ENZYMATIC HYDROLYSIS IMPROVES THE SENSITIVITY OF EMIT SCREENING FOR URINARY BENZODIAZEPINES

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We evaluated the relevance of hydrolyzing urine samples prior to screening with the EMIT d.a.u. Benzodiazepine assay. A total of 530 authentic patient urine samples were collected from volunteers with a high prevalence of benzodiazepine (mis-)use. All samples were screened with EMIT both before (EMIT) and after (EMIT-H) enzymatic hydrolysis. Regardless of the screening results all samples were subsequently analyzed by a recently developed GC-MS procedure, used as a reference method. The sensitivity increased from 67% (95% CI: 60 - 74%) for the EMIT test to 87% (95% CI: 81 - 92%) for the EMIT-H test, while the specificity decreased from 100% (95% CI: 99 - 100%) for the EMIT test to 96% (95% CI: 93 - 98%) for the EMIT-H test. The largest increase in EMIT-response was observed for samples containing flurazepam or di-K-clorazepate, but especially the sensitivity for lormetazepam and bromazepam was improved after pretreatment of the samples with β-glucuronidase. To study the effect of changing the cutoff value on sensitivity and specificity, the receiver-operating characteristic (ROC) curves for the two EMIT tests were derived and compared. From the ROC curves it was clear that EMIT-H outperforms EMIT as for a fixed specificity, the corresponding sensitivity was systematically higher for the EMIT-H test. We therefore recommend that enzymatic hydrolysis should be routinely included in the EMIT screening procedure for urinary benzodiazepines because the obtained gain in sensitivity is substantially larger than the concomitant loss in specificity.

Keywords: benzodiazepines – EMIT – enzymatic hydrolysis - urine