ORIGINAL RESEARCH

Tranexamic Acid and Blood Loss During and After Caesarean Section. A Randomized Case Control Prospective Study

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ABSTRACT

Background: To evaluate the effectiveness of tranexamic acid in reducing blood loss during and after caesarean section when give prior to caesarean delivery.

Materials and Methods: Singleton prime term pregnancy without any associated complication undergoing elective caesarean section under spinal anesthesia were included in this study and they were randomly divided into two groups. The study group were given tranexamic acid 1gm IV 30 min before giving skin incision. Injection oxytocin 10 units in were given soon after delivery of the neonate.Intraoperative and 2hour post-operative blood loss was assessed subjectively by visual estimation.Laboratory analysis of Hb% Het, Urine routine examination, renal function test and liver function test were done on the 2nd post-operative day**.**

Results: The drop of haemoglobin and haematocrit was significantly more in controlled group (P=<0.0001). There were no significant difference in heart rate, respiratory rate, renal function test and liver function test. There were no major events of complication due to the drug.

Conclusion: Tranexamic acid is and effective in reducing the blood loss during and after caesarean section and noTranexamic acid significantly reduced the amount of blood loss during & after the cesarean section. Its use was not associated with any major side effects or complication.

Keywords: Blood loss cesarean section, incision, oytocin, tranexamix acid.

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INTRODUCTION

Primary post-partum hemorrhage is traditionally defined as the loss of blood 500ml following vaginal delivery or 1000ml following cesarean section after completion of third stage of labor in the first 24 hours of delivery.[1] Though uterine atomy and abnormal placentation are the most common causes of post-partum hemorrhages, most women with PPH have low risk pregnancies and no identifiable risk factors.[2]

It is the leading cause of maternal mortality and morbidity worldwide. The millennium Development goal (MDG) related to maternal health as one maternal death is being reported every 10 minutes in the country now.[3] It is therefore, essential to prevent PPH in all women.[4]

In spite of various measures to prevent blood loss during and after caesarian sections. Post-partum hemorrhage continues to be the most common complications seen in from 3% to 15% of deliveries and 12% of survivors will have severe anemia.[5]
Tranexamic acid (TXA), a lysine analogue that inhibits plasmin-mediated fibrin degradation, on decreasing bleeding complications and mortality, has been routinely used to reduce hemorrhage during and after surgical procedures.[6]
TXA is also significantly effective in reducing blood loss in hemorrhage, of non-surgical event.[7] This provide further support for the hypothesis that TXA might be effective for prevention of PPH after both caesarian section and vaginal deliveries.[8]

MATERIALS & METHODS

This hospital based, prospective study was conducted in the Department of Obstetrics and Gynaecology, JNIMS, Imphal, during the year 2018-2020. It included a total of 200 pregnant women who underwent primary caesarean section at term between 39-40 weeks of pregnancy. Gestational age was confirmed in first trimester by ultrasonography.

Inclusion Criteria

1.Age	20-30 years
2.Height	150-160 cm
3.Body weight	55-65 kg
4.Hemoglobin	≥10gm%
5.Haematocrite	35-40%
6.Parity	Primi gravida
7.Gestation	39-40 weeks

Exclusion Criteria

Pregnant women complicated with:

1. Placenta previa
2. Fibroid uterus
3. Multiple pregnancy
4. Previous uterine incision
5. Medical disorders
6. Malpresentation

The subjects were divided into the study group which received 1gm TXA intravenously 30 minutes before operation and the control group which did not receive TXA. Each group consisted of 100 pregnant women. Lower segment caesarean section were performed under spinal anesthesia and placenta were delivered by cord traction combined with fundal massage.
Injection oxytocin 10 units intramuscular was given soon after delivery of the neonate. Laboratory analysis of hemoglobin, hematocrit, urine routine examination, renal function test, liver function test, were done as a routine pre-operative evaluation and again on the 2nd post-operative day.
Intra-operative and 2 hours post-partum blood loss was assessed subjectively
by visual estimation

RESULTS

TableI: Study Characteristics.

	Age	Weight in Kg	Height(cm)	Gestational age (week)
Study	24.19 ± 3.92	50.58 ± 7.12	150± 2.11	38.84 ± 0.92
Control	24.18 ± 4.14	51.62 ± 9.14	151 ± 1.23	38.75 ± 1.3
P. Value	0.43	0.34	0.057	0.45

Table-II: Comparison of blood loss

Variables	Intra-operative(ml)	The end of the cs to 2 hrs(ml)
Study	397.04 ± 108.95ml	36.72 ± 22.30
Control	488.99 ± 159.53ml	45.14 ± 27.12
P-value	<0.001	<0.188

TableIII: Comparison of Hemoglobin and Hematocrit

Study	Pre op.Hb%	Post op. Hb%	Pre.op HCT	Post op HCT
	10.76±0.85	9.71±0.716	35.97±2.43	34.08 ± 1.73
P-value	0.001			0.001
Control	10.81±1.12	9.2 ± 0.92	35.87 ± 3	32.51 ± 3.24
P-value	<0.001			<0.001

The patient's characteristics in two groups were similar with no statistical significant difference (Table-I). The duration of surgery was 44-50 minutes in all the cases. There was no statistical significant difference in the heart rate, respiratory rate, blood pressure, urine output during and after 2 hours of surgery. No statistical significant difference has been observed in liver and renal function test between the two groups. The difference in the quantity of blood loss from the making of incision to 2 hours post-partum was statistically significant (Table-II).

The drop in hemoglobin and hematocrit was significantly more in control group ($p<0.001$) as compared with study group (Table-III). No event of thrombo embolism was noted in both groups. The APGAR score at 1 and 5 minutes in both the groups were good.

DISCUSSION

The rate of caesarian section has increased to as high as 25% to 35% in both developed and developing countries in recent decades.[9] One of the most common complications of caesarian section in post-partum hemorrhage being regarded as the leading cause of preventable maternal mortality and morbidity. There is global commitment to reduce maternal mortality ratio by 5.5% each year.[10]

Continuous and constant efforts are made to find out measures which will help in reducing bleeding following delivery. TXA is a lysine analogue which acts as an antifibrinolytic via a reversible competitive inhibition of binding plasminogen to fibrin and has the potential to enhance the effectiveness of the patient's own hemostatic mechanism.[11]

During delivery, when the placenta separates from the uterine wall, physiologic and hemostatic changes occur sequentially to bleeding; increased platelet activity, massive release of coagulation factors and consequently a parallel increase in fibrinolytic activity. The coagulation and fibrinolytic systems are believed to be in a state of dynamic balance that maintains an intact vascular system.[12]

Faraoni et al published meta-analysis evaluating the prophylactic efficacy of TXA in women at low risk for post-partum hemorrhage showed TXA reduces post-partum blood loss.[13]
Rashni.et al. conducted a prospective randomized casecontrolled study on 100 women undergoing caesarian section. TXA significantly reduced the quantity of blood loss from the end of caesarian section to 2 hours post-partum which was 86.5 ml in study group versus 142.7 ml in control group ($p< 0.001$).[14]
Similar findings have been observed in the present study. WHO guidelines for PPH treatment state that TXA may be used if other measures fail.[15]
CRASH-2 trail demonstrated that TXA reduced mortality in bleeding trauma patients in high,middle, and low income countries.[16] WOMAN and EXADELI placebo controlled trial on women with PPH found that TXA reduces death due to bleeding with no adverse effects, especially when given early after bleeding onset.[17]
Mild maternal adverse events, including gastrointestinal signs as nausea, vomiting and diarrhea, may be associated with the use of TXA.[18] Similar findings have been observed in the present study. This side effects were not statistically significant by difference in the two groups. TXA is known to cross the placenta, however no significant difference of APGAR score at 1 & 5 minutes in both the groups were observed.[19]
Adverse events, like thrombotic events were not observed in the study.

CONCLUSION

Tranexamic acid appear to be a safe promising drug for the prevention and treatment of post-partum hemorrhage.

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