

Introduction

A 17-year old young woman was under the regular care of a psychiatrist for school dropout and borderline personality disorder. She confessed the occasional consumption of amphetamines, cannabis, benzodiazepines (prescribed but also from her mother) and methylphenidate (from a friend). In order to perform an unbiased psychiatric evaluation, it was mandatory to know if the patient was under the influence of drugs during the consultation. In this context, a general unknown screening was performed.

Material and Methods

Blood

-Alcohol → **Alinity® (Abbott)**
Enzymatic method: Alcohol Dehydrogenase

-Medicines → **Liquid - Liquid Extraction**

HPLC-DAD (Waters)
Alliance® 2695 + PDA 2996
Column: Symmetry C8, 5 µm, 250 X 4.6 mm (Waters)
Mobile Phase A: 43.5 mM PO₄ buffer pH 3.8
Mobile Phase B: Acetonitrile
Gradient mode: 45 min runtime

UHPLC-TOF-MS (Sciex)
Eksigent® LC 100 XL + TripleTOF® 4600
Column: Kinetex 2.6 C18, 100 Å, 50 x 3.00 mm (Phenomenex)
Mobile Phase A: 10 mM NH₄ formate
Mobile Phase B: ACN/MeOH (50/50)
Gradient mode: 15.5 min runtime

Urine

- Screening for drugs of abuse → **Alinity® (Abbott)**
Immunoenzymatic method: Glucose-6-Phosphate Dehydrogenase

- Confirmation for drugs of abuse → **UPLC Acquity® + Quattro Premier® (Waters)**

Cannabis (Liquid-liquid extraction)
Column: BEH C18, 1.7 µm, 50 X 2.1 mm (Waters)
Mobile Phase A: 10 mM NH₄ bicarbonate pH10
Mobile Phase B: methanol
Gradient mode: 3 min runtime

Cocaine - Opiates - Amphetamines (SPE)
Column: HSS T3, 1.8 µm, 100 X 2.1 mm (Waters)
Mobile Phase A: 5 mM NH₄ formate pH3
Mobile Phase B: 0.1% formic acid in methanol
Gradient mode: 19 min runtime

-Screening for NPS: same method than medicines (UHPLC-TOF-MS)

Results & Discussion

Negative

Nordiazepam: 1,12 mg/L
Oxazepam: 0.028 mg/L

Negative

Negative

Negative

Cannabinoids analysis

- Immunoanalysis: negative
- LC-MS-MS (ESI +): THC-COOH = 56.0 ng/ml ? **BUT** Ion Ratio 345 > 299 / 345 > 327
⚠ Standard : 0.77 ≠ Sample : 2.59
- LC-MS-MS (ESI -): negative
- New psychoactive substances including synthetic cannabinoids receptor agonists: not found

The patient sample contains a substance, compared to THC-COOH:

- 1) structurally quite different : no cross reactivity in immunoanalysis
- 2) structurally quite similar : extracted by sample prep/same retention time and fragments by LC-MS-MS

Conclusion

This case illustrates the absolute necessity to calculate ion ratios to ensure the specificity of a mass spectrometric identification. A well trained staff attentive to this point will avoid misleading conclusion.