PREDICTING DRUG REMOVAL BY DIALYSIS USING AN *IN VITRO* SYSTEM.

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Technical advances in the design of dialysis systems, such as high-flux dialysis have increased variability in drug disposition. The purpose of this study was to use an *in-vitro* dialysis system to determine clearance of select drugs used in patients with kidney disease under varying dialysis conditions. Dialysis clearance (CL_D) was determined for vancomycin (V) and gentamicin (G), agents of relatively large and small size, and for drugs more highly protein bound, carbamazepine (C) and phenytoin (P). The agents were added to a phosphate buffer solution (pH ≅ 7.4) with and without the addition of bovine albumin (Alb - concentration 2 g/L) to mimic *in-vivo* conditions. Creatinine (Cr) and urea (U) were added as marker compounds. Polyvinyl chloride tubing connected the drug reservoir to the selected dialyzer to provide a closed-loop, fixed-volume system. Three dialyzers were tested [polysynthane (Baxter PSN 210), polysulfone (Fresenius F80), polyamide blend (Gambro Polyflux 170)]. *In-vitro* dialysis was performed for 1 h at a dialysate flow rate (DFR) of 500 mL/min, reservoir flow rates (RFRs) of 200 and 400 mL/min, and the minimal ultrafiltration rate (10 mL/h). CL_D was determined using monoexponential regression. CL_D (mL/min) is reported below at a RFR of 400 mL/min with and without Alb (data at RFR 200 not shown).

	Polysynthane		Polysulfone		Polyamide	
Drug	- Alb	+ Alb	- Alb	+ Alb	- Alb	+ Alb
G	130	110	175	180	215	205
V	60	55	160	140	190	160
C	110	95	155	155	190	115
P	220	180	175	165	260	190

An increase in CL_D with increased RFR was observed for all agents and dialyzers. CL_D was greater for the high-flux dialyzers (polysulfone and polyamide) compared to the polysynthane dialyzer. The addition of Alb resulted in decreased CL_D more consistently for drugs with a higher degree of protein binding (C and P). CL_D for the marker compounds U and Cr was similar to that reported for each dialyzer supporting the use of this *in vitro* system to assess CL_D and determine dosing regimens for dialysis patients.