

Comparison of ICU transfusion practice (with and without autologous transfusion) in a cardiac surgery population

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Background

Several trials concluded that postoperative transfusion increases the risk for complications in cardiac surgery patients⁽¹⁻²⁾. Although this idea was challenged by other reports, it has led to the development of cell saving devices that collect autologous blood and – after washing of the red blood cells – deliver an end product with a high hematocrit.

Objectives

For several years, some of our surgeons used the CardioPAT device (Haemonetics, Braintree, Massachusetts, USA), but due to production problems and the company takeover, autologous transfusion was reduced in 2016 and finally stopped early January 2017. In order to look at the impact of this management change, we evaluated our transfusion numbers and several other outcome data.

Materials and methods

We compared the transfusion data from the previous years (2015-2016) with the data from 2017, in which the device was no longer used. With regard to transfusion data we looked at the amount of blood products used and the percentage of patients receiving them in the postoperative phase. Furthermore, we made a comparison of these data between the group receiving autologous transfusion and the group that did not. Finally we also describe several other outcome parameters (reintervention rate, new onset of atrial fibrillation, acute kidney injury, length of ICU stay and mortality).

Results

The number of procedures in 2015, 2016 and 2017 was 674, 640 and 456 (until August 31st) respectively. A total amount of 351 and 186 units of cell saved blood were retransfused in the first two years, correlating with 82.9 and 33.6 liters of autologous blood. The percentage of patients receiving allogeneic red blood cells increased (6%) in parallel with the reduction of cell saving, but the amount of blood products did not (table 1). The ICU length of stay did not change over the years (3.05, 3.08 and 3.01 days respectively), nor did the mortality.

We then divided all patients receiving blood products in two groups, one group with and another one without the retransfusion of autologous blood. Transfusion data are presented in table 2.

Previous reports on the use of the CardioPAT device were contradictory. A large Italian trial⁽³⁾, investigating intra- and postoperative autotransfusion, showed a significant reduction in exposure to allogeneic RBC's. Complications were also less frequent and the use of CardioPAT appeared to be safe.

A more recent Dutch trial⁽⁴⁾ did not show reduced transfusion requirements compared to intraoperative cell salvage alone and showed higher CK levels. Transfusion is significantly higher in the non-cell saved group. The data are somewhat higher than the percentages mentioned in the two previous trials.

When comparing our two groups of transfused patients, we noticed differences in various outcome parameters between the group

Conclusions

Abandoning autologous postoperative transfusion did not result in higher transfusion rates of allogeneic blood. The number of patients receiving RBCs increased slightly, but the total amount of blood products was not statistically significant. There was a significant difference in the group of transfused patients when comparing patients that received autologous retransfusion vs the ones that didn't concerning length of stay on the ICU, reintervention rates and the severity of acute kidney injury.

References

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receiving autologous blood and the group that did not. The incidence of reinterventions was 8.73% in the cell saved group vs 16.52% in the non-cell saved group (p=0.005). There was also a statistically significant change in severity of acute kidney injury (26.75% vs 55.13% rise in post- vs preoperative serum creatinine (p<0.0001), and the length of stay on the ICU (3.79 vs 5.76 days, p<0.0001). There was no statistical significant difference between the incidence of postoperative new onset atrial fibrillation (16.71% vs 18.75%, p=0.5) nor mortality (3.99% vs 6.7%, p=0.17) (table 3).

Table 1

	packed cells	fresh frozen plasma	platelets
2015	574 (21)	289 (12)	148 (10)
2016	601 (25)	290 (13)	173 (11)
2017	353 (27)	118 (10)	65 (9)

Total number of transfused blood products (% of transfused patients)

Table 2

	CS	no CS
Number of patients	401	224
Total amount of packed cells given	403	719
Packed cells/patient	1	3,21
Total amount of fresh frozen plasma given	232	309
Fresh frozen plasma/patient	0,58	1,38
Total amount of platelets given	130	178
Platelets/patient	0,32	0,79

Table 3

	CS	no CS
Reintervention (%)	8,73	16,52
New onset atrial fibrillation (%)	16,71	18,75
% rise in creatinine post- vs preoperatively	26,75	55,13
LOS ICU (days)	3,79	5,76
Deaths (%)	3,99	6,7

