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A Study on Efficacy of Prophylactic Tranexamic Acid in Reducing Blood Loss during Elective Lscs

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Abstract
Background: *Obstetric haemorrhage accounts for 20 – 25% of maternal mortality and morbidity. Anti fibrinolytics are being widely used in various surgeries for reducing blood loss.*
Objective: *The objective was to determine the role of prophylactic tranexamic acid in reducing blood loss during elective lscs.*
Study Design: *A randomized case control study*
Place of Study: *Chengalpattu medical college and hospital*
Methodology: *A randomized case control prospective study was conducted in 100 women undergoing elective lscs between june 2017 to november2017. Among the 100 women undergoing lscs 50 were randomized to study group and the other 50 to control group. Study group patients received 1gm of tranexamic acid in 100ml normal saline 15mins prior to surgery while the control group patients received the usual preoperative care. Amount of blood loss , duration of surgery , the use of additional uterotonics and preoperative hemoglobin and postoperative hemoglobin were calculated in both groups.*
Results: *The amount of blood loss was significantly lower in study group (406.96 ± 58.11) when compared to control group (460.1 ± 70.15). The duration of surgery was lower in study group (33.10 ± 5.33) when compared to control group(42.10 ± 3.65). Also the 24hrs postoperative hemoglobin was significantly higher in study group (11.83 ± 1.1) compared to control group(10.34 ± 1.03).*
Conclusion: *Tranexamic acid significantly reduces the blood loss during lscs. It was not associated with any side effects or complications.*
Keywords: *Tranexamic acid, lower segment cesarean section, antifibrinolytics.*

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I. Introduction:

The rates of cesarean section have increased worldwide. Maternal morbidity and mortality after caesarean delivery is significantly higher than vaginal delivery and primary or secondary hemorrhage is the major complication. PPH complicates 6% of caesarean deliveries. The WHO estimates that PPH accounts for nearly 30% of maternal deaths worldwide with an estimated 20million cases annually. In order to reduce maternal morbidity and mortality caused by bleeding, it is important to reduce the amount of bleeding during and afer lower segment cesarean section. A popular approach is to minimize peri operative bleeding through the prophylactic use of antifibrinolytic agents such as aprotinin, tranexamic acid and amino caproic acid. Tranexamic acid was discovered in 1962 by Utako Okamoto. Tranexamic acid has been routinely used for many years to reduce hemorrhage during and after surgical procedures. Tranexamic acid ia a synthetic derivative of the amino acid lysine that exerts its antifibrinolytic effect through the reversible blockade of the lysine binding sites on plasminogen molecules. Also it improves the patient's own hemostatic mechanism.

II. Methods:

It is a prospective randomized case control study in 100 hundred pregnant women undergoing lscs from june to November 2017. Thorough history taking ,general and obstetric examination were done for all patients. Routine investigations like blood grouping typing, complete blood count, renal function test, liver function test, bleeding time, clotting time were done.

- Inclusion criteria:
  - Age 21 to 35yrs
  - Singleton pregnancy
  - Term gestation

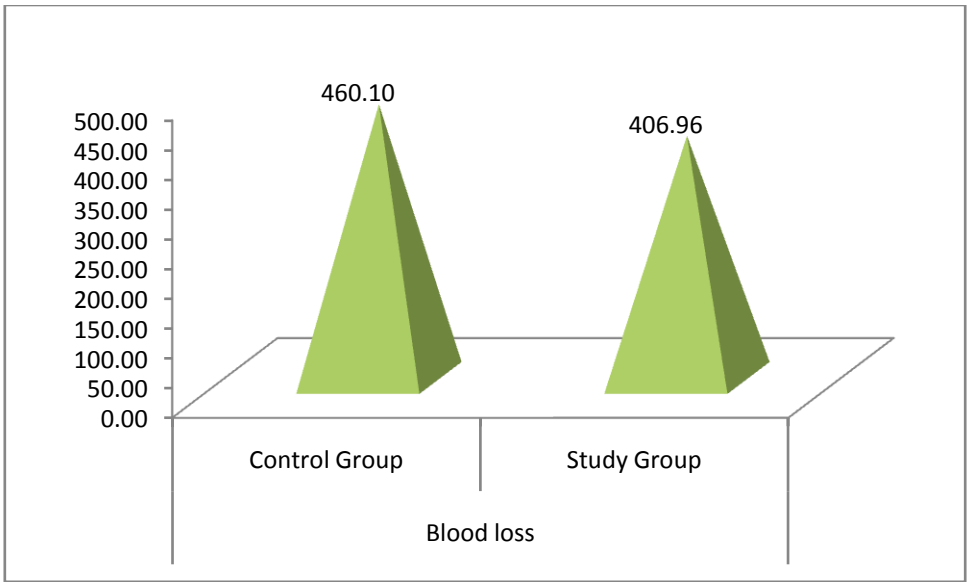
- Exclusion criteria
  - Grand multipara
  - Multiple pregnancy
  - Polyhydraminos
  - Placenta previa
  - Gestational diabetes mellitus
  - Preeclampsia
  - Anemia complicating pregnancy
  - h/o suggestive of bleeding disorders
  - previous history of deep vein thrombosis

After getting informed consent from the patients they were randomly allocated to study and control group. Preoperative hemoglobin was noted in both groups. The study group patients received 1gm of tranexamic acid in 100ml normal saline over slow intravenous infusion 15mins prior to skin incision while the control group patients have received the routine perioperative care. Spinal anesthesia was given to the groups. 10units oxytocin over infusion was given after the delivery of baby to both the groups. The patients receiving use of additional uterotonics like carboprost, methergine were also noted. Blood loss during surgery was measured as follows. Amount of blood loss (ml) = (weight of gauze pads after surgery –weight of gauze pads prior to surgery) + amount of blood collected in suction apparatus after placental delivery.
Postoperative hemoglobin was calculated in both study and control groups.

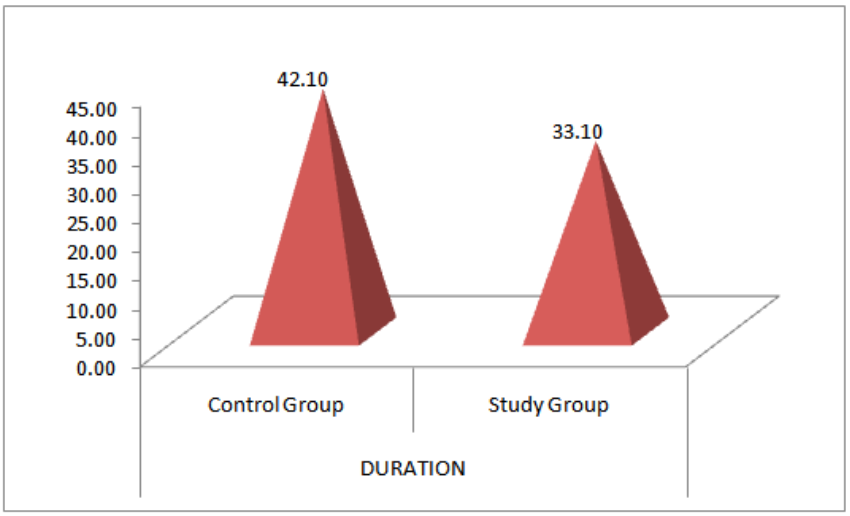
Statistical Analysis:
Statistical analysis was performed using independent t test, paired t test, chi square test between the study and control group. Statistical significance was derived with p value less than 0.05.

III. Results:

Comparison of the two groups as regard amount of blood loss during surgery showed statistical significance in study group (406.96 ± 58.11) compared to control group (460.1 ± 70.15) with p value 0.0001. Patients who have received tranexamic acid have 50ml mean blood loss less than the patients who didn't received tranexamic acid.

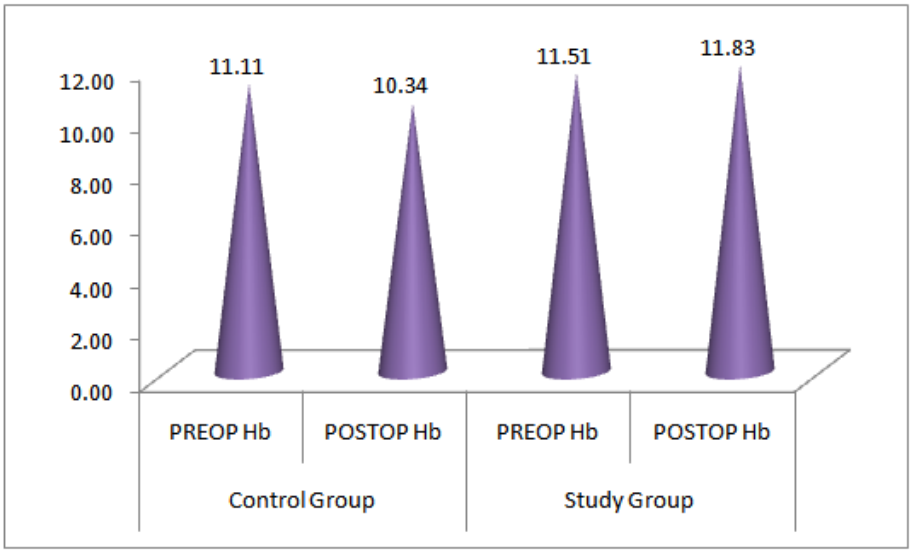


Also while calculating the duration of surgery , it was significantly reduced in study group (33.10 ± 5.33) compared to control group (42.10 ± 3.65) with p value 0.0001.



Independent t test : - to find difference between study and control group

Variables	Study Group	Control Group	P value
Age	24.96 ± 2.08	25.66 ± 1.36	0.06
Height	152.82 ± 3.39	152.72 ± 4.15	0.9
Weight	66.66 ± 3.36	66.11 ± 3.39	0.42
Duration	33.10 ± 5.33	42.10 ± 3.65	**0.0001**
Blood Loss	406.96 ± 58.11	460.1 ± 70.15	**0.0001**



In addition the 24 hours postoperative Hb was higher in study group (11.83 ± 1.1) compared to control group (10.34 ± 1.03) with p value 0.0001

Variables	Study Group	Control Group	P value (student t test)
Pre op Hb	11.51 ± 0.94	11.11 ± 0.96	**0.04**
Post op Hb	11.83 ± 1.1	10.34 ± 1.03	**0.0001**
P value (paired t test)	**0.0001**	**0.0001**	

While the possible confounding variables like age, height, weight, parity, indication for LSCS were matched effectively in both the groups.

Variables	Study Group	Control Group	P value
Age	24.96 ± 2.08	25.66 ± 1.36	0.06
Height	152.82 ± 3.39	152.72 ± 4.15	0.9
Weight	66.66 ± 3.36	66.11 ± 3.39	0.42

Chi sq test: to find difference between groups for categorical variables

Primi/ Gravida	Control Group	Study Group	Total	P
Primi	4 (8%)	3 (6%)	7	0.7
G2P1L1	46 (92%)	47 (94%)	93	
Total	**50**	**50**	**100**	
INDICATION	Control Group	Study Group	Total	P
Breech/footling	1 (2%)	2 (4%)	3	0.3
Long period of infertility	1 (2%)	1 (2%)	2	
Rpt lscs/cpd	46 (92%)	47 (94%)	93	
Oligohydraminos	2 (4%)	0	2	
Total	**50**	**50**	**100**	

Use of additional uterotonics during surgery

additional uterotonics	Control Group	Study Group	Total
Nil	38 (76%)	47 (94%)	88
20 u synto added in drip	7 (14%)	2 (49%)	9
20 u synto added in drip +i.m carboprost	5 (10%)	1 (2%)	3
Total	50	50	100

The use of additional uterotonics used during surgery was also higher in patients of control group when compared to study group.

IV. Discussion:

Tranexamic acid exerts its antifibrinolytic effect by blocking the lysine binding focus of the plasminogen and plasmin molecules hence preventing the binding of plasminogen and plasmin to the fibrin substrate. Tranexamic acid also inhibits conversion of plasminogen to plasmin.During placental delivery, activation of the fibrinolytic system which could lasts up to 10hours after delivery occurred, this leads to rapid degradation of fibrinogen and fibrin, resulting increase in fibrin degradation products (FDP). Therefore, the use of TXA appears to reduce the blood loss. How to minimize postpartum hemorrhage is the main goal of different researches as this is a main clue in reducing anemia that may predispose to postpartum hemorrhage infollowing pregnancies and in preventing blood transfusion with its potential hazards including allergic reaction and viral transmission.Economic evaluation has shown that giving TXA to reduce bleeding in elective surgery would be lifesaving in certain localities all over the world where there is a shortage of blood, because more blood will be available for those who need it.

In this randomized controlled trial conducted on a group of pregnant women & was planned to have elective LSCS. The patients were randomized to receive 1g TXA intravenously before elective LSCS group or not and blood loss was measured during surgery. Hemoglobin levels, hematocrit values were measured 24 hours after the operation. The present study showed that preoperative administration of TXA significantly reduced bleeding from the time of placental delivery up to six hours postpartum in LSCS.

Our results were in agreement with those obtained by Shahid and colleagues in 2013 whoseresearch was conducted on 74 term pregnancies and concluded that preoperative administration of TXA significantly decreased the amount of blood loss from placental delivery to the end of LSCS and it also reduced the quantity of blood loss from the end of LSCS till 2 hours post-partum. Shahid et al. [15] concluded that TXA can be used safely and effectively in women undergoing LSCS to reduce intra-operative blood loss. Also our results were matched with those of Abdel-Aleem M. and others in 2013, who conducted their work upon 740 patients (373 in study group and 367 in control group) and concluded that the use of TXA before elective cesarean section is associated with reduced blood loss during and after elective CS [16]. Another randomized, double-blind, case controlled study was conducted on 174 primipara undergoing CS by Xu and colleagues (88 given 10 mg/kg TXA immediately before CS were compared with 86 others to whom TXA was not given) to determine the efficacy of TXA in reducing blood loss in patients after CS. Xu et al. [17] found that the blood loss in the period between the end of CS and 2 hours postpartum was significantly lower in TXA group than in the control group and they concluded that TXA is effective in reducing blood loss in patients undergoing CS. Six hundred and

sixty women (660) women who underwent elective CS were included in Gungorduk and colleagues study to determinethe efficacy and safety of TXA in reducing blood

Similar study carried out in India by Mayur et all. [9].It was conducted on 100 patients underwent to LSCS showed comparable results reducing the blood loss in the study group, Blood loss was collected and measured during two periods. The first period was from placental delivery to end of LSCS and second from the end of LSCS to 2 hours postpartum. Hemoglobin, urine analysis, liver and renal functions were tested in both the groups. Another study carried out on 180 primipara by Gai MY, et al. [19], in China showed that TXA significantly reduces bleeding from the time of placental delivery to the end of caesarean section, which was 351 ml in the study group while 440 mL in the control group.Use of TXA in pregnant women may raise the risk of occurrence of thrombo-embolism. However, previous studies have shown the safety of this drug for use in both pregnant and non-pregnant patients [20]. In our study, thrombo-embolic events were not evaluated because the sample size was too low for adequate power. However, none of the women showed any signs or symptoms of immediate thrombo-embolic events and other side effects like color vision affection, allergic reaction, nausea, vomiting and diarrhea were not statistically significant by difference in the two groups.

V. Conclusion

Tranexamic acid could be helpful option in reducing amount of blood loss during elective LSCS & may give a great benefit as prophylaxis against postpartum hemorrhage.

Competing Interests

Authors have declared that no competing interests exist.

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