
Poster

[P27-6] P27-6: Clinical toxicology (2)

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[P27-6-1] Acryloylfentanyl: identification in seized powder and a fatal forensic case

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Background

Powder in a capsule seized during a smuggling attempt in a forensic psychiatric department in Denmark was analysed and unambiguously identified as the new synthetic opioid acryloylfentanyl. Shortly after, in the same geographical region, a 28-year-old male was found dead. The police and a forensic physician performed a crime scene investigation. The decedent was a known drug user, and he and a friend had been snorting "fentanyl and benzo". Medico-legal autopsy was performed on the deceased and relevant samples were submitted for toxicological examination.

Methods

Identification of substances in the seized powder was based on (i) gas chromatography/mass spectrometry (GC-MS); (ii) liquid chromatography / triple quadrupole mass spectrometry (LC-MS/MS); (iii) ultra-performance liquid chromatography with high-resolution time-of-flight mass spectrometry (UPLC-HR-TOFMS); (iv) orbitrap mass spectrometry; (v) nuclear magnetic resonance spectroscopy (NMR); and (vi) infrared spectroscopy (IR). Post-mortem samples from the deceased were screened by UPLC-HR-TOFMS and quantified using LC-MS/MS.

Results

A new synthetic analogue, *N*-phenyl-*N*-[1-(2-phenethyl)piperidin-4-yl]prop-2-enamide, with the synonyms acryloylfentanyl and acrylfentanyl, was identified. From the finding of a precursor for synthesis, *N*-phenyl-1-(2-phenethyl)piperidin-4-amine, and the identification of an impurity (triethylamine hydrochloride) of approximately 12%, a method of synthesis was proposed.

Most important toxicological post mortem results were: acryloylfentanyl and 3-hydroxyfenazepam, detected in a nasal swap sample; acryloylfentanyl (0.001 mg/kg), buprenorphine (0.002 mg/kg), diazepam (0.15 mg/kg) and 7-aminoclonazepam (0.19 mg/kg), quantified in femoral blood. Based on these findings, the cause of death was suspected to be an overdose of acryloylfentanyl in combination with 3-hydroxyfenazepam, buprenorphine, clonazepam and diazepam use and aspiration of gastric content.

Conclusions

A new synthetic analogue of fentanyl known as acryloylfentanyl was identified in a seized powder. Soon after, it was also identified in a forensic pathology case, where it was suspected to have caused a fatal overdose in combination with aspiration of gastric content. This is an example of a rapidly transforming drug market, where new synthetic opioids emerge at a growing rate and cause harm. New synthetic opioids of the fentanyl class –such as acryloylfentanyl and acetylfentanyl - are potent drugs and pose serious challenges for public

health due to a high risk of fatal intoxication.