Tranexamic Acid for Reducing Blood Loss in Elective Cesarean Section

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Abstract

Prophylactic administration of tranexamic acid has been associated with reduced postpartum blood loss after cesarean delivery in several small trials, but evidence of its benefit in this clinical context remains inconclusive.

KeyWords: Tranexamic Acid, Cesarean Section .

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Introduction

Antifibrinolytic agents including tranexamic acid (TXA) have been shown to be effective at preventing bleeding complications in a variety of hemostatic challenges and reduce mortality with minimal adverse effects in some settings Tranexamic acid also reduces bleeding-related mortality among women with postpartum hemorrhage and is consequently recommended worldwide for these patients. Moreover, the survival benefit associated with the earlier administration of the drug in these women suggests that it may prevent coagulopathy after delivery rather than treat it[(1)].

A hemostatic agent with broad applicability and minimal adverse effects such as TXA is attractive as a component of supportive care for many forms of pathologic hemorrhage. We therefore sought to review the latest data on TXA, including efficacy, safety, and dosing, in a number of clinical situations including obstetric indications, acute trauma, orthopedic and cardiothoracic surgeries, dental procedures, hemoptysis, epistaxis, and disorders of primary and secondary hemostasis[(2)].

MECHANISM OF ACTION:

Tranexamic acid is a synthetic derivative of lysine that exerts antifibrinolytic effects by blocking lysine binding sites on plasminogen molecules, inhibiting the interaction of plasminogen with formed plasmin and fibrin. As a result, inhibition of plasminogen activation results in stabilization of the preformed fibrin meshwork produced by secondary hemostasis[(1)].

OBSTETRIC INDICATIONS:

1-Abnormal uterine bleeding

2-ACUTE TRAUMA

Acute trauma is a common cause of mortality worldwide across all age groups. Among the many complications that accompany significant trauma, blood loss is the most common cause of life-threatening cardiovascular compromise, and thus prevention of active hemorrhage remains a major aim in trauma management. Emergent or urgent surgery in the setting of acute trauma is associated with a high risk of mortality due to hemorrhage. TXA used in this setting can reduce perioperative bleeding and reduces the need for blood transfusions[(3)].

3-Postpartum Hemorrhage

Postpartum hemorrhage (PPH) is an obstetric emergency and one of the top five causes of maternal mortality worldwide. Generally defined as 500–1000 mL of blood loss within the first 24 hours following delivery [(4)].

In terms of secondary outcomes, TXA did not reduce the risk of hysterectomy to control bleeding, serious maternal morbidity, or blood transfusion. Over 99% of the Cochrane Review data originated from the landmark WOMAN trial, which took place in the hospital settings in low, middle, and high-income countries. Low-income countries comprised Burkina Faso, the Democratic Republic of Congo, Ethiopia, Sudan, and Uganda. In their 2021 systematic review of the cost-effectiveness of TXA for PPH treatment, Aziz identified four studies from three countries[(4)].

They concluded that TXA is cost-effective in Nigeria and Pakistan but not in the United States unless the probability of death due to PPH is high enough. In other words, TXA is likely to be costeffective in situations where PPH and PPH-related morbidity are prevalent and TXA is available at a low price. Regarding the effectiveness of TXA for preventing PPH, Novikova found in their 2015 Cochrane Review that TXA, in addition to uterotonics, decreases postpartum bleeding and prevents PPH and blood transfusions among women at low PPH risk undergoing spontaneous and elective cesarean birth[(5)].

- Deep vein thrombosis
- Anaphylaxis ,impaired color vision ,visual disturbances.

Several safety considerations have become evident related to tranexamic acid administration recently.Firstly, there have been reportedserious thromboembolic events related to its administration that warrant attention. second safety concern has manifest in highly consequential drug substitution errors. There have been several reported cases of maternal death following the intrathecal administration of tranexamic acid in obstetrics. Unfortunately, some 2 mL (500 mg) vials of tranexamic acid are remarkably similar to vials of bupivacaine that are administered for spinal anesthesia for cesarean delivery[(6)].

There are few drug substitution errors that have been as uniformly lethal as injecting one half of a gram of tranexamic acid into the cerebrospinal fluid. Perhaps the most important element of increasing use of tranexamic acid would be to ensure that systems are in place for safe administration to avoid such similar tragedies[(7)].

Third known complication of tranexamic acid is seizure activity. Tranexamic acid is a competitive antagonist of gammaaminobutyric acid (GABA), which reduces the inhibition of neurotransmission thus increases excitability in neural networks. Dose dependent seizure activity has been reported with an incidence of 0.9-2.5% in non-obstetric patients, but this effect has generally not been observed with to the same degree in pregnant patients for unclear reasons[6].

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