K58 Sweat as Alternative Matrix to Monitor Buprenorphine Compliance, Opioids, Cocaine, and Tobacco Use in Opioid- Dependent Pregnant Women

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The goal of this presentation is to describe Buprenorphine (BUP), opioids, cocaine, and tobacco prevalence and concentrations in sweat patches from opioid-dependent pregnant women, and to compare their detection in sweat patches, Oral Fluid (OF), and urine.

This presentation will impact the forensic science community by showing how sweat is a good alternative matrix for monitoring drug use in clinical settings.

Introduction: Sweat is an alternative matrix for detecting drug consumption over about seven days, depending upon the time the patch is worn. Sample collection is easy, gender-neutral, and less invasive than for urine collection. However, limited sweat disposition data are available, especially for BUP and for opioid-dependent women.

Objective: To describe BUP, opioids, cocaine, and tobacco prevalence and concentrations in sweat patches from opioid-dependent pregnant women, and to compare detection in sweat patches, OF, and urine specimens over the same period.

Methods: Sweat patches were collected once weekly (n = 121), and OF and urine twice or three times weekly (n = 283) from seven opioid-dependent pregnant women during the 2nd and, primarily, the 3rd trimester, and up to one month postpartum. Sweat was collected with PharmCheck™ sweat patches worn for 6 ± 2.3 days, and OF with the Salivette® collection device. Sweat and OF specimens were analyzed by Liquid Chromatography with Tandem Mass Spectrometry (LC/MS/MS) for BUP, norbuprenorphine (NBUP), methadone, 2-ethylidene-1,5-dimethyl-3-diphenylpyrrolidine (EDDP), cocaine, benzoylecgonine (BE), ecgonine methyl ester (EME), morphine, codeine, 6-acetylmorphine (6AM), heroin, 6-acetylcodeine (6AC), cotinine, and trans-3′-hydroxycotinine (OH-cotinine) (LOQ 1-5ng/patch, 0.5-1ng/mL, respectively). Urine specimens were assayed for cocaine and opiates by immunoassay (cutoff 300ng/mL). Women received 8 – 24mg BUP daily.

Results: BUP was detected in 88% of sweat patch specimens (median 2ng/patch; range 1 – 15.3ng/patch) and NBUP in 37.2% (range 1 – 24.7ng/patch). BUP alone was dectected in 51.2%, along with NBUP in 37.2%. Cotinine was detected in 89.3% (median 159ng/patch; range 8.9 – 1,390ng/patch) and OH-cotinine in 86% (median 52.5ng/patch; range 3.1 – 377ng/patch). Most OF specimens contained both analytes (86%). Methadone from non-prescribed sources was detected in 47.9% specimens (range 1 – 661ng/patch); and EDDP in 14.9% (range 1 – 18.4ng/patch). In 24% of specimens, 6AM was identified (range 1.2 – 180ng/patch), morphine in 23.1% (range 2.3 – 51.3ng/patch), heroin in 14% (range 1.1 – 526 ng/patch), codeine in 9.1% (range 4.5 – 25.1ng/patch), and 6AC in 8.3% (range 1.4 – 17.8ng/patch). Morphine and 6AM were detected alone (5% and 3.3%, respectively), together (5.8%), or in combination with the other analytes (6.6%). For identifying illicit cocaine exposure, cocaine was identified in 88.4% of specimens (median 14ng/patch; range 1 – 5,660ng/patch), BE in 47.9% (range 1.4 – 850ng/patch), and EME in 18.2% (range 8.7 – 567ng/patch). Cocaine was detected alone in 39.7% of cases, cocaine and BE in 30.6%, and the three analytes in 17.4%. Comparing sweat patches and urine, there was an 85.1% concordance for opioids, while for cocaine, only 35.9% agreement was achieved. Sweat patches and OF concordance was 93% for tobacco, 88.6% for BUP, 81.6% for opioids, 61.5% for methadone, and 56.1% for cocaine.

Conclusions: These results offer new information about drug and metabolite concentrations and prevalence in sweat from opioid-dependent pregnant women. Sweat is a good alternative matrix for monitoring drug use in clinical settings.

Sweat, Pregnant Women, Drug Testing

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