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ORIGINAL ARTICLE

## Use of red blood cells concentrates at the General Hospital of Mexico



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### KEYWORDS

Blood transfusion;  
Blood bank;  
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### Abstract

**Background:** Blood transfusion is a valuable therapeutic tool for massive bleeding in spite of inherent risks and makes the difference between life and death. Rational use of blood components and particularly of red blood cells concentrates (RBC) request for surgery could minimize the transfusional reactions and financial burden for blood banks.

**Objective:** To know the transfusion practice and the relationship between the request and use of RBC in programmed surgeries at the General Hospital of Mexico.

**Materials and methods:** A retrospective study was conducted and data analysis based in the number of RBC units required from the blood bank were compared with the number of RBC units transfused. Medical records, surgical notes, anesthesia worksheets, nursing and laboratory reports from a 6 months period, were reviewed.

**Results:** During the studied period, 354 RBC were requested from the blood bank from different surgical specialties; with a total of 680 units. From these only 63 (9.2%) were transfused vs 617 (90.7%) that were not used and were returned to the blood bank.

**Conclusions:** RBC requests were excessive compared to the real demand; this represents inadequate blood requests and elevated costs for the blood bank and the health system. There is a need to promote strategies through the institutional Transfusion Medicine Committee.

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**PALABRAS CLAVE**

Transfusión  
sanguínea;  
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Concentrados  
eritrocitarios

**Uso de concentrados eritrocitarios en el Hospital General de México****Resumen**

*Antecedentes:* La transfusión sanguínea es una herramienta terapéutica valiosa para la hemorragia masiva; a pesar de sus riesgos, marca la diferencia entre la vida y la muerte. La solicitud racional de los concentrados eritrocitarios en cirugía, podría reducir al mínimo las reacciones transfusionales y el gasto financiero para los bancos de sangre.

*Objetivo:* Conocer la práctica transfusional y la relación entre la solicitud y el uso de sangre en cirugías programadas del Hospital General de México.

*Material y métodos:* Se realizó un estudio retrospectivo y análisis de datos basado en el número de unidades de sangre requeridas al banco de sangre comparándolas con el número de unidades transfundidas. Se revisaron notas médicas y quirúrgicas, hojas de anestesia y reportes de enfermería y laboratorio, en un periodo de 6 meses.

*Resultados:* Se analizaron 354 solicitudes de concentrado eritrocitario al banco de sangre; lo que equivale a un total de 680 unidades. De esta cifra, sólo 63 (9.2%) unidades se transfundieron y 617 (90.8%) que no se utilizaron y fueron devueltas al banco de sangre.

*Conclusiones:* La solicitud de concentrados eritrocitarios fue excesiva en relación a la demanda real requerida; esto representa una inadecuada solicitud de sangre y costos elevados tanto para el banco de sangre como para el sistema de salud. Es necesario promover estrategias a través del Comité de Medicina Transfusional institucional.

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**Introduction**

Blood transfusion is a therapeutic method that started on the sixteenth century, initially based on magic and mysticism until the appearance of the rigorous application of the scientific method.<sup>1</sup> In the specific case of a surgical patient, the RBC is probably the blood component more frequently transfused during the perioperative event.<sup>2</sup> Bleeding is one of the risks present during the surgical procedure. It can occur during any type of surgery, scheduled or emergency, and no surgical specialty is exempt from this risk. It is important to emphasize the risk-benefit evaluation when transfusing blood, it is alarming that up to 74% of unnecessary red cell transfusions concentrates are reported.<sup>3</sup> Bleeding may constitute by itself the cause for a patient to enter the operating room. This complication can cause serious repercussions on the health of patients, even death. The rational request of RBC to the blood bank is extremely important, they should not be requested to only comply a bureaucratic process, it cannot follow a simple protocol without proper fundament, RBC are used to replace blood losses and for palliative treatment of certain anemias.<sup>4</sup> Every day blood that was routinely requested is returned to the blood bank. It is still graver the fact that blood requested for "just in case" use and that is not transfused must be thrown out since it may not have been in optimal temperature conditions. Routinely in the operating room, RBC should be stored at room temperature for up to 4h; if they are required for a longer period of time, they must be kept between 2 and 6 °C.<sup>4,5</sup> The purpose of knowing whether or not the blood was properly conserved is a problem not regarding improper management but the identification of needs to build or develop strategies in order to improve the correct use of blood. It is very important to

emphasize the risk-benefit assessment for blood transfusion and its components and properly select the patient to be transfused with precise indications and number of units to be transfused.<sup>6</sup> A transfusion reaction refers to the adverse effects or an abnormal response that a patient develops with the administration of blood components; it can be acute if it occurs within 24h, or delayed if it occurs after 24h. Transfusion reactions are classified into two major categories: immunological and non-immunological, both can be immediate or delayed<sup>7,8</sup> (Table 1). In the specific case of surgical patients, transfusion risks include: increase in the frequency of postoperative infections, respiratory distress syndrome due to volume overload and graft versus host disease (GVDH), this impacts the patients morbidity and mortality without doubt.<sup>9</sup> The use of the ratio "10:30" for hemoglobin and hematocrit, respectively as indicative of the need for transfusion must be avoided.<sup>10</sup> This was referred in various publications as a trigger for hemoglobin values between 7 and 9 g/dl, for transfusion of RBC which is no more current<sup>11-14</sup>; even in young patients without concomitant diseases, the trigger value can be considered up to 6 g/dl, and in cases of advanced age (over 70 years) cardiovascular disorders (myocardial ischemia, heart failure, cerebral vascular disease), and in patients with diseases that cause high consumption of oxygen, hemoglobin values of 8-10 g/dl are justified.<sup>13-15</sup> The indication to transfuse erythrocyte concentrates is responsibility of the physician, and obviously clinical parameters are critical in the decision to perform a transfusion.<sup>4,16</sup> (Table 2). It is important to consider that storage time will have important repercussions in the blood; mainly in the intracellular concentration of 2-3 diphosphoglycerate (2,3-DPG) that contributes to the proper function of transfused red blood cells. The 2,3-DPG facilitates the

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