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Original Research Article

Prophylactic tranexamic acid in reducing blood loss during and after the lower segment caesarean section: Adverse effects and complications

[1]Dr. Usharani N, [2]Dr. Bhagyajyoti, [3]Dr. Chandrashekar K

[1]Associate professor, Department of OBG, VIMS, Ballari, Karnataka, India

[2]Senior Resident, Department of OBG, VIMS, Ballari, Karnataka, India

[3]Assistant Professor, Department of OBG, VIMS, Ballari, Karnataka, India

Corresponding Author:

Dr. Bhagyajyoti

Abstract

PPH is one of the major cause of maternal mortality and morbidity by altering hemodynamic stability. Primary PPH is excessive blood loss within 24 hours, Secondary PPH is excessive bleeding in the period from 24 hours after delivery till puerperium. Among 100 primigravida, 50 were taken as study group i.e., Group A which involves intervention by administrating IV Tranexamic acid 1 gm and 50 as control group i.e., Group B without intervention. In our study group most common indication was fetal distress i.e., 68% in cases and 76% in controls and p value is 0.126 (> 0.05), which means both groups were comparable. Nausea among 10 cases, Head ache among 12 cases and vomiting among 7 cases had occurred. There were no evidence of complications like thromboembolism.

Keywords: Tranexamic acid, reducing blood loss, adverse effects

Introduction

Clinically PPH is defined as, any amount of bleeding from or into genital tract following birth of baby up to end of puerperium which adversely affects the general condition of patient as evidenced by rise in pulse rate and falling blood pressure. Quantitative definition: Traditionally PPH is defined as blood loss ≥ 500 ml after vaginal birth or ≥1000ml in Caesarean section [1].

According ACOG cumulative blood loss greater than or equal to 1000ml or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after birth process (includes intrapartum loss) regardless of delivery. Practical definition: Hematocrit drop of 10% or Haemorrhage requiring immediate transfusion (ACOG 1998) [2].

PPH is one of the major cause of maternal mortality and morbidity by altering hemodynamic stability. Primary PPH is excessive blood loss within 24 hours, Secondary PPH is excessive bleeding in the period from 24 hours after delivery till puerperium.

The blood loss during caesarean section could be because of injury to inferior epigastric artery, injury or extension of incision till uterine artery and also because of upper uterine segment incision, thick lower uterine segment, DIC, increased FDP and activation of fibrinolytic system during third stage of labour or manual removal of placenta etc. The use of tranexamic acid decreases the blood loss by 30% [3].

Tranexamic acid is a white crystalline powder. Inert ingredients in the tablets of tranexamic acid are microcrystalline cellulose, talc, magnesium stearate, silicone dioxide & povidone. The aqueous solution for injection has a pH of 6.5 to 8.0.

The antifibrinolytic effect of the tranexamic acid results from the formation of a reversible complex of the drug with plasminogen. Human plasminogen contains lysine-binding sites that are important for interactions with not only synthetic antifibrinolytic amino acid derivatives but also alpha-2 antiplasmin & fibrin.

The binding of plasminogen and the heavy chain of plasmin to fibrin monomer is also mediated through the lysine binding sites of plasminogen to specific lysine residues of fibrin;

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this interaction is completely blocked by the synthetic antifibrinolytic amino acids such as Tranexamic acid. It is primarily the high affinity lysine binding site of plasminogen which is involved in its binding to fibrin; saturation of this binding site with tranexamic acid displaces plasminogen from fibrin surface. This results in retardation of fibrinolysis because no matter how rapidly plasmin is formed, it cannot bind to fibrinogen or fibrin monomers. Thus stabilizing fibrin structures. Conversely, when the lysine binding site of plasmin is blocked by tranexamic acid, inactivation by alpha-2 antiplasmin is impossible [4].

Methodology

Study design: Randomized clinical trial

Sample size

Among 100 primigravida, 50 were taken as study group i.e., Group A which involves intervention by administrating IV Tranexamic acid 1 gm and 50 as control group i.e., Group B without intervention.

Inclusion criteria

- Primigravida of gestational age between 37-42 weeks.
- Singleton pregnancy with cephalic presentation posted for LSCS.

Exclusion criteria

- Multigravida
- Malpresentation
- Multiple pregnancy
- Anemia
- Pre-eclampsia
- Antepartum hemorrhage
- Macrosomia
- Polyhydramnios
- Uterine fibroids
- Blood dyscrasias
- History of drug allergy
- History of thrombo-embolic disorder
- Medical or surgical problems of pregnant women

Group A: (Study group-50)

1 Gm / 10ml tranexamic acid diluted with 10ml of 5% dextrose (20ml) was given slowly over 10 mins before 20 mins of skin incision.

Group B: (Control group- 50)

Control group without any intervention.

Results

Table 1: Age wise distribution of cases/ controls

Age (Years)	Cases	%	Controls	%	Total
<20 years	12	24%	14	28%	26
21-34 years	37	74%	35	70%	72
>34 years	1	2%	1	2%	2
Total	50	100%	50	100%	100

- In our study maximum no. of patients in study (cases) and control groups were distributed in the group of 21-34 years, 74% and 70% respectively.

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Table 2: Mean Age wise distribution

	Cases	Controls	T test	p value
	Mean± SD	Mean± SD		
Age (years)	22.32±2.9	23.34±3.8	-1.356	0.178

- Mean age of distribution among cases was 22.32±2.9 years and in controls was 23.34±3.8 years.
- P value is 0.178 which is not statistically significant, which means both groups were comparable.

Table 3: Gestational age distribution of cases/ controls

Gestational Age (Weeks) with%	Cases (%)	Controls (%)	Total
37-<39 Weeks	15 (30%)	11 (22%)	26 (26%)
39-41 Weeks	31 (62%)	34 (68%)	65 (65%)
>41 weeks	4 (8%)	5 (10%)	9 (9%)
Total	50 (100%)	50 (100%)	100 (100%)

- In our study most of them were between 39-41 weeks i.e., 62% in study group 68% in control group.
- P value is 0.648 which is statistically not significant so both groups were comparable.

Table 4: Distribution of cases & controls according to indication

Indications	Cases	Controls	Total
Oligo/Anhydramnios	4 (8%)	2 (4%)	6 (6%)
CPD	8 (16%)	4 (8%)	12 (12%)
Fetal distress	34 (68%)	38 (76%)	72 (72%)
Non reassuring FHR	4 (8%)	6 (12%)	10 (10%)
Total	50 (100%)	50 (100%)	100 (100%)

- In our study group most common indication was fetal distress i.e., 68% in cases and 76% in controls and p value is 0.126 (> 0.05), which means both groups were comparable.

Table 5: Adverse effects and complications among cases

Adverse effect	Number	Percentage
Nausea	10	20%
Vomiting	7	14%
Headache	12	24%
Thromboembolism	0	0

- Nausea among 10 cases, Head ache among 12 cases and vomiting among 7 cases had occurred.
- There were no evidence of complications like thromboembolism.

Discussion

The Blood Conservation Using Antifibrinolytics in a Randomized Trial (BART) study (2002-2007) was a multicenter, blinded, randomized, controlled study comparing three antifibrinolytic agents used in cardiac surgery. In this multicenter, blinded trial, we randomly assigned 2331 high-risk cardiac surgical patients to one of three groups: 781 received aprotinin, 770 received tranexamic acid, and 780 received aminocaproic acid. The primary outcome was massive postoperative bleeding. Secondary outcomes included death from any cause at 30 days. This trial was terminated early because of a higher rate of death in patients receiving aprotinin. A total of 74 patients (9.5%) in the aprotinin group had more bleeding, as

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compared with 93 (12.1%) in the tranexamic acid group and 94 (12.1%) in the aminocaproic acid group (relative risk in the aprotinin group for both comparisons, 0.79; 95% confidence interval [CI], 0.59 to 1.05). At 30 days, the rate of death from any cause was 6.0% in the aprotinin group, as compared with 3.9% in the tranexamic acid group (relative risk, 1.55; 95% CI, 0.99 to 2.42) and 4.0% in the aminocaproic acid group (relative risk, 1.52; 95% CI, 0.98 to 2.36). The relative risk of death in the aprotinin group, as compared with that in both groups receiving lysine analogues, was 1.53 (95% CI, 1.06 to 2.22) [5].

Many studies showed that Aprotinin was associated with an increased risk of renal failure, myocardial infarction, heart failure, stroke, encephalopathy, and an increased mortality so in December of 2007, UK suspended its license on the basis of advice from the Commission on Human Medicines (CHM), after 1 yr. aprotinin's license was also suspended by the European Commission [6].

Comparison of Tranexamic acid and EACA done in total hip arthroplasty by Liu Q, *et al*., in international journal of surgery 2018.

A total of 1714 patients are analysed across three randomized controlled trials (RCTs) and one non-RCT. Recent meta-analysis reveals that TXA is associated with a significantly reduction of total blood loss and postoperative haemoglobin drop compared with EACA. No significant differences are identified in terms of transfusion rates, length of hospital stay, and the incidence of postoperative complications.

Although total blood loss and postoperative haemoglobin drop are significant greater in EACA groups, there is no significant difference between TXA and EACA groups in terms of transfusion rates [7].

Other studies comparing EACA and tranexamic acid does not show any differences still needed many studies to conclude their efficiency

In many studies initial data analysis in one of the study suggested similar efficacy for tranexamic acid 1mg/kg/hr (after loading dose of 10mg/kg) & desmopressin 0.3 mg/kg (before & after the surgery) in terms of proportion of patients who received blood transfusion. However, subsequent two analyses indicated that 8% of all patients who received tranexamic acid alone or tranexamic acid with desmopressin & 21% of those receiving desmopressin required transfusion (p=0.024) [8].

Conclusion

Tranexamic acid is efficient drug in reducing blood loss intra and post operatively compared to other drugs with minimal side effects. In our study Nausea among 10 cases, headache among 12 cases, vomiting among 7 cases. There were no evidence of complications like thromboembolism in our study. Thus it can be used effectively to reduce bleeding from caesarean section

References

1. Mousa HA, Alfirevic Z. Treatment for postpartum Haemorrhage Cochrane Data base syst Rev. 2007;(1):CD OO 3249.DO1 10.1002/PUB2
2. Muñoz M, Stensballe J, Ducloy-Bouthors AS, Bonnet MP, De Robertis E, Fornet I, *et al*. Patient blood management in obstetrics: prevention and treatment of postpartum haemorrhage. A NATA consensus statement. Blood Transfusion. 2019 Mar;17(2):112.
3. Eppes CS, Schupp J, Dildy G. 272: shock index: a potential criterion for a maternal early warning system. American Journal of Obstetrics & Gynecology. 2016 Jan 1;214(1):S159.
4. Gutierrez G, Reines H, Wulf-Gutierrez ME. Clinical review: Hemorrhagic shock. Critical care. 2004 Oct;8(5):1-9.
5. Fergusson DA, Hébert PC, Mazer CD, Fremes S, MacAdams C, Murkin JM, *et al*. A comparison of aprotinin and lysine analogues in high-risk cardiac surgery. New England Journal of Medicine. 2008 May 29;358(22):2319-31.
6. Mangano DT, Tudor IC, Dietzel C. The risk associated with aprotinin in cardiac surgery. New England Journal of Medicine. 2006 Jan 26;354(4):353-65.
7. Liu Q, Geng P, Shi L, Wang Q, Wang P. Tranexamic acid versus aminocaproic acid for

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blood management after total knee and total hip arthroplasty: a systematic review and meta-analysis. International Journal of Surgery. 2018 Jun 1; 54:105-12.

8. Cochrane review of comparision of tranexamic acid with aprotinin as anti fibrinolytic use of minimising preoperative allogenic blood transfusion-2005, Issue-4