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Tranexamic Acid: Role in Prevention of Postpartum Hemorrhage

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Abstract: The objective of the study was to determine the role of Tranexamic acid when administered along with AMTSOL in the prevention of PPH by comparing the blood loss of parturients of Study and Control group. Prospective Randomized Double Blind Control Study. This Study was conducted in the Labour Room, Department of Obstetrics and Gynaecology from August, 2017 to January, 2018 for 6 months. 100 parturients undergoing vaginal delivery were allocated to either study or control by randomization. Tranexamic acid was given during the third stage of labor in Study group in addition to the routine care Active Management of Third Stage of Labour (AMTSOL) whereas the Control group had AMTSOL alone. Blood loss was measured in both groups by Gradient Bag Method from placental delivery to next 2 hours. Volume of blood loss was considered as the outcome variable. Data was analyzed by using student paired t-test with IBM SPSS Statistics Software and *p* – value was determined. It was observed that there was a mean Blood loss of 141.9 ml in study group compared to 270.4 ml in control group. There was also, a significant reduction in blood loss (p value <0.03). It is concluded from our study that addition of Tranexamic acid along with AMTSOL is an efficient and safe method of reducing blood loss and also the need of blood transfusions. It is also an additional intervention in the prevention of Postpartum hemorrhage (PPH).
Keywords: Tranexamic acid, postpartum hemorrhage (PPH), Active Management of Third Stage of Labour (AMTSOL).

INTRODUCTION

Postpartum hemorrhage (PPH) is the *"Major Killer*" of women. [5]It is the leading cause of both maternal mortality and morbidity i.e. one quarter of all the maternal deaths worldwide, more so in developing countries[6,8]. Worldwide, it is estimated that each year PPH accounts for 27% of 3,03,000 maternal deaths. It has also been observed that *1 in every 4 women who die in child birth, is an Indian* [7]. In India, the unacceptable high maternal death of 130 per 100,000 live births in last few decades remains a major challenge.

PPH is defined as the loss of > 500 ml of blood followed by vaginal delivery and > 1000 ml blood after caesarean section. However these cut off values do not consider the pre-existing health condition and even blood loss of 200 ml can be lethal for a woman with pre-existing anemia or having medical disorders. Among the women having PPH, each year majority of the mothers die within an average interval of two hours from onset of bleeding till availability of help[5].

Maternal mortality nonetheless remains a crucial indicator of the obstetrical care and health status of the mother. The most common causes of PPH are atonic uterus, placentation pathology, trauma of genital tract, retained placenta and membranes, coagulopathies and arteriovenous malformations. Aggravating factors for PPH include past history, multiparity, increased BMI, induced or augmented labor, multiple pregnancy, polyhydramnios and big baby.

PPH leads to significant maternal morbidity, severe anemia, coagulation disorders and need of multiple blood transfusions, acute tubular necrosis, Sheehan's syndrome and obstetrical hysterectomies. Majority of the patients with PPH acquire blood borne infections, a hazard associated with multiple blood transfusions. In third stage after separation of placenta from the uterine wall, a cascade of physiological and hemostatic events occurs aiming to reduce bleeding: strong uterine contractions, increased platelets function, a massive release of coagulation factors and a simultaneous increase in fibrinolytic activity. Despite

the availability of multiple uterotonic agents, incidence of PPH continues to rise.

Tranexamic acid, an antifibrinolytic agent which is safe, easily accessible and cost effective has been investigated as a potentially useful complement to AMTSOL for prevention of PPH. Tranexamic acid, is a synthetic derivative of amino acid lysine which works by reversibly inhibiting the activation of plasminogen to plasmin and also a weak non-competitive inhibitor of plasmin, thus stops fibrinolysis and reduces bleeding. Our study was aimed to determine the effectiveness of the addition of intravenous Tranexamic acid to a standard active management of the third stage of labor (which included prophylactic injection of 10IU of oxytocin at the delivery of anterior shoulder of baby, early cord clamping and controlled cord traction). It is easily available and cost effective in managing the postpartum hemorrhage.

MATERIALS AND METHODS

This Study was conducted in the Labour Room of Department of Obstetrics and Gynaecology, Rajiv Gandhi Institute of Medical Sciences, Kadapa, from August, 2017 to January, 2018 for 6 months by Prospective Randomized Double Blind Controlled Study. Informed consent from the parturients was obtained for taking part in the study and for usage of their data in the research work.

Inclusion criteria considered for the parturients to be included in the study were having planned normal vaginal delivery, having ≥ 37 weeks of gestation, those who were with singleton pregnancy and having signed Informed Consent form. Exclusion criteria for the parturients were anemia (Hb< 9gms%), multiple pregnancy, antepartum hemorrhage, PIH, HELLP, eclampsia, prior LSCS, polyhydramnios and oligohydramnios, parturients with a history of epilepsy, cardiovascular renal and liver disorders, autoimmune diseases, sickle cell disease, severe hemorrhagic disease, venous and arterial thrombosis.

100 parturient undergoing vaginal delivery were allocated to either Study group or Control group by randomization. Detailed medical history was taken and examined; and investigations were carried out. Socio-demographic data such as age, parity, antenatal care were gathered. Tranexamic acid was administered during the Third stage of labour in Study group in addition to the routine care AMTSOL whereas the Control group had AMTSOL with IV distilled water 10 ml as placebo. Blood loss was measured in both the groups by Gradient Bag Method from placental delivery till next 2 hours. In our study, volume of blood loss was considered as outcome variable.

Data obtained was analyzed by student paired t-test with IBM SPSS Statistics Software in order to determine the p – value. Mean and standard deviation were also calculated for age, parity, gestational age and blood loss. Also, the association of postpartum hemorrhage with age and parity was noted.

RESULTS

Study was carried out in the Labour Room of Department of Obstetrics and Gynaecology, Rajiv Gandhi Institute of Medical Sciences, Kadapa. Totally, 100 parturients were considered for the study. They were further divided in two groups i.e. either study group or control group by randomization. 1gm of Tranexamic acid was given during the Third stage of labour in Study group along with the routine care AMTSOL whereas the Control group was administered AMTSOL with IV distilled water 10 ml as placebo.

p – Value was determined by analyzing the data.

As it can be inferred from table 1, mean age was 23 years for both Study and Control group. Minimum and maximum age for the Study group was 17 years and 30 years respectively. For control, it was 19 and 30 years respectively. So, the confounding bias of age, parity and other factors in this study were reduced to a great extent.

From table 2, it is evident that the mean blood loss for the Study group was 141.9 ml, with a a maximum value of 250 ml. But, comparatively the Control group had a mean blood loss of 270.4 ml, with minimum and maximum values of 90 ml and 400 ml respectively. No cases of PPH were noticed in this study. There was also a significant reduction in the blood loss for Study group.

Table-1:

Group		Number	Minimum	Maximum	Mean	Standard deviation
Control	Age	50	19	30	23.08	2.4145
	Parity	50	1	3	1.81	0.5714
	Blood Loss	50	90	400	270.4	78.63
Study	Age	50	17	30	23.2	2.8517
	Parity	50	01	03	1.81	0.5714
	Blood Loss	50	40	250	141.9	44.2729

Table-2: Blood loss

Groups	N	Mean	Std. Deviation	Minimum	Maximum
Control	50	270.4	78.63	90	400
TXA group	50	141.9	44.2729	40	250
Overall	100	206.15	61.451	40	400

Table-3: Frequency distribution of age

Group	Age			
	15-20	21-25	26-30	>30
Control	6	36	8	50
Cases	10	29	11	50
Total	16	65	19	100

Table-4: Frequency distribution of parity and blood loss

Sl. No.	Blood Loss (ml)	TXA			Total	PLACEBO			Total
		PRIMI	G2	G3		PRIMI	G2	G3	
1	1-100	2	4	3	9	0	0	1	1
2	101-200	12	16	7	35	2	6	2	10
3	201-300	6	0	0	6	5	17	2	24
4	301-400	0	0	0	0	13	1	1	15

DISCUSSION

As PPH is the most common cause of maternal mortality and Theoretical data and results of different clinical trials indicate that the Tranexamic acid is effective in the prevention as well as for the treatment of PPH. Although the available results of majority of clinical trials is not of sufficient quality to reach any definitive recommendation, however it does suggest that the Tranexamic acid administration reduces postpartum blood loss as evident by the above study. There is a significant reduction in the blood loss and the mean blood loss in the study group is 141.9 ml and in control group is 270.4 ml and the p-value of the study is 0.03.

In the study conducted by [9] Yang H *et al*. frequency of PPH was lower 6.4% in the experimental group having been given Tranexamic acid when compared with control group. Average blood loss was also significant in the experimental group. This shows that Tranexamic acid is efficient and safe in reducing postpartum hemorrhage. [10]In the study of Movafegh A, Eslamian L *et al*. Mean blood loss was significantly lower in experimental group as compared to control group (262.5±39.6 vs 404ml±94ml)[11]. In Study of M. Heesen *et al*. included seven trials concluded significantly reduced blood loss after addition of Tranexamic acid (WMD -140.29 ml, CI -189.64 to -90.93ml: P <0.00001)[12]. In the study of Ferrer P, Roberts I *et al*. the addition of Tranexamic acid in Third stage was helpful in the reduction of postpartum blood loss of 92 ml. Hence, results from RCTs conducted in other clinical contexts and above few clinical trials and the present study indicate that Tranexamic acid has a promise in the prevention and treatment of PPH.

Healthy mothers are a promise for healthy nation. But, poor infrastructure, lack of appropriate training for health care providers, lesser investment in health care and negative cultural norms are amongst the multiple factors that continue to have an adverse impact on the maternal health. Benefits of preconception evaluation, appropriate birth spacing, appropriate pregnancy planning, educating women regarding the importance of seeking antenatal care services shall be imparted.

CONCLUSION

It is concluded from our study that addition of Tranexamic Acid along with AMTSOL is an efficient and safe method of reducing blood loss and the need of blood transfusions. It is also an additional intervention in the prevention of PPH.

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