

Mean Blood Loss in Third Stage of Labour Treated with and without Prophylactic Tranexamic Acid

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ABSTRACT

Background: Massive obstetrical hemorrhage, a leading contributor towards maternal fatality in economically developing countries, is occasionally related with the passive and apathetic management of the third stage of labor. The increasing frequency of anaemia among pregnant women in developing countries, mild to moderate blood loss during labour necessitates massive transfusions with associated complications.

Aim: Recent studies claimed that prophylactic tranexamic acid can significantly reduce the mean blood loss during 3rd stage of labour and advocated it in future practice.

Methods: The research was conducted as randomized controlled trial carried out from February 2021 to October 2021 in the Department of Diagnostic Radiology and Obstetrics & Gynaecology Department, Ganga Ram Hospital, Lahore. A total of 116 pregnant women aged between 18-35 years presenting in labor at term (37-42 weeks of gestation as per dating scan) which were randomly allocated into two groups. Patients in Group-A were given additional tranexamic acid at the end of 2nd stage of labor while those in Group-B received conventional treatment alone.

Results: Patients were 28.33±4.77 years with the mean age while the mean gestational age at delivery was 39.39±1.69 weeks. 30(25.9%) women were primiparas and 86 (74.1%) were multiparas. The mean BMI of these patients was 27.50±3.90 Kg/m² while the average duration of 3rd stage of labor was 4.69±1.83 minutes. Patients taking prophylactic tranexamic acid lost significantly less blood in the third stage of labors than controls (244.83±21.47 vs. 354.09±22.36 ml; p-value<0.001).

Conclusion: In the present study, prophylactic tranexamic acid was found to significantly reduce the mean blood loss during 3rd stage of labor which along with low cost, widespread availability and oral administration advocates the routine use of tranexamic acid (during 3rd stage of labor) in future obstetric practice to minimize blood loss with subsequent decreased need for blood transfusion and better patient's recovery.

Keywords: Third Stage of Labor, Blood Loss, Tranexamic Acid

INTRODUCTION

Labor is a life-changing event and the care offered to a woman can affect her both physically and emotionally in the short and longer term¹. The ultimate goal of providing attention and care for women during childbirth is to make a positive experience for her and her family while maintaining their physical, mental and psychological health, hence reducing morbidity and emergency reactions².

The normal labor consists of 3 stages which have their own duration and complications. Every year, almost half a million moms die from pregnancy-related reasons such as haemorrhage, hypertension, sepsis, obstructed labor and botched abortion^{3,4}. Ninety-nine percent of these deaths occur in underdeveloped countries. Pakistan's maternal mortality rate is extremely high, with problems in the third stage of labor accounting for one-quarter of all deaths³. In low-income countries, passive management of the third stage of labor is occasionally linked with massive obstetrical hemorrhage, which is a major cause of maternal mortality^{6,7}.

As a result, antifibrinolytic agent tranexamic acid (TXA) has been examined as a potentially useful and effective complement for both prevention and treatment of ongoing bleeding, as well as to decrease predicted blood loss⁵. A study has proven that the mean blood loss in 3rd stage of labor in patients treated with and without prophylactic transamine was considerably lower (261.5±146.8 ml in transamine group vs. 349.98±188.85 ml without transamine; p<0.001)⁶.

Anemia in the pregnancy is a major issue in the Pakistani gravid female. Frequency of anemia among the gravid females in urban population of Pakistan is 90.5%⁷. The bleeding that occurs in third stage of labor further worsens the anemia and patient may require blood transfusion for it. There is a need to conduct this study in local population so that the blood loss can be decreased which can help in reducing the mortality and morbidity associated with blood loss and transfusion related complications.

The objective of the study was to compare the mean blood loss in third stage of labor treated with and without prophylactic tranexamic acid.

MATERIALS AND METHODS

Over the course of nine months, A randomized controlled trial study was conducted at Department of Obstetrics and Gynecology Unit-I, Sir Ganga Ram Hospital Lahore after getting permission from Hospital Ethical Review Board. Total 116 patients were selected as sample size by using non-probability consecutive sampling. The inclusion criteria for sample selection was gravid patients with singleton pregnancy, presenting at 37-42 weeks of gestation (as per dating scan) who had completed second stage of labor in the hospital (delivery of the infant and ligation of the cord) lies in the age range of 18-35 years. The patients were then randomly divided into two groups naming with Group-A for Tranexamic acid and Group-B for Conventional treatment using lottery method. 1 gm. of transamine was given in 5 minutes diluted in 20ml 5% dextrose water in the Group-A and 20ml of 5% dextrose water was given in Group-B patients at the time of delivery of shoulders. SPSS version 22.0 was used to enter and evaluated the gathered data. Numerical variables including age, gestational age at time of delivery, duration of third stage of labor and blood loss have been presented by mean±SD and t-test has been further applied for comparison of mean blood loss in third stage of labor between the two groups taking p-value ≤0.05 as significant. Categorical variable named parity has been presented as frequency and percentage. Stratification was used to control the impact of modifiers including age, parity, gestational age at delivery, BMI and duration of third stage of labor. Following stratification, t-test was used, with a p-value of 0.05 considered significant.

RESULTS

Table 1 shows the baseline characteristics of sample including age (in years), gestational age (in weeks), BMI, parity, and duration of

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3rd stage labor (in minutes). The patients' ages varied from 18 years to 35 years old, with a mean of 28.33±4.77 years while the gestational age at delivery ranged from 37 to 42 weeks, with a mean of 39.39±1.69 weeks. The parity ranged from 1 to 5, with a mean of 2.71±1.41. 30(25.9%) women were primiparas and 86 (74.1%) women were multiparas. These patients' BMI ranged from 20.4 Kg/m² to 34.1 Kg/m², with a mean of 27.50±3.90 Kg/m². With this, the duration of 3rd stage of labor varied from 2 minutes to 9 minutes, with a mean of 4.69±1.83 minutes.

Table 1: Baseline Characteristics of Study Sample (n=116)

Variable	Frequency	%age	Mean
Age (years)			
18-26	43	37.1%	28.33±4.77
27-35	73	62.9%	
Gestational Age (weeks)			
37-39	121	38.41	39.39±1.69
40-42	194	61.59	
BMI (Kg/m²)			
20-25	34	29.4%	27.50±3.90
25-30	41	35.3%	
30-35	41	35.3%	
Parity			
Primiparas	30	25.90%	2.71±1.41
Multiparas	298	94.60	
Duration of 3rd stage labor (minutes)			
2-5	85	73.3%	4.69±1.83
6-9	31	26.7%	

In terms of mean age (p-value=0.938), mean gestational age (p-value=0.956), mean parity (p-value=0.793), mean BMI (p-value=0.757) and mean duration of 3rd stage of labor (p-value=0.920), both research groups were comparable. Table 2 shows the distribution of various groups based on patient's age (p-value=0.848), gestational age (p-value=0.853), parity (p-value=0.672), BMI (p-value=0.920) and duration of 3rd stage of labor (p-value=0.834).

Table 2: Study Groups with Characteristics (n=116) - Chi-square test and independent sample t-test

	TXA (n=58)	Controls (n=58)	p-value
Age (years)	28.36±4.71	28.29±4.87	0.938
18-26	22 (37.9%)	21 (36.2%)	0.848
27-35	36 (62.1%)	37 (63.8%)	
Gestational age (weeks)	39.40±1.78	39.38±1.61	0.956
37-39	29 (50.0%)	30 (51.7%)	0.853
40-42	29 (50.0%)	28 (48.3%)	
BMI (Kg/m²)	27.39±3.81	27.61±4.01	0.757
20-25	18 (31.0%)	16 (27.6%)	0.920
25-30	20 (34.5%)	21 (36.2%)	
30-35	20 (34.5%)	21 (36.2%)	
Parity	2.67±1.41	2.74±1.42	0.793
Primiparas	14 (24.1%)	16 (27.6%)	0.672
Multiparas	44 (75.9%)	42 (72.4%)	
Duration of 3rd stage labor (minutes)	4.67±1.67	4.71±2.00	0.920
2-5	43 (74.1%)	42 (72.4%)	0.834
6-9	15 (25.9%)	16 (27.6%)	

Note: statistically insignificant

Table 3 displays those patients getting prophylactic tranexamic acid lost significantly low blood than controls (244.83±21.47 vs. 354.09±22.36 ml; p-value<0.001).

Table 3: Mean Blood Loss between TXA and Controls (n=116) - Independent sample t-test

TXA (n=58)	Controls (n=58)	p-value
244.83±21.47	354.09±22.36	<0.001*

*statistically significant

Similar significant difference was noted between the groups across various subgroups based on patient's age, gestational age

at delivery, parity, BMI and duration of 3rd stage of labor as shown in Table 4.

Table 4: Comparison of Mean Blood Loss (ml) between TXA and Controls subgroups (n=116)

Subgroups	TXA (n=58)	Controls (n=58)	P-value
Age (years)			
18-26	249.00±20.88	356.95±22.95	<0.001*
27-35	242.28±21.72	352.46±22.17	<0.001*
Gestational Age (weeks)			
37-39	244.03±22.67	352.97±22.78	<0.001*
40-42	245.62±20.57	355.29±22.26	<0.001*
BMI (Kg/m²)			
20-25	242.39±23.64	356.75±18.05	<0.001*
25-30	245.50±20.99	351.05±21.59	<0.001*
30-35	246.35±20.83	355.10±26.43	<0.001*
Parity			
Primiparas	246.29±22.09	358.38±21.43	<0.001*
Multiparas	244.36±21.51	352.45±22.75	<0.001*
Duration of 3rd stage labor (minutes)			
2-5	244.63±21.86	354.00±23.42	<0.001*
6-9	245.40±21.04	354.31±20.04	<0.001*

DISCUSSION

Anaemia during pregnancy is a public health issue, particularly in developing countries, and is linked to negative pregnancy outcomes⁸. According to the global data, anaemia affects 56 percent of pregnant women in economically developing countries⁹. Anaemia has been linked to poor maternal and child health during pregnancy, as well as an increased risk of maternal and perinatal mortality. According to research, anaemia during pregnancy is responsible for 23% of all maternal fatalities in economically developing countries¹⁰. An increased need for transfusion in anemic pregnant women is linked to complications such as transfusion reaction and infection transmission. As a result, strategies to prevent blood loss and the requirement for transfusion are hot focus of research^{10,11}.

In several non-obstetric surgeries, tranexamic acid (TXA) (a antifibrinolytic agent) assists to minimize the blood loss and the requirement for transfusion^{12,13,14}. TXA works by preventing plasmin and plasminogen from binding to fibrin in a competitive manner. After intravenous delivery, the peak plasma TXA concentration is obtained and thereafter the concentration decreases until the 6th hour. It has a half-life of around 2 hours¹². It has been thoroughly researched in both in pregnant and non-pregnant adults¹³. According to the recent studies, prophylactic tranexamic acid can significantly minimize the average blood loss during 3rd stage of labor and it should be used in future practice⁶. However, the available evidence was sparse and ambiguous, and there was no such locally published material and information, necessitating the current investigation.

The goal of this study was to assess the mean blood loss in third stage of labor between those who were given prophylactic tranexamic acid and those who were not. Based on present findings, mean blood loss was considerably low in patients receiving prophylactic tranexamic acid as compared to controls (244.83±21.47 vs. 354.09±22.36 ml; p-value<0.001). Our observation is in line with the previously published report by Gungorduk et al (2013) who also reported similar significant reduction in average blood loss (during 3rd stage of labor) in Turkish pregnant women treated with and without prophylactic transamine (261.5±146 vs. 350±189 ml; p-value<0.001)⁶. Similar significant difference in the mean blood loss in 3rd stage of labor with versus without prophylactic tranexamic acid (243.1±140.4 vs. 314.8±180.9 ml; p-value<0.001) has also been reported by Yang et al. (2001) among Chinese pregnant women¹⁴. A similar study involving Egyptian pregnant women also reported similar significant reduction of mean blood loss in third stage of labor with versus without prophylactic tranexamic acid (290 vs. 460 ml; p-value<0.0001)¹⁵.

The current study is first of its sort in the local population and adds to the body of research evidence on the subject that has already been published. In the present study, prophylactic tranexamic acid was found to significantly reduce the mean blood loss during 3rd stage of labor which along with low cost, widespread availability and oral administration advocates the routine use of tranexamic acid in the management of 3rd stage of labor in future obstetric practice to minimize blood loss with subsequent decreased need for blood transfusion and better patient's recovery. This would also in turn enable initiation of early breast feeding, development of the bond between mother and the baby thus improving neonatal outcome as well.

One of the present study's limitations was that it did not consider the various side effects of this novel treatment which could have shed some light on the safety of tranexamic acid use in future obstetric practice. Such a study is highly recommended in future research.

CONCLUSION

Prophylactic tranexamic acid was found to significantly reduce the mean blood loss during 3rd stage of labor which along with low cost, widespread availability and oral administration advocates the routine use of tranexamic acid during 3rd stage of labor in future obstetric practice to minimize blood loss with subsequent decreased need for blood transfusion and better patient's recovery.

Conflict of interest: Nil

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