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## Pharmacokinetics of vancomycin during continuous renal replacement therapy and extended daily dialysis in critically ill septic patients with Acute kidney injury- Own experience

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**Background:** Acute kidney injury (AKI) is a common complication in patients with sepsis. Dosing of antibacterial agents in critically ill septic patients is complicated by altered pharmacokinetics due to both AKI and critical illness. Vancomycin (VAN) is a widely used antibiotic drug that has an important role in the treatment of infections in critical care units. The pharmacokinetics of VAN in critically ill patients with AKI on high-volume continuous venovenous hemofiltration (CVVH) at a filtration rate 45 mL/kg b.w./hour and on low-flux and high-flux extended daily dialysis (EDD) is substantially different from other patients.

**Methods:** 17 septic patients with AKI treated with VAN on CVVH and 9 patients on EDD (5 low-flux and 4 high-flux) were included. In the CVVH group, patients received the first dose of 1.0 g intravenously followed by 1.0 g/12 hours if not adjusted. The VAN maintenance dose was optimized to achieve AUC<sub>0-24</sub>/MIC  $\geq 400$  (C<sub>min</sub> >10 mg/L). In the EDD group was VAN administered over the last hour of dialysis. Blood samples were obtained before VAN administrations, immediately after infusion, 1 hour and 2 hours after administration and before dialysis. Maintenance doses were adjusted according to drug serum concentrations.

**Results:** In the CVVH group: median VAN Cl<sub>tot</sub> was 0.89 and 0.55 mL/min/kg on the first and second day of study. CICRRT accounted for about 50 to 60% of VAN Cl<sub>tot</sub> found in a healthy population (0.97 mL/min/kg). VAN serum concentrations after the first dose were below the required target of 10 mg/L as early as 6 hours in 10 patients. AUC<sub>0-24</sub>/MIC  $\geq 400$  ratio was achieved in 67% of patients in the first day. In the EDD group, median percentage of VAN removal by low-flux membrane dialysis was 17% (range 8-38%) and by high-flux membrane dialysis 31% (range 13-43%). VAN removal by high-flux membrane EDD was about two-fold higher than dialysis with low-flux membrane.

**Conclusions:** CVVH at a filtration rate of 45 mL/kg b.w./hour leads to rapid and high removal of VAN. Due to change in patient's clinical status it was impossible to predict a fixed dosage regimen. We recommend administration of unreduced loading dose and blood sampling as early as 6 hours after first VAN dose and maintenance dose should be based on drug levels monitoring. Both high-flux and low-flux membrane EDD remove considerable amounts of VAN in critically ill patients with AKI and therapeutic drug monitoring is substantial for optimalization of dosage adjustment.

### Biography

Nadezda Petejova, MD, PhD, graduated from the Medical Faculty of the Safarik University in Kosice (Slovakia). After studies she started her professional carrier at the internal department of the City hospital in Svidnik (Slovakia) from 1998 to 1999, in 1999-2003 at internal department of City hospital in Rimavska Sobota (Slovakia) and from 5/2003 to present she has been working at internal department of University hospital of Ostrava (Czech Republic). She received the first-degree attestation in internal medicine in 2001, the second-degree attestation in 2005 and attestation in nephrology in 2009. Her research interests span various aspects of Internal and Critical care medicine but center mainly in critical care nephrology including renal replacement therapy and blood purification in critically ill patients with acute kidney injury. She is regularly publishing in impacted journals and presenting her scientific results at leading critical care and nephrology congress.

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