

**Eran Hadad**  
**Daniel S Moran**  
**Yoram Epstein**

### **Cooling heat stroke patients by available field measures**

Received: 2 November 2003  
Accepted: 5 November 2003  
Published online: 29 November 2003  
© Springer-Verlag 2003

Sir: Rapid and efficient cooling is the most important therapeutic objective in heat stroke. Several cooling methods have been described in the literature, however widespread uncertainty surrounds the best cooling procedure. The most acceptable cooling techniques include ice water immersion, exploiting the high conductive properties of water and methods based on evaporation achieved by using powerful fans on wet skin. In the Israeli Defense Forces (IDF),

commanders and medical teams have been instructed to cool heat stroke victims using simple basic field measures that include placing the victim in the shade, removal of clothing and wetting the skin with copious amounts of tap water while fanning. Analysis of 52 cases of exertion heat stroke in the IDF during the years 1996–2003 revealed that this simple and readily available cooling method yielded a cooling rate of  $0.14 \pm 0.11^\circ\text{C}/\text{min}$ . In comparison, evaporation methods and ice water immersion in the various studies produced a cooling rate that ranged from  $0.034$  to  $0.45^\circ\text{C}/\text{min}$  [1, 2] and from  $0.15$  to  $0.20^\circ\text{C}/\text{min}$  [3, 4], respectively. Moreover, aside from being readily available, the IDF routine is also not associated with severe side effects such as coronary artery vasospasm and generalized seizures, which are attributed to ice water cooling. Our results correlate with those of Magezanik et al. who found comparable cooling rates when using tap water or ice water in dogs with heat stroke [5]. It follows that effective cooling of heat stroke patients may be achieved by using available field measures and that the more sophisticated and expensive methods are not any more advantageous or preferable for the heat stroke patient.

3. Costrini A (1990) Emergency treatment of exertional heatstroke and comparison of whole body cooling techniques. *Med Sci Sports Exerc* 22 (1):15–18
4. Armstrong LE, Crago AE, Adams R, Roberts WO, Maresh CM (1996) Whole-body cooling of hyperthermic runners: comparison of two field therapies. *Am J Emerg Med* 14:355–358
5. Magazanik A, Epstein Y, Udassin R, Shapiro Y, Sohar E (1980) Tap water, an efficient method for cooling heat-stroke victims—a model in dogs. *Aviat Space Environ Med* 51(9):864–866

E. Hadad · D. S. Moran · Y. Epstein (✉)  
Heller Institute of Medical Research,  
Sheba Medical Center,  
52621 Tel Hashomer, Israel  
e-mail: hlirstn@post.tau.ac.il

Y. Epstein  
Sackler Faculty of Medicine,  
Tel Aviv University,  
Ramat Aviv, Israel

### **References**

1. Khogali M, Weiner JS (1980) Heat stroke: report on 18 cases. *Lancet* 2 (8189):276–278
2. Kielblock AJ, Van Rensburg JP, Franz RM (1986) Body cooling as a method for reducing hyperthermia. An evaluation of techniques. *S Afr Med J* 69 (6):378–380