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EVALUATION OF PROPHYLACTIC USE OF TRANEXAMIC ACID IN REDUCING BLOOD LOSS DURING CAESAREAN SECTION IN A TERTIARY CARE HOSPITAL, PURBA MEDINIPUR, WEST BENGAL

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Abstract

Background: Postpartum Haemorrhage (PPH) is one of the important causes of maternal death and severe maternal morbidity. Compared to vaginal delivery, women undergoing caesarean delivery incur the highest risk of PPH and haemorrhage related morbidity. Many evidence suggests that PPH during caesarean delivery is occurring more frequently than vaginal delivery. Objective: To Evaluate the effect of low dose intravenous tranexamic acid in reducing blood loss during Caesarean section Postpartumhaemorrhage (PPH) is the leading cause of obstetric morbidity and mortality around the world. Prophylactic administration of tranexamic acid in patients at risk for PPH is aimed at reducing estimated blood loss (EBL). This is a novel method of administering TXA. Materials and Methods: This randomized control trial among 100 antenatal women aged >18 years undergoing Lower segment caesarean section in tertiary care centre. They were divided into Study group and control group. Study group received 1gm iv tranexamic acid and the Control group did not receive tranexamic acid. All Data was entered in Microsoft Excel data sheet (MS-Excel) and analysed using commercially available SPSS 23 software package. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. Random sampling methos is used to conduct the study. Results: Between January 2024, and May 2024 , 100 women were enrolled in the study fifty patient's received tranexamic acid (n=50) and fifty patients were matched to control (n=50).The relative risk of PPH in a patient who received TXA was 0.8 with a CI -0.19 0.20. The numbers needed to treat in order to prevent 1 PPH was 5 women. The average EBL for C/S who received TXA was 672ml which was significantly less than those who did not 1072ml ($p<0.0007$). There were no reported cases of pulmonary embolism or deep vein thrombosis in either arm. Conclusion: TXA can be used as a prophylactic intervention to prevent blood loss, morbidity, and mortality in obstetric patients who are at risk for post-partum haemorrhage. It was not associated with any significant side effects and complications. It can be used effectively in all women undergoing caesarean section to reduce the postpartum Haemorrhage thereby reducing the maternal morbidity and mortality.

KEYWORDS: Lower segment caesarean section, Postpartum haemorrhage, Blood loss Tranexamic acid.

INTRODUCTION

Caesarean delivery was associated with 2.7 times the risk of severe maternal morbidity (95% CI: 2.6, 2.7), compared to vaginal delivery, and was estimated to contribute to 37% (95% CI: 36, 38) of severe maternal morbidity cases in the population .Previous studies have shown that tranexamic acid (TxA) significantly reduced maternal death due to postpartum haemorrhage (PPH) and reduced bleeding in caesarean and other surgeries [1–8]. Caesarean section (CS) rates have increased to 25 to 30% all over the world. Obstetric haemorrhage accounts for 20-25% of maternal mortality and morbidity. The common complication of caesarean section is primary and secondary haemorrhage (20%). It leads to increase in maternal mortality and morbidityglobally[9-13].The significant challenge that an obstetrician faces during delivery is managing the placental separation that takes place during the 3rd stage of labor. Myometrial contractions cause a significant constriction of blood vessels in the placental bed; however, adequate fibrin formation is also required for the process to be successful. Because pregnancy is always represented as a hypercoagulable state, many physiological adaptation

take place during pregnancy, and the haemostatic challenge is met in almost all pregnant women[14-18]. During pregnancy, there is an increase in the concentration of many factors that contribute to blood clotting, including factors II, VII, VIII, IX, and XII. During pregnancy, a woman's body naturally produces fewer factors XI and XIII, which results in a lower concentration of clotting factors overall. This phenomenon is most prevalent in the third trimester of pregnancy.

A randomized control trial provide evidence of TXA reducing estimated blood loss (but not blood loss based on gravimetric assessment) in patients undergoing cesarean delivery [9]. Tranexamic acid (TXA) is a synthetic lysine aminoacid derivative. It acts as an antifibrinolytic agent by blocking the lysine binding site at plasminogen molecules in a manner that is reversible. This reduces the rate at which haemostatic fibrin is dissolved by plasmin, which is the process that causes blood clots to break down. As a results in the lysine receptors binding sites of plasmin for fibrin being well occupied by tranexamic acid, which prevents the binding of fibrin molecules and, as a result, preserves and stabilizes the fibrin matrix[19-22]. Absorption following a single dose of oral administration, the peak concentration in plasma is reached in about three hours on average.

OnVolume distribution of Body , the plasma concentration of tranexamic acid is 30mg/L following an intravenous injection of 10mg/kg of tranexamic acid in pregnant women. Only a small portion of the drug is converted into its active form. The majority of it is flushed out of the body within the first ten hours, followed by other fractions. The half-life is approximately 2 hours. It has minimum side effects. Tranexamic acid is also used in various conditions like menorrhagia, Bleeding associated pregnancy, all gynaecological procedures, traumatic hemorrhage and other surgical procedures. The Haemorrhage that occurs during pregnancy is responsible for nearly 30 percent of all cases of maternal mortality.

Obstetrician continue to rely on visual estimates to determine the amount of postpartum blood loss, despite the fact, these estimates are frequently found to be inaccurate. Estimating the amount of blood lost during the postpartum period can be done using any one of a number of different methods. E.g.- , Rubberized Blood Mat, Visual Assessment, Direct and standard measuring jar Kelly's Pad, Gravimetric method and Laboratory based methods.

WhenObstetrician fail to recognize the excessive blood loss that occurs during child birth, if early intervention is not initiated, obstetrichemorrhage can lead to death, which is the worst complication of pregnancy. The objective of this study was to evaluates the effect of intravenous Tranexamic acid in reducing blood loss in patients undergoing Lower Segment Caesarean Section.

MATERIALS AND METHODS

We Conducted a Randomised Controlled Trial studydone in all the antenatal mothers who have aged >18yrsand who underwent Caesarean section in the Department of Obstetrics and Gynaecology, in ICARE Institute of Medical Sciences and Research and Dr. Bidhan Chandra Roy Hospital ,Haldia. In our study

weselected in 100 antenatal patients who were satisfying the eligibility criteria. Antenatal mothers >18yrs, Full term primigravida or Multigravida with singleton pregnancy undergoing Lower segment Caesarean section at Obstetrics and Gynaecology department were included and patient with Medical and surgical co-morbidities, History of thromboembolic disorders, complicated pregnancy, bleeding diathesis, those who are allergic to tranexamic acid, multiple pregnancy and polyhydramnios were excluded. The patients were randomly categorized into Group A and Group B in the order of admission. We use random sampling method to select the cases. All odd numbers were assigned in Group A and even numbers were assigned in Group B. Group A was considered as a study group and received 1gm intravenous tranexamic acid before incision and Group B was considered as a Control group who did not receive tranexamic acid before incision. Through Investigator Informed written consent was obtained from all the participants before proceedingto follow ethical guidelines . Tranexamic acid was administered 15 to 20 minutes before incision in a dosage of one gram intravenously and slowly infused over 5-10 minutes, in addition to Oxytocin after the delivery of baby.
Participants Blood was collected into the suction container after the placental separation, thus excluding the collection of amniotic fluid into the suction container, so that the collected blood is only from that which has occurred after placental delivery[23-25]. All the soaked Gauge pads and operation table sheets were weighed before and after surgery. The measurement was done by investigator in two different timeperiods. One from the time of placental separation to the end of surgery. The other from the end of surgery to two hours postpartum. Quantity of blood loss = (weight of used material + weight of unused material) - (weight of all material prior to surgery) + volume collected in the suction container after placental delivery [26-29]. Evaluation of effectiveness of Tranexamic acid was given by: 1. Efficacy of the drug -Amount of blood loss and fall in haemoglobin. 2. Safety of the drug – Monitoring of vitals, general side effects and laboratory findings.
Statistics and analysis of data
Data is put in excel sheet then mean, median and association is analyzedby SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Pvaue<0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software.

RESULT

In this the study population, the mean difference of BMI was 28.4±3.75 in Group A and 27.68±3.18 in Group B, P value was 0. 161. We find that The mean difference of Age among the study population was 28.68±3.76 in Group A and 25.96±3.93 in Group B, P value was 0.612. we got that mean difference of period of gestation between both the groups was 36.86±0.75 and 39.86±0.89 and P value was 0.999. In this study comparison of Socioeconomic status, place of living and occupation between the two groups was done. It was not statistically significant. P value >0.05 in our study.

Table1: Comparison of mean of bleeding from placental delivery to end of CS between group (N=100)

	Group (Mean+_S.D)		
Parameter	Group A	Group B	P value
Placental delivery to end of CS	432.6 ± 26.2	689.2 ± 305.2	<0.002
End of CS to 2 hrs Postpartum	47.4 ± 6.11	78.8 ± 13.53	<0.002
Total	480 ± 32.14	768 ± 318.73	<0.002
Fall in Hb% (gm/dl)	0.58 ± 0.21	1.32 ± 0.73	<0.002

Table 1:In table 1 represents that Placental delivery to end of cs among Group A mean+_S.d is 436.2+_26.2 andIn group B it is 689+_305.2 .And End of Cs to 2hr Postpartum in GroupA(mean+_s.d)is 47.4+_6.11and for GroupB It is 78.8+_13.53.

In this study(Mean +_ S.D) fall of % Hb (gm/dl) is 0.58+_0.21 for group A and 1.32+_0.73 for Group B.

In this study we come to concluded that the group A who already taken inj. Tranexamic has less anaemic as compare of control group (Group B) who did not take inj. Tranexamicacid .Here p value 0.002(p value <0.05) which reject n null hypothesis . It means it is significant and it support that tranexamic acid cause less EBL(estimated blood loss). That's way evidences support that Tranexamic acid cause reducing blood losses in women undergo caesarean section.

Among the study population, the difference in proportion of complication between study group was statistically significant. (p value <0.05)

Table 2:-Association of Gender with EBL(Estimated Blood Loss)

		Women with EBL<100ML(PPH)		Total
		yes	No	
Under Caesaria section women	Tranexamic Acid	39	11	50
		78.00%	22.00%	100.00%
	Control Group	18	32	50
		36.00%	64.00%	100.00%
Total		43	57	100

(Odds Ratio=6.30, 95% CI = 2.6 to 15.25 , Chi Square =4.6 , P value <0.0001)

Table 2: In this study it is found that the 78% women has less EBL(estimated blood loss) in group who taken Tranexamic acid as compare to Control Group who did not take Tranexamic injection during caesarean section operating procedure . Here Odds ratio is 6.30, chi square 4.6 and P value <0.001. which strongly support that tranexamic acid important play important role in reducing blood loss in caesarean section and because p value <0.001. Soits highly significant.

The difference in mean of bleeding from placental delivery to end of CS, end of CS to 2 hrs postpartum, total of both, Fall in Hb% (gm/dl) between study group was statistically significant. (p value <0.05)

Table 3: Comparison of complication between group (N=100)

Complication	Group A(N==50)	Group B(N=50)	Chi Square	P value
Nil	100%	36(72%)	6.8	<0.002
PPH	0%	14(28%)	6.8	<0.002

Table3 : In this study s it is found that Group A has less complication and PPH as compared to control group B which evidenced that women participants who received Tranexamic acid has less complication and PPH as compared to Group B(Control Group) who did not receive Tranexamic acid injection during caesarean section procedures .Here Chi Square is 6.8 and P value is 0.002 .So our result is statistically significant.

DISCUSSION

We Conducted a Randomised Controlled Trial study done in all the antenatal mothers who have aged >18yrs and who underwent Caesarean section in the Department of Obstetrics and Gynaecology, in ICARE Institute of Medical Sciences and Research and Dr. Bidhan Chandra Roy Hospital ,Haldia. In our study we selected in 100 antenatal patients who were satisfying the eligibility criteria . Antenatal mothers >18yrs, Full term primigravida or Multigravida with singleton pregnancy undergoing Lower segment Caesarean section at

Obstetrics and Gynaecology department were included and patient with Medical and surgical co-morbidities, History of thromboembolic disorders, complicated pregnancy, bleeding diathesis, those who are allergic to tranexamic acid, multiple pregnancy and polyhydramnios were excluded[30-31]. The patients were randomly categorized into Group A and Group B in the order of admission. We used random sampling method to select the cases. All odd numbers were assigned in Group A and even numbers were assigned in Group B. Group A was considered as a study group and received 1gm intravenous tranexamic acid before incision and Group B was considered as a Control group who did not receive tranexamic acid before incision. Through Investigator Informed written consent was obtained from all the participants before proceeding to follow ethical guidelines
This was similarly supported by Gautam et al. where they found majority of the participants was around the age group of 26 years. 11 We found that the mean gestational week of the women was 39 weeks. This was corroborated by Pirjani et al. where they observed the similar results. 12 4.1. Parity and caesarean section Among the study population with parity, in group A 10 (40%) of them were primi, 9 (36%) of them were G2P1L1 and in group B 9 (36%) of them were primi, 12 (48%) of them were G2P1L1. This was supported by the study conducted by Rydahl et al. As a mother's age increased, caesarean sections rates increased[32]. Only a minimum change in risk was seen when maternal and obstetric risk factors were taken into account. Use of oxytocin is lesser required with tranexamic acid In our study there was a significant difference in the need of additional oxytocin between the two groups and the difference was statistically significant. (p value<0.05)
In our study, we found that the requirement of oxytocin was nil with tranexamic acid group. This was supported by Mova et al.
In this study we come to concluded that the group A who already taken inj. Tranexamic has less anaemic as compare of control group (Group B) who did not take inj. Tranexamicacid .Here p value 0.002(p value <0.05) which reject n null hypothesis . It means it is significant and it support that tranexamic acid cause less EBL(estimated blood loss). That's way evidences support that Tranexamic acid cause reducing blood losses in women undergo caesarean section.
In this study it is found that the 78% women has less EBL(estimated blood loss) in group who taken Tranexamic acid as compare to Control Group who did not take Tranexamic injection during caesarean section operating procedure . Here Odds ratio is 6.30, chi square 4.6 and P value <0.001. which strongly support that tranexamic acid important play important role in reducing blood loss in caesarean section and because p value <0.001. Soits highly significant.
The difference in mean of bleeding from placental delivery to end of CS, end of CS to 2 hrs postpartum, total of both, Fall in Hb% (gm/dl) between study group was statistically significant. (p value <0.05) .
In this study s it is found that Group A has less complication and PPH as compared to control group B which evidenced that women participants who received Tranexamic acid has less complication and PPH as compared to Group B(Control Group) who did not receive Tranexamic acid injection during caesarean section procedures .Here Chi Square is 6.8 and P value is 0.002 .So our result is statistically significant.
Among the study population, the difference in proportion of complication between study group was statistically significant. (p value <0.05)
So we come to concluded that tranexamic acid given intravenously reduced intraoperative and postoperative blood loss as well as oxytocin administration in patients having caesarean deliveries.

Complications

In our study, we found that there were no complications like PPH with the group administered tranexamic acid. We found a statistically significant (p value 0.05). Sharma et al. also highlighted that the blood loss during and following a lower segment caesarean section is greatly lessened with tranexamic acid. Tranexamic acid use was not linked to any kind of complications or adverse effects like thrombosis, nausea, vomiting, or diarrhoea. Comparison of mean of bleeding from placental delivery to end of CS between group In our study, we found that the difference in mean of bleeding from Placental delivery to CS end, CS end to 2 hrs

Postpartum, the Total, fall in Hb% (gm/dl) before delivery and 24 hours after delivery between the study groups was statistically significant. (p value<0.05)

CONCLUSION

Tranexamic acid significantly reduces the amount of blood loss during and after lower segment caesarean section. It was not associated with any significant side effects and complications. It can be used effectively in all women undergoing caesarean section to reduce the postpartum Haemorrhage thereby reducing the maternal morbidity and mortality. It play important role to reducing blood loss during and after caesarean section

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