

Van Jehova tot sneller beter



P.M.J. Rosseel

Thoraxanesthesist,
Amphia Ziekenhuis,
Breda

INTRODUCTION

In 2006, a blood conservation study was initiated in the Amphia hospital in Breda, The Netherlands, with the primary aim of achieving an increase of transfusion free patients with 30-50% and a reduction of transfusion of allogeneic blood products with 30-50%, without an increase of adverse clinical outcomes, such as postoperative infarction, renal failure, infection, prolonged length of stay, and death.

A blood conservation protocol was introduced at May 17th 2006 as a guideline for blood conservation and transfusion practice in the care process of cardiac surgery.

PATIENT DATA

In this study, 517 patients who underwent a cardiac surgical intervention in the periods of May 17th to September 30th 2006 form the blood conservation group. We compared the data of this patient group retrospectively with data of 580 patients who underwent in the period of May 17th – September 30th 2005 (control group).

DATA ANALYSIS

The preoperative characteristics of both patient groups were compared. To analyze the differences in categorical data, we used the Pearson Chi-squared test, or Fisher's exact test where any expected cell count was less than 5. Continuous variables were analyzed using the unpaired Student t-test where a Gaussian distribution could be demonstrated; otherwise the Mann-Whitney U test was used.

Subsequently, we compared the surgical process and transfusion related variables and clinical outcomes for both patients groups. Differences in the distribution of continuous variables were analyzed using the unpaired Student t-test where a Gaussian distribution could be demonstrated;

otherwise the Mann-Whitney U test was used. Binary variables were analysed with logistic regression analysis; for these variables, the odds ratio and 95% confidence interval are reported in addition to p-value.

SURGICAL PROCESS VARIABLES

More off pumps and higher operative temperature. Similar aorta occlusion times and extracorporeal circulation times within non off pumps. Large increase of use of cell saver, no increase of cell saved volume given use of cell saver. Increase of patients receiving autologous blood transfusion before cardiopulmonary bypass, and increase of autologous blood transfusion volume given this transfusion. Medication: decrease in patients receiving aprotinine, large increase in patients receiving tranexamic acid or cyklopropion. No change in given heparin amount, decrease in heparin/protamine ratio, so an increase in protamine amount given the heparin amount.

TRANSFUSION RELATED OUTCOME

Decrease in amount of blood loss; decrease of patients with major blood loss. Large increase of allogeneic blood transfusion free patients (54%), decrease on amount of allogeneic blood transfusion volume (37% in median), decrease of patients who received major allogeneic blood transfusion volume. Decrease of allogeneic blood transfusion volume given no major blood loss; no decrease of allogeneic blood transfusion volume in patients with major blood loss. No decrease in hemoglobin and hematocrit values at several time points in the process. No difference in inotropics and vasopressin use.

	PRE (n=580)	POST (n=517)	p-value
General			
Age (mean±sd)	66.8±10.2	66.8±10.3	0.938
Female (%)	27.6	28.0	0.919
Body mass index (mean±sd)	26.8±3.8	26.7±4.0	0.541
Isolated CABG (%)	62.6	59.6	0.337
Isolated valve operation (%)	21.7	23.8	0.457
Combined CABG and valve operation (%)	12.8	14.5	0.450
Reoperation (%)	7.2	6.4	0.658
Elective surgery (%)	94.3	90.5	0.023
Co-morbidity			
EuroSCORE (median, interquartile range)	6, 3-8	6, 3-9	0.357
- EuroSCORE > 8 (%)	23.1	25.3	0.428
- EuroSCORE < 3 (%)	18.8	15.5	0.170
Diabetes mellitus (%)	17.6	21.7	0.101
Ejection fraction >50 (%)	73.4	71.2	0.463
Ejection fraction <25 (%)	5.2	8.0	0.076
Infarction < 4 weeks (%)	8.4	8.5	0.943
CVA/TIA (%)	10.3	11.2	0.712
Hemoglobin (mean±sd)	8.51±1.00	8.58±1.09	0.222
Creatinine (mean±sd)	91.2±33.3	94.1±38.9	0.185
Preoperative treatment			
Aspirin and clopidogrel < 5 days before surgery (%)	6.2	9.5	0.056
Nitroglycerin, intravenous (%)	7.2	6.9	0.951

Table 1: Comparison of baseline characteristics between the control group (PRE) and the blood conservation group (POST).

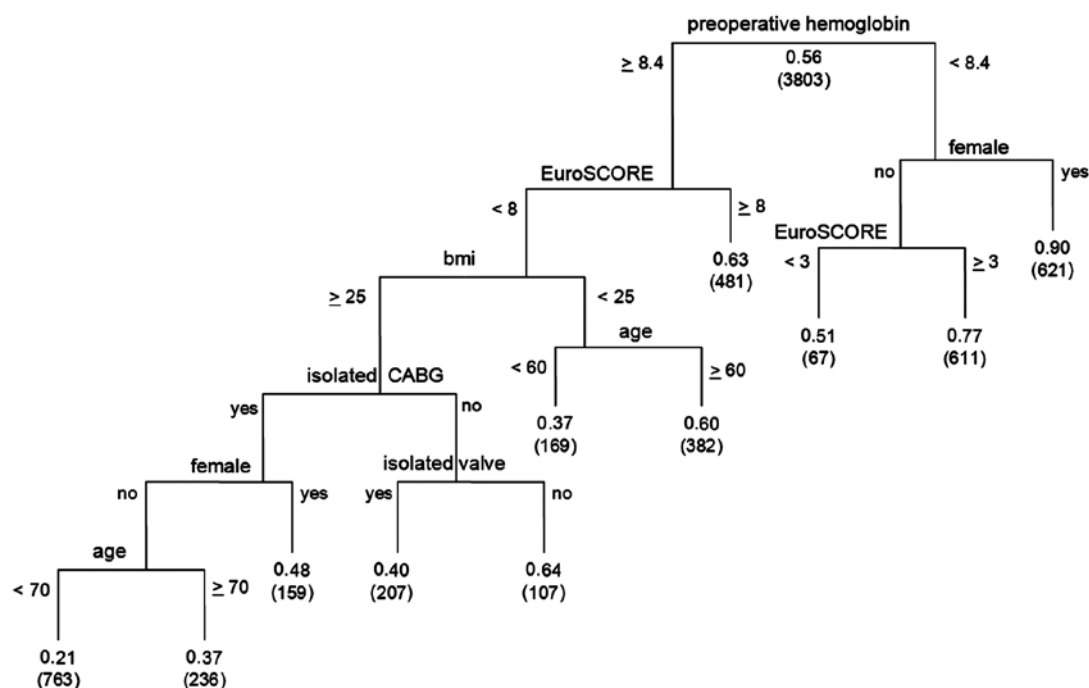


Figure 1. Amphibia transfusion tree model (n=3803)

CLINICAL OUTCOMES

No differences in outcomes, with one major exception: large increase of occurrence of infections. Figure 1 shows the Amphia transfusion risk tree model. The tree model includes preoperative hemoglobin as primary split. In addition, the variables EuroSCORE, female, body mass index, age, and isolated CABG or valve surgery were included as predictive features. The tree model assigns a transfusion risk of 0.90 to female patients with a low hemoglobin value (< 8.4), and a transfusion

risk of 0.77 to male patients with a similar hemoglobin value and an increased EuroSCORE (> 3). Lowest transfusion risk (0.21) was found for relatively young male patients (< 70) undergoing isolated CABG surgery with a good preoperative hemoglobin value (> 8.4), a relatively high body mass index (> 25), and without a high EuroSCORE (< 8). The indicator variable of the use of the blood conservation protocol was not included in the tree model, though.