Chapter 5

Bodies Recovered From Water

Summary

Recovery of a body from water does not mean drowning. Other causes of death, including trauma, are possible. Drowning is a type of asphyxia that involves complex pathophysiological mechanisms, which contribute to death. Premorbid conditions (e.g., ischemic heart disease, epilepsy, ethanol intoxication) increase the risk of drowning. Despite the complexity of the drowning process, associated external and internal findings are few. The lack of specific signs and submersion artifacts can hinder the determination of the cause of death in a presumed drowning. Various drowning “tests” have been used to assist in this assessment. A bathtub death can be particularly challenging because all manners of death occur. A diver’s death, ironically, can be caused by the artificial air supply.

Key Words: Asphyxia; drowning; immersion; diatoms; hypothermia; diving.

1. Introduction

Finding a body in water poses a challenge for the pathologist and other investigators determining the cause and manner of death (1–5). All manners of death are possible (6). Drowning is one of the leading causes of death associated with an undetermined manner (7). Information about the circumstances preceding the drowning—i.e., how the victim became submerged—are lacking in many cases, because the events prior to submersion are unwitnessed (1,3,8–10). Witnesses were present in one-half to three-fourths of drownings in some series (11,12). In a review of 1590 bodies found in water, 37.3, 30.8, 12.4, 11.9, and 5.3% of the accidents, homicides, suicides, natural deaths, and undetermined cases, respectively, were witnessed (overall = 25.3% [3]). More than half the witnessed cases had a single uncorroborated witness, which raised issues about the nature of the relationship between the witness and victim. Even multiple witnesses provide contradictory observations. A small percentage (6.9%) of undetermined cases, in one series, were witnessed, but investigators were still uncertain whether entrance into the water was accidental or deliberate (7).

The majority of submerged bodies, including those of undetermined manner, have been classified as drownings (5,7,13). Although the likelihood is that the cause of the
death in a submerged body is drowning, other potential causes of death (disease, trauma) need to be considered (see Headings 5–7. and refs. 1, 9, 10, and 14–16). The postmortem diagnosis of drowning requires exclusion of these other possibilities, with the realization that during the agonal stages of natural and other types of unnatural deaths, aspiration of water does occur (2,4,7,17–20). An autopsy is essential in the determination of the cause and manner of death (21,22). Determination that the victim was alive on entering the water and consequently drowned is based on the various nonspecific external and internal findings; however, these observations, coupled with the circumstances of the death, support drowning as a cause of death (1,3,5–10,19,20,23,24). The determination of drowning is hindered by a prolonged submersion interval, and decomposition alters and obliterates the few pathological findings available (10,25–27). Pathologists also need to address why the victim was unable to survive in the water (1). Despite the paucity of postmortem findings, drowning involves complex pathophysiological mechanisms dependent on the various factors related to the victim and the scene.

2. EPIDEMIOLOGY AND CIRCUMSTANCES

2.1. Manner of Death

In a study from Finland of 1590 bodies recovered from water, 56.2% were classified as accidents, 23.8% as suicides, 16.5% as undetermined, 0.8% as homicides, and 2.6% as natural (3). A 4-yr study of 123 bodies recovered from New York City waterways showed 42% were suicides, 41% undetermined, 13% accidents, and 4% homicides (5). An interstate study of 1201 submersion cases included 11% of undetermined manner (13). The manner of death is also dependent on the legal standard of proof, which varies in different jurisdictions (7).

Various studies have shown that cases considered as drowning (as opposed to bodies recovered from water in which the cause of death is not necessarily drowning) in all age groups are accidental in about 90% of cases (4,13,18,28–30). Suicides comprise most of the remainder of cases, although some studies outside North America have shown a higher incidence (see Heading 3. and refs. 4, 9, 13, 18, 24, 28, and 31–34). Homicides are uncommon (13,18,28,30,33,35,36). One series found no cases of women younger than 30 yr committing suicide, meaning that accident and homicide needed to be excluded (37).

2.2. Groups at Risk

Drowning victims are predominantly male (>65% (11–13,28,30,33,38–48)). A male predominance likely reflects that males are more active and risk-taking in water (42).

Drownings typically occur in the summer months, more frequently in rivers, lakes, ponds, and creeks (11–13,32,38,44,45,48). In northern climates, snowmobiles and motor vehicles break through ice (44). Swimming, diving, and wading are common activities associated with drowning (12,28,30,44,49,50). Men in their late teens and 20s are at risk (11,12,30,44,45,47,48,51). Many swimmers who drown are teenagers (13). Drugs and alcohol are factors, particularly when there is limited adult supervision of teenagers (29,39,41,45,48,52). Most drowning victims can swim, implying that other factors (e.g., ethanol intoxication) are involved (13). Other “normal” activities associated