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The Atreus System Versus Sterile Docked Red Blood Cell Leukoreduction: A Comparison of Two Processes

Heather Vaught, BS MT (ASCP)CM; Jennifer Brown, BS; Rebekah Greenough, BS; Dan Waxman, MD; Julie Cruz, MD
Indiana Blood Center, Indianapolis, IN

Background: Space and staff time are at a premium in our blood center, which collects 142,000 units of whole blood annually. Applying lean principles is of particular interest in our component manufacturing. The Atreus system, manufactured by Gambro BCT, is a new (not FDA approved) device that automates the production of blood products using single-piece flow manufacturing techniques. We compared the work flow and space requirements of our current manual component process with the proposed Atreus system.

Methods: A components manager and two senior component technicians participated in an Atreus system simulation lab. The work cell evaluated included one sterile connection device, three Atreus systems, a leukocyte reduction pole, and a segmentation station. A single whole blood collection bag was sterile-docked to a processing set containing a red blood cell (RBC) filter yielding a leukoreduced (LR) RBC, LR plasma and a leukocyte byproduct. The process was compared with our current practice in terms of space requirements and labor.

Step	Current Process	Atreus Process
1	Centrifuge WB units to manufacture RBC product	Sterile connect WB unit to Atreus kit
2	Store RBC in refrigerator	Use Atreus device to manufacture RBC product
3	Sterile connect filter to RBC	Prime filter with AS-3 solution
4	Allow RBC to drain in refrigerator	Invert RBC and filter RBCs
5	Perform computer modification	Detach filter from RBC and make segments
6	Return RBC to refrigerator	Store RBC in refrigerator pending completion of testing
7	Detach filter from RBC and make segments	
8	Store RBC in refrigerator pending completion of testing	

Results: The Atreus process eliminates steps 2, 4 and 6 from our current process by eliminating the intermediate product. The current process is labor intensive and requires significant product shuffling in and out of a walk in refrigerator. Our component lab currently devotes 1258.1 square feet to triaging, centrifuging, expressing, creating and leukoreducing whole blood/RBC units, including 154 square feet occupied by the walk in refrigerator. With an Atreus footprint of 4.9 square feet, using 10 devices, 462.55 square feet of space could be repurposed.

Conclusions: If approved, the Gambro BCT Atreus system may provide lean manufacturing benefits to our components operation. Repurposing of valuable space by a 37% reduction in required floorspace is highly desirable. In addition, creating better work flow through an integrated process that is less manual and labor-intensive allows reassignment of staff to other productive tasks.

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