Case Report
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Suicidal poisoning terminating into accidental drowning courtesy agonal respiration

Abstract

The authors report a case of a young adult male individual whose dead body was found from farm house in puddle of muddy water. This man committed suicide by ingesting some poisonous substance and then drowned himself accidentally by falling into shallow pool of water. According to information given by his relatives he had a history of depression and wanted to commit suicide. Toxicological results revealed in blood a toxic concentration of aluminium phosphide. This finding might be important for the interpretation, not of the cause of death (since the drowning was confirmed by autopsy and diatom test) with clinching of weeds from the surroundings in both his hands (cadaveric spasm) before death.

Keywords: shallow water drowning, aluminium phosphide poisoning, submersion, cadaveric spasm, diatoms

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Introduction

Suicide is now among the three leading causes of death among those aged 15-44years (both sexes). The rates of suicide among young people have been increasing to such an extent that they are now at the highest risk in a third of all developed/developing countries.[1] Pesticide poisoning is the single most important means of suicide globally. It is a major public health problem in rural India, where it has led to a very high-case fatality ratio than in the developed world. Out of all the common agricultural poisons, acute Aluminum Phosphide (AlP) or Celphos poisoning is extremely lethal and vast majority are suicidal in nature. It acts as a fumigant material commonly used to protect crops from pests and is readily available at a cheap rate. Poisoning by Aluminum Phosphide is typically suicidal, at times accidental and rarely homicidal in nature. Pesticide poisoning invariably presents as deliberate self-ingestion in young.[2] Drowning is a form of asphyxia due to aspiration of fluid into air passages caused by submersion in water or other fluid and is mostly accidental. Diatoms found inside the body of a drowned victim may serve as corroborative evidence in the diagnosis of cause of death.[3] Diatoms are microscopic unicellular or colonial algae with typical cell walls impregnated with silica and containing chlorophyll pigment. They are universally disseminated in fresh and salt water and comprise over thousand of species ranging in size from a few to several hundred micron in diameter. In drowning cases, they act as corroborative evidence when they are found in remote sites as bone marrow, liver, brain and kidneys after tissue digestion in strong acids. Merely submersion of mouth and nostrils is sufficient to aspirate fluid and cause death. In the terminal stages of asphyxial death or in agonal phase, sometimes the victim attempts to grasp the things which are nearby out of fear or pain. Here, the authors present one such case of suicidal poisoning which ultimately ended as accidental drowning.

Case report

The dead body of a young adult male individual found in his farm-house few metres away from the house lying in prone position in a small pool of muddy water. A case of homicide was alleged by his parents blaming his wife and his in-laws for the death in view of previous history of domestic violence. The dead body was brought for autopsy by the Investigating Agency to know the cause and manner of death. On examination, the body of deceased and clothes worn by him were found to be smudged with mud on the front with the backs portion completely spared (Figure 1). The right hand was tightly clinched and contained mud-stained twigs and weeds (Figure 2). After removal of the clothes, the exposed anterior region (front) of the body i.e. face, upper extremities, trunk and the lower extremities were found to be mud-stained whereas rest of the body was having no such mud-stains and was almost clean. The conjunctivae and face were congested. There were no external/internal antemortem injuries over the body. All the internal organs were found to be congested. The stomach was found to contain semi-digested greyish semi-digested food material emitting strong pungent smell with the gastric mucosa showing marked congestion, hyperaemia and petechia. The small gut was found to contain similar digested food material. In view of the autopsy findings not suggestive of any specific cause of death, the viscera were preserved for chemical analysis and the bones (clavicle and sternum) were preserved for diatom test. The investigating agency was also requested to preserve a sample of fluid from the alleged place of recovery of the dead body for diatoms and comparison thereof, if any with the result of the diatom test of the bones preserved for the same. The chemical analysis of viscera revealed that aluminium phosphide could be detected in the exhibits i.e. the viscera preserved for chemical analysis whereas and the diatoms could be detected in the bones (clavicle and sternum) preserved for diatom test which were of similar nature as detected in the water sample preserved from the place of recovery of the body. After getting the reports of the chemical analysis of viscera and diatom test of bones, the investigating agency sought the opinion regarding the cause of death in this case. After considering the findings observed on autopsy, the report of the chemical analysis of viscera and diatom test of bone, the authors opined that the cause of death in this case was poisoning coupled with drowning. In view of the opinion regarding the cause of death, the investigation

agency further sought the opinion regarding the manner of death in this case. The authors opined that the finding noticed in this case were indicative of suicidal-cum-accidental death, as there were no injuries or marks/signs of struggle in this case; the mud stains present over the front portion of the body and clothes, no visible apparent foot prints of any other person at the place of recovery of the body and also an alleged history of quarrel with his wife before the deceased left his house a few minutes before recovery of his body from his farm-house within 2 kilometres from his house. The clinching of mud-stained hands found to contain weeds and twigs in the fist as cadaveric spasm also indicated antemortem events which could have happened after the deceased has consumed aluminium phosphide tablet before leaving his house and later on when the poison started showing its effects, he fell into a puddle of water in farmhouse and inadvertently drowned himself there during the agonal period with cataleptic rigidity in hands either because of terminal seizures or asphyxial pain or fear.

Figure 1 Mud-stained clothes of deceased on their front aspect.

Figure 2 Cadaveric spasm of right hand containing tightly clinched mud and twigs.

Discussion

Aluminium phosphide (ALP) poisoning is a common occurrence in accidental and suicidal cases, predominantly in rural northwest and central India, which is mainly attributable to poor regulation regarding the accessibility of this gravely toxic rodenticide.[4,5] Typically it used for suicide, and sometimes randomly, although it is rare to use aluminium phosphide to homicide.[6] Aluminum phosphide various trade names including Celphos, Phostoxin, rice tablets and had Quickphos, solid tablets weigh approximately 3grams in India.[7,8] Phophine gas (PH3) is released, when the tablet is evaporated.[9,10] Each 3gm tablet releases 1gm and each 0.6gm pellet 0.2gm of phosphine gas on exposure to moisture and leaves behind a non- toxic grayish residue of alumunium hydroxide. Phosphine gas on exposure to air it gives a foul odour (garlicky or decaying fish) due to the presence of substituted phosphines and diphosphines. Though the exact mechanism of action is still not clear, it is supposed to act like cyanide by producing non-competitive inhibition of cytochrome C oxidase leading to inhibition of mitochondrial oxidative phosphorylation.[11] Not all corpses which are recovered from water, died because of drowning. The autopsy diagnosis of drowning presents one of the major problems in forensic medicine, especially when there is delay in recovering the victim. Bodies retrieved from water may have died from natural disease before falling into the water or while already in the water. They could have died from injury before being thrown into the water or while in the water died from effects of immersion other than drowning.[12]All the above may show signs of immersion on examination, but this is rarely helpful, other than confirming that they had indeed been in water. It does not assist in differentiating the mode of death.[12] Shallow water drowning is a condition when drowning occurs in small puddle of water or any fluid media, when depth of the fluid id only few inches but sufficient to submerge the mouth and nostrils of the victim. This will occur accidentally in those who are disabled or incapacitated such as small children, epileptics, drunkards, comatosed person under the influence of head injury, drinks, drugs, disease etc. sudden collapse from coronary artery disease or hypertension may also result in accidental drowning of an adult in shallow fluid media.[13] Even when a body of a known epileptic or alcoholic recovered from the shallow end of a pool or found face down in a roadside puddle may equally pose a considerable diagnostic problem as edema of the lungs is a common finding.[14] Cadaveric spasm is a form of muscular stiffening which occurs at the moment of death and which persists until true rigor mortis develops. Cadaveric spasm has medicolegal importance because it records the last act of life. When a body is recovered from water, the tight clutching of weeds in the hands is proof that the person was alive when he submerged into water.[15] In the civilian sphere it is most often seen in persons who fall into water or drop some distance down a precipitous slope such as a cliff. They may clutch at some nearby object, such as grass or shrubs, in an effort to break their fall and such material may be found held tightly in their fingers, even when the body is examined within a few minutes. If found in the victim of drowning, or of a slide from a height, it has some value in confirming that the person was alive at the time of the fall, thus excluding the post-mortem disposal of an already dead body.[12]

Conclusion

Wrong observation, erroneous interpretation and injudicious conclusion of an autopsy surgeon in respect of deceptive crime scene findings may often lead to imprisonment of the innocent or freedom of the accused much against the principle of natural justice and the

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doctor himself often facing tough and critical cross examination in the court of trial. Misinterpretation may lead to wrong cause and manner of death and miscarriage of justice. Thus every case of suspected drowning in shallow water should be carefully searched for other evidences of injuries, cause and manner of death.

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Conflict of interest

The author declares no conflict of interest.

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