

Fatal Sodium Nitrate Intoxication – Red Flags and Autopsy Findings

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Sodium nitrite (SN) is an inorganic, white, crystalline salt that is odorless and easily soluble in water. It is widely used in food preservation and is therefore readily available in drug stores or online. Several suicide-related internet fora suggest the use of SN as an “easy, quick, and pain-free recipe” to end one’s life. The toxic effect of SN is the oxidation of hemoglobin to methemoglobin (MHb) leaving the red blood cells unable to bind oxygen. We present a series of four cases of suicidal SN intoxication focusing on red flags related to ingestion of SN.

Suspicion of fatal SN intoxication, besides the obvious presence of a bottle of SN, should already be raised at the scene of death if clear liquid with traces of semi-dissolved white powder is found. As SN in fatal doses causes nausea and vomiting, the presence of antiemetics, as part of a “SN suicide package”, should also prompt the police or doctor performing the autopsy to suspect SN as a possible cause of death.

Distinct autopsy findings in cases of SN intoxication are related to the MHB-saturated, oxygen-deprived blood. Characteristic blue-grayish livor mortis are often present, and the MHb may give the blood a distinct color rendering organs with an almost chocolate-brown appearance. Both findings, however, might resemble early cadaverosis. If SN intoxication is suspected the use of a standard urine test strip or, if available, a nitrite/nitrate test strip in the gastric content may corroborate the suspicion.

As SN is not in the standard screening program in the autopsy-related toxicological analyses in any of the three departments of forensic chemistry in Denmark, it is important that the doctor performing the autopsy is aware of red flags suggesting SN intoxication prompting the forensic chemist to ultimately rule in or rule out SN as the lethal culprit.