G71 Dying of the Cold in a Warm Climate - Hypothermia Deaths in Sydney, Australia

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The goal of this presentation is to describe the features of hypothermia related deaths in Sydney, Australia, a geographic location generally viewed as having a temperate to hot climate.

This presentation will impact the forensic community and/or humanity by highlighting the dangers of hypothermia in the elderly, even in temperate climates. Attendees will be informed of the social circumstances, the death scene and pathological findings at autopsy in this series of cases.

Death due to hypothermia is well known as a significant public health problem in cold climates, affecting predominantly homeless people, drug dependent persons, and the elderly. Hypothermia is generally considered very rare in more temperate climates and there is a general lack of awareness of the problem by both the medical fraternity and the general public. This study examines the problem of fatal hypothermia in Sydney Australia, a city with a reputation of having a year round temperate to hot climate.

There were 24 cases of fatal hypothermia in a five-year period between January 2001 and December 2005. For the purposes of this study, the diagnosis of hypothermia was made by either a temperature measurement at hospital (17%), suggestive autopsy findings (33%), a suggestive history (4%), or a combination of autopsy findings and a suggestive history (46%). The majority of the deaths occurred in winter (46%) as expected, whilst equal numbers occurred in the seasons on either side of winter - spring (25%) and fall (25%). Despite generally hot summer temperatures, one death occurred during summer. This person had become lost in bushland and was found in a state of extreme dehydration.

The mean age was 76 years (range 56 – 92), with a female predominance (63%). Risk factors for hypothermia were identified in 58%, and these included alcoholism mental illness (schizophrenia, bipolar disorder) and developmental delay. All but two decedents lived alone. Nine decedents were underweight (body mass index < 20 kg/m^2).

Nineteen cases (79%) were found in a building, a house, apartment, or other premises. Of those, 46% were dead at the scene, while the remainder died either on the way to or in hospital. In the remaining five cases, the decedent was found outside. Three in this group were dead at the scene, while two died subsequently in hospital. This indicates that despite rewarming and supportive care, hypothermia past a certain point is irreversible and fatal.

Four decedents were found naked, four were dressed in minimal amounts of clothing and the decedent was adequately dressed in a further three cases. There was evidence of paradoxical undressing in seven cases. In the remaining six cases, the presence or absence of clothing was not given.

Pathological findings in fatal cases of hypothermia are generally considered non-specific. Gastric erosions were found in 79%. There was one case with acute pancreatitis, and a single case with rhabdomyolysis. The characteristic cutaneous lesions in hypothermia, reddening and abrasion over the large joints of the limbs were present in 16 (75%) cases. In four cases (17%), there were no autopsy findings to suggest hypothermia, although either hospital or environmental features strongly supported the diagnosis. Other significant autopsy findings included atherosclerotic cardiovascular disease (50%), pneumonia (17%), pulmonary congestion and edema (17%), chronic airways limitation (13%) and single cases of glioblastoma multiforme and metastatic bowel cancer. With the exception of two cases where only a raised blood alcohol was detected, all cases had significant pre-existing natural disease processes. Toxicology was performed in 18 cases – alcohol was detected in four cases, and other psychotropic agents were present in four deaths. No illicit drugs were detected.

This study highlights a significant public health problem that is not limited to cold climates. There is little awareness of the hazards of hypothermia in the elderly in Australia and probably other temperate parts of the world. Life-threatening hypothermia does not occur at any one particular temperature, as other factors such as wind movement, clothing, dampness of the environment, and vulnerability of the individual all play a role. Forensic pathologists and other death investigators who have the good fortune of living in warm climates need to remain vigilant of this condition, and not misattribute the death to natural disease processes such as atherosclerotic cardiovascular disease or pneumonia.

Autopsy Pathology, Hypothermia, Environmental Medicine

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