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M. Donike
H. Geyer
A. Gotzmann
U. Mareck-Engelke
S. Rauth
(Editors)

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D. DEBOER, S.N. BENSINK, A.R. BORGGREVE, R.D. VANOOIJEN, R.A.A. MAES:
III – GC/MS/MS Analysis of 19-Norsteroids during Pregnancy
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D. DeBoer, S.N. Bensink, A.R. Borggreve, R.D. VanOoijen and R.A.A. Maes.

Profiling 19-Norsteroids

III - GC/MS/MS Analysis of 19-Norsteroids during Pregnancy

Netherlands Institute for Drugs and Doping Research, Utrecht, Netherlands

The group of 19-norsteroids analyzed in doping control is focussed on 19-norandrogens. The main norandrogen is 19-nortestosterone. It has been misused in sports, frequently. The glucuronide of 19-norandrosterone is its major urinary metabolite [1]. After the administration of certain oral contraceptives this metabolite can also be detected in urine specimens [2]. By identifying the major metabolites of the contraceptives, a distinction can be made between the application of 19-nortestosterone or oral contraceptives. Because 19-nortestosterone, and also oral contraceptives, are considered to be synthetic steroids and to be of exogenous origin only, the screening for their metabolites is a qualitative analytical procedure. A urine specimen is either positive or negative.

However, it has been described, that 19-nortestosterone may also be of endogenous origin. It has been detected in plasma of pregnant women [3], follicular fluids [4] and testes [5]. Although the concentrations reported are relatively low, these facts cannot be ignored. The possible presence of 19-norandrosterone of endogenous origin in urine specimens should be investigated. This study describes the gas chromatographic/ single mass spectrometric (GC/MS) and /tandem mass spectrometric (GC/MS/MS) analysis of 19-norandrosterone in urine of pregnant women. GC/MS/MS was selected as a detection technique, because of its sensitivity and selectivity [6].

The steroids were isolated according screening procedure IV. Traces of the trimethylsilyl and trimethylsilyl-enoltrimethylsilyl ester derivatives of 19-norandrosterone in urine specimens were observed using the Selected Ion Monitoring (SIM) mode of GC/MS. During pregnancy the signal of the trace increased. For the tandem mass spectrometric analysis other derivatives were reported to be characteristic [7,8]. Therefore, the heptafluorobutyryl and pentafluorobenzoyloxime-heptafluorobutyryl ester derivatives of 19-norandrosterone were selected for GC/MS/MS. Under the conditions studied the Selected Reaction Monitoring (SRM) mode showed no improvement in sensitivity compared to the SIM mode of GC/MS. It is concluded that, although several data indicate of the presence of 19-norandrosterone, this metabolite has not been identified, yet. Definite identification requires a more specific isolation.

For no. I and II see reference 7 and 8, respectively.

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