A Randomized Controlled Trial on The Effectiveness and Safety of Tranexamic Acid in Decreasing Blood Loss in Cesarean Section

by Sianty Dewi

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Abstract

Background: *WHO reported more than 100,000 maternal death due to obstetric hemorrhage annually, in other hand Cesarean Section (CS) is a common surgery done to save mother and child with one of the complications is hemorrhage. tranexamic acid (TXA) as antifibrinolytic might improve maternal outcome by decreasing blood loss in CS.*

Objectives:*Determine effectiveness and safety of tranexamic acid in decreasing blood loss in cesarean section.*

Method:*A prospective, double blinded, randomized controled study in Obstetrics and Gynecology Department of Southern Philippines Medical Center. The participants are 124 women underwent CS, 62 women given tranexamic acid after cord cut compared to 62 given placebo. Estimated blood loss, cardiac rate, systolic blood pressure before and after CS, events during CS and additional medicines. Hemoglobin and hematocrit was taken before and after CS, course in the ward, blood transfusion, adverse events, mortality and length of hospital stay were compared.*

Results: *Socio demographic, clinical profile, events after interventions, need of additional medicines and complications are similar for both group (p-value>0.05). The cardiac rate after CS is significantly higher in TXA group (tranexamic:85.1±11.5 placebo:80.1±15. 6, p-value=0.0441), but still in normal range.*

Conclusion: *Tranexamic acid is not recommended to be given routinely to reduce blood loss in CS, instead its more beneficence to abort severe bleeding hence its should be available during CS. There was no adverse events recorded in both treatment and placebo group showed safety of tranexamic acid.*

Keywords: *tranexamic acid, hemorrhage, caesarean section*

Abstrak

Latar belakang: WHO melaporkan lebih dari 100.000 kematian ibu per tahun disebabkan oleh perdarahan obstetric, di lain pihak, seksio sesarea sebagai tindakan penyelamatan terhadap ibu dan bayi yang paling sering dilakukan dapat mengakibatkan komplikasi perdarahan. Asam traneksamat sebagai antifibrinolitik memberikan harapan dalam meningkatkan keselamatan ibu dengan menurunkan volume darah yang hilang dalam seksio sesarea.

Obyektif: Menentukan efektivitas dan keamanan asam traneksamat dalam menurunkan volume darah yang hilang dalam seksio sesarea.

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Metode: Studi prospektif acak terkontrol buta ganda di Departemen Obstetri dan Ginekologi di Southern Philippines Medical Center. Peserta adalah 124 wanita yang menjalani seksio sesarea, 62 wanita mendapat asam traneksamat setelah pemotongan tali pusat dan 62 mendapat placebo. Perkiraan volume darah yang hilang, frekuensi denyut jantung, tekanan darah sistolik sebelum dan sesudah seksio, kejadian saat dilakukan seksio dan tambahan terapi yang diberikan dicatat. Demikian pula dengan hemoglobin dan hematokrit sebelum dan sesudah seksio, kejadian di ruang rawat inap, transfusi darah, angka kematian dan durasi rawat inap.
Hasil: Sosio demografi, profil kliinis, kejadian setelah perlakuan, tindakan atau terapi tambahan yang diperlukan sebanding untuk kedua kelompok (p-value>0.05). Frekuensi denyut jantung setelah seksio lebih tinggi secara signifikan pada kelompok dengan asam traneksamat (traneksamat:85.1±11.5 plasebo:80.1±15.6, p-value=0.0441), namun masih dalam batas normal secara klinis.
Simpulan: Asam traneksamat tidak disarankan untuk rutin diberikan untuk menurunkan volume darah yang hilang pada tindakan seksio sesarea, namun penggunaannya lebih dianjurkan pada perdarahan hebat sehingga obat ini sebaiknya tersedia pada saat dilakukan seksio. Tidak ada efek samping pada kedua kelompok perlakuan sehingga disimpulkan asam traneksamat aman digunakan.
Kata kunci: asam traneksamat, perdarahan, seksio sesarea

INTRODUCTION

A study by WHO found that every year around 536,000 women die from pregnancy and childbirth-related causes. It is no longer a revelation to consider that obstetric hemorrhage is the leading cause at approximately 35%. From the 14 million participants who suffer from postpartum hemorrhage each year, 1-2% dies in about 2–4 hours [1].

In the country profile published by the WHO, Philippines has been cited to be one of the countries with increasing prevalence of Cesarean Sections. With an improvement in maternal and perinatal health as observed in the decreasing maternal mortality ratio from 209 in the year 1995 to only 99 in 2010 [9]. However, in a study commissioned by SEA-ORCHID noted high incidence of postpartum hemorrhage in 9 tertiary care centers across four Asian countries including the Philippines with as much as 30% of its procedures[6].

Guidelines on the ideal use of obstetric interventions and uterotonic drugs were already available long before but does not include the treatment of hemostatic abnormalities as such have been considered as consequences of uncontrolled bleeding. Hence, hemostatic drugs are not routinely used [10,11,12].

It is now known, however, that a relationship exists between a decrease in fibrinogen and outcome of patients who suffered from postpartum hemorrhage. Also, the tissue injury as the initiating event in the problem can change the hemostatic paradigm toward increased fibrinolysis, thus promoting vicious sequence of coagulopathy and bleeding [13,14].

Anti-fibrinolytic drugs like TXA have been proven to reduce transfusion

requirements as well as blood loss in elective cardiac and orthopaedic surgeries, but there are no obstetric cases included. Cochrane Database Systematic review, which summarizes 211 RCTs with 20,781 participants shows that tranexamic acid reduced the risk of blood transfusion by a relative 39% (RR=0.61, 95%CI 0.54 to 0.69). TXA also reduced transfusion needed by 1.1 units (95%CI 0.64 to 1.59) [15].

A randomized clinical trial done in 180 woman by Gai 2004 showed TXA may reduce extent of bleeding from the end of CS to two hours postpartum 42.75±40.45 ml in study group versus 73.98±77.09 ml in the placebo group (p 0.001) and was not associated with any side effects or complications [16]. However, this finding was not significant for routine use of TXA as prophylactic.

This study aims to explore more on the effictiveness of the blood loss reduction capabilities of TXA, and its safety to be formally introduced in the local setting and be a part of the routine management to prevent postpartum hemorrhage as adjunct to the use of uterotonic agent as current standard management.

Research Question

The study compares the effectiveness and safety of TXA to placebo in decreasing blood loss after CS.

Significance of the Study

An effective management of postpartum hemorrhage could help significantly to reduce maternal mortality and morbidity. Anti-fibrinolytic therapy might actually reduce the problems related to hemorrhage, including the need for hysterectomy, the risk of severe anemia and the need for blood transfusion, and its associated morbidities.

METHODOLOGY

This is a double-blind prospective case control study . The observer and patient were blinded while the researcher did randomization and kept the records. The observer was the anesthesiologist who estimate blood loss, took initial and repeat blood pressure and cardiac rate examination at the operating room. The study period was from June to July 2013. One hundred and twenty four (124) subjects enrolled in the study. **Inclusion Criteria:** This study performed on all pregnant women of legal age who came to Southern Philippines Medical Center for anticipated delivery and gave consent to join the study. **Exclusion Criteria:** Pregnant women who have histories or current problems as thrombosis (pulmonary embolism, deep vein thrombosis), post-cardiac surgery, cerebrovascular accident, sub-arachnoid hemorrhage, gravidocardiac, toxic goiter, allergy to tranexamic acid, defective color vision, antyphospholipid syndrome, SLE, prolonged immobilization/ bed rest (more than 7 days), pelvic masses such as large myoma uteri >6cm, ovarian new growth, planned Cesarean hysterectomy, severe hemorrhage, unconscious, mentally retarded, psychiatric patients, patient in pains, in active labor (more than 4 cm cervical dilatation) , and patient with indication for direct to Operating Room on admission.

Intervention and Comparison

In TXA group, the researcher gave TXA 1g diluted in 10cc NaCl 0.9% slow intravenous immediately after the cord is cut. In the placebo group 20cc NaCl 0.9% were given. Oxytocin 5 iu slow IV were given to the two treatment groups followed by 10 iu in D5LR 1L to run 120cc/hour for 8 hours. Parameters of blood pressure and cardiac rate taken before the procedure started and at the end of the procedure. Blood loss and all events during surgery such as adhesion, laceration, hematoma, uterine atony, duration of surgery, and its related management (adhesiolysis, repair of laceration, additional uterotonic agent, arterial ligation, hysterectomy) will be recorded. The patients were followed up in the ward. Hemoglobin and hematocrit repeated within 48-72 hours after surgery or before blood transfusion once blood transfusion needed before 48 hours. The length of hospital stay recorded.

Data handling and analysis

Data encoded into the computer using the EPI Info version 3.5.3. The same software shall be used to analyze the data. Descriptive statistics used to analyze the data like the mean and standard deviation for the quantitative variable and proportion for the qualitative variable. The independent T test used to compare the mean blood loss, blood pressure, cardiac rate, and blood transfusion. Comparison of the mean hemoglobin and hematocrit at baseline and after Cesarean Section by the Treatment Group shall be analyzed using the repeated measures analysis of variance. Chi-square used in comparing the mortality and hysterectomy by the treatment group. The level of significance set at 0.05.

RESULT

There were a total of 124 patients included in the study of which 50% received TXA while the other 50% acted as positive placebo.

Table 1. Socio-demographic and Clinical Profile of the Participants

Profile	Tranexamic Acid n=62	Placebo n=62	P value
Age (Mean ± SD)	26.9 ± 5.2	28.6 ± 6.9	0.1039
Gravidity (Mean ± SD)	2.2 ± 0.9	2.1 ± 0.9	0.4979
Parity (Mean ± SD)	1.1 ± 0.9	1.0 ± 0.8	0.3574
Weight (Mean ± SD)	63.5 ± 9.5	64.0 ± 9.9	0.7744
Height (Mean ± SD)	151.3 ± 6.4	150.4 ± 6.8	0.4377
Indication for CS (n %)			
PIH	1 (1.6)	0	1.0000
Abruptio Placenta	0	1 (1.6)	1.0000
Placenta Previa	1 (1.6)	1 (1.6)	1.0000
Arrest Disorder	6 (9.7)	9 (14.5)	0.4087
Fetal Distress	6 (9.7)	6 (9.7)	1.0000
Malpresentation	7 (11.0)	10 (16.1)	0.4335
Repeat CS	41 (66.1)	35 (56.5)	0.2686

Hemoglobin (mean ± SD) Baseline	124.6 ± 12.9	127.2 ± 12.9	0.2626
Hematocrit (mean ± SD) Baseline	0.38 ± 0.03	0.38 ± 0.04	0.9798
Systolic Blood Pressure before CS (mean±SD)	119.7 ± 15.3	120.2 ± 15.7	0.8577
Cardiac Rate before CS (mean ± SD)	86.5 ± 9.6	88.2 ± 17.4	0.5067

There is no significant difference in the events after the intervention except for the cardiac rate after the CS. The cardiac rate among the placebo group is significantly lower than the TXA group (p-value=0.0441)

Table 2. Events after Intervention

Variable	Tranexamic Acid n=62	Placebo n=62	P value
Estimated Blood Loss (mean ± SD)	424.2 ± 253.1	406.9 ± 175.1	0.9061
Hemoglobin (mean ± SD) After CS	110.8 ± 15.9	109.9 ± 16.8	0.7629
Change of Hemoglobin (mean ± SD) After CS	13.6 ± 12.2	17.8 ± 15.5	0.0924
Hematocrit (mean ± SD)After	0.3 ± 0.04	0.2 ± 0.01	0.3222
Change of Hematocrit (mean ± SD) After CS	0.04 ± 0.03	0.03 ± 0.02	0.3009
Systolic Blood Pressure after (mean ± SD)	113.4 ± 14.4	111.0 ± 19.3	0.4302
Cardiac Rate after CS (mean ± SD)	85.1 ± 11.5	80.1 ± 15.6	0.0441
Duration of CS	59.5 ± 23.2	63.1 ± 23.5	0.3934

Table 3. Comparison of Surgical Events/ Additional Medicines

Variable	Tranexamic Acid n=62	Placebo n=62	P value
Adhesiolysis	2 (3.2)	2 (3.2)	1.000000
Evacuation of Hematoma	-	-	-
Uterine atony	4 (6.5)	3 (4.8)	1.000000
Repair of Laceration	3 (4.8)	4 (6.5)	1.000000
Hysterectomy (n %)	1 (1.6)	0	1.000000
Additional medicine/s:			
Need for Oxytocin	2 (3.2)	3 (4.8)	1.000000
Mean amount of Oxytocin (international unit) ±SD	10.0 ± 0	11.7 ± 2.9	0.495025
Need for Methyl Ergometrin	1 (1.6)	1 (1.6)	1.000000
Mean amount of Methyl Ergomethryn (mg) ±SD	20 ± 0	20 ± 0	-
Need for Tranexamic Acid	1 (1.6)	4 (6.5)	0.364711
Mean amount of Tranexamic Acid (mg) ±SD	1000.0 ± 0	1000.0 ± 0	-

Table 4. Comparison of Complication by Treatment Group

Variable	Tranexamic Acid n=62	Placebo n=62	P value
Mortality (n %)	-	-	-
Length of hospital stay (mean ± SD)	4.1 ± 1.3	4.3 ±1.0	0.3479
Need for Blood Transfusion	3 (4.8)	2 (3.2)	1.000000
Mean volume of blood transfused (±SD)	1080.0 ± 0	315.0 ± 7.1	-

Adverse events in terms of gastrointestinal problems, allergic reaction and thrombosis event did not occur in both groups.

DISCUSSION OF RESULT

This study showed no significant differenc eof estimated blood loss, systolic blood pressure and changes in hemoglobin and hematocrit in treatment and placebo group (p-value>0.05). The cardiac rate after CS is significantly higher in TXA group (tranexamic:85.1±11.5 placebo:80.1±15.6, p-value=0.0441), but still in normal range so there is no clinical significant. Surgical events, duration of CS, need of additional medicines and length of stay is similar for both group. No adverse event such as thrombosis events, nausea and vomit reported for both group.

Study on TXA given prior to CS carried out by Gai et al in China and Gohel et al in India showed that TXA significantly reduces bleeding from the time of placental delivery to 2 hours post partum. The study showed significant decrease in the incidence of > 500 ml blood loss in the study group as compared to placebo group (Gai:P-0.029, Gohel:P-0.049). Zheng et al also reported similar results on vaginal delivery. A study by Ducloy-Bouthor by giving high dose TXA in post partum hemorrhage also showed significant reduction of blood loss[16,28,29].

Possible reason of different research outcome to previous studies are different time of administration, in study by Gai et al and Gohel et al TXA is given 10 and 20 minutes before skin incision, early administration of TXA give advantage from the start, in this study TXA given after delivery of baby and cord cut to prevent transplacental transfer of TXA to the newborn[16,28].

Immediate intervention such as additional medicines (oxytocin, methyl ergometrin, tranexamic acid) and surgical management (repair of laceration, hysterectomy) was done appropriately to avoid adverse events and complication lead to comparable outcome for both treatment and placebo group.

Intraoperative assessment of progressive blood loss that require additional TXA are more common in placebo than in treatment group (t:1; p:4; p-value=0.364711) although not significant, this finding showed importance of this medicine to prevent severe hemorrhage (comparable estimated blood loss of treatment and placebo group) hence assurance of availability of TXA is important during surgery.

CONLUSION

The sociodemographic and clinical profile of the patients in the tranexamic acid group and the placebo group showed no significant difference (p-value>0.05). Events after the intervention is not significant except for the cardiac rate after the CS where the TXA group showed a significantly higher rate than the placebo group (p-value=0.0441). The surgical events, need for additional medicines and complications are similar in the 2 treatment groups (p-value>0.05). There is no significant difference in the adverse events in the 2 treatment groups (p-value>0.05).

Recommendation

TXA is not recommended to be used routinely to reduce blood loss in CS. Instead, TXA is more beneficence to be used to abort severe bleeding hence its should be available as one of emergency medicine during CS. There was no adverse events recorded in both treatment and placebo group showed safety of TXA. More studies are needed to determine effectiveness of TXA to reduce postpartum hemorrhage, different variables to investigate such as early administration of TXA, and possible use of TXA in vaginal delivery.

REFERENCES

1. WHO, (2007). Maternal mortality in 2005: Estimates developed by WHO, UNICEF, UNFPA, and the World Bank. Geneva
2. Althabe F, Sosa, C, Belizán J,, Gibbons L,, Jacquerioz F,, Bergel E, (2006) Caesarean section rates and maternal and neonatal mortality in low-, medium- and high-income countries: an ecological study. *Birth*, 33:270-277.
3. Sufang, G , Padmadas S.S. , Fengmin Z. , Brown J.J. , Stones R.W. Delivery settings and Cesarean Section rates in China. [Online] Retrieved October 10, 2012, Available at http://www.who.int/bulletin/volumes/85/10/06-035808/en/index .html
4. WHO. Philippines Country profile. *Department of Making Pregnancy Safer, Analysis of Demographic and Health Surveys (1993-2008).*, October 25, 2012.
5. Lumbiganon, P. et.al. (2010). Method of delivery and pregnancy outcomes in Asia: The WHO global survey on maternal and perinatal health 2007–08, *Lancet*. 375: 490–99
6. Festin, M. et.al, (2009) Cesarean Section in Four South East Asian Countries: reason for, rates, associated care practices and health outcomes. *Research article for the SEA-ORCHID Study Group. BMC Pregnancy and Childbirth.* 9:17
7. Gibbons, L. et al, (2010). The Global Numbers and Costs of Additionally Needed and Unnecessary Cesarean Sections Performed per Year: Overuse as a Barrier to Universal Coverage, *World Health Report Background Paper, No. 30.*
8. Cunningham G, Leveno K, Bloom S, Hauth J, Rouse D,Spong C. (2010) " *Williams Obstetrics* 23rd

edition", The McGraw Hill Chapter 25 Cesarean Delivery and Peripartum Hysterectomy:1123-1140.

9. WHO Maternal Health (2010) Maternal Mortality Ratio (per 100,000 live births). 2010. [Online] Retrieved October 11, 2012, Available at http://gamapserver.who.int/gho/interactive_charts/mdg5_mm/atlas.html

10. RCOG. Setting Standard to Improve Women's Health: Prevention and Management of Postpartum Haemorrhage. *Green-top Guideline No.52*, May 2009.

11. Department of Reproductive Health and Research, World Health Organization. WHO Guidelines for the Management of Postpartum Haemorrhage and Retained Placenta, *Geneva: WHO Library Cataloguing in- Publication Data NLM classification*: WQ 330.

12. International Confederation of Midwives (ICM) International Federation of Gynaecology and Obstetrics (FIGO). Prevention and Treatment of Post-partum Haemorrhage 2006: New Advances for Low Resource Settings: Joint Statement.

13. .Charbit B, Mandelbrot L, Samain E, Baron G, Haddaoui B, Keita H, Study Group (2007), The decrease of fibrinogen is an early predictor of the severity of postpartum multicentre. J ThrombHaemost, 5:266-273.

14. Levy JH, Dutton RP, Hemphill JC, Shander A, Cooper D, Paidas MJ, Hemostasis Summit Participants: Multidisciplinary approach to the challenge of hemostasis. *AnesthAnalg 2010*, 110:354-364.

15. CRASH-2 trial collaborators, Shakur H, Roberts I, Bautista R, Caballero J,Coats T, Dewan Y, El-Sayed H (2010). Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-placeboled trial. *Lancet*, 376:23-32.

16. Gai MY, Wu LF, Su QF, Tatsumoto. (2004) Clinical observation of blood loss reduced by Tranexamic Acid during and after Cesarean Section: A multicentre, randomized trial, *Eur J ObstetGynecolReprod Biol*,112:154-157.

17. WHO (1994). Indicators to monitor maternal health goals. *In Report of a Technical Working Group Geneva*.

18. WHO and UNICEF (2010). Countdown to 2015 Decade Report (2000-2010): Taking track of Maternal, newborn and child survival.

19. Rath WH (2011). Postpartum Hemorrhage update on problems of definitions and diagnosis. OctaObstetGynecol Scand. 90(5):421-8.

20. Zhang WH, Tharaux CD, Brocklehurst P (2010) Effect of a collector bag for measurement of postpartum blood loss after vaginal delivery:cluster randomised trial in 13 European countries. *Eur J ObstetGynecolReprod Biol*, 220:133-137.

21. Wangwe PJT, Balandya B, (2012) Accuracy in diagnosis of postpartum haemorrhage using visual estimation of blood loss versus change in haematocrit in a tertiary teaching hospital in Tanzania. Retrieved October 10, 2012 from :http://dx.doi.org/10.4314/thrb.v14i2.

22. Schorn MN (2010) Measurement of blood loss: Review of the literature, Journal of Midwifery and Women's health volume 55:39-44.

23. Katzung BG, Masters SB, Trevor AJ (2011) Basic & Clinical Pharmacology 12th Edition. Mc Graw Hill.12: 54-60.

24. Ker K, Edwards P, Perel P, Shakur H,Roberts I. Effect of Tranexamic Acid on surgical bleeding: Systematic review and cumulative meta-analysis Clinical Trials Unit, London School of Hygiene and Tropical Medicine, London WC1E 7HT, UK, *BMJ* 2012;344:e3054 doi:10.1136/bmj.e3054 (Published 21 May 2012)

25. Guerriero, C. (2011). Cost-effectiveness analysis of administering Tranexamic Acid to bleeding trauma patients using evidence from the CRASH-2 trial. [Online] *PloS ONE* 6 (5). Available at:http://www.plosone.org/article/info%3Adoi2F10.1371%2Fjournal.pone.0018987

26. Henry DA,, Carless PA,, Moxey AJ, O'Connell D, Stokes BJ, McClelland B,, Laupacis A, Fergusson D. "Anti-fibrinolytic use for minimizing perioperative allogeneic blood transfusion". Cochrane Database Syst Rev. 2007, 4:CD001886.

27. Ferrer P, Roberts I,, Sydenham E,, Blackhall K,, Shakur H. (2009) "Anti-fibrinolytic agents in postpartum haemorrhage: A systematic review". *BMC Pregnancy and Childbirth*, 9:29.

28. Gohel, M et al. 2007. Efficacy of Tranexamic Acid in decreasing blood loss during and after Cesarean Section: A randomized case controled prospective study," J. ObstetGynecol India 57(3): 227-230.

29. Petsidis P, Kadir RA (2011). Anti-fibrinolytic therapy with Tranexamic Acid in pregnancy and postpartum. *Expert Opinion on Pharmacotherapy*. 503-516.

30. Ducloy-Bouthors et al. (2011) "High-dose tranexamic acid reduces blood loss in postpartum haemorrhage". *Critical Care*, 15: R117.

31. Freedman, B. (1987) Equipoise and the ethics of clinical research. *The New England Journal of Medicine*, 317 (3):141-145.

32. Novikova N, Hofmeyr G.J. Tranexamic Acid for preventing postpartum haemorrhage. *Cochrane Database of Systematic Reviews* 2010, Issue 7.

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