Comparison between the Effect of Using of Oxytocin and Oxytocin with Tranexamic Acid in Reducing Uterine Bleeding During and After Caesarean Section

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Abstract

Cesarean section is one of the commonest hospital based surgical procedure in obstetric mainly done to facilitate delivery in case where vaginal delivery is either not feasible or poses undue risk to mother, baby or both. The aim of this study was to compare between the effect of intravenous tranexam ic acid with oxytocin verse oxytocin alone in reducing of blood loss intra and postoperative cesarean section. The study was carried out in Tikrit city (Salahadeen general hospital) from 15th of February 2019 to 15th of June 2019. The number of pregnant women understudy were 100 women with a 18–40 years and , 50 of them were received tranexamic acid plus oxytocin infusion and 50 women who were received oxytocin infusion alone (and considered as control group). The main outcome measures were the determination of blood loss at cesarean section, change in hemoglobin levels, need for additional oxytocics, and drug-related side effects. The blood was measured by weigh and volume during two periods following placental delivery to the end of surgery and from the end of the operation to 2 hours after birth. The study showed no significant differences between the two groups regarding Age, BMI, gestational age, and duration of surgery. The study showed no significant difference between both the groups with regard to obstetrical complication and indication of CS like abnormal presentation, CPD, failure of induction, fetal distress, IUGR, previous LSCS, PROM. All the LSCS were done under spinal anesthesia. There is comparison of blood loss of case and control during intraoperative and postoperative patient. In intraoperative cases there was mean blood loss of 208.7±27.8ml (case) whereas there was 377.9±30.5 ml (control) blood loss and it was found to be statistically significant, indicating that a major amount of blood loss is found in control group. Similarly in postoperative blood loss (in ml) it was found mean blood loss was 74.7±10.ml (case) whereas 109.4±12.6 ml was found in control in whom tranexamic acid was not administered. The study showed that the incidence of postpartum hemorrhage (PPH) i.e. ≥500 mL blood loss was lower in the study cases than in the control group.

Keywords: Tranexamic Acid; Oxytocin, Postpartum Hemorrhage, Uterine Bleeding

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Introduction

Cesarean section is one of the commonest hospital based surgical procedure in obstetric mainly done to facilitate delivery in case where vaginal delivery is either not feasible or poses undue risk to mother, baby or both (1). Because of its weight as a leading cause of maternal mortality and morbidity, obstetric hemorrhage (ante-partum and
postpartum hemorrhages) must be investigated for national guideline development (2). Haemostatic drugs are not usually used as first-line treatment in post-partum hemorrhage (PPH). Tranexamic acid (TXA) reduces bleeding by inhibiting the breakdown of fibrin blood clots. The Woman trial is currently evaluating the effect of TXA on death and hysterectomy in women with established PPH (3). TXA given at the time of delivery could prevent severe postpartum bleeding. Plasma t-PA (the main fibrinolytic activator) doubles within an hour of delivery, probably due to the trauma of childbirth (4). It was authenticated that extensive tissue injury can direct the haemostatic equilibrium toward increased fibrinolysis, leading to coagulopathy and bleeding (5). Antifibrinolytic drugs, namely tranexamic acid (TXA) have been recognized to decrease blood loss and transfusion needs in various elective surgeries (6). The aim of this study was to compare between the effect of intravenous tranexamic acid with oxytocin verse oxytocin alone in reducing of blood loss intra and postoperative cesarean section.

Materials and Methods

The study was carried out in Tikrit city (Salahadeen general hospital) from 15th of February 2019 to 15th of June 2019. The number of pregnant women understudy were 100 women with a 18–40 years and, 50 of them were received tranexamic acid plus oxytocin infusion and 50 women who were received oxytocin infusion alone (and considered as control group)

Exclusion criteria:

- Pregnancy complications such as pre-eclampsia, polyhydramnios, macrosomia, multiple pregnancy, preterm labour, placenta praevia and abruptio placentae will excluded from the study
- Mothers with blood dyscrasias, coagulation disorders, thromboembolic disorders, severe anaemia, allergy to tranexamic acid and severe medical and surgical complications involving the heart, liver or kidney.
- Allergy to oxytocin
- Patients who take treatment affecting blood glucose.
- Type 1 and type 2 diabetic patients.
- Non fasting pregnant women.

Method

Patients were randomly allocated to one of the 2 groups of 50 each. The oxytocin group (control group) received 20 IU infusion of oxytocin in one liter Ringers lactate solution at the rate of 1,000 cc/h soon after delivery. The combined tranexamic acid –oxytocin group (cases) received 10 mg/kg of tranexamic acid plus 5 IU bolus intravenous oxytocin after delivery. The main outcome measures were the determination of blood loss at cesarean section, change in hemoglobin levels, need for additional oxytocics, and drug-related side effects. The volume of blood in the suction bottle and blood-soaked sponges was measured. Hemoglobin values were determined both before surgery and 24 h following surgery. Hemodynamic variables were recorded before anesthesia, 5 min anesthesia, 10 and 20 min after administration of oxytocic drugs during surgery. The need for additional oxytocic
therapy, operating time, need for blood transfusion, side effects of study drug, and any significant puerperal morbidity were also recorded.

**Clinical observations**

Vital signs: Heart rate (HR), Respiratory rate (RR), Blood pressure (BP), were checked immediately after placental delivery and 1 and 2 hour after birth respectively. The extent of postpartum hemorrhaging: The blood was measured by weigh and volume during two periods following placental delivery to the end of surgery and from the end of the operation to 2 hours after birth.

**Blood collection**

Blood will be collected via suction container, soaked gauge pads and operation table sheets can be weighted. Blood measurements can be obtained post partum during two separate periods from placental delivery to 2 hours post partum. The study shall ignore estimates of amniotic fluid and bleeding that occurred prior to placental delivery.

**Calculation of quantity of blood**

The quantity of blood = (weight of used materials + unused material – weight of all materials prior to surgery) / 1.05, plus the volume included in the suction container after placental delivery.

Evaluation of the efficacy and safety of tranexamic acid in cesarean section.

1) Efficacy
   a. The quantity of blood postpartum
   b. The incidence of postpartum hemorrhage

2) Safety
   a. Vital signs
   b. General and local reactions caused by tranexamic acid
   c. Laboratory findings.

**Results.**

The study showed no significant differences between the two groups regarding Age, BMI, gestational age, and duration of surgery (Table 1).
Table 1: Distribution based on patient characteristics in both groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Studied groups</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TXA+ oxytocin</td>
<td>Control</td>
</tr>
<tr>
<td>BMI</td>
<td>27.9± 2.98</td>
<td>28.1± 3.2</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-24</td>
<td>20 (40%)</td>
<td>22 (44%)</td>
</tr>
<tr>
<td>25-29</td>
<td>14 (28%)</td>
<td>15 (30%)</td>
</tr>
<tr>
<td>30-34</td>
<td>10 (20%)</td>
<td>8 (16%)</td>
</tr>
<tr>
<td>35-39</td>
<td>6 (12%)</td>
<td>5 (10%)</td>
</tr>
<tr>
<td>Mean±SD.</td>
<td>25.6± 3.98</td>
<td>24.3± 4.1</td>
</tr>
<tr>
<td>Gestational age (weeks)</td>
<td>38.36± 1.72</td>
<td>37.94± 1.55</td>
</tr>
<tr>
<td>Duration of surgery(min)</td>
<td>37.58± 1.72</td>
<td>37.1± 2.49</td>
</tr>
</tbody>
</table>

Table 2 showed no significant difference between both the groups with regard to obstetrical complication and indication of CS like abnormal presentation, CPD, failure of induction, fetal distress, IUGR, previous LSCS, PROM. All the LSCS were done under spinal anesthesia.

Table 2: Indications of caesarean section in cases and controls

<table>
<thead>
<tr>
<th>Reason for LSCS</th>
<th>TXA+Oxytocin</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>CPD</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Breech</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Fetal distress</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Failure of induction</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>PROM</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Previous LSCS</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>IUGR</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

X²: 2.8 P. value: 0.9 non-significant

There is comparison of blood loss of case and control during intraoperative and postoperative patient. In intraoperative cases there was mean blood loss of 208.7± 27.8ml (case) whereas there was 377.9±30.5 ml (control) blood loss and it was found to be statistically significant, indicating that a major amount of blood loss is found in control group. Similarly in postoperative blood loss (in ml) it was found mean blood loss was 74.7±10.ml (case) whereas 109.4±12.6 ml was found in control in whom tranexamic acid was not administered. Thus, total mean blood loss intraoperative and postoperative in case group, given tranexamic acid is 283.4±37.9 and in control group 487.3±40.6 (not given tranexamic acid) (p Value ≤0.001). Hence those patient given tranexamic acid showed significant decrease in total mean blood loss (Figure 1).
Table 3 showed that the incidence of postpartum hemorrhage (PPH) i.e. ≥500 mL blood loss was lower in the study cases than in the control group.

Table 3: Comparison of the incidence of PPH in both the groups

<table>
<thead>
<tr>
<th>Blood loss from placental delivery to 2 hr after postpartum (ml)</th>
<th>Cases</th>
<th>Control</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>&lt;500 ml</td>
<td>47</td>
<td>94</td>
<td>41</td>
</tr>
<tr>
<td>≥500</td>
<td>3</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

Discussion

In agreement with our finding, Xu et al \(^1\), found a lower amount of blood loss was observed in the TXA group after cesarean until 2 following hours. Regarding the total blood loss from placental expulsion up to 2 hours after the cesarean delivery, a significant difference was detected between the TXA and placebo groups. This result is in line with the fining of the current study study which demonstrated a lower blood loss in the TXA group. Similarly, Gungorduk et al \(^2\) administered 10 mg/kg of TXA to the patients and obtained similar results indicating that administering TXA to the experimental group could curtail blood loss by 17% compared to the control group. Moreover, in a multicenter study, Gai et al \(^3\) found that the TXA-receiving group had a lower blood loss (18%) compared to the control group. Additionally, in a meta-analysis performed by some studies concluded that TXA could significantly reduce the blood loss compared to the placebo \(^4-6\). Nevertheless, Milani et al \(^7\) concluded that the administering 10 mg/kg of TXA in CS significantly reduced the volume of PPH. However, it did not cause
significant changes in hemodynamic state or Hb level. Therefore, it can be recommended as an appropriate treatment for these patients, however Novikova et al (4) conducted a new study and indicated that TXA could be helpful in patients with a low risk of bleeding. Likewise, Movafegh et al (8) obtained that a lower mean amount of blood loss was found in the TXA group compared to control one in terms of intraoperative (404.7 ± 94.4 mL vs. 262.5 ± 39.6 mL) and postoperative blood loss (P < 0.001, 141.0 ± 33.9 mL vs. 67.1 ± 6.5 mL). In addition, a recent systematic review demonstrated that comparing mean reduction in blood loss volume were respectively 141.25 mL and 22.88 mL administering TXA in CS and vaginal delivery to control group (9). Likewise, Pacheco et al (10) found significantly less blood loss during the intraoperative and postoperative periods in patients receiving TXA compared to that of the placebo group.

Several studies have shown significant decrease in PPH in patients who received tranexamic acid and indicated that tranexamic acid significantly reduces bleeding from the time of placental delivery to 2 hrs postpartum (11-13). Yeng et al (14) showed that tranexamic acid significantly reduced postpartum blood loss after vaginal delivery and concluded that tranexamic acid was efficient & safe in reducing postpartum hemorrhage. Bresnoe (15) evaluated tranexamic acid in postpartum hemorrhage & showed that tranexamic acid significantly decreased the amount of blood loss & the incidence of postpartum hemorrhage in subjects with vaginal delivery to the tune of about 20% as compared to control group. The results were found similar to that in our study. Shahid et al (16) evaluated tranexamic acid in caesarean section and showed that showed that tranexamic acid reduces significant blood loss from the end of LSCS to 2 hours postpartum, 75.71 ml in the study group verses 133.03 ml in the control group (P = .001). It also significantly reduces the quantity of blood loss from placental delivery to 2 hour postpartum, 372.71 ml in the study group versus 469.70 ml in the control group (P = 0.003). These results were comparable to our study. Sekhavat et al (67) showed that tranexamic acid significantly reduced the blood loss from the end of CS to 2 h postpartum; 28.02 ± 5.53 mL in the tranexamic group versus 37.12 ± 8.97 mL in the control group (p = 0.000).

Similar to this study, Yang et al (14) and Shahid et al (16) reported there was no significant difference between the two groups in terms of Hb levels. Gungorduk et al (2) in a prospective, randomized, double-blind, placebo-controlled study no significant difference of Hb level between the two groups. Milani et al (7) showed no significant difference was noted between the TXA group and control regarding changes in hemoglobin (Hb) concentration before and after delivery.

**Conclusion:**

It was concluded that receiving of tranexamic acid has significant role in reducing of blood of pregnant women underwent cesarean delivery without observed side effect on mother and baby.

**References**


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