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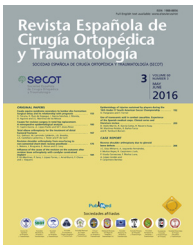

ORIGINAL ARTICLE

Efficacy of 2 grammes of intravenous transexamic acid in the reduction of post-surgical bleeding after total hip and knee replacement☆

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KEYWORDS
Tranexamic acid;
Blood loss;
Transfusion;
Thromboembolic complications

Abstract
Background: There is currently sufficient clinical evidence to recommend tranexamic acid (TXA) for reducing post-operative blood loss in total knee and hip arthroplasty, however, its optimal dose and administration regimes are unknown.
Objective: Analyse effectiveness and safety of TXA in total hip and knee arthroplasty using 2 grammes (g) intravenously in two different regimes.
Material and methods: A prospective randomised intervention study was conducted on a total of 240 patients. The patients were divided into 3 groups: (1) control; (2) 1 g of TXA intraoperative, followed by another postoperative; and (3) 2 g preoperative. Each group consisted of 40 patients undergoing total knee arthroplasty, and 40 total hip arthroplasty.

Postoperative blood loss, transfusion rate, and thromboembolic complications were studied.
Results: There were significant differences ($P < .005$) when comparing mean total blood loss and transfusion between group 1 and 2, and between group 1 and 3, but not between the two TXA groups (2 and 3). The authors only recorded one complication in group 1 (deep vein thrombosis).
Discusion: This study was not performed to investigate the already well established effectiveness of TXA, but to confirm if 2 empirical intravenous g is safe, and what is most beneficial regimen.

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In conclusion, according to the literature, both proven patterns of 2 g intravenous of TXA are effective in reducing blood loss and transfusion requirements, without increasing the complication rate.

PALABRAS CLAVE
Ácido tranexámico;
Sangrado;
Transfusión;
Complicaciones tromboembólicas

Eficacia de 2 gramos intravenosos de ácido tranexámico en la reducción del sangrado postoperatorio de la artroplastia total de cadera y rodilla

Resumen
Introducción: Actualmente, para disminuir el sangrado postoperatorio en la cirugía de artroplastia de cadera y rodilla, hay suficiente evidencia científica para recomendar el uso del ácido tranexámico (ATX), sin embargo, la dosis y pauta ideal para obtener su máximo beneficio es desconocida.
Objetivo: Analizar la efectividad y seguridad del uso del ATX en cirugía de artroplastia de cadera y rodilla a dosis fijas de 2 gramos (g) intravenosos con dos pautas diferentes.
Material y métodos: Se realiza un estudio de intervención prospectivo aleatorizado de 240 pacientes. Los pacientes fueron divididos en 3 grupos: 1) control; 2) administración de 1 g de ATX intraoperatorio y otro postoperatorio; 3): 2 g de ATX preoperatorios. Cada grupo consta de 40 pacientes intervenidos de artroplastia total de rodilla y otros 40 de cadera.

Se estudia la pérdida sanguínea postoperatoria, índice de transfusiones y la aparición de complicaciones tromboembólicas.
Resultados: Se obtienen diferencias estadísticamente significativas ($p < 0,05$) en la pérdida sanguínea y transfusión entre grupo 1 y grupos 2 y 3, pero no entre grupos 2 y 3. Observamos una complicación en grupo 1 (trombosis venosa profunda).
Discusión: Se realizó este estudio no para confirmar la eficacia del ATX, un hecho ya establecido, si no para confirmar si la pauta empírica de 2 g iv. es segura y qué pauta es más beneficiosa.

En conclusión podemos decir, coincidiendo con la literatura, que ambas pautas probadas de ATX son efectivas en la reducción de pérdida sanguínea y en las necesidades de transfusión sin aumentar el índice de complicaciones.

Introduction

The loss of blood that occurs in total hip or knee replacement may lead to acute anaemia and therefore the risk of perioperative cardiovascular complications. Although the transfusion of red blood cells may prevent these complications, this has intrinsic risks such as infection, immunological reaction, the transmission of infectious diseases, acute lung damage, circulatory overload and increased associated costs.[1–3] The percentage of cases in which transfusions are used in these surgical operations varies in the literature from 12% to 87%.[3]

One strategy to reduce blood loss and the risk involved in transfusion is the use of antifibrinolytic medication. Antifibrinolytic medicines inhibit the degradation of coagulation by interfering with the formation of plasmin through fibrinolysis and the dissolving of the incipient coagulation. Tranexamic acid (TXA) and e-aminocaproic acid are lysine analogue antifibrinolytic drugs that bind reversibly to plasmin as well as plasminogen.[4]

TXA is commercialised in Spain under the Amchafibrin® (Rottapharm, Italy) name. Its authorised indications for use are the treatment and prophylaxis of haemorrhages associated with excessive fibrinolysis, such as prostate and urinary tract surgical operations, gynaecological, thoracic, cardiovascular and abdominal surgery.[5] The authorised indications for the use of TXA do not include orthopaedic and traumatological surgery.[5] Nevertheless, according to the results of randomised controlled trials and systematic revisions, TXA administered during total hip and knee replacement surgery may prevent haemorrhaging, reducing intra- and postoperative blood loss by 20–50%.[6–14] In fact, the updating of the consensus guide on alternatives to the transfusion of allogenic blood known as the ''Seville Document'',[15] suggests the use of TXA in orthopaedic surgery with a weak recommendation supported by high quality evidence (2A).

The ideal dose and regime to obtain the maximum benefit from TXA are unknown.[16] The dose evaluated in the published studies for replacement surgery of the knee and hip varies from 10 mg to 25 mg (mg)/kilogramme (kg) in 1, 2 or 3 intravenous (IV) doses. To prevent errors in calculation and possible iatrogenic harm some authors recommend set IV doses at 1 g to 2 g TXA.[5]

Study objectives

1. To analyse the efficacy of the use of TXA in hip and knee surgery at fixed 2 g intravenous doses in two different