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SCIENTIFIC ARTICLE

Two-year experience with cell salvage in total hip arthroplasty

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KEYWORDS
Cell salvage;
Hip arthroplasty;
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Abstract
Background and objective: The aim of this study was to determine the efficacy of the cell salvage system in total hip arthroplasty surgeries and whether the cell salvage system can reduce the allogeneic blood transfusion requirement in total hip arthroplasty patients.
Methods: We reviewed retrospectively the medical records of patients who underwent hip arthroplasty surgeries between 2010 and 2012 in a university hospital. A total of 181 arthroplasty patients were enrolled in our study.
Results: In the cell salvage group, the mean perioperative rate of allogeneic blood transfusion was significantly lower (92.53 ± 111.88 mL) than that in the control group (170.14 ± 116.79 mL; $p < 0.001$). When the mean postoperative transfusion rates were compared, the cell salvage group had lower values (125.37 ± 193.33 mL) than the control group (152.22 ± 208.37 mL), although the difference was not statistically significant. The number of patients receiving allogeneic blood transfusion in the CS group ($n = 29$; 43.2%) was also significantly lower than control group ($n = 56$; 73.6%; $p < 0.05$). In the logistic regression analysis, perioperative amount of transfusion, odds ratio (OR) −4.257 (95% CI −0.502 to 0.184) and operation time, OR: 2.720 (95% CI 0.001–0.004) were independent risk factors for the usage of cell salvage system.
Conclusion: Cell salvage is an effective strategy for reducing the need for allogeneic blood transfusion in the perioperative setting; it provides support to patient blood management interventions. Thus, we recommend the cell salvage system for use in total hip arthroplasty surgeries to reduce the need for allogeneic blood transfusion, if possible.

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PALAVRAS-CHAVE
Recuperação intraoperatória de sangue;
Artroplastia do quadril;
Sistema de transfusão autólogo

Dois anos de experiência com recuperação intraoperatória de sangue em artroplastia total do quadril

Resumo
Justificativa e objetivo: O objetivo deste estudo foi determinar a eficácia do sistema de resgate celular em artroplastia total de quadril e se o sistema de recuperação intraoperatória de sangue pode reduzir a necessidade de transfusão de sangue alogênico em pacientes submetidos à artroplastia total de quadril.
Métodos: Análise retrospectiva dos prontuários de pacientes submetidos a cirurgias de artroplastia de quadril entre 2010 e 2012 em um hospital universitário. No total, 181 pacientes submetidos à artroplastia foram inscritos no estudo.
Resultados: A média da taxa de transfusão de sangue alogênico no período perioperatório foi significativamente inferior no grupo de recuperação intraoperatória de sangue (92,53 ± 111,88 mL) que no grupo controle (170,14 ± 116,79 mL; p < 0,001). Quando as médias das taxas de transfusão no pós-operatório foram comparadas, o grupo de recuperação intraoperatória de sangue apresentou valores inferiores (125,37 ± 193,33 mL) aos do grupo controle (152,22 ± 208,37 mL), embora a diferença não tenha sido estatisticamente significativa. O número de pacientes que recebeu transfusão de sangue alogênico no grupo RC (n = 29; 43,2%) também foi significativamente inferior ao do grupo controle (n = 56; 73,6%; p < 0,05). Na análise de regressão logística, a quantidade de transfusão no período perioperatório, a razão de chance (OR) −4,257 (95% CI −0,502−0,184) e o tempo cirúrgico, OR: 2,720 (IC 95% 0,001-0,004) foram fatores de risco independentes para o uso de sistema de resgate celular.
Conclusão: A recuperação intraoperatória de sangue é uma estratégia eficaz para reduzir a necessidade de transfusão de sangue alogênico no período perioperatório, que auxilia no manejo sanguíneo durante as intervenções. Portanto, recomendamos o sistema de recuperação intraoperatória de sangue para uso em artroplastia total de quadril para diminuir a necessidade de transfusão de sangue alogênico, quando possível.

Introduction

Considerable blood loss is a frequent problem in patients undergoing major orthopedic surgery. Particularly for arthroplasty surgeries, allogeneic red cell transfusion is often necessary.[1] However, the probability of transition of a wide variety of viral diseases such as those caused by hepatitis B and C, human immunodeficiency virus, transmission-transmitted virus, West Nile virus, Cytomegalovirus, Epstein−Barr virus, as well as variant Creutzfeldt−Jakob disease, bacterial contamination, and sepsis are a concern for allogeneic blood transfusion (ABT).[2,3] The incidence of transfusion-transmitted diseases decreased to very low levels in many countries with the modern laboratory techniques (nucleic acid testing) during the past years, but ABT still has considerable risks such as cardiac overload, transfusion-related acute lung injury, and transfusion-related immunomodulation. Medical staff welded incorrect blood transfusion, ABO-Rh mismatch, and allergic reactions also as serious causes of morbidity and mortality.[4] Although the risks for transfusion-transmitted diseases decreased to a very low level in the developed countries, many developing countries where transfusion services are insufficient still experience a high prevalence of such infections.[5] Meanwhile, for the developed countries, the major concern for ABT is the financial cost of providing and preserving a safe blood product rather than transfusion-related infectious diseases.[5]

Consequently, to reduce the need for ABT, different methods are established, including preoperative autologous blood donation, normovolemic hemodilution, iron or erythropoietin based patient blood management, and cell salvage (CS) systems.[1,6,7] CS is the process of collecting and reinfusing autologous blood.[8] Its main target is to reduce and, if possible, eliminate the need for ABT and diminish probable infectious and noninfectious complications.[9]

The aim of this study was to examine the records of patients who had the CS system used in their total hip arthroplasty (THA) surgery and compare them with patients operated without the CS system. In addition, we investigated if the CS method can decrease the need for ABTs.

Methods

This study was conducted with the approval of the local Ethical Committee under approval no. 2013/14, dated 27/12/2012. We searched the database of the medical faculty and retrospectively evaluated patients operated in the Department of Orthopedics and Traumatology. A total of 181 THA patients were enrolled in our study. Of the patients, 38 were excluded from the study because their medical records indicated hematological problems that met our exclusion criteria. We included 67 patients in a CS (cell salvage) group and 76 patients for control groups who underwent hip arthroplasty.