

"Effect of Tranexamic Acid on Hemorrhage in preeclamptic women during cesarean section (CS)"

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Abstract

Objective; To assess the efficacy and safety of preoperative Tranexamic Acid in the reduction of blood loss during and after elective lower segment cesarean delivery among preeclamptic cases.

Methodology: 50 pregnant women, candidate for LSCS, were received Tranexamic acid in form of 1 gm (10 ml) TXA diluted in 20 ml of Glucose 5% (administered as intravenous infusion over 5 minutes, at least 15 minutes prior to skin incision immediately before starting skin incision. The 1ry outcome was the estimated blood loss (EBL) during cesarean delivery and 2ry outcomes included the occurrence of excessive blood loss (> 1000 mL) within the first 24 hours postoperatively and the occurrence of any maternal or fetal side effects.

Results: the mean age and BMI were 29.59 years old and 34.02 kg/m² respectively, the mean GA at termination was 38.51 weeks, the mean preoperative Hb was 11.17 gm/dl, postoperative 10.39 gm/dl and hemoglobin drop -0.78 gm/dl, the mean preoperative was 32.47 (%), postoperative was 30.66 (%), and hematocrit drop -1.80 (%), the mean EBL was 802.36 ml and mean Blood loss in suction 266.09 ml. The percentage of cases as regard the occurrence of side effect was 2%, the mean Apgar scores at 1 min was 7.1. Also, the mean Apgar scores at 5 min was 9.2.

Conclusion: Intravenous Tranexamic acid reduce the intraoperative blood loss and postpartum hemorrhage, in addition to this there was no evidence of any side effects only one patient developed mild hypersensitivity side effects from Tranexamic acid.

Keyword: *Caesarean section, Tranexamic acid.*

INTRODUCTION

Cesarean delivery is the most common major surgical procedure performed on women worldwide and its rates continue to rise steadily in both developed and developing countries 1. For nearly 30 years, the international healthcare community has considered the ideal rate for caesarean sections to be between 10% and 15% 2. Postpartum hemorrhage is a major contributor to maternal mortality, mainly in developing countries 3. Studies from developed countries report an increase in the rate of postpartum hemorrhage, which has been attributed (at least in part) to a rise in the rate of cesarean delivery 4. Postpartum hemorrhage following a cesarean delivery has been defined as blood loss over 1000 ml with a prevalence of postpartum ranges from 0.6% to 6.4% 5 The efficacy of routine administration of oxytocin, to reduce the frequency of postpartum hemorrhage after vaginal and cesarean birth is well-established. The Royal College of Obstetricians and Gynecologists (RCOG) recommends a slow intravenous bolus dose of 5 IU of oxytocin after delivery of the neonate in cesarean delivery to ensure adequate uterine contractility, reduce intraoperative blood loss and prevent postpartum hemorrhage 6. Likewise, the ACOG recommends the practice to use oxytocin but infusion instead of a bolus dose 5. Regardless of the mode of administration, oxytocin use in the setting of cesarean delivery may result in maternal adverse effects, such as hypotension and tachycardia 7. Tranexamic Acid (TXA) is an analogue of lysine that inhibits fibrinolysis by competitively binding to plasminogen. It prevents the lysis of formed clot by inhibiting activation of plasminogen and plasmin. It is ten times more potent than Amino- caproic

acid 8 Several studies had assessed the use of Tranexamic Acid in both the prophylaxis against and the treatment of PPH with the conclusion that TXA reduces the following; blood loss in women with PPH, the need for hysterectomy, the risk of severe anaemia and the need for further blood transfusion; hence, this could contribute significantly to the goal of reducing maternal mortality 9 The study aimed to evaluate the prophylactic effect of TXA on hemorrhage during and after the cesarean section (CS).

PATIENTS AND METHODS

A total of (50) pregnant women with preeclampsia aged between 20- and 40- years old candidate for termination of pregnancy by lower segment cesarean section (LSCS) met the inclusion criteria and included in the current study. They were recruited from Obstetrics and Gynecology Department (Kasr Al-ainy Hospital – Faculty of Medicine – Cairo University) in the period between January 2019 to June 2020.

Inclusion criteria:

Pregnant women candidate for LSCS, Age: 20-40 years old, Full-term pregnancies (> 37 weeks confirmed by the 1st day of the LMP or 1st trimesteric ultrasound scan), Singleton or twin pregnancies, CS under spinal anesthesia.

Exclusion criteria:

Fetal death (IUFD), Fetal anomalies or IUGR (estimated fetal weight below the 5th centile), Women attending for emergency CS, more than 2 previous CS procedures, Prolonged procedure (more than 2 hours from skin incision to skin closure), Abnormally invasive placenta, Known or history of

thromboembolic events, History of Tranexamic acid allergy.

The following was done to all participants.

Full medical history, Clinical Examination, Obstetric ultrasonography, Preoperative laboratory tests, Patients were given 1 gm (10 ml) TXA (Kapron, Amoun, Egypt) diluted in 20 ml of Glucose 5% (administered as intravenous infusion over 5 minutes, at least 15 minutes prior to skin incision).

Estimated Blood Loss (EBL) was evaluated as follows.

EBL= EBV x Preoperative hematocrit-
Postoperative hematocrit

Postoperative hematocrit

Where EBV is estimated blood volume of the patient in mL (equals weight in kg × 85).

The primary outcome: Assess the estimated blood loss (EBL) during cesarean delivery among preeclamptic cases.

Statistical analysis:

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

RESULTS

Table (1): Participants characteristics in the studied groups

Baseline characteristics	TXA Group (n=50)
Age (years)	
Mean ± SD	29.59±4.15
Range	22 – 40
BMI (Kg/m²)	
Mean ± SD	34.02±5.33
Range	27 – 46
Parity	
Median (IQR)	3 (2)
Range	0 – 5
Primi-Multi	

PG	3 (6%)
P1	6 (12%)
Multipara	41 (82%)
No of previous CS	
No	11 (22%)
Previous 1 CS	22 (44%)
Previous 2 CS	17 (34%)

IQR: Interquartile range

As shown in table (1), the mean age and BMI of the participants in the tranexamic acid group the mean age and BMI were 29.59 years old and 34.02 kg/m² respectively. As regard parity Median (IQR) was 3 (2), in Primi-Multi 82 % Multipara were included in the tranexamic acid group.

Table (2): Cesarean deliveries data in the studied groups.

CS Data	TXA Group (n=50)
GA at termination	
Mean ± SD	38.51±0.96
Range	37 – 40
CS Indication	
Breech	8 (16%)
CPD	1 (2%)
CS	40 (80%)
ICSI	1 (2%)
Transverse	0 (0.0%)
Twins Breech	0 (0.0%)
CS Duration (Min.)	
Mean ± SD	73.78±14.92
Range	45 – 109.5
Time interval from skin excision to fetal extraction (minutes)	
Mean ± SD	15.15±1.12
Range	12-16

As regard Cesarean deliveries data, the mean GA at termination was 38.51weeks, As regard CS Indication, (16%) was Breech, (2%) CPD, (80%) CS, (2%) ICSI. the mean CS Duration was 73.78 min, the meantime interval from skin excision to fetal extraction was 15.15 minutes.

Table (3): hemoglobin level (pre and postoperative) and hemoglobin drop in the studied cases.

Hb (gm/dl)	TXA Group (n=50)
Pre-operative Hb	
Mean \pm SD	11.17 \pm 0.89
Range	8.9 – 13
Post-operative Hb	
Mean \pm SD	10.39 \pm 0.87 ^a
Range	8.3 – 12.4
Hb drop	
Mean \pm SD	-0.78 \pm 0.57 ^a
Range	-2.8 – 0

As regard hemoglobin level, the mean preoperative Hb was 11.17 gm/dl, postoperative 10.39 gm/dl and hemoglobin drop -0.78 gm/dl.

Table (4): hematocrit level (pre and postoperative) and hematocrit drop in the studied cases.

HTC (%)	TXA Group (n=50)
Pre-operative	
Mean \pm SD	32.47 \pm 4.89
Range	26.7 – 40.2
Post-operative	
Mean \pm SD	30.66 \pm 2.69 ^a
Range	25 – 38.6
HTC drop (%)	
Mean \pm SD	-1.80 \pm 1.03 ^a
Range	-4.8 – -0.4

As regard hematocrit level, the mean preoperative was 32.47 (%), postoperative was 30.66 (%), and hematocrit drop -1.80 (%).

Table (5): Blood loss (estimated by the equation and suction) in the studied cases.

Blood loss	TXA Group (n=50)
EBL in ml	
Mean \pm SD	802.36 \pm 226.05 ^a
Range	522.6 – 1658.4
Blood loss in suction	
Mean \pm SD	266.09 \pm 124.35 ^a
Range	100 – 700

As regard Blood loss estimated by the equation, the mean EBL was 802.36 ml and mean Blood loss in suction 266.09 ml.

Table (6): Blood loss (estimated by soaked towels) in the studied cases.

Blood loss	TXA Group (n=50)
No of soaked towels	
Median (IQR)	4 (3) ^a
Range	2 – 9
Weight difference of soaked towels	
Mean \pm SD	460.78 \pm 96.24 ^a
Range	300 – 800

As regard Blood loss estimated by soaked towels, the median of No of soaked towels was 4 towels, and the mean Weight difference of soaked towels was 460.78.

Table (7): Postpartum blood loss (> 1000ml in 1st 24 hr.) in the studied cases.

Postpartum blood loss > 1000ml in 1st 24 hr.	TXA Group (n=50)
No	49(98%)
Yes	1 (2%)

The percentage of Postpartum blood loss (> 1000ml in 1st 24 hr.) was 2%.

Table (8): distribution of cases as regard the occurrence of side effect.

Side effect	TXA Group (n=50)
No	49 (98%)
Yes	1 (2%)

The percentage of cases as regard the occurrence of side effect was 2%.

Table (10): Neonatal outcome in the studied cases.

Neonatal outcome	TXA Group (n=50)
Apgar score at 1 min.	
Mean ± SD	7.10±0.71
Range	6 – 9
Apgar score at 5 min.	
Mean ± SD	9.16±0.74
Range	7 – 10
Neonatal weight (gm)	
Mean ± SD	3291.6±135.7
Range	3085 – 3512

As shown in table (10), the mean Apgar scores at 1 min was 7.1. Also, the mean Apgar scores at 5 min was 9.2. The mean neonatal weights were 3291.6. No neonatal NICU admission or deaths were recorded in the studied cases.

DISCUSSION

Obstetric hemorrhage is the most common and dangerous complication of childbirth. Traditionally, postpartum hemorrhage (PPH) has been traditionally defined as greater than 500 mL estimated blood loss in a vaginal delivery or greater than 1000 mL estimated blood loss at the time of cesarean delivery. 10 Its incidence is increasing, and it affects 1-5% of all deliveries. Uterine atony is the most common cause of PPH and is responsible for about 80% of PPHs 11.

Tranexamic Acid (TXA) is an analogue of lysine that inhibits fibrinolysis by competitively binding to plasminogen. It prevents the lysis of formed clot by inhibiting activation of plasminogen and plasmin. It is ten times more potent than Amino- caproic acid 8

The current study showed the mean age and BMI of the participants in the tranexamic acid group the mean age and BMI were 29.59 years old and 34.02 kg/m² respectively. As regard parity Median (IQR) was 3 (2), in Primi-Multi 82 % Multipara were included in the tranexamic acid group.

The present study can be supported by Abdel-Aleem, et al 12. Who aimed to assess the effectiveness of TA in reducing blood loss during and after CS, among women undergoing elective CS in addition to oxytocin prophylaxis. They found that mean Age (years): 26.34, mean Parity: 1.57, and BMI ≥ 30 kg/cm² No (%) was 276 kg/cm².

As regard Cesarean deliveries data, the mean GA at termination was 38.51weeks, as regard CS Indication, (16%) was Breech, (2%) CPD, (80%) CS, (2%) ICSI. the mean CS Duration was 73.78 min, the meantime interval from skin excision to fetal extraction was 15.15 minutes.

The present study can be supported by Ray et al 13. Who aimed to assess the effect of IV

tranexamic acid on blood loss during and after CS. They found that the mean Period of gestation was 38.92 (weeks), Indications for LSCS Post-dated pregnancy (28 %), CPD (26 %).

As regard hemoglobin level, the mean preoperative Hb was 11.17 gm/dl, postoperative 10.39 gm/dl and hemoglobin drop -0.78 gm/dl. As regard hematocrit level, the mean preoperative was 32.47 (%), postoperative was 30.66 (%), and hematocrit drop -1.80 (%).

Our findings are consistent with Sentürk et al 14. Who aimed to assess the efficacy and safety of an intravenous formulation of tranexamic acid to reduce intrapartum and postpartum bleeding in patients giving birth by cesarean section. They found that the mean Preparation Hb 11.66 (g/dl), Post operation Hb 10.55 (g/dl), Hgb difference (%) 1.11, Hct difference (%) 3.48.

Also, Our findings are consistent with Maged et al., 15. Who aimed to evaluate the efficacy and safety of preoperative intravenous tranexamic acid for the reduction of blood loss during and after elective lower-segment cesarean delivery. They found that the mean Preoperative Hemoglobin concentration, 110.5 g/L, Postoperative 100.3 g/L Percentage change 10 (%).the mean Preoperative Hematocrit % 35.4, Postoperative 32.9, Percentage change 7.0.

As regard Blood loss estimated by the equation, the mean EBL was 802.36 ml and mean Blood loss in suction 266.09 ml. As regard Blood loss estimated by soaked towels, the median of No of soaked towels was 4 towels, and the mean Weight difference of soaked towels was 460.78.

The present study can be supported by Yehia et al 16 . Who aimed to evaluate the efficacy of tranexamic acid in reduction of blood loss during and after cesarean section. They found that the mean total blood loss from placental

delivery till end of CS (mL) 369.5 ml. the mean vaginal bleeding during first 6 hours post operative (mL) 85.0 ml.

Also, Our findings are consistent with Maged et al., 15. They found that the mean Estimated blood loss, mL 459.4 ml.

The percentage of Postpartum blood loss (> 1000ml in 1st 24 hr.) was 2%. The percentage of cases as regard the occurrence of side effect was 2%.

Our findings are consistent with Sekhavat et al 17. Who aimed to assess the efficacy and safety of tranexamic acid in reducing blood loss at caesarian section (CS). They found that There was no side effect caused by tranexamic acid.

Also, our findings are consistent with Movafegh et al 18. Who aimed to assess the effect of intravenous tranexamic acid on blood loss during and after cesarean delivery. They found that No complication occurred during surgery in patients from either group.

The current study showed the mean Apgar scores at 1 min was 7.1. Also, the mean Apgar scores at 5 min was 9.2. The mean neonatal weights were 3291.6. No neonatal NICU admission or deaths were recorded in the studied cases.

The present study can be supported by Ray et al 13. They found that the mean APGAR score 1 min was 7.06, and the mean Apgar scores at 5 min was 8.66.

CONCLUSION

In conclusion, Intravenous Tranexamic acid reduce the intraoperative blood loss and postpartum hemorrhage, in addition to this there was no evidence of any side effects only one patient developed mild hypersensitivity side effects from Tranexamic acid.

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