



## Original Article

# Blood transfusion in hip arthroplasty: a laboratory hematic curve must be the single predictor of the need for transfusion?<sup>☆,☆☆</sup>

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### ABSTRACT

**Objective:** to determine whether the laboratory hematic curve must be the single predictor of postoperative blood transfusion in total hip arthroplasty.

**Methods:** the laboratory blood samples of 78 consecutive patients undergoing total hip arthroplasty was analyzed during five distinct moments: one preoperative and four postoperative. There was a count of hemoglobin, hematocrit and platelets of the patients samples. Other catalogued variables ascertain possible risk factors related to transfusional practice. They characterized the anthropometric, behavioral and co morbidities data in this population. The study subjects were divided and categorized into two groups: those who received blood transfusion during or after surgery (Group 1, G1), and those who did not accomplish blood transfusion (Group 2, G2). Transfusion rules were lead by guidelines of American Academy of Anesthesiology and the British Society of Hematology.

**Results:** a total of 27 (34.6%) patients received blood transfusions. The curves of hemoglobin, hematocrit and platelet transfusions between G1 and G2 were similar ( $p > 0.05$ ). None of the analyzed risk factors modified the rate of transfusion rate in their analysis with  $p$  value  $> 0.05$ , except the race. The sum of clinical co morbidities associated with patients in G1 was a median of 3 (95% CI 2.29–3.40), while in G2 the median was 2 (95% CI 1.90–2.61) with  $p = 0.09$ . **Conclusion:** the curve in red blood cells has limited reliability when used as sole parameter. The existence of tolerant patients hematimetric curve variations assumes that their assessments of clinical, functional evaluation and co-morbidities are parameters that should influence the decision to transfusion red blood cells.

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## Transfusão sanguínea em artroplastia de quadril: a curva laboratorial hemática deve ser o único preditor da necessidade de transfusão?

### R E S U M O

#### Palavras-chave:

Artroplastia de quadril  
Transfusão sanguínea  
Hemoglobina

**Objetivo:** verificar se a curva laboratorial hemática deve ser o único preditor de transfusão sanguínea pós-operatória em artroplastia total de quadril (ATQ).

**Métodos:** amostras laboratoriais sanguíneas de 78 pacientes consecutivos submetidos à ATQ foram analisadas em cinco em períodos distintos (um pré-operatório e quatro pós-operatórios). Verificou-se a contagem de hemoglobina, hematócrito e plaquetas desses pacientes. Foram analisadas características antropométricas e comportamentais e comorbidades referentes à amostra, para verificação de fatores de risco associados à prática transfusional. Os indivíduos do estudo foram divididos em dois grupos: aqueles que receberam transfusão sanguínea foram alocados no Grupo 1 (G1) e os que não a receberam, no Grupo 2 (G2). As condutas transfusionais respaldaram-se dos critérios da Academia Americana de Anestesiologia e da Sociedade Britânica de Hematologia.

**Resultados:** receberam transfusão de hemoderivados 27 (34,6%) pacientes. As análises das curvas de hemoglobina, hematócrito e plaquetas entre o G1 e o G2 nas cinco visitas distintas foram similares ( $p > 0,05$ ). Todos os fatores de risco analisados, com exceção da etnia, não apresentaram repercussões nos índices de transfusão em suas análises com valor  $p > 0,05$ . A soma das comorbidades clínicas associadas aos pacientes no G1 foi mediana de 3 (IC 95% 2,29–3,40), enquanto no G2 a mediana foi 2 (IC 95% 1,90–2,61) com valor  $p = 0,09$ .

**Conclusão:** a curva hemática apresenta confiabilidade limitada quando usada como parâmetro exclusivo e absoluto. A existência de pacientes tolerantes às variações da curva hematimétrica pressupõe que as suas avaliações de caráter clínico, funcional e de comorbidades sejam parâmetros que devam influenciar na decisão do uso de hemoderivados.

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## Introduction

The indication for blood transfusion in prosthetic orthopedic procedures – especially hip arthroplasty – generates disagreement among medical professionals as the management of post-surgical anemia.<sup>1-4</sup> The standardization of transfusional procedures in the post-operative management with laboratory thresholds was initially done in 1942,<sup>5</sup> because of the fear of complications such as fatigue and inability to recover and rehabilitate the patient, together with the high costs and with the morbidity and long hospital stays. Further understanding of human physiology brought greater doubt about the use of preset laboratory thresholds for transfusion. Because of the risk of bleeding during and after surgery, and of drainage and secretion of the surgical wound, its imposition as routine practice was countered by the risks related to the consequences of its use. We report an association of this practice with highest rates of surgical site infection,<sup>4,6</sup> and increase of post-operative pneumonia index and mortality in the short term, and vascular events, besides autoimmune reactions, systemic inflammatory response syndrome, and transmission of contagious diseases.<sup>6-8</sup>

Numerous guidelines depict the local experience of specific centers, or demonstrate the scenario of medical groups' procedures in several countries,<sup>9-11</sup> but there is no support or specific worldwide standardization for these conducts.<sup>12</sup> Prominent studies warn about the risk factors associated with blood transfusions, being adamant in defining optional preoperative methods for reducing the costs and morbidities related

to the use of allogeneic blood products. The use before, during and after the surgical procedures of substances such as ferrous sulphate, erythropoietin, trenexamic acid, recombinant factor VII and fibrin glue, and the promotion of protocols of autotransfusion, hemodilution and rescue of red blood cells,<sup>8</sup> are the main approaches, although not without risks,<sup>8</sup> to solve this issue.<sup>4,6,13-17</sup>

The gaps related to the conducts regarding the use of blood products led us to define the overall functioning of the post-operative laboratory hematic curve of patients undergoing primary total hip arthroplasty (THA) in this orthopedic referral service. The objective was to understand the real need for blood transfusions based on their laboratory results. In this study, possible factors that could influence the transfusion procedures were examined, to explain why some patients presented clinical and laboratory recovery without the use of blood transfusion, based on absolute numbers. This analysis questions and alerts about necessary precautions of routine blood transfusion.

## Materials and methods

From January 2011 to June 2012 those patients undergoing THA in the Santa Casa de Porto Alegre (HSCPOA) Hospital Complex were enrolled in this prospective study. Seventy-eight participants were randomized and provided written informed consent. This study was approved by the HSCPOA institutional ethics and research board. Patients with any hematopoietic disorder, hemoglobin levels below 10 g/dL, active contagious

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