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The effect of continuous hemodiafiltration on the pharmacokinetics of maintenance doses of teicoplanin

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Objectives : Continuous hemodiafiltration (CHDF) may alter teicoplanin pharmacokinetics and increase the risk of incorrect dosing. In a prospective observational study, we assessed the effect of CHDF on the pharmacokinetics of maintenance teicoplanin therapy.

Methods : We collected blood, urine and dialysate samples to measure teicoplanin levels. We calculated CHDF clearance (CLCHDF), total clearance (CLTOTAL), and volume of distribution (Vd) by simplex-linear modelling. We assessed the influence of CHDF intensity on teicoplanin pharmacokinetics.

Results : We studied 8 patients who provided 10 samples. Creatinine clearance was 3.4 ± 5.1 ml/min/1.73m2 and three patients were anuria. The intensity of CHDF was 32.1 ± 7.0 mL/kg/h. Vd was 1.6 ± 0.7 L/Kg, T1/2 was 100.1 ± 42.7 hours, CLTOTAL of teicoplanin was 11.9 ± 5.4 mL/min, and clearance by CHDF was 5.8 ± 4.2 mL/min. Contribution of CLCHDF to the CLTOTAL was 51.2 ± 23.6%. CLCHDF of individual teicoplanin varied widely, and large intra-occasion differences were also observed. Intensity of CLCHDF did not influence overall CLTOTAL, Vd, or half-life. The proportion of CLTOTAL due to CLCHDF varied widely and was high in some cases.

Conclusions : In patients receiving CHDF, there is great variability in teicoplanin pharmacokinetics, which complicates an empiric approach to dosing and suggests the need for therapeutic drug monitoring. More research is required to investigate the apparent relation between teicoplanin clearance and CHDF.

Keywords : Teicoplanin; Hemodiafiltration; Pharmacokinetics; Drug Monitoring