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Removal of Large-Middle Molecules in Dialyzers Reused in Thailand, the Philippines, and Vietnam

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Objectives : In developing countries, dialyzers are often washed, disinfected, and reused to reduce costs; however, reprocessing procedures vary among facilities and are not standardized. Although small-solute removal is reportedly maintained after reuse, evidence regarding the removal of medium- and large-middle molecules remains limited. This study evaluated the decline in the removal performance of large-middle molecules in dialyzers reused in Thailand, the Philippines, and Vietnam.
Methods : The dialyzers used were ELISO 210HR (Thailand), ELISO 190HR (Philippines), and ELISO 15H (Vietnam), all polyethersulfone (PES) membranes manufactured by NIPRO Corporation. Both first-use dialyzers and dialyzers reused five times were examined. Prior to the circulation experiment, blood-side filling volume (total cell volume, TCV) and pure water permeability (Lp) were measured. β-lactoglobulin (β-LG; approximately 36 kDa in its dimer form) was added to porcine blood adjusted to a hematocrit of 30 ± 1% and total protein of 6.5 ± 0.1 g/dL, and a 1-hour hemofiltration experiment was conducted. The circulation conditions were a blood flow rate of 250 mL/min and a filtration flow rate of 42 mL/min. Blood samples were collected at the end of the experiment. β-LG concentrations were measured by ELISA, and sieving coefficients were calculated.
Results : TCV showed no significant difference between first-use dialyzers and dialyzers reused five times in any country. In contrast, Lp significantly decreased after reuse in all countries. In Vietnam, the sieving coefficient of β-LG also decreased significantly, indicating reduced removal of large-middle molecules. These findings suggest hollow-fiber occlusion and pore narrowing due to incomplete removal of thrombi and proteins during reuse. Variability in Thailand and the Philippines may reflect differences in reprocessing procedures.
Conclusions : Dialyzers reused five times may exhibit reduced removal of large-middle molecules.