Was the Biblical King David Affected by Hypothermia?

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Background. The elderly population has suffered from hypothermia for thousands of years.

Methods. This report analyzes the first documented case of hypothermia as described in the Bible.

Results. The sentence “Now King David was old and stricken in years, and they covered him with clothes, but he gained no warmth” indicates that hypothermia afflicted the biblical King David, the second and the greatest of Israel’s kings, who ruled the country 3000 years ago. Environmental factors did not play a significant role in the development of hypothermia. Among various diseases, the most likely to cause immobility and subsequent hypothermia are dementia, senile osteoporosis, hyperparathyroidism, and malignancy. Among these diseases, malignancy is the most likely.

Conclusions. Viewed by a modern physician, the story of King David unfolds as possibly the earliest description of a patient affected by hypothermia, features of which have changed little through the ages. This report shows that the roots of contemporary geriatrics lead back to biblical times.

ELDERLY patients have suffered from hypothermia for thousands of years. It is defined as a core (rectal, esophageal, tympanic) body temperature equal to or less than 35°C (95°F) (1–4). The term accidental hypothermia is used to imply that the low body temperature is unintentional (5), environmentally induced, and distinguished from hypothermia that develops secondary to medical conditions or surgical treatment (2,4–7). Who was the person who suffered from hypothermia as described in the Bible? What were the characteristics of this hypothermia? This report aims to evaluate this subject using the biblical description of hypothermia.

HYPOTHERMIA AS DESCRIBED IN THE BIBLE

King David, the second and greatest of Israel’s kings, who ruled the country 3000 years ago, was about 70 years old at the end of his reign. “David was thirty years old when he began to reign, and he reigned forty years” (II Samuel 5:4). When the King reached old age, he suffered from a low body temperature. “Now King David was old and stricken in years, and they covered him with clothes, but he gained no warmth” (I Kings 1:1). Thus, David’s servants summoned Abishag to warm the King: “... let her cherish him, and let her lie in thy bosom, that my lord the King get heat” (I Kings 1:2). Do these words indicate hypothermia? According to the biblical text, King David was a very old man. Although the King was covered with clothes, his body gained no warmth. Therefore, the King’s body temperature was lower than normally accepted, that is, equal to or even less than 95°F. Thus, it is clearly stated that the King was suffering from hypothermia.

ABNORMAL PHYSIOLOGIC MECHANISMS

Man adapts to cold in a variety of ways: vasoconstriction reduces peripheral blood flow and maintains the temperature of the body core, shivering increases heat production, and modification of behavioral patterns results in better tolerance of abnormally low temperatures (6). When these mechanisms fail, hypothermia develops (8,9). Its symptoms include impairment of increased heat production and decreased heat loss (10), impaired recognition of decreased temperature, allowing patients to tolerate cold conditions without discomfort (7), decreased activity of the autonomous nervous system, decreased resting peripheral blood flow, decreased vasoconstriction, decreased ability to alter respiratory response to changes in environmental temperature, decreased mobility, decreased muscle mass, and decreased or absent shivering (8).

Did any of the mechanisms mentioned above play a role in the old King’s hypothermia? This question remains unanswered because there are insufficient documented data to evaluate it.

TYPES OF HYPOTHERMIA

Etiologically, there are three types of hypothermia: immersion, exhaustion, and subclinical (11). Immersion or accidental hypothermia may result from exposure to prolonged or extreme cold from immersion or atmospheric conditions that lead to a body heat deficit and a fall in the core temperature to 95°F (12). Mountain climbers inadequately clothed in cold weather and long distance swimmers exposed to hot and cold waters are prone to this type of hypothermia (11). Exhaustion hypothermia results from depletion of the body’s readily available energy sources. It occurs in long distance runners, miners, steel workers, manual laborers, and so on. Subclinical hypothermia is usually found in older adults, resulting from an impairment of their temperature-regulating center. Often, older patients are unable to adjust their body temperatures readily to extremes. They may have consistently low core body temperatures due to impaired ambient temperature per-
ception, impaired capacity to shiver, decreased total body water, and inability to conserve heat by vasoconstriction (8,11).

How can King David’s hypothermia be classified? Obviously, the King was not a mountain climber, nor a long distance swimmer, nor a runner, nor a manual laborer. Thus, immersion and exhaustion hypothermia can be excluded. Because the King represents an elderly person, it is most likely that he suffered from subclinical hypothermia.

**Environmental Hypothermia**

A variety of environmental factors, such as poor heating facilities, particularly during winter, a lack of indoor plumbing, living alone, and being housebound, contribute to hypothermia (13–16). Fox and colleagues (17), however, were unable to correlate any environmental factors with low body temperatures in elders. Similarly, Davidson and Grant show that accidental hypothermia is not confined to elderly people, nor is it a winter phenomenon. They found that the eventual outcome was determined more by the underlying medical condition than by the severity of hypothermia (3).

Did any of the environmental factors mentioned above play a role in the development of King David’s hypothermia? Because the King did not belong to the lower socioeconomic strata, hypothermia related to poor housing seems very unlikely.

**Urban Hypothermia**

Urban hypothermia is characterized by a poor temperature discrimination and lack of precision in adjusting the thermal environment (9). Apparently, the King’s house was not poorly heated. Thus, this type of hypothermia seems very unlikely.

**Clinical Stages**

In mild hypothermia or the responsive stage, body temperatures range between 32.2°C and 35°C (90°F to 95°F) (3,8). Patients tend to generate and retain body heat, hence the term responsive stage. The body’s metabolic rate, blood pressure (17), cardiac rate, cardiac output, and respiratory rate increase. The patient shivers unless this response is lost as a result of aging. Cutaneous vasoconstriction occurs and renders the skin pale and cold to the touch. Diuresis ensues as vasoconstriction increases the volume of the central circulation. In moderate hypothermia or the slowing phase, body temperature reaches 32.1°C to 24°C. The ability to generate heat is seriously impaired. Muscles tend to stiffen, and shivering decreases. The respiratory rate declines; hyperventilation, hypotension, arrhythmia, and central nervous system dysfunction such as disorientation, confusion, and hallucinations occur; pupils dilate; and coma may develop (6,9,18). The lower the body temperature, the more likely the victim is to become unconscious (1,4). Severe hypothermia or the poikilothermic phase occurs when body temperature is below 24°C (75°F). At this stage, a rigor mortis-like appearance is evident, and patients have been mistaken for dead (3,4,8). Finally, death may occur (4).

**Additional Signs**

Hypothermia should be suspected if any of these signs are evident: bloated face, pale and waxy skin color (at times oddly pink), trembling on one side of the body or in one arm or leg, irregular and slowed heartbeat (18), shallow, very slow breathing, low blood pressure (4), absence of chilliness due to diminished alertness, lessened reflexes (19), clumsiness, drowsiness, poor coordination, poor judgment, slips, and falls (4).

What stage did King David’s hypothermia reach? The King was not warmed in spite of covering with clothing, but he was warmed by Abishag’s body heat. Because other signs of hypothermia did not develop, it is most likely that the King’s hypothermia reached only a mild stage. The absence of shivering can be explained by an impaired thermoregulation mechanism due to the King’s advanced age. Although absence of shivering may also indicate moderate or even severe hypothermia, the occurrence of these two stages is very unlikely.

Was the King’s temperature taken? The thermometer, first invented 400 years ago by Galileo and refined for clinical use by Sir Clifford Albutt in 1866, is one of the simplest and most useful tools available in medicine. The measurements show the body’s response to myriad stresses (2). King David lived 3000 years ago, before the thermometer was invented. Was temperature measured by another means? Or was it not measured at all? These questions remain unanswered.

**Predisposing Conditions of Hypothermia**

Various conditions associated with hypothermia are shown in Table 1 (2,4,6,8,18,20–23). There is a pathognomonic EKG pattern—the lengthening of the RR, PR, QRS, and corrected QT (QTC) intervals, the presence of the typical inflammatory skin diseases.
Did King David suffer from any of the conditions listed in Table 1? As previously mentioned, it is most likely that the King was affected by subclinical mild hypothermia. Thus, although the occurrence of all conditions may be possible, it is unlikely that the King suffered from very serious conditions such as sepsis, brain hemorrhage, myocardial infarction, pulmonary emboli, or cardiogenic shock. There are some clues to other diseases. Biblical text indicates that King David forgot that he appointed his son Solomon to reign after him: “My lord, thou swearest by the Lord thy God unto thine handmaid, saying, Assuredly Solomon thy son shall reign after me, and he shall sit upon my throne. And now, behold Adonijah reigneth; and now my lord the King, thou knowest it not” (I Kings 1:17,18). Thus, it is very likely that the King suffered from dementia, even Alzheimer’s type. Other passages, “My strength failed . . . and my bones are consumed” (Psalms 31:11) and “My bones wasted away through my anguish and roaring all day long” (Psalms 32:3), analyzed in a previous report (25), indicate the osteoporosis that affected the King’s bones. Among various diseases associated with osteoporosis, dementia, senile osteoporosis, hyperparathyroidism, or malignancy were the most likely to cause immobility and subsequent hypothermia in King David. Did he suffer from malnutrition or at least loss of subcutaneous fat that led to hypothermia? Because the diagnosis of malignancy is the most acceptable (25), it is very likely that this disease led to malnutrition and subsequent hypothermia. Did he suffer from diabetes, peripheral vascular disease, arthritis, or drug-induced hypothermia? In the absence of appropriate anamnestic, physical, and laboratory findings, these diagnoses seem very unlikely.

CONCLUSION

The sentence in the Bible, “Now King David was old and stricken in years, and they covered him with clothes, but he gained no warmth,” indicates hypothermia in elders. It is most likely that the King suffered from subclinical mild hypothermia. Among the various diseases that lead to immobility and subsequent hypothermia, the most likely are senile osteoporosis, hyperparathyroidism, dementia, or malignant disease. Among these diseases, malignancy is the most acceptable. The presence of accidental hypothermia associated with environmental factors is very unlikely. Viewed by a modern physician, the story of King David unfolds as possibly the earliest description of a patient affected by hypothermia, the features of which have changed little through the ages.

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