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An evidence-based review of the use of cardiotomy suction and cell salvage to limit the systemic inflammatory response in cardiac surgery

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Introduction

We report here an evidence-based review of the use of cardiotomy suction and cell salvage to limit the systemic inflammatory response in adult coronary artery bypass grafting (CABG) surgery.

Methods

The review was confined to papers published in the peer-reviewed medical literature between1970-2008, published in the English language. To be included, at least one inflammatory marker had to be measured. Pediatric, off-pump, valve, and other cardiothoracic surgery procedures were excluded. Evidence was gathered, synthesized and graded for level and class of evidence by two reviewers in accordance with the recommendations put forth by the American College of Cardiology and American Heart Association. Discrepancies in this evaluation process were resolved by an independent reviewer.

Results

Of 139 articles initially identified from a systematic search of the literature using a combination of search terms, 14 met the minimal inclusion criteria of measuring a single inflammatory marker. No meta-analyses satisfied the minimal inclusion criteria. Observational studies demonstrated an increase in inflammatory markers in shed blood compared to patient's circulating blood, this was supported by data from randomized controlled trials (RCT's) demonstrating elevated TNF-α, IL-6, IL-8, C3a and plasma free Hb. Cell processing diminished level of inflammatory markers (TNF-α, IL-6, IL-8, myeloperoxidase) in observational and RCT. Studies examining the return of processed versus cardiotomy suction blood demonstrated no clinical benefit, however reduced inflammatory marker load was evident.
Current evidence mandates the following limited recommendations:

> **Avoidance of the direct reinfusion of cardiotomy suction blood and/or the cell processing of salvaged blood should be used to reduce the level of inflammatory markers in patients undergoing CABG with cardiopulmonary bypass (Class I, A).**

Conclusions

The ICEBP has chosen to generate guidelines to assist clinicians in understanding the evidence-base concerning aspects of cardiopulmonary bypass. We chose to initially examine practices that minimise the effect of the inflammatory response. The literature did not demonstrate any influence of cell salvage on measures of organ function. The majority of studies failed to measure any inflammatory markers, while few studied reported clinical or organ endpoints. In order to make a recommendation in relation to clinical endpoints further studies are required.