

# Use of Cell Saver Reduces the Systemic Inflammatory Response after Coronary Artery Bypass Grafting

S. Damgaard, C. H. Nielsen, K. Bendtzen, L. W. Andersen, M. Tvede, D. A. Steinbrüchel, Copenhagen, Denmark

## Objectives

To investigate whether perioperative use of cell saver reduces the systemic inflammatory response after coronary artery bypass grafting (CABG) with cardiopulmonary bypass (CPB).

## Materials and Methods

30 patients undergoing CABG with heart-lung-machine (HLM) for 2-3-vessel coronary artery disease. Median age 67 years, range 44-80, median EuroSCORE 4, range 0-9. Patients were randomized to: cell saving of collected suction blood and blood left in the HLM after CPB (cell saver group, N=15) versus: use of the HLM suction and direct reinfusion of the blood left in the HLM after CPB (control group, N=14). One patient was excluded after an anaphylactic reaction at induction requiring intravenous corticosteroids and antihistamine.

Baseline characteristics of the two groups were comparable.

Primary outcome measures: patient plasma concentrations of inflammatory markers, preoperatively, perioperatively, and postoperatively at 6, 24 and 72 hours: Interleukin (IL)-1 $\beta$ , -6, -8, -10, -12, tumor necrosis factor alpha (TNF- $\alpha$ ), soluble tumor necrosis factor receptor I and -II (sTNF-RI and -II) and procalcitonin (PCT).

Secondary outcome measures: blood loss, transfusions and complications.

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## Results

Primary outcome measures: 6 hours postoperatively the cell saver group displayed significantly reduced levels of IL-6, -8, -10 ( $p < 0.02$ ) and -12 ( $p = 0.04$ ).

IL-1 $\beta$ , TNF- $\alpha$ , TNF-RI and -II and PCT showed the same pattern, however, without statistically significant differences.

At 24 and 72 hours, there were no longer significant differences between groups.

In the cell saver group, the collected suction blood was virtually cleared of TNF-RI and -II ( $p = 0.001$ ). Significant reductions were also seen in IL-6, -8, -10 ( $P < 0.01$ ), and PCT ( $p = 0.03$ ).

Blood from the HLM after CPB contained significantly reduced levels of IL-6, -8 and -10 ( $p < 0.05$ ) after cell saving.

Patient plasma TNF- $\alpha$  levels were generally in the range of 0-10 pg/ml, indicating a patient population undergoing only a mild systemic inflammatory response.

Secondary outcome measures: median perioperative net blood loss was lower in the cell saver group: 250 vs. 475 ml ( $p < 0.02$ ), and median lowest postoperative hemoglobin at the intensive care unit was higher: 6.2 vs. 5.5 mmol/l ( $p = 0.03$ ), but this did not lead to differences in transfusion requirements. Complications in the two groups were comparable.

## Conclusion

The use of cell saver reduced several known markers of systemic inflammation after CPB. The role of the anti-inflammatory molecules IL-10 and soluble TNF receptors is undefined in this setting.