $p < 0.001$ ). The mean blood-loss in PCD group was  $174.69 \pm 13.69$  ml compared to  $196.25 \pm 15.06$  ml in the control group ( $p < 0.001$ ) (Table-1).

In the PCD group 15(15%) cases had PPH, while in the control group 20(20%) had PPH ( $p > 0.05$ ) (Table-2).

## Discussion

The amount of blood-loss during the third stage of labour was the primary outcome of the current study as was the case with a couple of earlier studies.<sup>13,14</sup> Pakistan is still struggling hard to achieve the sustainable development goal (SDG) of lowering maternal mortality ratio (MMR), and PPH is still the leading cause of death. PCD is a simple step to achieve minimal blood-loss after delivery. Many local studies and reviews have been published on the risk factors of PPH, but literature on the use of cord drainage for the management or assessment of foeto-maternal haemorrhage during the third stage of labour is sparse.<sup>15</sup>

According to the current study, the median duration of the third stage of labour in PCD group was statistically lower than the other group ( $p < 0.001$ ). The mean blood-loss in PCD group was statistically lower compared to the other group ( $p < 0.001$ ) which also co relates with a study<sup>16</sup> which found that the duration of the third stage was 5 minutes in the PCD group and 7.4 minutes in the other. The average blood-loss was 175ml and 252ml respectively.<sup>16</sup> Placental cord drainage resulted in less incidence of PPH, 3% in the cord drainage group and 10% in the control group.<sup>16</sup>

One study<sup>5</sup> found that cord drainage reduced the length of the third stage of labour and reduced the average amount of blood-loss.<sup>5</sup> Though the length of the third stage of labour was less reduced, blood-loss was reduced

with higher change.<sup>5</sup> Another study described that the mean estimated blood-loss was significantly lower in the cord drainage group than in the control group ( $p = 0.001$ ).

Another study also demonstrated that the PCD shortened the duration of the third stage of labour. There was no PPH, uterine atony, hypovolaemic shock, or the need for blood transfusion in either group.<sup>17</sup> As placental cord drainage results in reduced risk of PPH, patients also have lesser incidence of postpartum anaemia.<sup>18</sup>

Another study showed similar results of shortened third stage of labour in the drainage group than in the control group ( $p = 0.001$ ).<sup>19</sup> A study showed incidence of PPH as high as 21% in some areas of Pakistan, so this PCD method can be applied effectively in low resource settings.<sup>20</sup>

The Cochrane data base of systematic review studied the effect of PCD on the third stage of labour and concluded that cord drainage resulted in statistically significant reduction in the length of the third stage and blood-loss.<sup>1</sup> In another randomised study, the average amount of blood-loss and the length of the third stage were significantly low in the PCD group ( $p < 0.05$  each).<sup>10</sup> One study<sup>9</sup> revealed that PCD is simple, safe, and non-invasive method in reducing the duration and blood-loss in the third stage of labour, thereby preventing PPH. In the current study, PPH rate in PCD group was 15(15%), while in the control group it was 20(20%) ( $p > 0.05$ ). Another study reported lesser incidence compared to the current study i.e. PPH 3% in the study group and 10% in the control group.<sup>16</sup>

The current study is very important regarding its results, as it reduces the duration of the third stage of labour, and chances of PPH. MMR is very high in Pakistan and PCD application can play its part in bringing it down.

## Conclusion

In the management of the third stage of labour, with the application of cord drainage method, postpartum blood-loss and the duration of the third stage of labour were significantly reduced in patients undergoing normal

vaginal births.

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**Conflict of Interest:** None.

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