K4 Validity of the Cozart Rapiscan Test for Drug of Abuse Screening in Hair by GC/MS Confirmation

Roberto Gagliano-Candela, PhD, Lucia Aventaggiato, Anna Pia Colucci, PhD, and Giuseppe Strisciullo, University of Bari, Dipartimento Medicine Interna Medicina Pubblica, Policlinico, Piazza G. Cesare n.11, Bari, 70124, Italy*

After attending this presentation, attendees will understand the analysis of opiates, cocaine and cannabinoids in hair by Cozart Rapiscan oral fluid Test® and GC/MS confirmation.

This presentation will impact the forensic community and/or humanity by providing information on the testing of drugs of abuse in hair.

Goal: This project was carried out to evaluate the performance characteristic of the immunoassay Cozart Rapiscan oral fluid Test® for drugs of abuse screening in hair extracts.

Methods: Hair samples (70) collected from dope addicts and druginvolved deaths in 2004 were selected from routine analysis samples at the Forensic Toxicology Laboratory, Bari University. The method involves decontamination in 1% sodium dodecyl sulfate, distilled water, and methanol, pulverization in a ball mill, overnight extraction in methanol at 60°C. The methanol extract was then blown until dry under nitrogen and reconstituted in 140 mcL of Cozart buffer for immunoassay analysis. Both positive and negative samples were confirmed by gas chromatographymass spectrometry (GC/MS/EI) operating in selected ion monitoring mode. Before extraction, deuterated internal standards were added to hair specimens. For opiates and cocaine metabolite analysis, BSTFA/TMCS 1% silylation was used. The 72 positive results were confirmed by GC-MS analysis.

Sensitivity and specificity: The number of true positives, false negatives, false positives and true negatives was determined by comparison of the Cozart results to GC-MS as the reference method. Sensitivity, the truepositive rate, was calculated from the totality of true positives and false negatives as TP/(TP + FN). Specificity was calculated as TN/(TN + FP).

Results: The confirmation in GC/MS determined 39 true positives for opiates, 18 for cocaine, and 15 for delta-9-THC versus 72 total positive results. True negatives were 11 for opiates, 32 for cocaine and 35 for delta9-THC. False negatives were 1 for cocaine and 3 for delta-9-THC. No false positive results were obtained.

The Cozart Test for opiates in hair, using a cut-off of 0.2 ng/mg with a 50-mg hair sample, had a sensitivity of 100% and specificity of 100%. The Rapiscan Test for cocaine in hair, using a cut-off of 0.5 ng/mg with a 50-mg hair sample, had a sensitivity of 94.7% and specificity of 100%. The Cozart Test for delta-9-THC in hair, using a cut-off of 0.5 ng/mg with a 50mg hair sample, had a sensitivity of 83.3% and specificity of 100%.

Conclusions: The Cozart Rapiscan oral fluid Test® revealed good sensitivity and maximum specificity, proving to be a valid method of screening. To ensure the legal validity, confirmation analysis with chromatographic techniques (GC/MS or HPLC/MS) is required.

Hair Analysis, Drug Screening Analysis, Cozart Rapiscan

 ** Presenting Author*