Modification to the Haemonetics Cell Saver 4 Circuit

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Keywords: Haemonetics Cell Saver, blood pressure infusion

Abstract

This paper describes a safe modification to the Haemonetics Cell Saver 4 circuit to allow the use of a pressure infusor cuff with the reinfusion bag. A pre-sterilized 'Y' connector is attached to the proximal end of the Cell Saver 4 circuit and allows the inclusion of a second reinfusion bag. This second reinfusion bag can be isolated from the Cell Saver 4 circuit and the contents can be safely pressurized using an external pressure cuff. This modification is used routinely for all Cell Saver 4 cases in this hospital and has allowed constant pressure infusion of washed red cells without interruption the Cell Saver 4 processing cycle.

Introduction

The (Haemonetics Cell Saver 4 Autologus Blood Recovery System) provides high speed processing of blood lost during surgical procedures. The standard Cell Saver 4 pumps the washed red cell suspension into a reinfusion bag but this may contain some air from the line. If the bag were pressurized this air could be infused into the patient causing air embolism. Further, the present machine circuit would not tolerate the back pressure. Where the blood loss is rapid, the limiting factor in the efficiency with which the Cell Saver 4 can process the patient’s own cells is the problem of reinfusion rate of the red cell suspension. In this situation the reinfusion bag must be pressurized to about 300 torr to achieve an adequate rate.

We have modified the standard Cell Saver 4 circuit to allow for constant pressure infusion of the washed red cells without risk to the patient.

Materials and Methods

At the proximal end of the reinfusion line from the standard Cell Saver 4 circuit a 'Y' connector (A) is inserted to allow the inclusion of a second reinfusion bag (B). (Figure 1) Any air contained in this additional reinfusion bag is removed prior to initial infusion. The bag is then inserted into a pressure infusor cuff (C). Because it is at a lower level and is connected by large bore tubing it can be filled rapidly from the primary reinfusion bag (D). Following the initial removal of air from the second reinfusion bag it can be filled as required from the primary reinfusion bag. The bag is then isolated by means of the slide clamp (E) and the contents are then pressure infused to the patient. There is no back pressure to the Cell Saver 4 circuit because of the slide clamp. There is no further ingress of air as the secondary bag is filled from the base of the primary bag.
This simple modification allows constant pressure infusion of washed red cells without interrupting the Cell Saver 4 processing cycle.

This system has been used for more than 35 patients in Cambridge on the liver transplant programme during the last year. It has had an important role in allowing processing and continuous pressure infusion of autologous blood with infusion rates high enough to cope with blood losses exceeding 80 liters in some cases.

Acknowledgment

We are grateful to the Department of Medical Photography and Illustration, Addenbrookes Hospital, for their help with the preparation of this article.

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**Figure 1: Modified reinfusion circuit, Haemonetics Cell Saver 4**