The discovery of more than one corpse on site generally raises the suspicion of an unnatural death. They are often caused by homicide, extended suicide or carbon monoxide intoxication. However, intoxications by consumed drugs or medicines with more than one dead person are rare. In the case presented two male adults were found dead and the cause and manner of death had to be clarified.

The two men were known as drug and alcohol consumers. They returned to the aunt's flat in a drunken and “stoned” condition. On the next morning they were found dead by the aunt, one lying over the other (see figure 1). Several packages of fentanyl patches that were prescribed the aunt (figure 2), were found nearby the bodies and the brother of one of the deceased reported on repeated sucking and chewing of fentanyl patches.

Besides fentanyl and norfentanyl in hair, methylenediphenate (50 pg/mg), loperamide (50 pg/mg), tramadol and O-desmethyltramadol could be detected in trace amounts in subject 1, methadone, cocaine, benzoylcgonine and cocarthyline could be detected in trace amounts in subject 2. These results pointed to a moderate abuse of drugs of both subjects [1]. The rather low level of fentanyl, norfentanyl and other opioids (lorperamide, tramadol, methadone) in the hair samples lead to the suggestion that both subjects had not developed a pronounced opioid tolerance.

By discovery of several corpses in one room, carbon monoxide must always be taken into consideration as cause of death. The level of carbon monoxide-haemoglobin in blood was low – 1% (referred to total haemoglobin) (subject 1) and 2% (subject 2) – particularly among smokers (urine tested positive for nicotine and cotinine in both subjects).

Urinal alcohol concentrations were 3.28 %b (%) (subject 1) and 1.87 %b (%) (subject 2). Thus at least subject 1 was in the elimination phase [2] and both subjects may have developed a significant alcohol tolerance.

In subject 2 no further drugs could be detected, subject 1 showed a current abuse/use of several drugs besides fentanyl. Additional findings in the femoral urine 1 showed as follows: 26 ng/ml methylenediphenate, 5.4 ng/ml THC, 0.8 ng/ml 11-OH-THC, 17 ng/ml THC-CO2H, loperamide below 1 ng/ml, and tetracepam below 10 ng/mL. Urine tested positive for ibuprofen and paracetamol.

Methods

**LC-MS/MS analysis**

Sample preparation for LC-MS/MS analysis was performed as follows:

1 ml serum (according to an alkaline liquid-liquid extraction (LLE):

+ ISTD: 10 ng D3_fentanyl/norfentanyl for quantitation of fentanyl/norfentanyl.
+ 20 ng D2_MDA for quantitation of methylenediphenate 50 ng D3_diazepam for quantitation of tetracepam
+ 100 ng D3_codeine for quantitation of lorperamide
+ 0.5 mL borate buffer (pH 9)
+ 1.5 mL chlorobutane
+ 2 min mixing, 10 min centrifugation at 4000 rpm, evaporation of organic phase with N2 at 40°C

Residue was resolved in 25 µL solvent A/B (80:20) (v/v).

approx. 25 mg hair

+ ISTD: 10 pg D3_fentanyl/norfentanyl for quantitation of fentanyl/norfentanyl
+ 100 ng D3_oxazepam for quantitation of methylenediphenate and loperamide
+ 2 mL methanol
+ 4 hours ultrasoundization, evaporation of organic phase with N2 at 40°C, resolved in 2 mL phosphate buffer (pH 6), SPE extraction, evaporation of SPE-extract with N2 at 40°C

Residue was resolved in 25 µL solvent A/B (50:50) (v/v).

**LC-MS/MS analysis (cont.)**

LC settings: QTrap 2000 triple-quadrupole linear ion trap mass spectrometer fitted with a TurboIonSpray Interface (AB Sciex, Darmstadt, Germany) and an Agilent 1100 Series HPLC system (G1312A Bin Pump, G1311A autosampler, G1379A degasser, Agilent, Santa Clara CA, USA; United States). Separation was performed on a polar-endcapped phenylpropyl reversed phase column (Synergy Polar-RP 50 mm x 2 mm, 4 µm) with an equivalent guard column (4 mm x 2 mm) (Phenomenex, Schäffhausen, Germany) and gradient elution using solvent A (0.1% formic acid (v/v) with 1 mM ammonium formate) and solvent B (acetonitrile: 0.1% formic acid 95:5 (v/v) with 1 mM ammonium formate) with the following 15 min gradient: 0-1 min: 20 % B; 1-10 min: 20-95 % B linear; 10-11 min: 95 % B; 11-12 min: 95-20 % B linear; 12-15 min: 20 % B. The total flow rate was set to 0.4 mL per minute. 20 µL of the extracted samples were injected.

**Alcohol analysis**

Blood and urine alcohol was detected by routine HS-GC-FID and ADH-procedure.

**GC/MS Screening**

Urine samples were analysed by two step direct liquid-liquid extraction and by acidic hydrolysis followed by basic liquid-liquid extraction and acetylation [5].

Analyses were performed on an 7890A gas chromatograph equipped with a 7683B series injector, and a 5975C inert XL series mass selective detector in split-less mode with an HP-5 MS-0.25µm capillary column (Agilent, Waldbronn, Germany). The MS was operated in the SCAN mode with electron impact ionisation.

**Quantitative GC/MS analysis of cannabinoids**

1 ml serum

+ ISTD: 5 ng D2 THC, 5 ng D2 11-OH-THC, 25 ng D2 THC-CO2H + 2 ml 0.1 M acetic acid
+ 2 min mixing, SPE extraction, evaporation of SPE-extract with N2 at 65°C

Residue is resolved in 25 µL MSTFA and 25 µL ethylacetate.

Analyses were performed on an 7890A gas chromatograph equipped with a 7683B series injector, and a 5975C inert XL series mass selective detector in split-less mode with an HP-5 MS-0.25µm capillary column (Agilent, Waldbronn, Germany). The MS was operated in the SIM mode with electron impact ionisation.

**References**


