ORIGINAL ARTICLE

A Comparative Analysis of Duration of Third Stage of Labor with or without Placental Cord Drainage in Females Undergoing Term Delivery

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ABSTRACT

Objective: The purpose of this study was to compare the duration of the third stage of labor between two groups of females undergoing term delivery: those undergoing placental cord drainage and those not undergoing this procedure.

Study Design: Comparative interventional Study.

Place and Duration of Study: Gynecology and Obstetrics Department, Imran Idrees Teaching Hospital, Sialkot for six months duration from 19-01-24 to 24-07-24.

Materials and Methods: A comparative study (ref: 2023/IITH/RA/006) at Imran Idrees Teaching Hospital, Sialkot involving 186 women (aged 18-40, parity <5, term pregnancies) selected via non-probability consecutive sampling. Randomly divided into two groups (n=93 each), Group A received placental cord drainage and active third-stage labor management, while Group B had immediate cord clamping. Demographic data and labor duration were recorded throughout the study period. SPSS 23 analyzed data, utilizing independent t-tests ($p \leq 0.05$). Stratification by gestational age, BMI, and parity was performed. Results provide insights into the efficacy of drainage of the placental cord in managing labor

Results: Average time of the third stage of labor was notably reduced in Group-A (5.25 ± 0.80 minutes) compared to Group-B (7.94 ± 1.03 minutes) having p-value of 0.0001. This significant reduction was consistent across all stratifications by age, gestational age, parity, and BMI, indicating that draining placental cord effectively reduces the length of the third(last) stage of labor.

Conclusion: Effectively draining placental cord, shortens the last stage of labor in term SVD(spontaneous vaginal deliveries), potentially reducing maternal morbidity and mortality. This straightforward intervention should be considered for routine obstetric practice to enhance maternal outcomes and improve the overall quality of care. Further research on its long-term effects is recommended.

Key Words: *Labor, Labor Duration, Maternal Morbidity, Obstetric Practice, Placental Cord Drainage, Third Stage of Labor.*

Introduction

The World Health Organization characterizes normal birth as the occurrence of a low-risk pregnancy culminating in a spontaneous, vertex delivery between the 37th and 42nd weeks of gestation, ultimately yielding a healthy outcome for both mother and child.[1] Labor consists of three stages: the first involves contractions and cervical dilation, the second, birth of the baby, and the third concludes with placental expulsion, aided by contractions, typically within 5-30 minutes, often assisted by controlled cord traction and medication to prevent post partum hemorrhage.[2] The third stage is a critical phase in the process of birth. The management of this stage has been a subject of ongoing investigation and debate in obstetric care. Two approaches are employed clinically to handle the third stage of labor: expectant and active management. The natural delivery of the placenta, often referred to as the 'after-birth', is known as expectant management of the third stage of labor. In contrast, active management of the third stage of labor involves the administration of prophylactic uterotonics, early

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clamping of the umbilical cord, and controlled traction to expel the placenta to aid placental delivery.[3] Active management of the third stage of labour is highly effective at preventing postpartum haemorrhage. Among the various techniques explored in active management of labor , controlled cord traction and administration of uterotonic agents play a crucial role in reducing postpartum haemorrhage rates.[4] An extended last stage of labor is linked with more chances of postpartum hemorrhage, maternal morbidity, and the need for other medical or surgical interventions.[5] Placental cord drainage, a relatively newer approach, involves the passive extraction of blood from the placenta through an elevated umbilical cord by releasing the clamp the previously clamped umbilical cord on maternal side after delivery of the baby and permitting the blood from the placenta to flow into a suitable receptacle.[6] Advocates of this technique suggest that it may facilitate the prompt release of the placenta by reducing blood volume within the placental vessels, thus potentially shortening the last stage of labor.[7] A study indicated that applying cord drainage led to a decreasing last stage of labor compared to those without cord drainage.[8] According to a parallel-group randomized trial after implementing umbilical cord drainage, the last stage of labor exhibited a notably reduced duration. In the group undergoing drainage, the average length of the last stage was around 7.1 ± 1.01 minutes, whereas in the comparison group, the duration averaged 10.4 minutes, with a standard deviation of 3.2 minutes, demonstrating a significant difference ($P < 0.001$).[6] In an Egyptian study, differences in the lengths of the third stage were noted among three groups ($p < 0.05$). The control group (C) exhibited a longer time span of the final stage of labor at 8.80 ± 4.92 minutes compared to Group A, where oxytocin was administered, showing a duration of 7.72 ± 2.72 minutes, and Group B, with cord drainage, with a duration of 5.52 ± 2.04 minutes; suggesting effectiveness of cord drainage technique.[9]

One more randomized trial in Egypt showed that placental cord drainage significantly shortened the third stage of labor by 2.6 minutes compared to the control group (4.5 ± 1.7 vs. 7.1 ± 2.9 minutes; $t=5.788$, $p<0.001$), confirming its effectiveness as an intervention.[10]

A comparable study conducted in Pakistan, findings suggested a notable shortening of the last phase of labor within cord blood drainage cohort, averaging around 8.5±3 minutes, contrasted with the other group, which averaged 11±5.3 minutes; the observed p-value indicated statistical significance at 0.001.[11]

This study aimed to compare the duration of the third stage of labor between females undergoing term delivery with and without placental cord drainage. By shedding light on the potential advantages or drawbacks of placental cord drainage during term deliveries, the study findings may guide healthcare strategy formulation and elevate standards in the treatment of pregnant individuals and their newborns.

Materials and Methods

This comparative research was carried out in the Department of Gynecology and Obstetrics, at Imran Idrees Teaching Hospital, Sialkot, over a six-month period following the approval from Ethical Review Board (reference no. 2023/IITH/RA/006). Altogether 186 women participated with 93 women in each group.

The criteria for including the participants were women from the age of 18-40 years, having a parity of less than 5, presenting in labor at term (gestational age greater than 37 weeks), and undergoing normal vaginal delivery. The exclusion criteria were women with antepartum hemorrhage (as identified through clinical examination), HTN(defined as blood pressure greater than 140/90 mmHg), diabetes (blood sugar levels greater than 186 mg/dl), abnormal placental positions such as placenta accreta or previa (as identified through ultrasound), scarred uterus due to previous c section or any uterine surgery, twin pregnancies, fibroid uterus (as identified through ultrasound), deranged clotting profiles or bleeding disorders (based on history and investigations), and those on anticoagulation therapy.

Following approval from the hospital's ethical committee, 186 women who met the selection criteria were recruited from the labour room. Data, including maternal age, parity(previous pregnancy), and duration of gestation, were collected. After enrollment through consecutive sampling, participants were randomly allocated into two groups using the lottery method to ensure unbiased

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distribution of the subjects. were then randomly divided into two groups using probability simple random sampling method specifically implemented through a lottery method. Each participant drew a slip of paper from a non-transparent container immediately after consenting to participate. The slips were equally divided into Group A (placental cord drainage with active management of the third stage of labor) and Group B (immediate cord clamping). This approach ensured that each participant had an equal chance of being assigned to either group, thereby minimizing selection bias.

Group A consisted of females who underwent drainage of placental cord along with active management of the last stage of labor, which included uterine stimulation by massaging, gentle cord traction, and an injection of syntocinon. For this group, the placental end of the cut maternal end of the umbilical cord was not clamped immediately following delivery of baby and was left unclamped to allow blood drainage into a vessel till blood stopped, and duration was recorded. Group B consisted of women who did not receive placental cord drainage; instead, severed end of the placenta was kept fastened. The women were then followed until the expulsion of placenta, the duration from initiation of the last labour stage to the placental delivery was recorded.

Data were gathered using a proforma and subsequently recorded and analyzed using SPSS version 23. Quantitative data including numerical variables, such as maternal age, gestational age, and the length of the last stage of labor, was assessed by mean and standard deviation. Parity was described by using frequency. The average length of last stage and the incidence of retained placenta were analyzed for comparison between the two groups using used t-tests for independent samples, with confidence level of 95% p-value was set to be ≤0.05 as significant. Further stratification of the data was performed for gestational age, body mass index (BMI), and parity.

Results

Out of 186 cases (93 in each group) women who met the selection criteria were enrolled to evaluate the average span of Third stage of labor experiencing SVD (spontaneous vaginal delivery) at term among those who underwent cord drainage and those who did not.

Table I: Age of Patients & Gestational Age

Characteristic	Group-A	Group-B
Age Distribution		
18-30 years	57 (61.29%)	49 (52.69%)
31-40 years	36 (38.71%)	44 (47.31%)
Mean Age (years ± SD)	29.18 ± 2.89	30.37 ± 2.31
Gestational Age Distribution		
37-39 weeks	68 (73.11%)	66 (70.97%)
>39 weeks	25 (26.89%)	27 (29.03%)
Mean Gestational Age (weeks ± SD)	38.73 ± 1.24	38.77 ± 1.28

Table I This table outlines the age and gestational age distributions of participants in Group-A and Group-B

Table II: Parity and BMI

Characteristic	Group-A	Group-B
Parity Distribution		
1-2 parity	52 (55.91%)	49 (52.69%)
3-4 parity	41 (44.09%)	44 (47.31%)
BMI		
Mean ± SD	29.60 ± 2.33	29.95 ± 2.55

Table II This table presents parity distribution and body mass index (BMI) among participants in Group-A and Group-B

The age distribution analysis revealed that in both the groups, most of patients were within the 18-30 years age group, comprising 61.29% and 52.69% respectively. Conversely, a smaller proportion, 38.71% in Group-A and 47.31% in Group-B, were aged as 31-40 years. The mean age for Group A was 29.18 years (± 2.89), slightly lower than Group B's mean age of 30.37 years (± 2.31). Regarding gestational age, a significant majority in both groups were at 37-39 weeks, with 73.11% in Group A and 70.97% in Group B. The remaining participants, 26.89% in Group A and 29.03% in Group B, had a gestational age of>39 weeks. The mean gestational age for Group A was 38.73 weeks (± 1.24), comparable to Group B's mean gestational age of 38.77 weeks (± 1.28)

Table III A comparative analysis of the mean duration of the third stage of labor between Group A and Group B

Table III presented a comparison of the mean length of the third(last) stage of labour between Group A and Group B, with stratification by various factors. In the overall comparison, Group A exhibited a mean duration of 5.25 minutes (± 0.80), whereas Group B shows a longer mean duration of 7.94 minutes (± 1.03), having a p-value of 0.0001. The table further

Table III: Comparative Analysis of the Average Duration of Third Stage Labour

	Group A	Group B	P-Value
Overall	Mean: 5.25 ± 0.80 min	Mean: 7.94 ± 1.03 min	0.0001
Age Stratification	18-30: 5.12 ± 0.76 min	18-30: 7.82 ± 1.01 min	0.0001
	31-40: 5.44 ± 0.84 min	31-40: 8.07 ± 1.04 min	0.0001
Gestational Age Strat.	37-39: 5.18 ± 0.77 min	37-39: 7.77 ± 1.09 min	0.0001
	>39: 5.13 ± 0.69 min	>39: 7.62 ± 1.06 min	0.0001
Parity Stratification	1-2: 5.19 ± 0.81 min	1-2: 7.11 ± 1.02 min	0.0001
	3-4: 5.23 ± 0.86 min	3-4: 7.19 ± 1.05 min	0.0001
BMI Stratification	≤30: 5.24 ± 0.88 min	≤30: 7.36 ± 1.01 min	0.0001
	>30: 5.34 ± 0.79 min	>30: 7.41 ± 1.14 min	0.0001

showed subgroup comparisons, including stratification by age groups (18-30 years and 31-40 years), gestational age categories (37-39 weeks and >39 weeks), parity (1-2 and 3-4), and BMI (≤30 and >30).

Discussion

The practice of draining the cord could diminish the placenta's volume and surface area, potentially enhancing detachment of placenta and promoting contraction of uterus, thereby increasing the area where separation occurs.[12,13]

In this study the overall comparison reveals that Group-A had a significantly shorter mean length of third stage of labor (5.25 ± 0.80 min) compared to Group-B (7.94 ± 1.03 min), with a highly significant p-value of 0.0001. This suggests that the observed difference in mean durations between the two groups is statistically significant. A study by Karimi N et al documented that drainage of the placental cord effectively reduces the third stage of labor duration.[6] A Randomized control trial found a statistically significant decrease in the placental cord drainage group's time until placenta separation signals appeared (3.5583±0.83915) compared to the control group.[15,16] Age is an important demographic factor that may influence the length of last stage of labor. Stratification by age groups (18-30 years and 31-40 years) shows consistent results, with Group-A demonstrating shorter mean durations compared to Group-B within each age category. This suggests that the benefit of draining umbilical cord in reducing the span of the third stage of labor is consistent across different age groups.

Gestational age at delivery is another crucial determinant of obstetric outcomes. Like age stratification, the stratification by gestational age categories (37-39 weeks and >39 weeks) demonstrates a shorter average duration of the last stage of labor in Group A compared to Group B, regardless of gestational age. This finding along with similar work done by Kaba et al. indicated that draining the cord drainage remains effective irrespective of gestational age at delivery. Parity, or the number of previous pregnancies, may influence the dynamics of labor. The consistent shortening of the last stage of labor with umbilical cord drainage across parity categories suggests that the intervention is equally effective in nulliparous and multiparous women. This finding underscores the generalizability of the intervention across different obstetric populations.[17] The analysis hierarchy by parity (1-2 and 3-4) also reveals a consistent pattern, with Group A exhibiting shorter mean durations of the third stage of labor in comparison with Group B within each parity category. This suggests that the efficacy of drainage of placental cord is not influenced by parity status. A similar also highlighted that there is no significant role of parity on span of third stage of labor.[11] Maternal BMI(body mass index) is a potential confounder in obstetric outcomes. The finding that draining the placental cord reduces the length of last stage of labor regardless of maternal BMI category indicates its robust efficacy across varying body compositions. Stratification by BMI categories (≤30 and >30) demonstrates that Group-A had shorter mean durations of the third stage of labor in comparison of Group B across both BMI groups. This finding indicates that the effect of cord drainage is independent of maternal BMI. Study done by Mohamed et al. also emphasize on the role of BMI in placental cord drainage.[18] The results are consistent with other studies that have investigated the draining of umbilical cord on the span of the final stage of labor. As explained in a study of McDonald et al., highlighting the efficacy of interventions such as placental cord drainage in reducing postpartum hemorrhage and found that draining cord significantly decreases the span of the third stage of labor.[19] To summarize, the study provides robust evidence supporting the use of the technique of

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draining placental cord as a practical intervention to shorten the length of last stage of labor in women experiencing normal delivery(SVD) at term. These findings have important implications for obstetric practice, potentially reducing the risk of postpartum hemorrhage and improving maternal outcomes.

Conclusion

This study confirms that placental cord drainage significantly shortens the third stage of labor in term deliveries, with the duration averaging 5.25 minutes for treated women versus 7.94 minutes for controls, a statistically significant difference ($p = 0.0001$). The benefits were consistent across all demographic and physiological strata tested. The findings support incorporating placental cord drainage into standard obstetric practice to improve maternal outcomes by reducing the risks associated with prolonged labor.

Limitation of the Study

The study was conducted at a single center, making it difficult to generalize the findings to other clinical settings with different patient demographics or healthcare practices. Additionally, the measurement of the third stage of labor duration was subjective and reliant on healthcare staff, which could introduce inconsistencies due to the absence of standardized timing protocols.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.