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Case Report

An Unusual Case of Drowning

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ABSTRACT

Drowning remains a significant cause of accidental death in young children. The site of drowning varies among the communities and is influenced by cultural and geographic factors, including the availability of particular water sources. An open shallow drain with a small collection of water let off from the bathroom turned fatal to a young toddler. Only partial submersion of face was present and had led to death characterised by the absence of pathognomonic drowning signs. This paper demonstrates specific issues that may arise in such cases. As this is a new hazard in home environment, precautions should be recommended by the forensic pathologists and awareness should be created among the public that even partial submersion in a shallow collection of water can result in fatal drowning.

Keywords: Unusual, Drowning Types, Mechanism, Autopsy

INTRODUCTION

Evaluating the cause of death in a suspected case of drowning is difficult at medico-legal autopsy. Deaths due to drowning are not frequently easily solved. In addition, diagnosis of dry drowning and immersion syndrome is even more difficult.[1] Drowning is defined as death due to submersion in a liquid. Mode of death in acute drowning is irreversible cerebral anoxia. When submersion does not immediately result in death, the term near drowning is used.[2]

In some cases, death may be extremely rapid after falling into the water and the time elapsed is insufficient for classical drowning features to occur. Such cases are usually the victims of dry drowning.

Two mechanisms can lead to death in dry drowning, first can be attributed to a reflex cardiac arrest similar to vasovagal stimulation; it involves powerful stimulation of parasympathetic system, resulting in bradycardia and triggering cardiac arrest via tenth cranial nerve nucleus. Such stimulation is induced by sudden immersion in cold water, which causes intense stimulation of cutaneous endings in the mucosa of pharynx, larynx and ear drum, or a bolus of water entering the trachea, which can itself cause reflex cardiac arrest.

Second mechanism is laryngeal spasm, which causes lethal hypoxaemia by airway closure. To induce a lethal hypoxia, such upper airway closure should last for a long time, during which the larynx must be closed, preventing the entry of water and air. However, there is little evidence for this mechanism.[2]

Here, an attempt is made to prove a case of dry drowning with the help of existing literature.

CASE REPORT

A one-and-a-half-year-old female child was subjected to autopsy at the Department of Forensic Medicine, MS Ramaiah Medical College, Bangalore, with the history of being found unresponsive by her parents in the premises of their residence. The body was found in the prone position, with the face submersed in a shallow collection

of water drained from the bathroom, termed as the drainage inspection chamber (Figure 1). The baby was seen to be active and alive about 30 min earlier and had no pre-existing illness.

Figure 1: The drainage inspection chamber

Figure 2: Pseudo-ligature mark

Figure 3: Cut section of the lung

AUTOPSY FINDINGS

The child was built for her age and was moderately nourished. Skin over the front of the neck was pale, dry, hard and wrinkled, resembling a ligature mark (Figure 2). There were no external injuries on the body. Nail beds were bluish in colour. Upon dissection of the neck, tissues beneath the suspected mark were pale and glistening. The thyroid cartilage and hyoid bone were intact. Other neck structures were intact and congested. Lungs were oedematous and congested, and upon sectioning of the lungs, froth was seen mixed with blood (Figure 3). All other internal organs were intact and congested. There were no demonstrable congenital or infective diseases in the body. Stomach contained 50 ml of clear fluid, with no unusual smell, and the mucosa was normal. Chemical analysis was negative for toxic substances.

DISCUSSION

'Things are not always what they seem; the first appearance deceives many; the intelligence of a few perceives what has been carefully hidden'. Various artefacts and post-mortem injuries may be misinterpreted and a medico-legal masquerade may occur, resulting in false accusations. This is again reiterated in the present case.

The finding in the neck was initially attributed to a ligature around neck and ligature strangulation was suspected in the beginning. Upon obtaining further information from the investigating officer about the circumstances of death and background of the deceased, it was found to be a pseudo-ligature mark. These marks are seen on dead bodies of infants and children in whom the neck is short. These marks are produced by the folds in skin due to bending of the head. Ignorance of such post-mortem artefacts may lead to wrong interpretation during investigation.[3]

Though the history suggested drowning, autopsy features were not favouring classical drowning. Hence, other types of drowning were considered and dry drowning was zeroed in after excluding other causes of death. Dry drowning is a difficult entity to prove. The water used for bathing is let out through a drain, which merges with the main drainage of the house. At the junction, a small 1 cubic ft open collection of water was present, which is termed as the drainage inspection chamber (Figure 1). The stomach contents did not match with the liquid medium in which the head was submersed.

Young children are known to be at increased risk of drowning for a variety of reasons, including their insatiable curiosity, enjoyment of exploration of seemingly unlikely environments, lack of appreciation of dangers and relative physical weakness.[4] These factors may have a compounding effect when young children leave supervised environments to investigate situations. Their immature coordination, small size and limited strength prevent escape.

Upon water entering the airways, both conscious and unconscious victims experience laryngospasm, i.e. the larynx or the vocal cords in the throat constrict and seal the air tube.

This prevents water from entering the lungs. Because of this laryngospasm, water enters the stomach in the initial phase of drowning and very little water enters the lungs. Unfortunately, this can interfere with the air entering the lungs too. In most victims, the laryngospasm relaxes some time after falling unconscious and the water enters the lungs, causing 'wet drowning'.

However, about 10-15% of the victims maintain this seal until cardiac arrest. This is called 'dry drowning' as no water enters the lungs. In forensic pathology, water in the lungs indicates that the victim was still alive at the point of submersion. Absence of water in the lungs indicates either a case of dry drowning or death before submersion.[5]

CONCLUSION

To demonstrate drowning unambiguously as the cause of death remains a difficult issue in the current forensic practice. The autopsy diagnosis of drowning has always presented difficulties for pathologists, as the physical findings are relatively non-specific and it may not be possible to exclude death from natural or unnatural causes prior to the body being immersed.[6] However, in this case, the findings that helped in the favour of dry drowning were the age of the victim, immersion of the face in shallow water and absence of other injuries on the body. Secure child-proof lids should be installed, particularly on in-ground tanks, to prevent such untoward deaths.

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