TERUMO BLOOD AND CELL TECHNOLOGIES

Unlocking Potential

Effects of Full Automation in Whole Blood Processing on Operator Safety, Ergonomic Performance, and Workflow Efficiency

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Introduction

There has been an increase of the quantity of studies conducted by healthcare institutions to optimize medical practices at economic, clinical, and operational levels.[1,2]

The importance of operators' physical ergonomics related to multiple-device manipulation and sample handling in blood bank processing rooms is a key consideration. Poor ergonomic designs in essential devices such as centrifuges and equipment of similar characteristics can lead operators, during their repetitive manual processes for whole blood processing, to experience physical fatigue and improper postures and motions, increasing the risk of injuries and errors. [3]

Although studies on healthcare worker ergonomics have been conducted, none assessed the differences between semi-automated blood processing systems, which requires a minimum of four independent devices, and full automation with a single device, the Reveos™ Automated Blood Processing System (Reveos).[4]

In 2021, Colombian Hospital Pablo Tobón Uribe Blood Bank introduced Reveos as part of its continuous improvement strategy to enhance processing efficiency and operator safety.

Objectives

The aim of this study is to evaluate potential benefits that full automation in whole blood processing with Reveos can provide to operators and to the workflow in blood bank centers that use semi-automation with centrifuge Presvac DP-2065 R Plus (Presvac) or similar devices.

Bibliography

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Materials and methods

In 2021, when the full automation processing system with Reveos was introduced at Hospital Pablo Tobón Uribe Blood Bank, ergonomics were evaluated by comparing physical, operational, and safety characteristics between the new technology and its current semi-automated buffy-coat processing system with the Presvac centrifuge.

The parameters assessed included overall device dimensions, cover orientation, opening and closing mechanisms, and number of manual steps.

Table 1 was created to showcase the most relevant results.

Results

Reveos is a smaller device than Presvac. All dimensions were measured by the persons conducting the study. Reveos measures 68.6 cm in width, 100 cm in height when closed, 155 cm in height when opened, and 82.6 cm in depth, compared with Presvac's dimensions of 73 cm in width, 101 cm in height when closed, 172 cm in height when opened, and 88 cm in depth. In addition, Reveos has a lighter cover that automatically opens centered in front of the operator after the process is finished, whereas the Presvac cover requires manual force and opens laterally.

Study results show that process optimization with Reveos, compared to Presvac, reduced manual steps, limited exposure to manual handling of blood components, and decreased mobility in the processing room.

Reveos has a blood leak sensor inside the device that automatically stops the process in case of a bag rupture, as well as an emergency stop button, whereas Presvac has neither a blood leak sensor nor an emergency stop button. The presence or absence of these safety features on both devices was assessed by the persons conducting the study.

Table 1. Parameters for fully automated whole blood processing with Reveos and semi-automated whole blood processing with Presvac DP-2065 Plus centrifuge.

	Full Automation	Semi-Automation
Parameters	**Reveos**	**Presvac DP-2065 R Plus**
Device width (cm)	68.6	73
Device height with closed cover (cm)	100	101
Device height with opened cover (cm)	155	172
Device depth (cm)	82.6	88
Cover opening orientation	Centered	Lateral
Cover opening mechanism	Automatic	Manual
Cover closing mechanism	Manual	Manual
Manual steps for blood processing	Less	More
Blood leak sensor	Yes	No
Emergency stop button	Yes	No

Conclusions

Reveos reduced manual steps performed by operators, requiring less manual handling of blood components and less movement around the processing room.

The authors consider full automation with Reveos for whole blood processing to be the preferred option at the Hospital Pablo Tobón Uribe Blood Bank.

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