

The Use of Tranexamic Acid in Foot and Ankle Surgery

Emlyn Forsung, DPM PGY-1, Cindel Harris, DPM PGY-1, Lawrence A. DiDomenico, FACFAS Program Director

East Liverpool City Hospital Residency



Introduction

Intra-operative blood loss is a very important consideration for every surgery. Surgical skills combined with blood saving techniques and pharmacologic agents used in the management of blood coagulation can help reduce unnecessary blood loss and the need for blood transfusions. Excessive blood loss during surgical procedures can cause hypovolemia, hemodynamic instability, post operative anemia and reduced oxygen available to tissues. Various techniques such as tourniquet or patient position have been discussed before, but pharmacologic agents can play a important role. Pharmacologic agents such as such a Epsilon-aminocaproic acid (EACA), Nafamostat, Aprotinin, Tranexamic acid (TXA), and many more have been used to prevent post- operative blood loss(2). TXA prevents the actions of a potent enzyme that degrades fibrin clots, fibrinogen, and other plasma proteins, including the procoagulant factors V and VIII. Inhibiting the actions of plasmin prevents excessive blood loss. In foot and ankle surgery, TXA has been shown to prevent post blood loss, pain and swelling when administered pre-operatively.

Keywords

Tranexamic acid · Tranexamic acid blood loss· Tranexamic acid in orthopedic surgery

Method

A review of peer published journal articles. These four electronic databases consist of PubMed- US National Library of Medicine National Institutes of Health (NCBI), Google search engine, Cochrane registry for control trials, and The Journal of Foot and Ankle Surgery(JFAS) . Through these databases, articles that involved randomized control trials were thoroughly reviewed. These articles did not include patient's age, gender and comorbid condition. The route of TXA administration was also not included in these articles.

Method of action of tranexamic acid

In 1962, Japanese researchers Shosuke and Utako Okamoto reported the invention of a new chemical entity that inhibited the enzymatic breakdown of fibrin by plasmin. Initially referred to as AMCHA, this drug is known now as TXA(5). It blocks binding of α 2-antiplasmin and inhibits inflammatory reactions. TXA is 10 times more potent compared to epsilon-aminocaproic acid(EACA). This substance can be administered orally or intravenously. Orally, the bioavailability is ranges from 30 to 50%(4).This substance is mostly metabolized in the kidney, therefore it is recommended to check your patient to see if they have any decrease in renal function. The half life of TXA is 2.3 hours in adults.

Benefit

TXA in total ankle arthroplasty(TAA) helps reduce post-operative swelling, decreases pain, decreases post-operative wounds, and increases range of motion(3). For instance, Nodzo evaluated 25 patients that underwent TAA using TXA and 25 patient that did not use TXA. When using TXA, the drain output was significantly less in the TXA-TAA group compared to that in the No TXA-TAA group. TXA-TAA group had better pain management control and decrease of hemarthrosis.



TXA molecular structure: C8H15NO2

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Contraindications

TXA is remove from the kidney and liver. 95% of TXA is metabolized by the kidney. It is necessary to check the estimate glomerular filtration rate(eGFR). Patients with an eGFR of less than 30%, or has a stage four chronic kidney disease(CKD). Other contraindications are subarachnoid hemorrhage, hypersensitivity, and active intravascular clotting(1). Patients that have had a subarachnoid hemorrhage, can increase the risk of cerebral ischemic complications. Lastly, TXA should not be given to pregnant patient because it can cross the placenta and cause developmental problems.

Conclusion

TXA decreases the amount of tissue swelling and pain in patient while promoting hemostasis . TXA has been found to be successful in use of the foot and ankle surgery.

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