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Commentary: Do-it-yourself cell salvage

Stephen D. Waterford, MD,^a and Marc R. Moon, MD^b

We enjoyed reading the article on cell salvage from a seasoned aortic group.¹ It revives an age-old debate on cell salvage and is even more enjoyable for it. The debates are numerous. First, does cell salvage itself cause postoperative complications or is it rather the loss of blood that does? This question has been the subject of many a question posed to medical students and for which there is never a correct answer.

The background for this article is extensive. In fact, debates on cell salvage seemed to have raged for years, likely to the dismay of the manufacturers of the devices. Cosgrove and colleagues² reported on cell salvage in 1979 in 50 coronary bypass operations using cell salvage, concluding that 47 of 50 patients did not require a transfusion intraoperatively or postoperatively. In 1982, an article³ was published entitled “The Cell Saver During Cardiac Surgery: Does It Save?”. Winton and colleagues³ concluded that autologous blood product transfusion did not decrease significantly with cell salvage. In more modern work, it has been suggested that cell salvage reduces postoperative lung injury, possibly by removing cytokines.⁴ Although it does appear to reduce autologous blood transfusion, it remains debated whether cell salvage improves other outcomes such as neurocognitive outcomes and renal failure, and the literature is mixed on these topics.^{5,6} Thus, the Society of Thoracic Surgeons blood conservation guidelines are conservative in their recommendations, with a level IIB recommendation that cell salvage might decrease lipid emboli and decrease the concentration of inflammatory cytokines.⁷ Further, the guidelines do not comment on the use of cell salvage

Left heart bypass with roller pump (yellow) to reinfuse cell salvage without washing.

CENTRAL MESSAGE

Cell salvage is appropriate during open thoracoabdominal operations, but custom circuits can be devised, with options for direct reinfusion of whole blood.

in thoracoabdominal operations, where circuits are often modified to omit washing of salvaged blood.

As a result, debates on cell salvage in thoracoabdominal repair continue. Ouzounian and colleagues⁸ use left heart bypass with cell salvage, although we do not know whether the salvaged blood is washed before reinfusion. In the present article, the authors modify cell salvage during the period of repair, omitting washing of the blood, to return whole blood during the period of repair.¹ After reversal of heparin, washing of salvaged blood is carried out. The authors describe an increased rate of complications, including renal failure and mortality, with increased amounts of cell salvage.

At Washington University in St Louis, we have a long tradition of high-volume, open thoracoabdominal repair. Our solution to this problem has been a hybrid approach to cell salvage, as our colleagues do at Memorial Hermann Hospital. We use suction connected to a cell salvage device. This device, instead of washing the blood, is modified to deliver whole blood back to the patient, using a roller pump to reinfuse whole blood into the arterial line used for left heart bypass. The Figure 1 shows our approach. Over the years, we have found that this accommodates the blood loss that is invariably a part of thoracoabdominal operations, while preserving platelets and clotting factors. We have further found this facilitates the conclusion of the case, because it seems to shorten the amount of time spent managing coagulopathy.

Of note, the methods that we and our colleagues use do not involve washing of the blood, and therefore inflammatory cytokines and fat microparticles are present in the reinfused blood, potentially accounting for perioperative complications.

From the ^aDivision of Cardiothoracic Surgery, Department of Surgery, SUNY Upstate Medical University, Syracuse, NY; and ^bDivision of Cardiothoracic Surgery, Department of Surgery, Washington University in St Louis, St Louis, Mo.

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Address for reprints: Marc R. Moon, MD, Division of Cardiothoracic Surgery, Washington University School of Medicine, 4566 Scott Ave, Box 8234, St Louis, MO 63110 (E-mail: moonm@wustl.edu).

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FIGURE 1. Left heart bypass with roller pump (yellow) to reinfuse cell salvage without washing.

Performing a randomized trial of washing salvaged blood is also unlikely, given the need for rapid reinfusion of shed blood during thoracoabdominal operations. Therefore, the cause of complications observed with increased cell salvage is likely to remain enigmatic. Nonetheless, we commend the investigation of our colleagues into cell salvage, and our inclination

is to agree that excessive cell salvage cannot be salutary. And while advertising is always cheap, we continue to recommend reinfusing whole blood through a system similar to ours and that of our colleagues.

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Commentary: Extensive cell salvage during thoracoabdominal and descending aortic repair: Actual risk factor for postoperative complications or just an associated indicator of difficult surgery?

Jean Bachet, MD, FEBCTS

From Association pour le Développement des Techniques de Diagnostic et de Traitement des maladies cardiovasculaires, Suresnes, France.

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Address for reprints: Jean Bachet, MD, FEBCTS, Association pour le Développement des Techniques de Diagnostic et de Traitement des maladies cardiovasculaires, 1 place Marcel Legras, 92150 Suresnes, France (E-mail: jean.bachet@yahoo.fr).

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Jean Bachet, MD, FEBCTS

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Despite a fine statistical comparative analysis, it seems still difficult to prove whether extensive cell salvage is a cause of complicated outcomes or only an indicator of the difficulty of surgery.

Kiser and colleagues¹ tend to establish a correlation between the rate of postoperative complications and the amount of cell salvage used during 2 important