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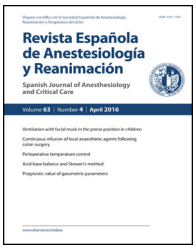

ORIGINAL ARTICLE

Cost-effectiveness of post-operative cell salvage in total knee arthroplasty. Should we continue to recommend its use today?☆

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KEYWORDS
Arthroplasty;
Knee;
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Abstract
Objectives: Total knee arthroplasty (TKA) has a high transfusion rate. In our protocol, the use of postoperative cell salvage is indicated in patients with contraindications to tranexamic acid (TA). An analysis was performed on the effect of post-operative cell salvage (POCS) regarding transfusion rate and costs in patients undergoing TKA.
Material and methods: A prospective analysis was conducted on 518 patients, of whom 434 received TA, and 84 were contraindicated. The red cell mass, blood volume, and the percentage of lost blood volume were calculated. Incidents associated with the use of post-operative re-perfusion of drained blood and the rate of transfusion were recorded. An analysis was performed on the costs associated with allogeneic transfusion prevention methods.
Results: A POCS drain was not inserted in 10 out of the 84 patients not candidates for TA. In the 74 in which it was placed, 158 ± 72 ml of red cell mass was reinfused. The allogeneic transfusion rate was 36%, and was 52% in those with no drain inserted. Relative risk of transfusion using POCS was 0.69 (0.41 to 1.16) with an absolute risk reduction of 16% (−8 to 40%). The number needed to treat to avoid allogeneic transfusion was 7. The direct costs to avoid allogeneic transfusion were €1610. No complications associated with blood re-infusion were observed.
Conclusions: The use of POCS would be required in 7 patients after TKA to avoid one allogeneic transfusion with a cost over 10 times that of a transfusion of red cell concentrates.

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PALABRAS CLAVE
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Análisis de coste-eficacia del recuperador postoperatorio de sangre de drenajes en cirugía protésica primaria de rodilla. ¿Debemos seguir recomendando su empleo en la actualidad?

Resumen
Objetivos: La artroplastia total de rodilla (ATR) presenta una elevada tasa transfusional. En nuestro protocolo, indicamos el empleo del recuperador de drenajes postoperatorios (RDPO) en los pacientes con contraindicación al ácido tranexámico. Analizamos el efecto de los RDPO respecto la tasa transfusional y sus costes en pacientes intervenidos de ATR.
Material y métodos: Se incluyeron prospectivamente 518 pacientes. De ellos, 434 recibieron ácido tranexámico y en 84 se contraindicó. Calculamos la masa eritrocitaria, el volumen sanguíneo y el porcentaje de volumen sanguíneo perdido. Controlamos las incidencias asociadas al uso del recuperador y la tasa de transfusión. Realizamos un análisis de costes asociados a los métodos de prevención de transfusión alogénica.
Resultados: En 10 de los 84 pacientes no candidatos a ácido tranexámico no colocamos el RDPO. En los 74 en los que colocamos un RDPO, reinfundimos 158 ± 72 ml de masa eritrocitaria. La tasa de transfusión alogénica fue del 36%, y en los que no se colocó, del 52%. Con el empleo de RDPO el riesgo relativo de transfusión se situó en el 0,69 (0,41-1,16), con una reducción de riesgo absoluto del 16% (−8,-40%). El número de pacientes a tratar para evitar una transfusión alogénica fue de 7. Los costes tangibles directos para evitar una transfusión alogénica se situó en 1.610 €. No observamos complicaciones asociadas a la reinfusión de la sangre recuperada.
Conclusiones: El empleo de RDPO tras ATR precisa de su empleo en 7 pacientes para evitar una transfusión alogénica, con un coste más de 10 veces superior al del concentrado alogénico.

Introduction

The shortage and rising cost of packed red blood cells has sparked interest in the management and rational use of this valuable resource.[1] One of most demanding surgical procedures in terms of blood transfusion is total knee arthroplasty (TKA), and it is in this context that the greatest efforts have been made to reduce transfusion rates. Improvements in perioperative patient management (preoperative haemoglobin optimisation)[2] and the introduction of tranexamic acid (TA)[3,4] have helped reduce blood requirements to a considerable degree.[5–7] Nevertheless, tranexamic acid has been designated in this indication as an orphan drug, and its safety profile, particularly in patients with a history of thrombosis, is unclear. According to our clinical protocol, therefore, this subgroup of patients are candidates for postoperative cell salvage (POCS). POCS, being easy to use and inexpensive, has been used in several types of orthopaedic interventions, particularly knee arthroplasty. Although the benefits of this blood management strategy have been amply demonstrated in the literature,[8,9] many authors question its safety due to the risk of complications (around 10%) associated with the use of ''unwashed'' blood[10,11] and the scant benefit over allogeneic transfusion.[12]

The aim of this study was to analyse the benefit of POCS in TKA patients contraindicated for tranexamic acid compared with patients receiving TA and those not receiving either TA or POCS. We evaluated the postoperative transfusion rate and direct cost of preventing allogeneic transfusion in these 3 groups of patients.

Materials and methods

We designed a prospective observational study in patients undergoing TKA between January and December 2010. The study was approved by the hospital's Ethics Committee and assigned number HCB/0565. Patients received information about the study during their pre-anaesthetic assessment and gave written consent for researchers to use their anonymised clinical data. Study variables were entered into a specific database and processed in accordance with the hospital's rules on confidentiality.

All patients underwent a pre-anaesthetic assessment, during which they were tested for anaemia. Patients presenting anaemia received specific treatment to increase haemoglobin levels to ≥13 g/dl. On this basis, patients were assigned (according to protocol) to receive intraoperative tranexamic acid or no pharmacological treatment. Patients at high risk of thrombosis, and therefore contraindicated for tranexamic acid, were assigned to the POCS group. Once in the operating room, patients were premedicated and preoperative haemoglobin levels were checked (Hemocue® Hemoglobin Systems 201, Hemocue Ängelholm, Sweden). Femoral and sciatic nerve blocks were performed according to protocol. During surgery, electrocardiogram (ECG), pulse oxymetry, non-invasive blood pressure and urine output were monitored. The procedure was performed under spinal anaesthesia, with 10 mg 0.5% bupivacaine and 10 μg fentanyl. Cefuroxime (1.5 g) was administered for antibiotic prophylaxis (2 doses: 1 during anaesthesia induction and another during cementing of the prosthesis), together