



H3 Unusual Asphyxial Deaths: Sand, Soil, and Stool

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Learning Overview: The goal of this presentation is to report a series of unusual asphyxial deaths due to the inhalation of foreign material.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by raising awareness of the characteristics of asphyxial death caused by the inhalation of foreign material and the need to standardize the classification of asphyxial deaths.

A 30-year-old female was found buried in sand at the beach. The autopsy showed sand in the eyes, ears, nose, sphenoid sinuses, oral cavity, and upper and lower airways. A Computed Tomography (CT) scan showed high-density material in the bronchial tree.

A 26-year-old male who was working at a construction site was witnessed to be buried in soil when the 8-foot hole he was digging collapsed on him. The autopsy showed collections of sand and dirt in the nose, oral cavity, upper and lower airways, esophagus, and stomach.

A 20-year-old male was working in an excavation site repairing a storm drain when the site started to collapse. The autopsy showed collections of mud and dirt in the upper airway, abrasions and contusions of the face, neck, and left arm, and lacerations on the right posterior scalp.

A 48-year-old male (A), an 18-year-old male (B), and a 14-year-old male (C) were found in a manure pit at a dairy farm. All three were working at the farm spreading manure on the fields before they were reported missing. The autopsies showed liquid and semisolid manure in the upper and lower airways and sphenoid sinuses on all three cases. Testing for potential methane gas presence in the lungs was unable to be performed due to impaction of semisolid stool in the airways.

Asphyxia is a broad term used to describe the disruption of oxygen uptake or utilization in cells. Asphyxia can be further subcategorized into suffocation, mechanical asphyxia, strangulation, and drowning.¹ Additionally, the term suffocation is non-specific and encompasses a variety of mechanisms that include smothering, choking, and confined spaces/entrapment/compromised atmosphere, each with its own definition and criteria. Over the past ten years, there were 2,055 deaths attributed to asphyxia at the Maryland Office of the Chief Medical Examiner, including those due to drowning (904 deaths), strangulation/hanging (406 deaths), suffocation (218 deaths), and mechanical asphyxia (143 deaths). The remaining 384 deaths were non-specified, which included the 6 reported cases above. Most of these reported cases showed overlap between categories, including obstruction of the upper airways (smothering) and lower airways (choking) by foreign material, and all likely have impaired respiration due to pressure from being buried or submerged (mechanical asphyxia). In four out of six cases, permeation of material into the sphenoid sinuses was present, which is usually seen in cases of drowning. These cases highlight the apparent complexity of asphyxial deaths and the possible variation of categories in which they may be classified. Although deaths due to inhalation of foreign material are uncommon, they show similar findings at autopsy and likely share the same mechanisms of death. Recognition of these presentations and further exploration of similar cases can aid in structuring a scheme to provide better standardization under the current classification system.

Reference(s):

¹. Sauvageau, Anny, and Elie Boghossian. Classification of Asphyxia: The Need for Standardization. *Journal of Forensic Sciences*, no. 5, 2010.

Asphyxia, Suffocation, Drowning