e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(10); 728-731

Original Research Article

A Hospital Based Cases-Control Study Assessing the Effect of Tranexamic Acid on Blood Loss after Vaginal Delivery

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Received: 18-04-2023 Revised: 17-05-2023 / Accepted: 10-06-2023
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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to find out the effect of tranexamic acid on blood loss after vaginal delivery.

Methods: This study was prospective observational study at Department of Obstetrics and Gynecology, carried out over a period of 2 years in the hospital. Hundred pregnant women entered the study. There were 50 subjects in control group and 50 in the study group. Prior to enrolment, written informed consent was attained from all women participated in the study. All women were explained purpose of study and consent was taken in the language that they understand.

Results: The two groups matched in terms of socio-demographic, and also in terms of reproductive, delivery characteristics, newborn weight and the results were not statistically significant. The amount of blood loss in study and control group was 248 ml and 326 ml respectively which was significant (P<0.01). There was a significant difference in the post-delivery Hemoglobin (P<0.01) and PCV (P <0.01) between the groups. The difference of Hemoglobin and PCV decline in the study group and in control group was statistically significant (P <0.01). No adverse effects were observed with the use of tranexamic acid in the study.

Conclusion: From our study it was clear that use of tranexamic acid would help to reduce blood loss during delivery. It's a cheap and readily available drug. Its use along with Oxytocin would help in reducing blood loss during delivery. Hemorrhage being the commonest cause of maternal mortality its use would help a long way in preventing maternal mortality due to bleeding.

Keywords: Postpartum hemorrhage, Tranexamic acid, Vaginal delivery

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Introduction

Globally, about 500,000 women die yearly from complications of pregnancy and childbirth. [1] Majority of these deaths occur in the immediate postpartum period and most cases are due to postpartum haemorrhage (PPH).[2,3] PPH is the commonest cause of maternal death, with the highest incidence in low-middle- income countries (LMIC). [1,4] Moreover, postpartum haemorrhage (PPH) is the main cause of severe maternal morbidity (SMM), accounting for 47.6% of the cases of SMM. [5,6] PPH is the excessive bleeding per vaginam after the delivery of the baby and up to six weeks postpartum. [1] It can either be primary or secondary. [6,7] Primary PPH is the loss of > 500mls of blood within the first 24 h of delivery or loss of any amount that is enough to cause haemodynamic instability. [7,8] Primary PPH complicates approximately 3% of vaginal deliveries. [9]

Tranexamic acid was recently shown to reduce bleeding-related mortality among women with postpartum hemorrhage, especially when the drug was administered shortly after delivery. [10] A meta-analysis of data from individual patients, [11] including data from patients with trauma [12] and women with postpartum hemorrhage, [10] suggested the importance of early treatment. Every 15-minute delay in administration was associated with a reduction of approximately 10% in the benefit against bleeding-related deaths, and no significant benefit was noted when the drug was administered more than 3 hours after delivery. These findings suggest that tranexamic acid be considered as an intervention not only to treat but to prevent postpartum coagulopathy, [11] but evidence to support a prophylactic effect on postpartum hemorrhage is weak.

In theory, postpartum hemorrhage provides an additional indication for tranexamic acid because rapid degradation of fibrinogen and fibrin and increased activation of plasminogen activators occur at placental expulsion. [13,14] Tranexamic acid has a half-life of three hours and adequate therapeutic levels persist for 7±8 hours following intravenous injection. Tranexamic acid is inexpensive, available in many settings, and has a good safety profile. Given the hypercoagulable status of pregnant women, possible thromboembolic side effects of tranexamic acid administration have been the subject of earlies studies. Reported adverse events were mainly minor and no clear evidence was found for an increase of thromboembolic events in pregnant women who were administered with a low dose of tranexamic acid. [15]

The aim of the present study was to find out the effect of tranexamic acid on blood loss after vaginal delivery.

Materials and Methods

This study was prospective observational study at Department of Obstetrics and Gynaecology, Yashoda Multi-speciality Hospital,Somajiguda, Hyderabad, India carried out over a period of 2 years in the hospital. Hundred pregnant women entered the study. There were 50 subjects in control group and 50 in the study group. Prior to enrolment, written informed consent was attained from all women participated in the study. All women were explained purpose of study and consent was taken in the language that they understand.

The eligible participants were all women aged 18-35 years with a term singleton pregnancy with cephalic presentation who had vaginal delivery. Patients with grand multiparity (parity>5), uterine surgery and uterine myoma were excluded from the study. Patients with known coagulation disorders were excluded. Anaemia, were also excluded from the study. Patients who underwent cesarean section were excluded from the study.

Out of which 50 patients in study group, received Inj. Tranexamic acid along with Inj Oxytocin 10 units IM and 50 patients in control group received only Inj. Oxytocin 10 units IM.

Monitoring of Labor Done

Ten units Inj. Oxytocin 10 units was given to the mother IM within 1 min of delivery of the baby, followed by Inj. Tranexamic acid 1 gram slow IV in study group. In control group no additional drug was given apart from Inj. Oxytocin. A calibrated blood collecting bag was used to measure the blood loss. Patients were continuously monitored for clinical signs of thrombosis or other complications. Complications if any, noted. Post-delivery Hemoglobin levels and PCV were noted 24 hours after delivery. Blood loss and change in Hemoglobin levels and PCV were noted in each group.

Results

Table 1: Demographic and obstetric characteristics of participants by group

N=100	Study groupN = 50	Control groupN=50	P Value
Age in years	26.66±3.47	27.73±2.68	0.10
BMI	25.55±2.4	25.5±1.66	0.48
Primipara	30	40	0.36
Multipara	20	10	0.75
Sponatenous labour	41	42	0.34
Induced labour	9	8	0.32
Stage 1 duration in minutes	355±30.5	310±20.16	0.25
Satge 2 duration in minutes	24.44±10.6	23.27±8.2	0.66
Stage 3 duration in minutes	8.4±3.7	8.5±4.2	0.76
Birth weight in gms	2924.2±325.05	3000.4±388.2	0.78

The two groups matched in terms of socio-demographic, and also in terms of reproductive, delivery characteristics, newborn weight and the results were not statistically significant.

Table 2: Comparison of hemoglobin and hematocrit and blood loss between the groups

N=100	Study group N=50	Control group N=50	P Value
Pre-delivery Hb (gms/dl)	12.4±0.16	12.6±0.12	0.24
Post-delivery Hb (gms/dl)	11.3±0.87	10.4±0.76	<0.01
Pre-delivery PCV	37.10±0.38	37.63±0.37	0.32
Post-delivery PCV	34.06±2.56	33.27±2.57	<0.01
Blood loss(ml)	248±42.18	326±44.92	<0.01

The amount of blood loss in study and control group was 248 ml and 326 ml respectively which was significant (P<0.01). There was a significant difference in the post-delivery Hemoglobin (P<0.01) and PCV (P <0.01) between the groups. The difference of Hemoglobin and PCV decline in the study group and in control group was statistically significant (P <0.01). No adverse effects were observed with the use of tranexamic acid in the study.

Discussion

Labor is a physiological process, but it is often associated with morbidity and mortality. Bleeding is a common cause of maternal death. Postpartum hemorrhage is defined as blood loss of 500 mL or more after delivery within 24 hours. [16] The foremost cause of maternal mortality is postpartum hemorrhage. Incidence of PPH is reported as 2%-4% after vaginal delivery and 6% after cesarean section. According to India Sample registration scheme (SRS) 2001-2003, PPH accounts for 38% of maternal deaths. [17] By timely and appropriate management, the deaths from PPH can be avoided. The most common being use of prophylactic uterotonics in third stage of labor. The pathophysiology of PPH involves mechanical and clotting mechanism. By using prohemostatic drugs like tranexamic acid a biochemical hemostatic effect can be expected. Tranexamic acid decreases the lysis of fibrin clots. [10,18] Since 1960s, tranexamic acid, an anti-fibrinolytic agent has been used in different medical and surgical conditions. In a systematic review by Cochrane review it is recommended that more studies are needed to assess the efficacy of tranexamic acid to reduce blood loss. [18]

The two groups matched in terms of socio-demographic, and also in terms of reproductive, delivery characteristics, newborn weight and the results were not statistically significant. The amount of blood loss in study and control group was 248 ml and 326 ml respectively which was significant ($P<0.01$). The amount of blood loss and the need of post-operative blood transfusions have come down with the perioperative use of tranexamic acid. There are no serious side effects associated with the use of tranexamic acid. [19] Gungorkuk et al [20] did a randomized trial in 439 patients undergoing normal delivery and there was a significant decrease in blood loss in tranexamic group compared to placebo group. In 2015, Roy P et al [21] conducted a study to find out the efficacy of tranexamic acid in the reduction of blood loss after delivery. The study found good reduction in blood loss with the use of tranexamic acid. A study by Gobbur V et al [22] found that tranexamic acid reduces blood loss during cesarean section.

There was a significant difference in the post-delivery Hemoglobin ($P<0.01$) and PCV ($P <0.01$) between the groups. The difference of Hemoglobin and PCV decline in the study group and in control group was statistically significant ($P <0.01$). No adverse effects were observed with the use of tranexamic acid in the study. A French randomized controlled open-label trial studied the effect of high dose tranexamic acid (4 grams in 1 hour) versus placebo in 144 women with postpartum hemorrhage of more than 800 ml. Blood loss six hours after enrolment was lower in the tranexamic acid group, but the difference was only 48 ml, which seems clinically irrelevant. [23] A pre- and post-implementation study from the same country compared high dose tranexamic acid (4 grams in 1 hour) in 159 women with postpartum hemorrhage of more than 800 ml after vaginal birth and showed no difference in amount of blood loss, duration of bleeding or need for transfusion. [24] Both studies were rather small, and contained women with less severe postpartum hemorrhage compared to our cohort, making it difficult to assess major clinical outcomes. After the first trial some concern arose with regard to a possible association between high dosages of tranexamic acid and unexplained renal failure. [24] Treatment of postpartum hemorrhage with these high dosages of tranexamic acid was therefore discontinued in several French hospitals.

Many studies have also proven less blood loss during cesarean section with the use of tranexamic acid. [25,26] Use of tranexamic thus would also reduce blood loss in patients undergoing cesarean section. There was significant decrease in blood loss when tranexmaic acid was used in our study. Use of tranexamic acid in third stage labor would thus help in reducing blood loss. Postpartum bleeding is the commonest cause of maternal mortality. Tranexamic acid is a readily available and inexpensive drug. [27]

Conclusion

From our study it was clear that use of tranexamic acid would help to reduce blood loss during delivery. It's a cheap and readily available drug. Its use along with Oxytocin would help in reducing blood loss during delivery. Hemorrhage being the commonest cause of maternal mortality its use would help a long way in preventing maternal mortality due to bleeding.

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