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Medicolegal Aspects of Blood-Urine Toluene and Urinary Ortho-Cresol Concentrations in
Toluene Exposure

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Abstract: Toluene is a widely used solvent in different industrial areas and has a depressant effect on the central nervous system. In medicolegal cases, for the possible influence of toluene on actions or conditions prior to death, a reliable indicator of exposure must be precisely investigated. We developed an appropriate method for toluene analysis and investigate the blood-urine toluene levels and urinary ortho-cresol levels in toluene-exposed workers. Blood and urine toluene levels from 50 male subjects were detected by Gas Chromatography-FID (GC-FID) using the head-space method, and urinary o-cresol levels, a metabolite of toluene, were analyzed by GC. The significance of difference of o-cresol/creatinine levels was evaluated by the nonparametric statistics Kruskal-Wallis One Way Anova, and correlation and regression statistics were determined by Pearson Correlation of bivariant analysis. The toluene concentrations in blood ranged from 0.07 to 2.12 mg/g. Urinary o-cresol levels were not correlated significantly with blood or urine toluene levels. There was no significant difference for ortho-cresol/creatinine levels between the control and worker groups. It is concluded that for medicolegal purposes, urine toluene and urinary o-cresol levels are not reliable markers, and direct toluene analysis in blood must be preferred in toluene exposure.

Key Words: forensic toxicology, toluene, toluene exposure, toluene abuse, ortho-cresol

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