K21 Unusual Routes for Substance Abuse: Fatal Inhalation of a Fentanyl Patch

Federico Manetti, MD, Rome, ITALY; Martina Padovano, MD, Sapienza University of Rome, Rome 00161, ITALY; Matteo Scopetti, MD, Sapienza University of Rome, Rome 00161, ITALY; Maria Chiara David, PhD, Tor Vergata University of Rome, Rome 00100, ITALY; Alessandro Santurro, MD, Sapienza University of Rome, Rome 00161, ITALY; Antonio Grande, MD, PhD, Forensic Science Police Service, Rome 00173, ITALY*

Learning Overview: After attending this presentation, attendees will have the opportunity to appreciate the characteristics of intoxication that occurred following an unusual use of a fentanyl patch.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by presenting a unique case of a fatal inhalation of a fentanyl patch investigated by autopsy and toxicological analysis.

Fentanyl usually has been used by transdermal patches to treat cancer and non-cancer-related chronic pain. However, inappropriate or illegal application may cause fatal poisoning. Presented here is the case of a South American man, 29 years old, who was found dead on the road.

Fentanyl is a synthetic Mu-opioid receptor agonist, approximately 100 times more potent than morphine per dose. It has been widely used for anesthesia and to manage intense chronic pain. Fentanyl has been available for human application, both in the oral transmucosal and in the parenteral (such as transdermal) form. Recently, fentanyl transdermal patches with a matrix design (drug-in-adhesive) became more commonly used than those with a reservoir design. In Italy, fentanyl transdermal matrix patches are prescribed to alleviate cancer or non-cancer-related chronic pain, which is not alleviated by other analgesics, or when the oral administration route cannot be used.

A 29-year-old man was found dead on the street after attending a party with friends in which recreational drug use had taken place. An autopsy was performed approximately 48h after his death. On external examination, his body was 165cm in height and 80.0kg in weight. The body mass index was 29.4kg/m2. Postmortem lividity was highly expressed on his back. On the face and clothes were clear residues of vomit (not observed on the scene). There was minimal blood staining in the oral cavity. Internal examination revealed a dusky red color of the blood and marked multi-visceral congestion. At the opening of the respiratory tract, the protective film of a fentanyl transdermal patch was found inside the right main bronchus. The stomach contained 50mL of undifferentiated food material. No injuries were observed that could be directly related to death. Organ examination revealed non-specific signs of asphyxia; no other pathological findings likely to cause death in the remaining organs where observed.

The femoral blood alcohol concentration determined by Headspace/Gas Chromatography (HS/GC) was 0.22g/L. The immunochemical drug screening kit, Multiline Drug Test® for urine samples, was positive for cocaine, morphine, methadone, cannabinoids (THC), and benzodiazepines. A general screen for non-volatile organic compounds was performed using the GC/MS and the results revealed the presence of methadone, 2-Ethylidine-1,5-Dimethyl-3,3-Diphenylpyrrolidine (EDDP), morphine, 6-Monoacetylmorphine (6-MAM), cocaine, Benzoylecgonine (BEG), Ecgonine Methyl-Ester (EME), fentanyl, and alprazolam.

The postmortem signs and evidence gathered made it possible to identify the cause of death in a fentanyl intoxication following the unusual intake of the drug through chewing a patch. The state of intoxication induced a central depression underlying the respiratory failure. On the basis of the findings highlighted, it was also possible to demonstrate that respiratory failure was favored by the accidental inhalation of the protective film that caused a partial mechanical obstruction of the right main bronchus.

Cases of fatal intoxication from misuse—intentional or accidental—of therapeutic formulations of fentanyl have been described throughout the world. However, per research, there were no autopsy reports in Italy of intoxication caused by fentanyl transdermal patches abnormally consumed as in this case. This case represents further evidence of the social relevance and mortality related to the improper use of opioids intended for pain therapy.

Fatal Intoxication, Fentanyl Abuse, Patch Inhalation