Spring 5-5-2023

Tranexamic Acid Protocol for Lower Extremity Total Joint Arthroplasties

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Executive Summary

Introduction of the Problem

Tranexamic acid (TXA) is an antifibrinolytic medication commonly used in orthopedic surgery to decrease surgical blood loss. While the drug has been in use for many years, there has been a lack of consensus within the literature and practice regarding contraindications and dosing guidelines. As a result, there was high provider variance in TXA administration within the host facility. Stakeholders had expressed a need for a protocol to guide TXA administration.

Literature Review

A literature review was conducted utilizing CINAHL, Medline Complete, EBSCO host, and Cochrane Database of Systematic Reviews. A total of 47 articles met criteria for inclusion in the review. Contraindications for TXA administration included within the protocol were acute subarachnoid hemorrhage, coronary or vascular stent within the previous six months to one year, myocardial infarction within one year, an active thromboembolic disorder, a current uncontrolled seizure disorder, an active consumptive coagulopathy disorder, and renal failure (Goobie & Frank, 2017; Lecker et al., 2015; Melvin et al., 2015; Whiting et al, 2014; Zufferey et al., 2020). Relative contraindications included history of thromboembolic disorder, history of uncontrolled seizure disorder, and chronic renal insufficiency (Goobie & Frank, 2017; Lecker et al., 2015; Melvin et al, 2015). The literature suggested a dose reduction for patients with chronic renal insufficiency, which should be based on serum creatinine levels (Adeline, 2012).

Dosing recommendations for TXA were not as clearly defined in the literature. Clinical practice guidelines endorsed by the American Association of Hip and Knee Surgeons, American Society of Regional Anesthesia and Pain Medicine, American Academy of Orthopedic Surgeons, The Hip Society, and The Knee Society were located, which were based on the review of 67

articles (Fillingham et al., 2018). A dose of 20 mg/kg up to a maximum dose of 2.5 grams was determined appropriate, which was in line with manufacturer recommendations (Adeline, 2012; Fillingham et al., 2018). Additionally, doses should not exceed 20 mg/kg in patients with a body mass index of 30 or greater. Administration of TXA prior to surgical incision resulted in the greatest reduction of surgical blood loss (Fillingham et al., 2018).

Project Methods

This DNP project utilized a nonexperimental design to construct and present an evidence-based TXA protocol for potential adoption by anesthesia providers within a tertiary care facility in central Illinois. Evidence-based findings from the literature review related to contraindications and dosing recommendations of TXA were utilized to develop the protocol. This protocol was intended to guide anesthesia providers responsible for treating adult patients undergoing total joint arthroplasty of the lower extremity. Goals of this protocol were to decrease provider variance of TXA administration and to optimize patient outcomes through decreases in surgical blood loss and the need for transfusion. This project was submitted to the Southern Illinois University Edwardsville Institutional Review Board (IRB). The IRB determined that this project was exempt and was deemed quality improvement.

Following IRB approval, current evidence and the protocol were disseminated via an in-person PowerPoint presentation within the host facility. Those invited to attend included anesthesia providers, pharmacists, and operating room nursing staff. Participants evaluated the presentation and protocol utilizing a short post implementation survey. Participation was completely voluntary, and feedback remained confidential. The survey included demographic information regarding profession, years of practice, and yes/no questions. Additionally, a prerecorded presentation was delivered to team members who were unable to attend the in-

person session. An electronic link to the post survey was provided for those who viewed the prerecorded presentation.

Evaluation

A total of ten staff members were present for the in-person presentation, which included eight CRNAs, one MDA, and one SRNA. Years of professional experience for the majority of available staff fell into the 0–5-year range, with the exception of four participants who had practiced for 10-20 years or more. Only one respondent, an anesthesiologist with over 20 years of professional experience, completed the electronic survey. All staff members in attendance had at least basic knowledge of TXA before the presentation.

Results from the study indicated that participants largely supported adopting the protocol into practice. A four-point Likert scale was utilized to assess the quality of the presentation and content. All respondents (100%) provided a rating of excellent or good. A five-point Likert scale was utilized to assess staff perception of the protocol. These questions pertained to the protocol's utility in identifying contraindications, decreasing provider variance in TXA administration, and guiding staff administration of TXA. All respondents (100%) indicated they agreed or strongly agreed the protocol would be beneficial. The final question addressed staff support for adopting the protocol into practice. One participant (9%) indicated they were neutral, while the remaining respondents (91%) indicated they agreed or strongly agreed with adopting the protocol.

There were some limitations to this project. No pharmacists were available to attend due to a facility visit from Joint Commission. As such, the author could not determine if there were any barriers to implementation from a pharmacy department perspective. An additional limitation was the small sample size, which limited the generalizability of the survey results. Unfortunately, the electronic delivery of the presentation and survey did not increase

participation as was hoped, and a total of eleven respondents completed the survey. Participation may have increased by implementing the project during a monthly departmental meeting or via multiple smaller meetings. Survey results indicated respondents did not identify any barriers to the implementation of the protocol.

Impact on Practice

Healthcare costs continue to rise nationwide, and facilities are routinely tasked with providing exceptional patient care under tight budgets. Costs can increase exponentially due to transfusion requirements and complications related to surgical hemorrhage. The adoption of an evidence-based TXA protocol at this facility may have an immediate impact on decreasing surgical blood loss, reducing the need for blood transfusions, reducing the length of hospital stay, and improving patient outcomes in those undergoing lower extremity total joint arthroplasty. Additionally, patient satisfaction may improve as a result of the implementation of this protocol. Surgical complications and increased length of stay can negatively impact patients and their families, including loss of income, financial strain, and emotional challenges. Should the implementation of this protocol yield positive results, this protocol may serve as the foundation for the development of additional protocols to improve surgical outcomes. This protocol focused on lower extremity total joint arthroplasty; however, it may serve as a catalyst for developing similar protocols for upper extremity and spinal procedures.

Conclusions

Tranexamic acid has been available and utilized at this tertiary care center; however, a standardized protocol was lacking for patients undergoing lower extremity total joint arthroplasty prior to this project. With the development and adoption of an evidence-based protocol, there may be less provider variance and improved patient outcomes. This project assisted in educating

the healthcare providers on current evidence concerning the contraindications of TXA and dosing recommendations. The inclusion of this protocol should have a positive impact on the care provided to adult surgical patients at this facility. Recommendations for follow up could include a survey for anesthesia staff regarding protocol utilization, and a chart review of adult lower extremity total joint surgeries to enhance and promote long-term practice change. Additional research is needed to determine if this protocol is appropriate for joint arthroplasty of the upper extremity.

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