CASE REPORT

An Artefact in Celphos Poisoning: A Case Report

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Abstract

Introduction: Postmortem artefacts are changes that occur in a body after death, but before the autopsy, which can sometimes lead to misinterpretation of autopsy findings. These artefacts can result from various factors such as environmental conditions, the body's position, medical interventions before death, or the decomposition process. In this article we explain an artefact encountered in a case of Celphos poisoning.
Case Presentation: A 54-years-old man, a daily wage worker, brought to GTB Hospital with alleged history of ingestion of 2 tablets of Celphos and got admitted, gastric lavage was done and expired during course of treatment. In postmortem examination, stomach contained blackish fluid along with whitish oval shaped solid matter. In mortuary, dead bodies were stored in proper refrigerated storage cabinets/shelves or cold chambers. Due to that, coconut oil, which was used for resuscitation got frozen in stomach and remained in solid state.
Conclusion: Coconut oil was an iatrogenic artefact in this case. This indicates that these artefacts are present in significant number of cases, which may lead to misinterpretation of findings as evidence of underlying assault or accident if autopsy surgeon is not aware of these artefacts. Accurate interpretation is needed before labelling such findings as proofs of assault, accident or an artefact.

Keywords: Artefact, Celphos, Poisoning, Iatrogenic, Coconut oil

How to cite this article:

INTRODUCTION

Artifacts in forensic postmortem toxicology are substances or drug concentrations present in body fluids or tissues. During analysis, they do not correspond to the genuine drug or drug level present in the body at the time of death. The medico-legal autopsy is best done by the prudent combination of theoretical and practical knowledge. A good medical examiner is one, who has not merely a vast experience in conducting autopsies, but one, who has trained himself/herself to make precise and correct interpretation of the findings. Hence, the doctor conducting the autopsy carries great responsibility over his/her shoulders. It is obvious that if he/she is unable to furnish proper interpretation of the findings, the pangs of justice will be disturbed and, therefore, it is imperative that all unusual findings be meticulously examined and photographed. Moreover, if required, some experienced, better qualified colleague may be approached there and then since, as stated earlier, a poor opinion is worse than no opinion at all. The doctor should learn to make thoughtful, logical findings rather than jumping to conclusions too quickly. Additionally, if he/she misunderstands the results, they will have a difficult time in court during the cross-examination if the defense lawyer, who is aware of these traps, tries to refute the testimony. To some extent, the artefacts rely on the observer; for example, someone who is unfamiliar may find a certain finding confusing, while an expert may quickly recognize it as spurious or an artefact. An artefact of this kind might be presented before to, during, or following death [1]. Effects of treatment during resuscitation or hospitalization may produce artifacts. Forensic experts often encounter different types of therapeutic intervention related findings during autopsies. They must be able to distinguish between findings caused by therapeutic procedures and those caused by other factors, so that erroneous diagnosis and wrong conclusions may be avoided. For the forensic experts, postmortem artifacts may be an intricate and demanding challenge. To avoid errors in the evaluation of a result, it is essential to be aware of artifacts.

CASE REPORT

A 54-year-old man, a daily wage worker, brought to hospital with alleged history of ingestion of 2 tablets of Celphos and got admitted, gastric lavage was done. During course of treatment, he died after 5 hours of ingestion. Afterwards, as per police inquest, postmortem examination was conducted in GTB Hospital mortuary. On postmortem external examination, the deceased was moderately built and nourished, both eyes and mouth closed, postmortem staining was present and fixed in nature, rigor mortis present over whole body, no antemortem external injuries present over the body. Moreover, on internal examination, brain was congested and edematous, both lungs adherent to chest wall

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at places, congested, edematous, multiple petechial hemorrhages were present over the surface, multiple petechial hemorrhages were present over the epicardial surface of heart, stomach contained about 20 ml of blackish fluid along with whitish oval shaped solid matter measuring 7.5 cm x 4.8 cm x 1cm (weighing 20 grams), stomach wall was congested (Fig. 1, 2). Furthermore, intestines contained fluids, feceus and gases, wall – no abnormalities detected, liver, spleen and kidneys were congested, on cut section corticomedullary junction deranged. The chemical analysis of blood and viscera confirmed toxicity with aluminum phosphide.

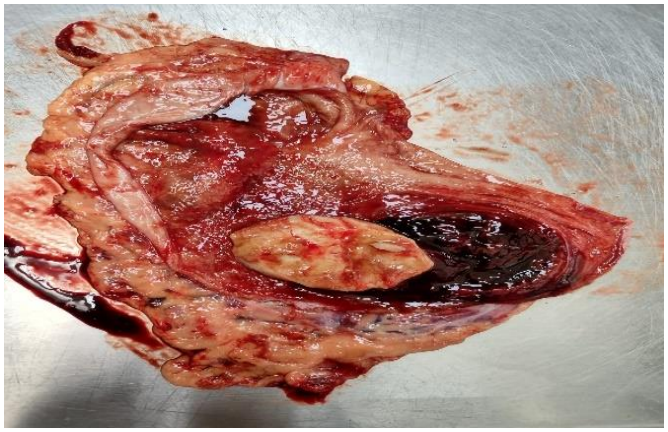

Fig. 1. Congested stomach wall with its content.

Fig. 2. Stomach and its content (whitish oval solid matter) after washing.

DISCUSSION

Artefact is defined as any change caused or feature introduced in the natural state of the body that is likely to be misinterpreted at autopsy. Iatrogenic injury is defined as unintended or unnecessary harm or suffering that arises from any aspect of healthcare management. Artefacts arising from these are called as iatrogenic artefacts [2]. Poisoning is a common medical emergency resulting from exposure to toxic substances. Its management aims to prevent further absorption, enhance elimination, and provide supportive care. Historically, oils like some vegetable oils and mineral oil were used to adsorb toxins and prevent their absorption in the gastrointestinal tract. Aluminium phosphide is a cheap, effective, and commonly used pesticide, however, unfortunately, it is now one of the most common causes of poisoning among agricultural pesticides [3]. The common trade names include Celphos, Alphos, Quickphos, Phostek, Delicia, Wheat pill, and Chemfume [4]. Supportive care continues to be the mainstay of management as there is no recognized particular antidote. A favorable outcome may be achieved by prompt arrival, resuscitation, diagnosis, reduction of poison exposure (by gastrointestinal lavage with potassium permanganate and coconut oil), close observation, and supportive medication [5]. Solid matter, which we found as a stomach content in case report mentioned above, started melting after few minutes of keeping it in a room temperature. It then became semi solid matter and liquified in course of time, respectively. In mortuary, dead bodies are stored in proper refrigerated storage cabinets/shelves or cold chambers at a temperature of 3.5-to-6.5-degree Celsius [6]. Due to that, the coconut oil used for resuscitation got frozen in stomach and remained in solid state for few minutes and started melting with time in room temperature. Changes in thermal properties of coconut oil are presented in table 1[7]. Therefore, coconut oil used for resuscitation was an iatrogenic artefact in our case.

Table 1. Thermal properties of coconut oil.

Thermal properties	Coconut Oil - Pure
Freezing onset, (°C)	18.20
Freezing peak, (°C)	17.26
Freezing end, (°C)	16.02
Melting onset, (°C)	20.39
Melting peak, (°C)	24.11
Melting end, (°C)	25.78
Freezing Latent Heat, (J/g)	84.45
Melting Latent Heat, (J/g)	81.41
Liquid specific heat at 40 °C, (J/g K)	2.71
Solid specific heat at 10 °C, (J/ g K)	1.33
Liquid thermal conductivity at 30 °C, (W/mK)	0.165
Solid thermal conductivity at 10 °C, (W/mK)	0.174

CONCLUSION

This study indicated that artefacts are present in significant number of poisoned cases, which can lead to misinterpretation of findings, especially if they are used as evidence of underlying assault or accident. If autopsy surgeon is not aware about such artefacts, misinterpretations may cause problems at court. In India, the majority of autopsies are done by medical officers working in rural areas. Hence, MBBS students need to be sensitised about these artefacts in undergraduate teaching. Whenever doubt arises in findings, autopsy surgeon should refer to hospital records before labelling such them as an evidence of underlying assault, accident or an artefact.

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