

MANAGEMENT OF HEATSTROKE IN 304 PATIENTS DURING HAJJ PILGRIMAGE

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ABSTRACT

Three hundred and four patients with different degrees of heatstroke were treated by the Hajj medical team of the Islamic Republic of Iran. Four percent of the patients had associated diseases. A simple method using immersion in iced tap water was used for management of heatstroke. Advantages and wide applicability of the technique are described, achieving good results without using sophisticated and expensive means.

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INTRODUCTION

Heatstroke is one of the most common causes of death among Mecca's pilgrims. We present our experiences with 304 patients suffering from heatstroke of different degrees.

PATIENTS AND METHODS

The medical team of the Islamic Republic of Iran is responsible for the treatment of Iranian pilgrims and also other patients referring from other countries as well. During the 1984 (1404 lunar calendar) pilgrimage, 304 patients with heatstroke were managed by this medical team, located in Mina. From 304 patients, 15 were non-Iranian. One hundred thirty-eight were male and 166 were female, the youngest being four days old and the oldest, 83 years old. Average age was 53.6 years for males, and 50 years for females. Twenty-eight percent of the patients had a temperature above 40 degrees centigrade; in about 65% it was between 38-40° C and in 7%, it was below 38°C. Average temperature in these patients with heatstroke was 41.5° C (Table I). About 83% of patients had minor stroke and 18% had major type. Four percent of these patients had associated diseases (cardiovascular, diabetes, COPD and hypertension) (Table II). It should be mentioned that patients with major heatstroke usually have passed the

status of minor type. Procedures for management of heatstroke have been described by Khogoli.¹ We hereby describe our experience in management of 304 patients with heatstroke.

Patients with considerable symptoms of heatstroke underwent treatment as will be discussed. Symptoms that were considered serious were coma, stupor, delirium with or without convulsions, rectal temperature above 40° C, and dry, hot skin^{1,6}. We elected a simple and effective method rather than expensive and sophisticated means.⁴ The first and most important step in management of patients with severe heatstroke was the rapid and efficient cooling of the patient.^{2,3} The time factor is serious in the reduction of mortality. Our practical method for cooling the patient was the immersion in a tub containing ice and water. First the patient is immersed in 15° C cold water, and after five minutes, when the patient is adjusted to the cold water, ice is added to the water in the tub. In order to prevent spasm in the superficial vessels, massage of the skin and limbs was performed simultaneously.

Rectal temperature was recorded every 3-5 minutes and immersion was continued until the temperature was reduced to 38.5 degrees centigrade. Normal saline was started intravenously for the patient while immersed and continued after the patient was brought out of the tub.

Vital signs were recorded every 5-10 minutes. If the patient had diarrhea or vomiting, the water was

changed continuously via a drain in the tub bottom. Our mortality rate for heatstroke was only 3.5%. Considering the simplicity and cost effectiveness of our method, we recommend its routine use in heatstroke cases. The most common complication was hypothermia, which occurred in 2% of the patients.

DISCUSSION

The main cause of heatstroke is exposure to high temperatures for prolonged periods. Physical activities in such conditions will exacerbate the symptoms.^{1,8} Classification of heat illnesses is reported by WHO in 1971.¹

Minor heatstrokes are usually seen during the first days of entry to hot environments, and this condition will subside in a lower temperature environment or following several days' stay in high temperatures, due

Table I. Body temperature in 304 patients with heatstroke

> 40°C	28%
38-40°C	65%
< 38°C	7%

Table II. Different types of heatstroke

Severe	18%
Mild	82%
Associated disease	4%

to the adaptation mechanism. Heat cramps are usually due to salt loss, which is accompanied by severe abdominal pain and pain in the limbs. If left untreated, a vicious cycle ensues and the patient's condition will deteriorate.^{6,7} Heat exhaustion will occur when the person has to stay more than a few days in a hot environment. Dehydration and hyponatremia will cause the symptoms described, and will lead to shock if left untreated.^{6,7}

Severe heatstroke is an emergency situation which is associated with loss of consciousness. The patient's temperature will be elevated to more than 42°C, due to the failure of heat regulatory mechanisms. Perspira-

Table III. Clinical symptoms in 304 patients with heatstroke

Dermatologic	Hot, dry skin	80%
	Moist skin	30%
	Skin flushing	80%
Gastrointestinal	Diarrhea	4%
	Vomiting	9%
	Nausea	9%
	Bleeding	25%
Cardiovascular	Tachycardia in major HS	90%
	in minor HS	60%
Respiratory	Dyspnea	10%
	Cyanosis	8%
	Wheezing	3%
Nervous System	Headache & dizziness	80%
	Convulsions	3%
	Delirium	5%
	Stupor	8%
	Coma	3%

tion is stopped.^{6,7} Without immediate treatment, mortality approaches 100%, while 90% will be saved if treatment is initiated rapidly.

REFERENCES

- 1- Khogoli M: Heat Disorders, 1982 (1402 A.H.), Second Edition; 1983 (1403 A.H.) Third Edition.
- 2- Khogoli M, Weiner JS: Heatstroke: report of 18 cases. *Lancet* 2:276-279, 1980.
- 3- Khogoli M, al-Khowashki: Heatstroke during Makkah Pilgrimage. *Saudi Medical Journal* 2:85-93, 1981.
- 4- Weiner JS, Khogoli M: A physiological, body-cooling unit for treatment of heatstroke. *Lancet* 1:507; 1980.
- 5- Chattan MJ: Disorders Due to Heat, Disorders Due to Physical Agents; Chapter 30, 985-985, *Current Medical Diagnosis and Treatment*, 1985.
- 6- Campbell JW, Frisse M: Heat Illness/ Medical Emergencies; Chapter 23, 407, *Manual of Medical Therapeutics*, 24th Ed., 1983.
- 7- Petersdorf RG: Disorders Associated with High Temperatures/ Heat Syndromes, Disturbances of Heat Regulation: Chapter 8—Section 2:52-53, *Harrison's Principles of Internal Medicine*, 10th Ed., 1983.
- 8- Brobeck JR: Regulation of Body Temperature, Neural Control Systems; Chapter 7, Section 9:137-142, *Best and Taylor's Physiological Basis of Medical Practice*, 10th Ed., 1979.
- 9- Root RK: Pathogenesis of Fever; Section 4:161-162, *Biological Principles of Disease*, Smith and Thier, 2nd Ed., 1985.