Abstract:

**Background:** Extra-Corporeal Membrane Oxygenation (ECMO) has become a powerful tool in the race to reverse failure to rescue events. Rapid implementation set the stage for the advent of the 30-days wet-priming storage as a standard practice. Recent alerts regarding Methylene Blue (MB) unidirectional leach from patient’s circulation through the oxygenator Thermoplastic Polyurethane (TPU) heat-exchanger membrane into the Heater/Cooler (H/C) water-bath led us to believe that despite reassurances, the reverse process might be possible. To that effect we performed a pilot in-vitro experiment.

**Method:** We tested three adult ECMO sets (Quadrox D Oxygenator, Getinge, Doral, FL, USA) probing for the transfer of MB between the water-bath of a Sarns Dual Heater Cooler (Terumo Corporation, Ann Arbor, MI, USA) and the circuit stored wet-primed for 30 days. In each test, 1400mg of reconstituted MB (HiMedia, Mumbai, India) were added to the 7.5 liters of water in the H/C, circulated for 6 hours upon which the hoses were disconnected and the setup was stored for 30 days. The priming was tested for MB transfer at day 0-9-13-30 by means of Optical Density (OD) at 665 nm and 26.5°C.

**Results:** Transference of Methylene Blue from the heater cooler water-bath into the ECMO circuit could be detected as early as day 13 after setup, achieving statistical significance by day 30 (OD 0.025 p<0.001).

**Conclusions:** The complete separation of water interfaces between the patient’s circuit and the H/C water-bath may prove to be more dogma than fact when certain chemical substances are used in conjunction with TPU membrane oxygenators. Whether the transfer of substances is due to chemical processes or molecular weight needs further evaluation. Meanwhile, the use of chemical for the cleaning of the H/C should be mindful of potential noxious effects.