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Efficacy of tranexamic acid in reducing blood loss before and after lower segment caesarean section: A prospective case control study

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Abstract
Introduction: Maternal mortality and morbidity due to haemorrhage still remains the major cause of maternal death worldwide. So, it becomes very important to reduce the blood loss during and after delivery so as to reduce the maternal mortality. tranexamic acid an anti-fibrinolytic which is used in various fields to reduce blood loss intra operatively is also used in obstetrics to reduce the blood loss in both vaginal delivery and LSCS.
Objectives: To study the efficacy of tranexamic acid in reducing the blood loss during and after lower segment caesarean section.
Methods: A randomised prospective case control study was conducted on 200 pregnant women was conducted. 100 of them was given 1 gm tranexamic acid 10-15 minutes before surgery and 100 of them were not given TXA and blood loss was calculated from placental delivery to skin closure and from skin closure to 2 hours postpartum.
Results: Tranexamic acid significantly reduce the blood loss, 322ml in study group from placental delivery to skin closure vs 425 ml in study group ($p< 0.001$); 52.4ml in study group from skin closure to 2 hours postpartum vs 71.9ml in control group ($p< 0.001$). Overall a total blood loss of 374ml in study group vs 495 ml in control group which was statistically significant ($p< 0.001$).
Conclusion: Tranexamic acid significantly reduces the blood loss during and after lower segment caesarean section and reduces the need for blood and blood products transfusion.

Keywords: Tranexamic acid, caesarean section, postpartum haemorrhage

Introduction
Maternal mortality in India though seem to have reduced from 130 per 1 lakh live births 2014-2016 to 122 per 1 lakh live births in 2015 to 2017, haemorrhage remains the most common cause of maternal mortality worldwide. The caesarean section rates are on the rise both in developed and developing countries like India in recent years [1]. Availability of blood and blood products is not easy and maintaining a blood bank is hard. So, it is important to reduce the amount of blood loss during and after lower segment caesarean section. The use of anti-fibrinolytics in trauma, surgeries and menorrhagia to reduce the blood loss is very well known. The use of Tranexamic acid, the haemostatic agent in obstetrics to reduce the blood loss is being studied by several case studies and its efficacy is studied in elective and emergency LSCS in reduction of blood loss. World Health Organisation in 2017 recommended the use of TXA for the treatment of Postpartum haemorrhage [2].

Materials
Type of study – Randomised case control study (prospective)
Period of study – October 2018 To June 2020
Place of study – Department of Obstetrics and Gynaecology, Rajah Muthiah Medical College, Annamalai University, Chidambaram

Sample size – 200 cases
Inclusion criteria
- Term primipara with a singleton delivered by CS
- Regular perinatal care
- Adherence to research regulations

- Informed consent obtained

Exclusion Criteria

- Severe medical and surgical complications including the heart, liver and kidney, brain disease and blood disorders.
- Allergy to tranexamic acid.
- History of thromboembolic disorders.
- Abnormal placenta: such as placenta previa, placenta abruption, Placental adhesions caused by repeated artificial abortions.
- Severe pregnancy complications such as severe pre-eclampsia.
- Multiple pregnancies, macrosomia, poly hydramnios
- Complication with myoma.
- Patients not willing for the procedure.

Method

Among the 200 patients 100 of them were given 1 gm of tranexamic acid 10 – 15 minutes before LSCS. The other 100 were not given tranexamic acid. Both the groups were given uterotonics like oxytocin prophylactically after the delivery of shoulders of the baby.

Both the study and control groups were evaluated and their complete blood count, LFT was done.

Blood loss was calculated in two periods. First, from placental delivery to skin closure and then second one from skin closure to 2 hours postpartum.

The dry and wet mop pads are weighed before and after surgery and the blood loss is calculated as follows:

- Blood loss in ml from placental delivery to skin closure: weight of used and unused mop pads – weight of the unused pads before surgery + amount of blood in suction apparatus.
- Blood loss in ml from skin closure to 2 hours postpartum: weight of the used pads – weight of the unused pads.
- The blood loss, pre and post operative Hb values, post operative vitals in both groups are compared.
- Hb is measured 48 hours after LSCS.
- Patients in both groups were also followed up for any side effects.

Results

Mean age was 25.6 yrs. in study group & 26.2 yrs. in the control group (P=0.12). The difference in age of subjects of both the groups was not statistically significant

Mean weight was 64.13 kg. In study group & 66.63 kg. In the control group (P=0.001). The difference in weight of subjects of both the groups was statistically significant

The above possible confounding variables are effectively matched in both the groups.

Table 1: Age and weight characteristics compared in both groups

	Study Group Mean (SD)	Control Mean (SD)	'P' Value	
Age in years	25.6(3.52)	26.2(3.54)	0.12	**NS**
Weight in KG	64.13(6.74)	66.63(6.1)	**0.001**	**S**

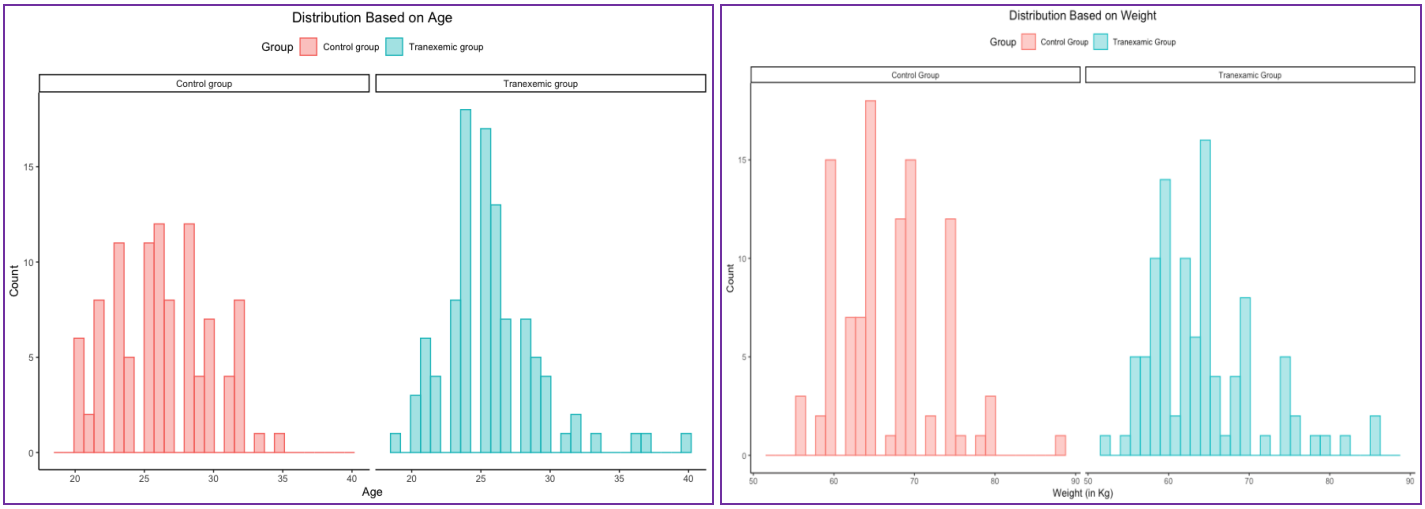


Fig 1, 2: Distribution based on age and weight characteristics in both groups.

The below graph describes the various indications for LSCS between both groups. The indications for surgery is important as it also affects the amount of blood loss indirectly. There was no statistical significance between the two groups. The fact that these were matched adequately removes the effect of these confounding variables.

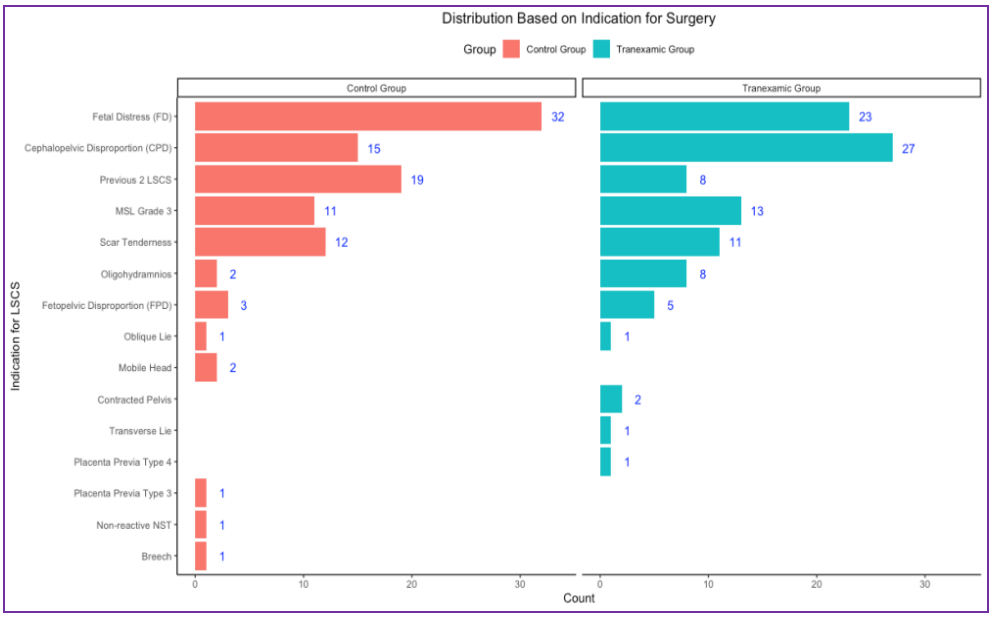
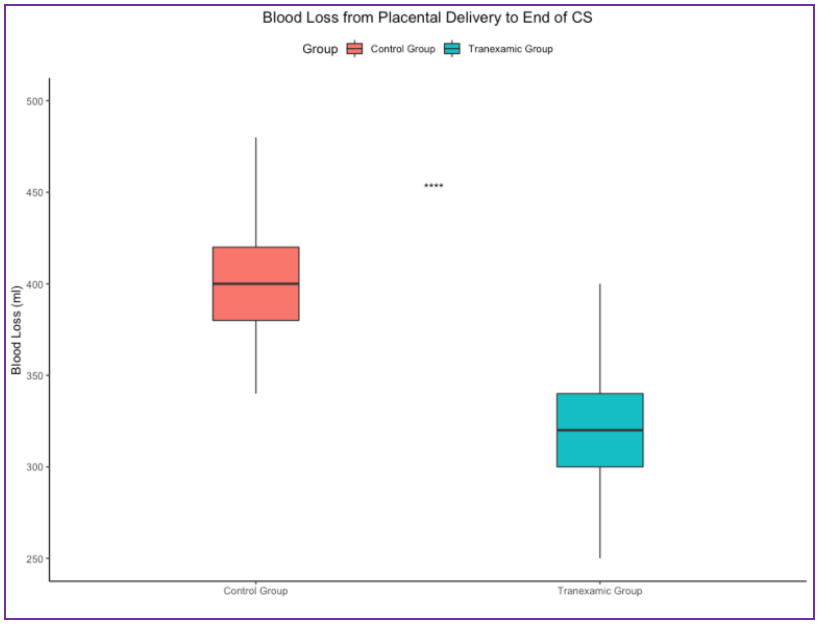


Fig 3: Distribution based on indications for surgery in both groups.

The below table shows blood loss in both groups measured in two periods. The mean blood loss in cases who received tranexamic acid prior to surgery which is 322 ml and mean blood loss in control group which is 425 ml from the duration of placental delivery to skin closure. p value is < than 0.001 which is highly significant. Patient who received tranexamic acid had 100 ml less blood loss than patients who did not receive tranexamic acid.

Table 2: Effect of tranexamic acid in blood loss from placental delivery to skin closure.

Blood loss (ml)	Cases		Control		'p' value
Placental delivery to skin closure	Mean	SD	Mean	SD	< 0.001 - Significant
	322	30	425	90	



**** indicates p value is significant.

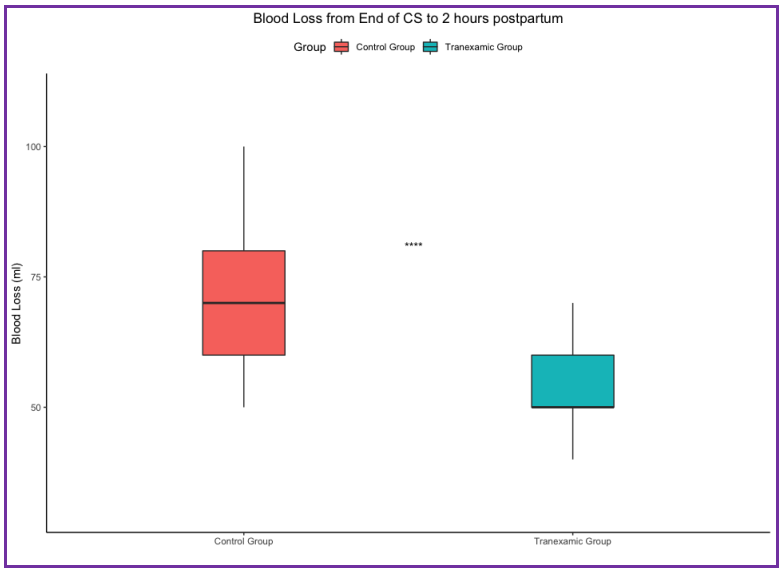
Fig 4: Effect of tranexamic acid in blood loss from placental delivery to skin closure.

The blood loss from skin closure to 2 hours postpartum is given below.

Table 3: Efficacy of tranexamic acid – blood loss from skin closure to 2 hours postpartum

Blood loss (ml)	Cases		Controls		'p' Value
Skin closure to 2 hours postpartum	Mean	SD	Mean	SD	<0.001 Highly significant
	52.4	10.1	71.9	17	

Table 3 shows mean of blood loss in cases and controls which are 52.4 and 71.9 respectively. The p value is less than 0.001 which is highly significant. Patient who received tranexamic acid significant amount of about 20 ml less blood loss than patient who did not receive it.



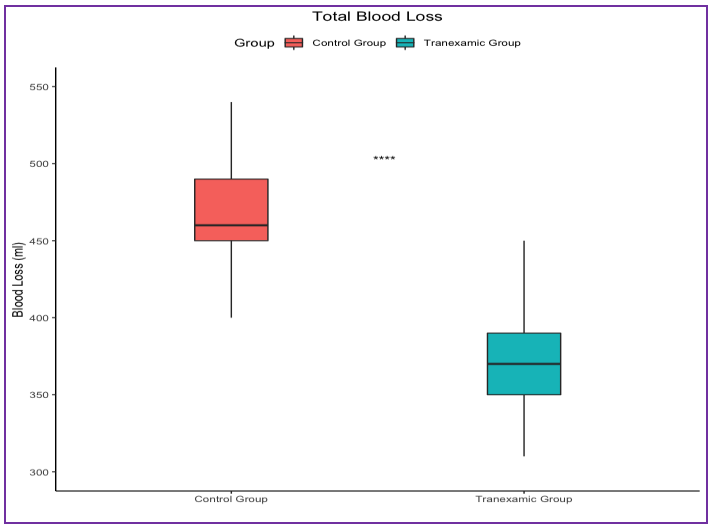
**** indicates p value is significant.

Fig 5: Effect of tranexamic acid in blood loss from skin closure to 2 hours postpartum

The total amount of blood loss in patients undergoing LSCS from placental delivery to two hours postpartum. Patients who received tranexamic acid the mean value is 374 ml which is about 120 ml less blood loss compared to patients who did not receive tranexamic acid whose mean value is 495 ml. 'p' value less than 0.001 is highly significant.

Table 4: Total blood loss in both groups, effect of tranexamic acid

Blood loss(ml)	Cases		Controls		'p' Value
Total blood loss	Mean	SD	Mean	SD	<0.001 Highly significant
	374	33	495	94	



**** indicates significant p value

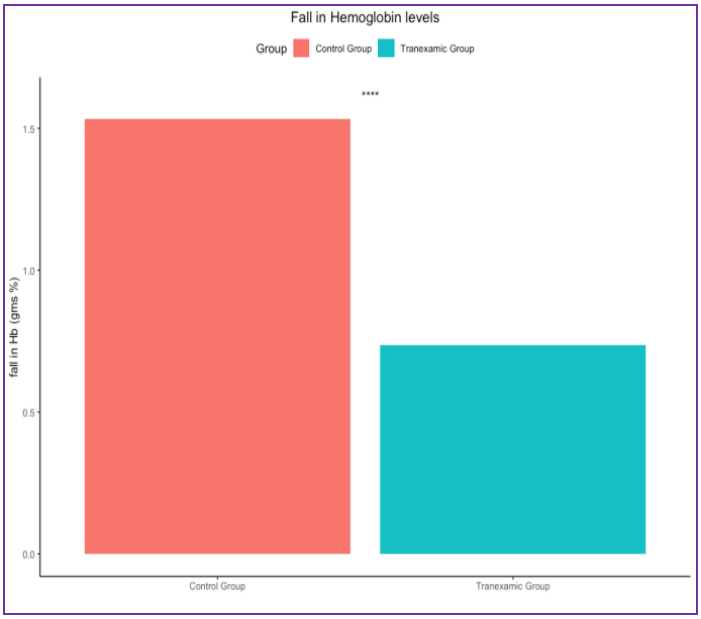
Fig 6: Effect of tranexamic acid in LSCS – total blood loss

The below table compares the pre-operative haemoglobin and post-operative haemoglobin in both groups. The fall in haemoglobin is also studied. The below table shows pre-operative haemoglobin levels in both groups. Mean values 11.11 g% and 11.05 g% in cases and control respectively. Mean haemoglobin in both groups is almost similar.

Table 5 shows fall in haemoglobin in both groups. Mean Hb in tranexamic acid group is 0.74 g% and in control group is 1.53.g%. p value less than 0.001 is highly significant. Mean difference is 0.78.

Table 5: comparison of Hb levels.

Hb (gm%)	Cases		Control		*P* value
Pre op Hb	Mean	SD	Mean	SD	0.6
	11.11	0.90	11.05	0.88	
Post op Hb	10.37	0.95	9.53	0.96	<0.001
Fall in Hb	0.74	0.50	1.53	0.29	<0.001



**** - significant *p* value

Fig 7: Effect of tranexamic acid – fall in Hb in both groups.

The unpaired t test was used to analyse and compare the variables. A *p* value of <0.05 is considered significant.

Table 6: Overall sum up of results showing efficacy of tranexamic acid in reducing blood loss in lower segment caesarean section.

Characteristic	N	Overall, N = 200	Control Group, N = 100[1]	Tranexamic Group, N = 100[1]	p-value[2]
Age	200	25.9 (3.5)	26.2 (3.5)	25.6 (3.5)	0.12
Weight	200	65.14(17.4)	66.13(15.6)	64.16(17)	**<0.001**
Blood Loss 1	200	373 (85)	425 (90)	322 (30)	**<0.001**
Blood Loss 2	200	62.2 (17.0)	71.9 (17.0)	52.4 (10.1)	**<0.001**
Total Blood Loss	200	435 (93)	495 (94)	374 (33)	**<0.001**
Preop Hb (gms%)	200	11.08 (0.88)	11.05 (0.87)	11.11 (0.90)	0.6
Postop Hb (gms%)	200	9.95 (1.04)	9.53 (0.96)	10.37 (0.95)	**<0.001**
Fall in Hb (gms%)	200	1.13 (0.57)	1.53 (0.50)	0.74 (0.29)	**<0.001**
Preop SBP	200	114 (11.0)	114 (12.9)	114 (8.91)	0.6
Postop SBP	200	115 (8.97)	116 (9.57)	115 (8.33)	0.5
Preop DBP	200	71.7 (9.86)	70.7 (12.2)	72.6 (6.76)	0.8
Postop DBP	200	73.5 (7.07)	73.2 (6.49)	73.8 (7.63)	0.3

[1] Statistics presented: mean (SD); n (%)
[2] Statistical tests performed: Wilcoxon rank-sum test

Discussion

Maternal deaths due to haemorrhage need to be focused in coming years so as to achieve a decline in MMR. Postpartum haemorrhage still remains the leading cause of maternal mortality and morbidity. Blood loss on the other hand is has its own disadvantages with risks of transfusion reactions such as allergic reactions and transmission of potentially fatal infections like HIV, HCV, HPV. Also, availability of blood and blood products is hard nowadays.

In order to reduce the need for blood transfusion and increased blood loss during and after LSCS a potential drug which reduces the blood loss is to be considered. Uterotonics like oxytocin and PGF2α are being used in postpartum haemorrhage for ages. The use of anti- fibrinolytics in obstetrics and Gynaecology is very well known since its usage in menorrhagia [3].

Pregnancy by itself is a hypercoagulable state [4]. During placental delivery fibrinogen and fibrin are rapidly degraded. The fibrinolytic system gets activated and as result of it Plasminogen activators and Fibrin degrading products increases. This phenomenon last up to 6 – 10 hours postpartum, which can lead on to increased bleeding [4]. Tranexamic acid plays a vital role in this step to control the postpartum haemorrhage.

Tranexamic acid is not a new drug. It is a plasminogen activator used for ages in various surgeries to reduce the intra operative blood loss and in menorrhagia and also in teeth extraction in haemophilia patients [5]. Tranexamic acid exerts its antifibrinolytic effect by blocking the lysine binding locus of the plasminogen and plasmin to the fibrin substrate. TXA is a potent inhibitor of fibrinolysis. There are various trials like CRASH-2 and WOMAN that has made TXA to be included the list of essential drugs by WHO [6, 2].

This study is a double blinded placebo-controlled study which showed that tranexamic acid effectively reduced the intra-operative bleeding from placental delivery to skin closure and also up to 2 hours postpartum. The total amount of blood loss in lower segment caesarean section is difficult to estimate as there is commixture of amniotic fluid [7]. Hence, the pre op and post op levels of haemoglobin are taken into consideration to estimate the blood loss.

In this study, the patients who received TXA did not have blood loss >500ml whereas, in the control group there were four out of hundred had a blood loss of >500ml and two of them required blood transfusion. The study results clearly shows that TXA group had higher mean haemoglobin than the control group after LSCS. Definitely there is a reduction in incidence of postpartum haemorrhage in TXA group. There was no notable alteration in the vitals if study group following administration of tranexamic acid.

The major side effect which should be considered while administering TXA is thrombo-embolic events. In this study not a single patient developed thrombosis. Other minor side effects noted were nausea, vomiting and headache.

Conclusion

Tranexamic acid assuredly reduces the blood loss during and after lower segment caesarean section with less side effects. In addition to uterotonics like oxytocin this drug reduces the incidence of PPH and the need for blood transfusion to a greater extent.

References

1. Betran, AP, Torloni, MR, Zhang, JJ, Gülmezoglu, AM for the WHO Working Group on Caesarean Section*. WHO Statement on Caesarean Section Rates. BJOG 2016;123:667-670.
2. Woman: reducing maternal deaths with tranexamic acid, The Lancet, 389, 10084 2081
3. Tranexamic Acid (Lysteda) for Treatment of Menorrhagia, Obstetrics & Gynecology 2010;116(5):1210 doi: 10.1097/01. AOG. 0000390401. 8582
4. Inga Marie Nilsson, Stig Kuuander. Coagulation and Fibrinolytic Studies During Pregnancy, Acta Obstetricia et Gynecologica Scandinavica 1967;46(3):273-285, DOI: 00016346709158632
5. Queiroz SIML, Silvestre VD, Soares RM, Campos GBP, Germano AR, da Silva JSP. Tranexamic acid as a local hemostasis method after dental extraction in patients on warfarin: a randomized controlled clinical study. Clin Oral Investig 2018;22(6):2281-2289. doi: 10.1007/s00784-017-2327-4. Epub 2018 Jan 26. PMID:
6. Roberts I, Shakur H, Coats T, Hunt B, Balogun E, Barnetson L *et al*. The CRASH-2 trial: a randomised controlled trial and economic evaluation of the effects of tranexamic acid on death, vascular occlusive events and transfusion requirement in bleeding trauma patients. Health Technol Assess 2013;17(10):1-79. doi: 10.3310/hta17100. PMID: 23477634; PMCID: PMC4780956.
7. Stafford I, Dildy GA, Clark SL, Belfort MA. Visually estimated and calculated blood loss in vaginal and cesarean delivery. Am J Obstet Gynecol 2008;199(5):519.e1-7. doi: 10.1016/j.ajog.2008.04.049. Epub 2008 Jul 17. PMID: 18639209.