Falsely elevated cyclosporin and tacrolimus concentrations over prolonged periods of time due to reversible adsorption to central venous catheters.

Abstract:
Falsely elevated concentrations of immunosuppressants can be caused by reversible adsorption to central venous catheter (CVC) systems. If undetected, this may lead to dose reduction resulting in underdosage which may even entail graft-versus-host disease or organ rejection. We analyzed the adsorption and release for cyclosporine A (CsA) and tacrolimus (Tac) in vitro and in vivo. Four types of CVCs were examined in vitro: two made from polyurethane (PU), one from silicone and one from PU with an incorporated silver ion-based antimicrobial agent. All 26 CVCs analyzed in vitro showed significant reversible adsorption of CsA (n=13; p=0.001) and Tac (n=13; p=0.001, Wilcoxon signed rank test). Immediately after infusing the drugs, the mean concentrations of 6420ng/mL of CsA and 250ng/mL of Tac were measured. Flushing with NaCl lowered the drug release. Besides, blood samples of fifteen patients were taken simultaneously from all lumina of the CVC and via venipuncture. The samples from contaminated lumina showed the mean elevations by a factor of 11 for CsA (n=12) and 89 for Tac (n=3). Blood sampling for immunosuppressant monitoring should thus never be performed from lumina previously used for infusing the drug even after prolonged periods of time and extensive rinsing.