

Assessment of Adherence to Diuretics and β -blockers by Serum Drug Monitoring in Comparison to Urine Analysis

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Abstract

Purpose: Toxicological screenings for identifying antihypertensive drugs proved to be a useful tool for assessing adherence. However, misinterpretation may occur in case of highly metabolised drugs with low renal excretion, as well as for drugs with a prolonged detectability. The aim of the present study was to compare a recently developed therapeutic drug monitoring (TDM) method based on serum concentrations to an urine drug detection method for assessing adherence in outpatients. **Materials and methods:** Corresponding urine and blood samples were obtained at the same time from 26 outpatients without supervised medication. Urine and serum analyses were performed using established high-performance liquid chromatography-tandem mass spectrometry (LC-MS/MS) methodologies. Adherence was assumed if drugs were detectable in urine or if serum concentrations were above individually calculated lower dose-related concentrations (DRC) or literature-based therapeutic reference ranges (TRR) used as cut-off, respectively. **Results:** The identification of analytes in urine as well as the quantitative serum assay were performed for atenolol ($n = 6$ patients), bisoprolol ($n = 8$), nebivolol ($n = 6$), canrenone ($n = 6$, metabolite of spironolactone), hydrochlorothiazide ($n = 12$) and furosemide ($n = 2$). On the basis of drug detectability in urine, adherence was assumed in 88% of prescriptions. In 81% (DRC) and 50% (TRR) of the serum analyses the cut-off value was exceeded, which confirms patients' adherence in a lower number. Differences in adherence rates were found in five patients, mainly for β -blockers. **Conclusion:** This study suggests that assessment of adherence can be performed more precisely on the basis of serum drug concentrations with individually calculated lower DRC than by using the TRR or qualitative urinalysis.

Keywords: LC-MS/MS; adherence assessment; antihypertensive therapy; dose-related concentration; toxicological screenings.