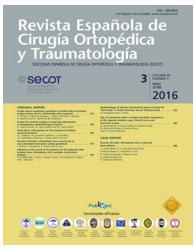
Rev Esp Cir Ortop Traumatol. 2018;62(1):47–54

Revista Española de Cirugía Ortopédica y Traumatología

www.elsevier.es/rot



ORIGINAL ARTICLE

Efficacy and safety of the topical application of tranexamic acid in primary cementless hip arthroplasty: Prospective, randomised, double-blind and controlled study☆

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Received 21 March 2016; accepted 3 September 2017

KEYWORDS
Tranexamic acid;
Topical administration;
Hip replacement;
Prospective study

Abstract
Objective: To evaluate the efficacy of topical tranexamic acid topical in cementless total hip arthroplasty from the point of view of bleeding, transfusion requirements and length of stay, and describe the complications of use compared to a control group.
Material and methods: A prospective, randomised, double-blinded and controlled study including all patients undergoing cementless total hip arthroplasty in our centre between June 2014 and July 2015. Blood loss was estimated using the formula described by Nadler and Good.
Results: The final analysis included 119 patients. The decrease in haemoglobin after surgery was lower in the tranexamic acid group (3.28 ± 1.13 g/dL) than in the controls (4.03 ± 1.27 g/dL, $p = 0.001$) and estimated blood loss (1216.75 ± 410.46 mL vs. 1542.12 ± 498.97 mL, $p < 0.001$), the percentage of transfused patients (35.9% vs. 19.3%, $p < 0.05$) and the number of transfused red blood cell units per patient (0.37 ± 0.77 vs. 0.98 ± 1.77; $p < 0.05$). There were no differences between groups in the occurrence of complications or length of stay.
Conclusions: The use of topical tranexamic acid in cementless total hip arthroplasty results in a decrease in bleeding and transfusion requirements without increasing the incidence of complications.

☆ Please cite this article as: Tavares Sánchez-Monge FJ, Aguado Maestro I, Bañuelos Díaz A, Martín Ferrero MÁ, García Alonso MF. Eficacia y seguridad de la aplicación del ácido tranexámico tópico en la artroplastia primaria no cementada de cadera: estudio prospectivo, aleatorizado, doble ciego y controlado. Rev Esp Cir Ortop Traumatol. 2018;62:47–54.

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PALABRAS CLAVE
Ácido tranexámico;
Administración tópica;
Artroplastia de cadera;
Estudio prospectivo

Eficacia y seguridad de la aplicación del ácido tranexámico tópico en la artroplastia primaria no cementada de cadera: estudio prospectivo, aleatorizado, doble ciego y controlado

Resumen
Objetivo: Evaluar la eficacia del ácido tranexámico tópico en la artroplastia total de cadera no cementada desde el punto de vista del sangrado, las necesidades transfusionales y la estancia media, así como describir las complicaciones derivadas de su uso respecto a un grupo control.
Material y métodos: Estudio prospectivo, aleatorizado, controlado y doble ciego que incluye todos los pacientes intervenidos de artroplastia total de cadera no cementada en nuestro centro entre junio de 2014 y julio de 2015. La pérdida de sangre se estimó mediante la fórmula descrita por Nadler y Good.
Resultados: El análisis final incluyó 119 pacientes. El descenso de hemoglobina tras la cirugía fue menor en el grupo del ácido tranexámico (3,28 ± 1,13 g/dL) que en el control (4,03 ± 1,27 g/dL, p = 0,001), así como el volumen estimado de sangre perdida (1.216,75 ± 410,46 mL vs. 1.542,12 ± 498,97 mL, p < 0,001), el porcentaje de pacientes transfundidos (35,9% vs. 19,3%, p < 0,05) y el número de unidades de hematíes transfundidas por paciente (0,37 ± 0,77 vs. 0,98 ± 1,77, p < 0,05). No hubo diferencias entre los grupos en la aparición de complicaciones ni en la estancia media.
Conclusiones: El uso de ácido tranexámico tópico en la artroplastia total de cadera no cementada produce una disminución en las necesidades transfusionales y el sangrado sin aumentar la incidencia de las complicaciones.

Introduction

Total hip replacement is a surgical procedure that improves quality of life and combats the pain caused by joint degeneration or injury. Bleeding is one of the most common problems associated with this procedure. Bleeding occurs during the operation and will continue, usually to a lesser extent, during the postoperative period. It is estimated that the average blood loss is 1236 mL[1] and it is also possible that many surgeons underestimate this blood loss.[2] The most notable direct consequence of this bleeding is the need to transfuse up to 30% of patients according to the series.[3,4] Blood transfusions are a finite resource and not always available, are generally costly,[5] and carry potential risks such as the transmission of infection, and immune and anaphylactic reactions.[6]

Antifibrinolytics drugs are able to prevent clot degradation after they form, increasing their duration, and thus have a net procoagulant effect. Many studies have demonstrated that antifibrinolytics can reduce bleeding, the need for transfusions and even the costs involved in hip and knee joint replacement surgery,[7] adult spinal reconstructive surgery,[8] and paediatric scoliosis surgery.[9]

Tranexamic acid has a very similar molecular structure to that of the amino acid lysine and creates a reversible block of the specific site for this amino acid in the plasminogen molecule, preventing it from bonding to the fibrin of the blood clot and thus inhibiting the activation of the plasminogen-tPA-fibrin complex.[10]

Orthopaedic surgeons have become increasingly interested in tranexamic acid in recent years. On the one hand, it has been demonstrated in a great many publications to be a safe and effective drug even in high doses[11] and on the other, its topical use appears to facilitate application without compromising its efficacy.[12,13]

Although minor adverse reactions after taking the drug have been described such as nausea, vomiting and orthostatism[14] and, to a lesser extent, renal failure and epileptic seizures,[15] theoretically the most significant problem that can occur after using tranexamic acid is thrombophilia. Since this is a procoagulant drug there might be an increased risk of major adverse events such as pulmonary thromboembolism or deep vein thrombosis. This is why patients with a history of thrombotic disorder are excluded from most published papers.[16–18] Nevertheless, practically none of the published studies have been able to demonstrate this risk.

Moreover, as this is a cheap drug, many authors acknowledge that its use might constitute a financial saving, up to 25% in some cases, in the peri-operative management of these patients.[7]

This study was planned with the aim of assessing the reduction of bleeding and the needs for a transfusion of patients undergoing primary total cementless hip arthroplasty via an anterolateral approach using 1.5 g topical tranexamic acid during surgery.

Material and methods

A prospective, randomised, double blinded clinical study was undertaken, which included all the patients operated in our hospital's Orthopaedic Department for total hip arthroplasty via the anterolateral approach (Watson-Jones), using