



Original Article

The use of tranexamic acid in patients submitted to primary total hip arthroplasty: an evaluation of its impact in different administration protocols[☆]

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ABSTRACT

Objectives: There is still no consensus as to the best form and dosages of use of tranexamic acid (TXA). The aim of this study was to evaluate the use of TXA in total hip arthroplasty (THA), in order to reduce blood loss and decrease hemoglobin, taking into account different administration protocols.

Methods: 42 patients submitted to THA were divided into three groups. The study was prospective and randomized. Group 1 received a venous dose of TXA of 15 mg/kg, 20 min prior to bolus incision. Group 2 received an intravenous dose of 15 mg/kg bolus, 20 min before the incision, and an extra dose of 10 mg/kg by infusion pump during the duration of the surgical procedure. Patients in group 3 did not receive TXA, being the control group. Pre- and post-operative hemoglobin levels were measured and blood loss was measured 24 h after surgery using a Portovac drain.

Results: There was a significant reduction in the amount of bleeding through the Portovac drain and reduction in postoperative hemoglobin drop in patients who used TXA. There was neither significant difference in hemoglobin drop between groups 1 and 2, nor was there a need for hemotransfusion. Two patients in group 3 required blood transfusion.

Conclusions: The findings demonstrated that the use of intravenous tranexamic acid in THA reduced postoperative bleeding rates and significantly reduced serum hemoglobin without increasing thromboembolic effects. The bolus and bolus + infusion pump methods were shown to have a similar influence on hemoglobin and need for blood transfusion.

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O uso do ácido tranexâmico em pacientes submetidos a artroplastia total primária do quadril: uma avaliação do seu impacto em diferentes protocolos de administração

R E S U M O

Palavras-chave:

Artroplastia de quadril
Ácido tranexâmico
Hemotransfusão

Objetivos: Ainda não há consenso sobre qual a melhor forma e quais as dosagens de uso do ácido tranexâmico (ATX). O objetivo do estudo foi avaliar o uso do ATX na artroplastia total do quadril (ATQ) quanto à redução da perda sanguínea e queda de hemoglobina. Levaram-se em consideração diferentes protocolos de administração.

Métodos: Foram divididos em três grupos 42 pacientes submetidos à ATQ. O estudo foi prospectivo e randomizado. O grupo 1 recebeu uma dose venosa de ATX de 15 mg/kg 20 minutos antes de incisão, em bólus. O grupo 2 recebeu uma dose endovenosa de 15 mg/kg em bólus, 20 minutos antes da incisão, e uma dose extra de 10 mg/kg através de bomba de infusão durante a duração do procedimento cirúrgico. Os pacientes do grupo 3 – controle – não receberam ATX. Foram feitas dosagens de hemoglobina pré e pós-operatoriamente e foi medida a perda sanguínea em 24 horas após a cirurgia através do uso de dreno portovac.

Resultados: Houve uma redução significativa na quantidade de sangramento através do dreno portovac e redução na queda da hemoglobina pós-operatória nos pacientes que usaram ATX. Não houve diferença significativa na queda de hemoglobina entre os grupos 1 e 2, assim como não houve necessidade de hemotransfusão. Dois pacientes do grupo 3 necessitaram de hemotransfusão.

Conclusões: Os achados demonstraram que o uso do ácido tranexâmico por via endovenosa na ATQ reduziu as taxas de sangramento no pós-operatório e queda da hemoglobina sérica de forma significativa, sem aumentar os efeitos tromboembólicos. Os métodos bólus e bólus + bomba de infusão demonstraram ter uma influência semelhante quanto à hemoglobina, perda sanguínea através dos drenos e necessidade de hemotransfusão.

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Introduction

Total hip arthroplasty (THA) has become an excellent treatment method for pain relief and functional improvement in patients with degenerative hip joint disease. Initially, its indication was restricted to elderly patients with lower functional demands. However, surgical technique improvements and the evolution of implants and its friction surfaces, which provide less wear and tear, have widened the universe of patients who could benefit from this procedure.¹

Perioperative blood loss is a common cause of complications of this procedure.² Bleeding complications may hinder the success of any surgery.³ In recent years, several authors have reported on the perioperative administration of tranexamic acid (TXA) and its beneficial effect in reducing blood loss.⁴

TXA has been used to reduce blood loss and the need for transfusion in total hip and knee arthroplasty, with varying results.⁵

TXA is a synthetic antifibrinolytic drug whose effect results from the formation of a reversible complex of plasminogen and plasmin; it inhibits fibrinolysis and prevents lysis of the fibrin clot, and acts in the partial blockade of plasmin-induced platelet aggregation.⁶ TXA can provide a hemostatic benefit in recurrent or excessive bleeding due to stabilization of fibrin structures and prevention of clot dissolution, especially when

fibrin formation is impaired. Its effect on the preservation of the fibrin matrix can further enhance collagen synthesis and increase the elastic force of the tissue.⁷

TXA is quickly absorbed. Approximately 90% of an IV dose is excreted in the urine within 24 h; the plasma half-life is of approximately 2 h, and the therapeutic levels are maintained for 6–8 h. Its action preserves the clot and makes the hemostatic mechanism more efficient, reducing the intensity and risk of bleeding; it can be administered intravenously or topically.⁸

Currently, there is enough clinical evidence to recommend the use of TXA to reduce postoperative blood loss in total knee and hip arthroplasty. However, its optimal dose and regimens of administration are unknown.⁹ At high concentrations, TXA can be a direct noncompetitive plasmin inhibitor. Peak plasma levels are achieved 5–15 min after intravenous administration.⁷ Due to its low cost and minor side effects, research in different parts of the world has been conducted to assess TXA's effectiveness in controlling perioperative bleeding during major surgery.⁶

Bleeding reduction strategies have been used to decrease the need for transfusion of blood and blood products, due to the risks posed by these procedures. These risks include not only the transmission of viral and bacterial diseases, but also the immunomodulation related to homologous transfusion, which has been of increasing concern especially considering the increase in the prevalence of infections in implanted

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