Tiny Bubbles Big Troubles: One Center's Solution to Eliminating Air Bubbles in the Return Line in Patients Weighing Less Than 16kg

Suzan Stephens RN, BSN, CNN, Mary Sanders RN, BSN, CPN, Brittany McClendon RN, BSN, CNN, Ashley Tiller, RN, BSN, CPN, Kelsey Lloyd, RN, BSN, Samantha Haimbaugh RN, BSN, CPN, Eileen Schwartz RN, BSN, Joi Bowen RN, BSN, CPEN, CPM, Louise Helander M.B.B.S. FASCP, Tuan Le MD, Chelsey Hayes MD, and Kyle Annen DO



BACKGROUND

- Air bubbles from outgassing coalesced in the blood warmer tubing forming large air bubbles
- Air bubbles were found in 14 patients weighing less than 16 kg undergoing apheresis procedures
- Air bubble formed downstream from Optia's return line air detector
- Diligent operators discovered air bubbles prior to reaching the patient





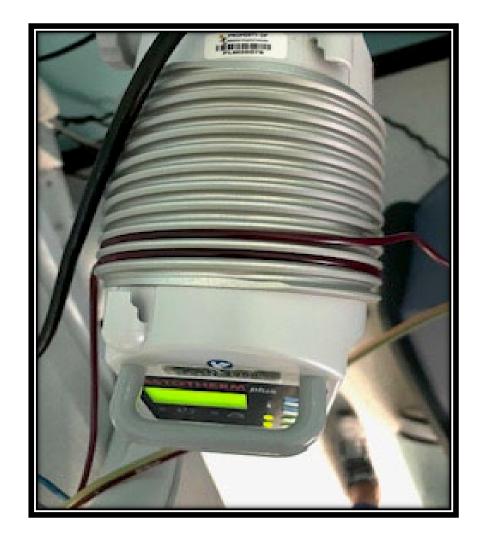
Procedure	Red Cell Prime	Albumin Prime
CMNC	11	
TPE	2	
RCE		1

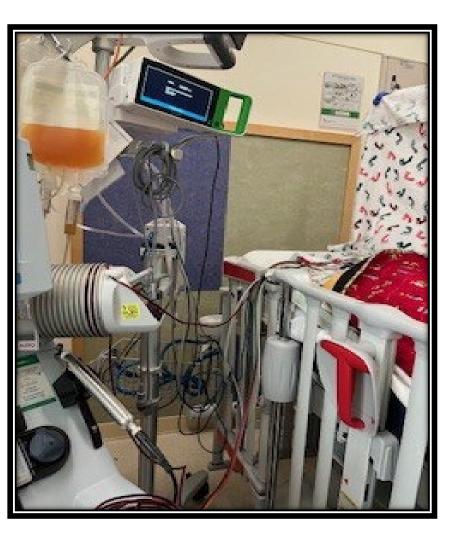
METHODS

- Retrospective Quality and Safety Reporting System reports reviewed from June 2023-June 2024
- Children's Hospital Apheresis Center consulted with Terumo and other pediatric apheresis centers to develop an action plan

RESULTS

- In 11 procedures, air was manually removed prior to reaching the patient
- 3 procedures were aborted to prevent air from reaching patient
- All connections were securely tightened, the luer connection from the return line to the blood warmer tubing was not higher than 20 inches above the return access
- Corrective actions
 - Warm RBC unit used to prime circuit to room temperature by placing unit in ambient air for 1 hour
 - Blood prime rate 25 mL/min
 - Wrap blood warmer tubing around warmer 2-3 times
 - Place blood warmer parallel to the patient
 - Transitioned to horizontal SpectraTHERM blood warmer 04/2024





IMPLICATIONS

- Large coalesced air bubbles present a life-threatening situation during apheresis procedures
- Currently, there are no safety alarms to alert the operator of air in the blood warmer tubing
- Corrective measures were necessary for patient safety

CONCLUSIONS

- Since implementing corrective measures, there have been no reports of large coalesced air bubbles in the blood warmer tubing
- Operators continue to vigilantly monitor blood warmer tubing for coalesced air
- The addition of an air detector monitor on the blood warmer tubing would be a beneficial safety device