

Effectiveness of Cell Saver in Valve Surgery and Coronary Surgery

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ABSTRACT

Introduction: The cell saver (CR) is an alternative to blood transfusion. It is used in surgical procedures that lose large blood concentrates, such as cardiac surgery under an extracorporeal circuit. Also CR is used in heart operations where they predict major blood loss, such as coronary and valve surgery, so we ask the research question; Is RC more effective in Company? Coronary with respect to the Company. Valve or vice versa? The objective of this study was to evaluate the efficacy of CR in reducing transfusion requirements in patients undergoing coronary and valvular surgery.

Methodology: Descriptive, longitudinal, prospective and observational study, where two cohorts of patients were established: Coronary group (CG), valvular group (GV), both groups were used CR. The study population is those who underwent coronary and valvular surgery, whose sample attends 30 patients, 15 for each group. Period of study 1-31 October 2014. Consent Informed to patient and Ethics Committee of our hospital. SPSS statistical package 18.

Results: Haemoglobin /Haematocrit: GC, 10.2gr/dl - 30.02%. GV, 9.8gr/dl - 28.16%. Autologous blood transfusion: GC, 95.1%. GV, 89.9%. $p=0.37$. Allogeneic blood transfusion: GC, 10.1% GV, 4.9%

Conclusions: The cell saver is effective in the two surgical interventions studied, and there are no statistically significant differences. Therefore, its use as a measure to the reduction of allogeneic blood transfusion is recommended.

Keywords

Nursing, Heart surgery, Autotransfusion.

Introduction

The Clinical Practice Guidelines of the Spanish Society of Cardiology [1] indicate that a measure of saving blood to allogeneic, donor and recipient blood transfusions are different, would be autotransfusion or transfusion of autologous blood.

When talking about autologous blood transfusion, we mean that the donor and the patient are the same person, which solves important problems associated with allogeneic blood transfusion, such as the elimination of possible immunological complications, the risk of Transmission of infectious diseases or decreases the consumption

of donated blood units for general use [2].

A strategy to perform autologous blood transfusion in patients undergoing cardiac surgery under cardiopulmonary bypass is currently being used. It is called the cell saver (CR). The CR is an electronic device that is responsible for recovering the patient's blood from the surgical field, as well as the residual volume of the extracorporeal circulation pump circuit after cardiopulmonary bypass, in order to take advantage of the maximum amount of Blood available, that after a processing cycle a volume of red blood cells is obtained which is the one that is reinfused to the patient [3].

It is a fundamental pillar in the strategies of alternative allogeneic blood transfusion, which always taking into account the true

indications of the same, are very effective, since the keys to success in its management, is the multifactorial approach, since the combination of several techniques is more effective than each of them separately [4].

It is well known that the surgical treatment of coronary disease will be directed to revascularization, while valve surgery will be of replacement or valve replacement, two different surgical procedures that affect the heart and where the CR is used with a medium. We are wondering; Is the CR in coronary surgery more efficient than valvular surgery or vice versa? To answer this question, we set the following objective: To evaluate the efficacy of the use of the CR in reducing transfusion requirements in patients undergoing surgery for valvular and coronary surgery under extracorporeal circulation.

Material and Method

This is a descriptive, longitudinal prospective and observational study, where two cohorts of patients are established: Coronary group, patients undergoing coronary pathology and using the cell saver. Valvular group, those patients operated on for valvular pathology and using the cell saver.

The study population was all patients undergoing cardiac surgery under extracorporeal circulation at the UGC of the Cardiovascular Surgery Service of the Virgen Macarena University Hospital.

The sample consisted of 30 patients, of which 15 corresponded to the coronary group and the remainder to the valvular group, within the period from 01 to 31 October 2014. The inclusion criteria are patients: Scheduled for a surgical intervention of Valvular and coronary surgery where the cellular recuperator is used. To voluntarily accept to participate in said study. On the other hand, we excluded: Emergency resuscitation because these patients present alterations in the hemoglobin and hematocrit numbers, which may mask the results of the collection of the variables. Interventions of valvular or coronary surgery that do not use the cell saver or an extracorporeal circuit. Those who do not want to participate in the study.

The variables analyzed in both groups were: Socio-demographic as age (expressed in years), sex/gender, weight (expressed in kg) and height (expressed in cm). And, clinical variables such as haemoglobin (expressed in g/dl), haematocrit (expressed in %), number of autologous blood transfusions received and number of allogeneic blood transfusions received. All of the variables described were analyzed separately in the coronary group and in the valvular group within the operating room of cardiovascular surgery of our hospital and after the end of the surgical intervention. All patients who participated in our study and the Ethics and Research Committee of our hospital were asked for informed consent. The data were subjected to statistical analysis using the statistical package SPSS version 18.0 for Windows, using the Pearson Chi-Square to compare the statistical variables, and for the continuous variables the Student's T was used to determine if there were differences or not statistically significant. The mean

and standard deviation values were also calculated by accepting a confidence level of $p=0.05$.

Results

Socio-demographic variables

- **Age:** In the coronary group the mean was 65.95 years with a standard deviation of 9.70 years. In contrast, in the valvular group it was 66, 38 years with a standard deviation of 9.35 years. Student t, $p = 0.718$.
- **Sex/gender:** In the coronary group, 89.4% were male and 10.6% female versus 80.6% male and 19.4% female from the valvular group. Chi-Square, $p = 0.092$.
- **Weight:** In the coronary group, the mean was 65.8 kg versus 74.2 kg in the control group. Chi-Square, $p = 0.131$.
- **Size:** In the coronary group, the mean was 159.1 cm versus the 160.8 cm of the valvular group.

Clinical variables

- **Haemoglobin and haematocrit:** In the coronary group the mean hemoglobin figure was 10.2 g/dl with a hematocrit of 30.02%. In the valvular group, the mean hemoglobin level was 9.8 g/dl and 28.16% hematocrit. $p=0,23$.
- **Number of autologous blood:** Patients who were transfused after completion of surgery with blood recovered from the cellular recovery were 95.1% in the coronary group and 89.9% in the valvular group. Chi-Square, $p= 0.37$.
- **Allogeneic blood number:** Patients who received allogeneic blood after completion of surgery in the coronary group were 10.1% in the coronary group and 4.9% in the valvular group.

Discussion

At the end of the surgical intervention, we did not find statistically significant differences between the coronary group and the valvular group, on the analytical parameters, haemoglobin and haematocrit.

Although the mean hemoglobin and hematocrit between the two groups is considered low considering the values proposed by the World Health Organization [5], to define anemia, but in the context of cardiac surgery under extracorporeal circulation, these values are considered normal by the Treatment and referrals suffered by the patient's blood.

Regarding the number of autologous blood transfusions between the coronary group and the valvular group, there are no statistically significant differences, but the number of allogeneic blood received between the two groups is striking, being higher in the coronary group. If there are statistically significant differences.

However, these differences can be attributed to the fact that in the coronary group there is a longer time of exposure to the extracorporeal machine or the time spent in the by-pass, and there is no direct relationship with the use or not of the cellular recuperator.

Conclusions

The cell saver is effective in the two surgical interventions studied,

and there are no statistically significant differences. Therefore, its use as a measure to the reduction of allogeneic blood transfusion is recommended.

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