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Publishing Title: **Umbilical Cord Blood Processing Analysis: Comparison of Methodologies**

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Abstract Body:
Purpose/Objective: Cord blood can provide a life saving source of ethnically diverse stem cell donors. Today, manual methods and new semi-automated methodologies for processing cord blood/stem cell units are available. This report outlines the experience of the Texas Cord Blood Bank in the evaluation of three processing methods.
Materials/Methods: Cord Blood Units (CBU's) were processed utilizing three different methods. The collection weights of units ranged from 100g and 300g. Hydroxy Ethyl Starch (HES) was added prior to processing all cord bloods to aid in red cell separation and reduction. A Total Nucleated Cell Count (TNC) was performed on pre and post processing samples. Each CBU was evaluated for TNC recovery, amount of time required to process a CBU, how each system processed a large volume CBU, and ease of use.
10 units were processed using manual methodology (red cell & plasma reduction), 10 units were processed using AXP® method (semi-automated cell separation) and 10 units were processed using Sepax® method (semi-automated cell separation). A second group of 10 units were processed using Sepax® method, and calculations were performed utilizing instructions for dilution of samples (pre & post TNC).
Results: The results of the manual method of processing showed an average TNC recovery of 83.4%. The AXP® method demonstrated a TNC recovery of 76% and Sepax® showed an average TNC recovery of 75% in the first trial, and 87% using the pre-dilution recommendations.
The manual method required approximately 3 hours (± 15 min) to obtain the final CBU product (buffy coat). The AXP® required approximately 1.5 hours (± 15 min) to obtain the final CBU product (buffy coat), while the Sepax® only required 1 hour (± 15 min).
For a large volume CBU, the manual methodology requires that the unit be split just prior to addition of cryoprotectant. AXP® and Sepax® require large volume units (>220mL) be split at the beginning processing.
Ease of use was compared with the manual method and found to be least desirable due to large amounts of manual manipulation during the red cell and plasma reduction process. The AXP® required manipulation in loading the processing bags/equipment prior to centrifugation process. The Sepax® required the least manipulation, once the processing set is loaded properly; the user starts the pre-programmed cell separation process, and returns when complete.
Conclusions: The conclusion of this study resulted in selection of the Sepax® processing system as primary method due to the ease of use and cell recovery. In addition to the cell recovery, this method provides greater efficiencies of staff time. The challenges of the method include cost and limited size of storage bag. Design enhancements of the freezing bag are being reviewed with the manufacturer.

Author Disclosure Block: **M. Fisk**, None.