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A Clinical Study of the Efficacy of Low Dose Tranexamic Acid for Blood Loss During Elective LSCS

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Abstract

Background: *The incidence of cesarean section is on the rise generally throughout the world and particularly in countries like India. One of the important causes of morbidity and mortality in CS is perioperative blood loss. Hence minimizing the blood loss is important for better maternal outcomes. We in the present study tried to evaluate the effect of low doses of tranexamic acid on postoperative blood loss during lower segment cesarean section.* ***Methods:*** *This prospective cross-sectional study was done in the Department of Obstetrics and Gynecology, Kalinga Institute of Medical Sciences, KIMS – Bhubaneswar. Inclusion criteria: all the singleton pregnancies being delivered by elective LSCS. A total of n=60 patients were included during the study period. They were divided randomly into two groups of n=30 of cases and n=30 of controls. The cases (study group) received injection tranexamic acid 1gm IV diluted with 10ml of distilled water slowly administered 10 minutes before the abdominal incision for CS and after informing the anesthetist the cases were given 10 units of oxytocin in a pint of DNS for 30 minutes after the delivery of the neonate. In the control group, tranexamic acid was not given and only 10 units of oxytocin in a pint of DNS were given by IV drip for 30 minutes. Estimation of blood loss done at intra-operative and post-operative intervals and total blood loss was calculated in both groups.* ***Results:*** *The indications for LSCS in the cases and controls were studied the most common cause for LSCS was Cephalopelvic disproportion (CPD) in both n=16(53.33%). The breech presentation was seen in n=7(23.33%) of patients. The mean total blood loss in cases was 306.0 ml and in the controls, it was 421.1 ml the p values were found to be significant.* ***Conclusion:*** *Tranexamic acid significantly reduces the amount of blood loss during the Lower segment cesarean section (LSCS) and its use in low doses was not associated with any significant side effects. Hence Tranexamic acid must be considered for use in patients where there is the anticipation of PPH.*

Keywords*: Tranexamic Acid, Blood Loss, LSCS*

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Introduction

Blood loss is very common during cesarean section deliveries. There is growing evidence of an increase in cesarean sections and some estimates have shown up to 25 – 30% increase throughout the world. [1] In India the maternal mortality ratio is higher compared to the world average. [2] Delivery by CS can cause more complications as compared to the vaginal delivery and one of the important causes of complication in CS is primary or secondary postpartum hemorrhage. Hence it is important to reduce the amount of bleeding during and after the lower segment cesarean section (LSCS). [3]A crucial analysis of blood loss during CS is useful in order to prevent hemorrhagic complications. Excess blood loss often leads to transfusion of allogeneic blood products and exposes the patients to the risk of adverse

effects of transfusion reaction and blood-borne infections. Continual blood shortage, blood safety, and costs are the other important concerns during transfusion hence there is a need to minimize the blood loss during operations. [4] Tranexamic acid is a synthetic derivative of amino acid lysine that exerts its anti-fibrinolytic effects by reversibly blocking the lysine binding sites on the plasminogen molecules. [5] It has been shown to be effective in reducing blood loss and reduce the incidence of blood transfusions in surgeries. During the placental delivery, fibrinogen and fibrin are rapidly degraded and plasminogen activators and fibrin degradation products increase due to activation of the fibrinolytic system. The activations may last to up to 6 hours. [1] IV administration of tranexamic acid has been in use for operations like CABG, liver transplantation, hip/knee arthroplasty oral surgeries and urinary tract surgeries. The clinically used doses of tranexamic acid to reduce post-operative bleeding range from one to ten folds. [6] Shreds of evidence have shown that tranexamic acid may cause convulsions in a dose-dependent manner. [7] Hence it is important to use an appropriate dose of tranexamic acid that reduces postoperative bleeding. With this background, we in the present study tried to evaluate the effect of low doses of tranexamic acid on postoperative blood loss during lower segment cesarean section.

Materials and Methods

This prospective cross-sectional study was done in the Department of Obstetrics and Gynecology, Kalinga Institute of Medical Sciences, KIMS - Bhubaneswar. Institutional ethical committee permission was obtained for the study. Written consent was obtained from all the patients in the study. Inclusion criteria: all the singleton pregnancies being delivered by elective LSCS. Exclusion criteria: eclampsia, anemia, blood disorders, multiple gestations, renal insufficiency. The indications for cesarean section are given in table 4. A total of n=60 patients were included during the study period. They were divided randomly into two groups of n=30 of cases and n=30 of controls. The patients were subjected to the detailed investigation including CBP, blood group and Rh typing, LFT, RFT, HBsAg. The cases (study group) received injection tranexamic acid 1gm IV diluted with 10ml of distilled water slowly administered 10 minutes before the abdominal incision for CS and after informing the anesthetist the cases were given 10 units of oxytocin in a pint of DNS for 30 minutes after the delivery of the neonate. In the control group, tranexamic acid was not given and only 10 units of oxytocin in a pint of DNS were given by IV drip for 30 minutes. The delivery of the placenta was by controlled traction. The vital parameters were measured before surgery, immediately after the delivery of the placenta, 1 hour, 2 hours and after birth. The blood loss was estimated by finding the difference between the weight of dry mops and the weight of used mops and weight of clot in grams and weight of pads used after completion of LSCS. Since the amniotic fluid in all the cases was comparable hence the impact will be nullified in measurements. The blood loss was measured from the time of incision to until the time of closure of the abdomen at the end of surgery. Excess bleeding was managed by IM prostaglandin F2250gm or intrarectal tablet of misoprostol 600 – 800 gm. The data was recorded in MS Excel and analyzed using SPSS version 17 on windows format ‘p' value of < 0.05 was considered as statistically significant.

Results

The common age group in cases was 25 - 30 years n=11(36.66%) followed by 20 – 24 years n=9(30%) and next 31 – 34 years n=6(20%) and in the controls the common age group was 20 – 24 years n=12 (40%) of cases followed by n=9(30%). The other age groups and distribution of cases are given in table 1.

Table 1: Showing the age wise distribution of the patients in the study

	Cases		Controls	
	No	**%**	**No**	**%**
20 – 24	09	30	12	40
25 – 30	11	36.66	09	30
31 – 34	06	20	06	20
35 – 40	04	13.34	03	10
Total	30	100	30	100

The mean of the basic parameters was recorded in the patients in cases the mean height was 150.51 ± 5.05 cms. The mean weight was 52.68 ± 3.35 Kgs the mean gestational age was 37.50

± 1.50 weeks. The mean gravidity in the cases was 1.93 ± 0.68. In the controls the mean height was 151.36 ± 4.5 cms, the mean weight was 1.55 ± 5.1 Kgs the mean gestational age was 38.05 ± 1.60 weeks and the mean gravidity was 2.13 shown in table 2.

Table 2: Showing the basic characteristic of cases and controls

Parameter	Mean SD	Cases	Controls	P Values
Height (cms)	Mean	150.51	151.36	0.55
	SD	5.5	4.5	
Weight (Kgs)	Mean	52.68	51.55	0.95
	SD	3.35	5.1	
Gestational age (weeks)	Mean	37.50	38.05	0.36
	SD	1.50	1.60	
Gravidity	Mean	1.93	2.13	0.12
	SD	0.68	0.75	
Duration of Surgery	Mean	48.5	46.5	0.265
	SD	5.5	6.4	

The mean vital parameters were recorded in the cases and controls immediately after the placental delivery and after one hour of the placental delivery. There was no significant difference in parameters recorded between both groups at the time immediately after placental delivery and 1 hour after placental delivery the p values were greater than 0.05 shown in table 3.

Figure 1: Gravida in the cases and controls

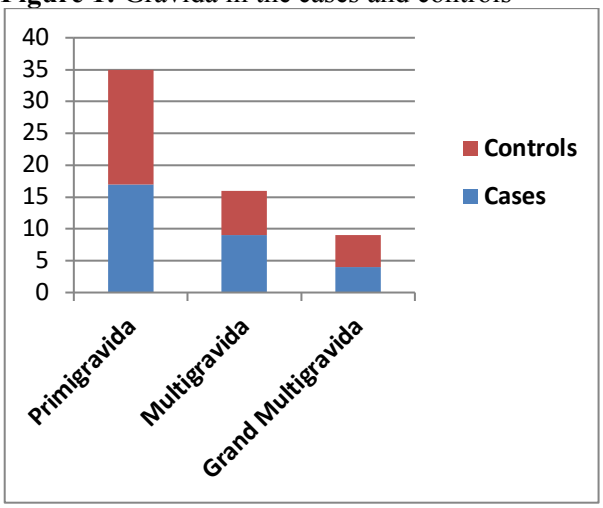

Table 4: Indications for LSCS in the cases and controls

	Cases		Controls	
	n	%	n	%
CPD	16	53.33	16	53.33
Breech	7	23.33	9	30
Fetal distress	2	6.66	2	6.66
PROM	1	3.33	0	00
Failure of Induction	0	00	1	3.33
Previous LSCS	3	10	2	6.66
IUGR	1	3.33	0	00

Table 3: Vital parameters recorded between cases and controls

Vitals		Immediately after placental delivery		P values	1 hour after placental delivery		P values
		Cases	Controls		Cases	Controls	
Heart Rate (Beats Per Minute)	Mean	85.5	88.6	1.25	90.5	91.5	0.87
	SD	5.5	3.5		2.5	1.5	
Respiratory Rate (Beats/Min)	Mean	18.5	19.5	0.95	20.2	21.2	1.4
	SD	1.5	1.6		1.2	1.8	
SBP (mmHg)	Mean	118.5	121.8	0.645	121.2	123.5	0.78
	SD	2.6	1.5		1.6	2.5	
DBP (mmHg)	Mean	78.5	79.5	1.1	81.5	79.5	0.66
	SD	2.3	1.6		2.5	1.9	

The indications for LSCS in the cases and controls were studied the most common cause for LSCS was Cephalopelvic disproportion (CPD) in both n=16(53.33%). The breech presentation was seen in n=7(23.33%) of patients in the cases and n=9(30%) of the patients in the control group. Fetal distress was seen in n=2(6.66%) in both case and controls. premature rupture of membranes [PROM] was found in n=1(3.33%) in the cases and the previous history of LSCS was found in n=3(10%) and intrauterine growth restriction was seen in n=1(3.33%) patient of the cases group table 4.

The estimation of blood loss was done in the cases and controls the mean blood loss was measured during the operation (intraoperative blood loss) followed by measurement after the

operation (postoperative blood loss) and the total blood loss was measured. The mean total blood loss in cases was 306.0 ml and in the controls, it was 421.1 ml the p values were found to be significantly shown in table 5.

Table 5: Estimated blood loss during LSCS in both groups

Estimation of blood loss		No	Mean (ml)	SD	P values
Intra-operative blood loss (ml)	Cases	30	250.5	33.3	<0.05*
	controls	30	310.2	25.5	
Postoperative blood loss in (ml)	Cases	30	55.5	10.2	>0.05*
	controls	30	110.9	11.5	
Total blood loss (ml)	Cases	30	306.0	35.5	<0.001*
	controls	30	421.1	45.1	

*** Significant**

Discussion

In the present study, the effectiveness of tranexamic acid to reduce the blood loss after cesarean section a total of n=60 patients were studied of which 30 received tranexamic acid that formed the study group. In this study, the CS was performed in 48.5 ± 5.5 and in the study group; it was 46.5 ± 6.4 in the p values were not found to be significant. In the similar studies by Gohel *et al;* and Shekhawat *et al;* the mean duration of surgery for CS was ranging from 20 min to 40 min which is less than the present study. [1, 8] In this study the time gap between the administration of injection tranexamic acid and time of incision was 10 minutes which agrees with the study by Gungorduck *et al;* [9] the time gap of 10 min was taken for administration of the drug. Other studies by Gohel *et al;* and Movafegh *et al;* the time gap was 20 minutes from the time of administration of the drug to the incision. [1, 10] The mean gestational age of the subjects in the study in both group ranged from 36-39 week similar results were found in the study by B.K. Bhatia *et al;* where the average gestational age in the study group and control groups were (37-40 weeks). [4] The intraoperative vital parameters of the patients in both the group shows no statistically significant difference. The vital signs were also no significant at the time of delivery and 1 and 2 hours postpartum. These findings were similar to the studies done by Ming-Ying Gaiet et al; Yang H *et al*; M Gohel *et al;* [1, 11, 12] In the present study it is seen that tranexamic acid significantly reduces the from placental delivery to 2 hours postpartum in LSCS, similar results have been found by PS Rashmi *et al;* [13] MY Gai *et al;* [11] G Mayur *et al;* [1]. Tranexamic acid is known to potentiate the clotting system and is hence used for preventing bleeding. The mechanism of action of tranexamic acid is related to its antifibrinolytic actions, which make it potentially very effective in the third stage of labor. Tranexamic acid is an inhibitor of fibrinolysis that blocks the lysine-binding site of plasminogen to fibrin. [14, 15] The antifibrinolytic effects of tranexamic acid make it a safe and effective alternative to other drugs currently used in the third stage of labor for the prevention of PPH. It also reduces the complications such as placenta praevia and lower genital tract trauma as well as bleeding from the uterine body from the placental site. Hence use of tranexamic acid could potentially prevent some PPH cases if it is given to women with known risks for PPH. [16] It is also particularly useful in cases of PPH due to factors other than uterine atony where uterotonic drugs would not be effective.

Conclusion

Within the limitations of the present study, it can be concluded that Tranexamic acid significantly reduces the amount of blood loss during the Lower segment cesarean section (LSCS) and its use in low doses was not associated with any significant side effects. Hence Tranexamic acid must be considered for use in patients where there is the anticipation of PPH.

Conflict of Interest: *None declared*
Source of Support: *Nil*
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References

1. Gohel Mayur, Patel Purui, Gupta Ashoo et al. Efficacy of tranexamic acid in decreasing blood loss during and after cesarean section. A randomized case-controlled prospective study. J Obstet Gynecol India 2007; 57 (3): 227-30.
2. IHME 2010, Maternal Mortality (Global), Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5, Institute for Health Metrics and Evaluation, http://www.healthdata.org/research-article/maternal-mortality-181-countries-1980-2008-systematic-analysis-progress-towards [Accessed on 16 April 2019].
3. Kambo I, Bedi N, Dhillon BS, Saxena NC. A critical appraisal of cesarean section rates at teaching hospitals in India. Int J GynecolObstet 2002 Nov; 79:151-58.
4. B K. Bhatia, R. Vachhani, R. Ratnani. Study the Efficacy of Tranexamic Acid in Reducing Blood Loss During L.S.C.S. International Journal of Innovative Research in Medical Science (IJIRMS) 2018; 3(3):1831-36.
5. Sekhavat, Tabatabaii A, Dalili M, Farajkhoda T, Tafti AD. Efficacy of tranexamic acid in reducing blood loss after cesarean section. J Matern Fetal Neonatal Med 2009; 22(1): 72-75.
6. Horrow JC, Van Riper DF, Strong MD, Grunewald KE, Parmet JL. The dose-response relationship of tranexamic acid. Anesthesiology 1995;82:383-92.
7. Kalavrouziotis D, Voisine P, Mohammadi S, Dionne S, Dagenais F. High-dose tranexamic acid is an independent predictor of early seizure after cardiopulmonary bypass. Ann ThoracSurg2012;93:148-54.
8. Sekhavat L, Tabatabaii A, Dalili M, Farajkhoda T. Efficacy of tranexamic acid in reducing blood loss after cesarean section The Journal of Maternal-Fetal and Neonatal Medicine. 2009;22(1):72-75.
9. Gungorduk K, Yildirm G, Asicioğlu O, Gungorduk OS, Sudolmus S, Ark C. Efficacy of intravenous tranexamic acid in reducing blood loss after elective cesarean section: a prospective, randomized, double-blind, placebo-controlled study Am J Perinatol 2011;28(3):233-40.
10. Movafegh A, Eslamian L, Dorabadi A. Effect of intravenous tranexamic acid administration on blood loss during and after cesarean delivery. Int J Gynecol Obstet. 2011;115(3):224-26.
11. Miya-Ying Gai, Lian-fang Wu, Qi-fengs Su. A clinical observation of blood loss reduced by tranexamic acid during & after caesarian section: A multicenter randomized trial. European J Obstet Gynecol& repro bio 2004; 112:154-57.
12. Yang H, Zheng S, Shi C et al. Clinical Study on the efficacy of Tranexamic acid in reducing postpartum blood loss: a randomized, comparative, multicenter trial Chin J ObstetGynecol 2001; 6:590 -92.
13. P.S. Rashmi, T.R. Sudha, Prabhudev Prema, Patil Rajashri, Vijayanath.V. Role of Tranexamic Acid In Reducing Blood Loss During And After Cesarean Section A Randomized Case Control Prospective Study.JMRP 2012; 1(2):40-43.
14. Astedt B. Clinical pharmacology of tranexamic acid. Scandinavian Journal of Gastroenterology 1987;137:22–5.
15. Longstaff C. Studies on the mechanisms of action of aprotinin and tranexamic acid as plasmin inhibitors and antifibrinolytic agents. Blood Coagulation & Fibrinolysis 1994;5(4):537–42.
16. Peitsidis P, Kadir RA. Antifibrinolytic therapy with tranexamic acid in pregnancy and postpartum. Expert Opinion on Pharmacotherapy 2011;12(4):503–16.