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Death in a bathtub and pattern of decomposition

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Abstract: A case is presented where the corpse of a woman was found partially submerged in a bathtub at her home. The evolution of decay and water level marks suggested the circumstances in which the body had remained after death. Alcohol, tobacco and prescription drugs where present at the scene, and a history of alcohol dependence was well recorded. No signs of violence by others or suicidal intent were found in the scene, so qualifying the death as unintentional and relatied to alcohol intake combined with various medications prescribed for chronic alcoholism.

Key Words: forensic pathology, bathtub, unintentional death, putrefaction, drowning, alcoholism, death scene investigation.

INTRODUCTION

The unintentional deaths happened during the term/stay in the bathtub are not exceptional, constituting in Western Washington 17% of all those occurring in the water [1], in Canada 8.9% [2] or 3.7% in Denmark [3]. Its high frequency in Japan is well known, constituting 8% of the total of the deaths involved in forensic medical study between 2009 and 2011 in Tokyo [4].

Even though most of these deaths are considered as a consequence of drowning, the primary cause sometimes fails to be clarified, due to the difficulty to ensure whether an underlying pathology has been sufficient to originate it by itself, or has led to the loss of consciousness and secondary submersion or simply has not had any influence.

Moreover, the evolution of putrefaction can significantly hamper the macroscopic and histological study of the different organs. Furthermore, the diagnosis of drowning itself, according to the non-specificity of its signs, comes to be carried out by exclusion, as there is no test or finding that confirms it in a precise manner/way [5].

Certain antecedents have been indicated as risk factors involving deaths in bathtubs, such as alcohol and drugs abuse, accidental falls, seizures or inattention in the case of minors [6].

Regarding the evolution of putrefaction it can vary considerably in different areas of the body when so do the environmental conditions on them, in case of exposure to water, sun, artificial heat sources or air currents. All these findings are worth in the legal medical reconstruction of the facts and knowledge of postmortem circumstances [7].

The presented case corresponds to an unintentional death in the bathtub, due to a cardiac origin established by exclusion of other causes. In the corpse, putrefactive phenomena appear evolved in an illustratively different way in each body area according to their degree of immersion in the water.

CASE REPORT

Corpse of a 48-year-old woman, found in the bathroom in her home address, in a bathtub full of water. There was no news of her in the preceeding

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four days. Among her medical records depression and chronic alcoholism are included. She had a very erratic monitoring of her prescribed medical treatment, without quitting/abandoning the alcohol abuse. She had not expressed autolytic intentions.

On a small table, next to the bathtub, there were remains of tobacco, a jug of drink and various anxiolytic and antidepressant drugs/medication. In other rooms in the house alcoholic beverages galore were found. The examination of the scene did not reveal any sign consistent with violence. There were no sources of artificial heat in the bathroom, noticing the water at room temperature. The bathtub faucet was closed/turned off, only a thin puddle of water was visible on the floor. Four days before the find, the neighbors downstairs had complained about a leak of water appeared in their ceiling, leaving her a warning under the door.

The corpse was partially submerged, floating in right lateral decubitus with half of the head in the water. It was in an emphysematosus putrefactive phase, with a marked venous vascular pattern in the skin and "washer-woman" hands (Fig. 1). The water, where a bottle of shampoo and a sponge were floating, showed a reddish and sanious appearance, distinguishing small bubbles around the mouth and nostrils (Fig. 2). The water had left perimeter marks on the inner surface of the bathtub, indicating at least three levels reached at different times, as a result of the evolution of putrefaction (Fig. 3).

Autopsy findings

In the autopsy examination, no violent lesions/injuries were found, neither froth in the air ways nor water in the lungs. In the pleural cavities there was a liquid of putrefaction. The stomach appeared without content. On the part of the face and the hemithorax that were kept out of the water, remains of sanious material remained deposited.

Histological findings

The heart weighed 328 grams. The valvular morphology and the thickness of the cardiac walls were normal, with moderate plaques of atheroma in the aorta. The anatomopathological study revealed intense calcification of the coronary arteries, although without significant obstruction or signs of acute ischemic damage.

Toxicological results

The toxicological analysis was limited to the routine determination of drugs of abuse and certain drugs on a liver sample, resulting in: Ethyl alcohol: 1.09 g/L, Paroxetine: 11.27 mg / Kg, Zolpidem: 2.59 mg / Kg.

Therefore, based on the autopsy findings and

Figure 1. Corpse floating in the bathtub.

Figure 2. Small bubbles near the mouth and the nose.

Figure 3. The different marks left by the water levels in the bathtub are highlighted wirh a dotted square.

Figure 4. Corpse out of the water, showing clear delimitation of the different stages of putrefaction.

the examination of the scene, a death of unintended origin was considered, due to a probable arrhythmic pattern.

DISCUSSION

Deaths in the bathtub have been described in the context of the different natural, homicidal, suicidal and accidental medical-legal etiologies [5, 8-10]. In Japan, a country with a high frequency of this type of deaths, it mainly affects people over 60 years of age, in the winter season and as a place for the bath of the private home [4], which has been related to the use of bathtubs deep filled with water, with temperatures between 40 and 42ºC and the body in position "head-out water immersion" [11]. Under these circumstances, and due to different physiological mechanisms, underlying pathologies, mainly cardiac, can become more severe and lead to death [4, 12, 13]. The genetic subsistence of a long QT syndrome (LQT) as a cause of death has been described in this regard [14].

In the case here discussed no clear signs of asphyxia by submersion have been found, although they could be altered due to putrefaction or even missing a reaction of laryngospasm, dry drowning. The slight foaming observed in the water near the mouth is a possible drowning sign, but cannot be considered a specific one [11]. So, possibly, she did not get to breathe underwater.

In the liver sample moderate amounts of alcohol, zolpidem and paroxetine were determined, the latter associated with alterations in heart rhythm [15]. The quantification obtained, however, is only indicative, given the liver nature of the sample and its state of putrefaction. The analysis did not investigate the possible intake of disulfiram, found at home and susceptible, in association with alcohol consumption, to cause cardiovascular alterations [16]. On the other hand, the potentiation of the effects between alcohol and different drugs is known. Therefore, in the absence of signs of violence or any trace suggesting suicide, such as a farewell letter, the discovery of another means of suicide or the body being dressed [17], it was considered to be related to an unintentional death while she was in the bathtub due to a disturbance of the heart rate, in relation to the drugs and alcohol revealed in the toxicological study.

Regarding the cadaverous phenomena, the body was in putrefaction, with different evolution between the submerged corporal regions and those that had remained out of the water, delimiting the corporal surface in a clear and symmetrical way (Fig. 4). In this case the imbibition of the skin by water is considered fundamental in the evolution of putrefaction. The marks on the inner surface of the bathtub allowed to differentiate at least three levels reached by water, between the initial moment after death and its gradual flotation because of the gases formed by putrefaction. The deposits in a part of the left hemithorax and in the left side of the face, out of the water, showed that they were initially submerged before the flotation of the body.

The regional putrefaction has been described in different circumstances, such as electrocution [7, 18], deeming a useful piece of information in the forensic medical reconstruction of the facts, allowing to know the position in which the body has remained after death [19].

CONCLUSION

In deaths occuring in a bathtub, it is often difficult to know the fundamental cause of death, leading to a difficulty in establishing the manner of death as natural or violent. So, the investigation of the clinicall record and a careful examination of the scene are mandatory, in addition to the autopsy and toxicology study, in order to achieve a good medico-legal asessment.

Conflict of interest. The authors declare that there is no conflict of interest.

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