

## Abstract

# Under pressure: Investigating hemolysis at -100 and -300 mmHg in cell salvage

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## Background

Cell salvage is widely used in cardiac surgery to allogeneic transfusions. At Rigshospitalet, Copenhagen, the Medtronic autoLog IQ™ autotransfusion system is used for this purpose. Manufacturer recommend a vacuum between -80 and -120 mmHg, whereas current clinical practice at our institution uses -250 and -300 mmHg. The aim of the study was to investigate whether a vacuum of -300 mmHg imposes greater mechanical stress on the red blood cells, resulting in increased hemolysis compared with the -100 mmHg.

## Methods

This before-and-after study included patients undergoing elective coronary artery bypass grafting or aortic valve replacement. In group 1 (n=12), the cell saver vacuum was set to -300 mmHg; in group 2 (n=10), to -100 mmHg. Outcome measures were hemoglobin and plasma free hemoglobin. Blood samples were collected at the end of circulatory bypass: one from the Heart lung machine circuit and the second from the cell saver reservoir after the blood had been aspirated by vacuum.

## Results

The change in hemoglobin (after minus before vacuum) did not differ significantly between -300 mmHg and -100 mmHg ( $p=0.30$ ). Similarly, the change in plasma free hemoglobin showed no statistically significant difference ( $p=0.11$ ). However, the median plasma free hemoglobin in group 1 was 21  $\mu\text{mol/L}$ , nearly four times higher than in group 2 (5.5  $\mu\text{mol/L}$ ).

## Conclusion

No statistically significant difference in hemolysis was observed between vacuum settings of -300 mmHg and -100 mmHg. The substantially higher median of plasma free hemoglobin at -300 mmHg may indicate that elevated vacuum levels increase hemolysis. However, the small, non-randomized cohorts limit the strength of these findings and prevent any firm conclusions.