Lower inflammatory activation of retransfused residual blood with the Ringer Wash-In technique

Anki Olsson, Joakim Alfredsson, Sören Berg
Karlskrona & Linköping, Sweden

Background: The residual blood in the cardiopulmonary bypass (CPB) circuit has been shown to contain high levels of cytokines and complement. Different techniques are used to retransfuse the blood after weaning. It is common to empty the blood into an infusion bag and give it to the patient as a direct infusion (DI). An alternative is to wash in the residual blood through the heart-lung machine with Ringer’s acetate (RWI).

Aim: Our aim was to assess differences in the blood in inflammatory activation and bacterial contamination between these two techniques.

Methods: 40 patients undergoing coronary artery bypass graft surgery with CPB were randomized to receive the residual blood either as a DI or through the RWI procedure. The degree of inflammation was assessed by measuring interleukin-6 (IL-6), IL-8, the chemokine interferon gamma-induced protein 10 (IP-10) and complement activation. Cultures were taken from the CPB circle before weaning and from the retransfused blood. Results are mean ± SD, non-parametric tests were used.

Results: Higher levels of IL-6 and IL-8 was found in the DI blood compared to the RWI blood (IL-6; DI 363±116 vs RWI 72±65 µg/L; p=0.03), IL-8 DI 143±99 vs RWI 88±60 µg/L; p=0.056). IP-10 was higher in the RWI blood (DI; 2029±1673 vs RWI; 2537±1207 µg/L; p=0.03) although the complement levels were comparable between the groups. Positive cultures were found in 11 patients before weaning (DI; 4, RWI; 7 p=0.29) and in 16 samples in the retransfused blood (DI; 11 RWI; 5 p=0.053). There were no differences in inflammatory mediators 4 hours postoperatively or in procalcitonin 5 days after surgery (DI; 0.86±5.5 vs RWI; 0.65±1.1 µg/L; p=0.43).

Conclusions: Residual blood retransfused through the CPB circuit with RWI technique has lower cytokine levels than with DI. The DI retransfused blood shows a high percentage of bacterial contamination.