Risk factors, preventive measures and emergency treatment for exertional heat illness (EHI) in recreational and elite sports

Karl Jochen Glitz[1], Alexander Sievert[1], Ulrich Rohde[1], Claus Piekarski[2] and Dieter Leyk[1, 3]

[1]Bundeswehr Institute for Preventive Medicine – Division A -Health and Performance Promotion-, Germany
[2]University of Cologne – Institute & Policlinic for Occupational Health, Environmental Medicine & Prevention Research, Germany
[3]German Sport University Cologne – Research Group Epidemiology of Performance, Institute for Physiology and Anatomy, Germany

INTRODUCTION

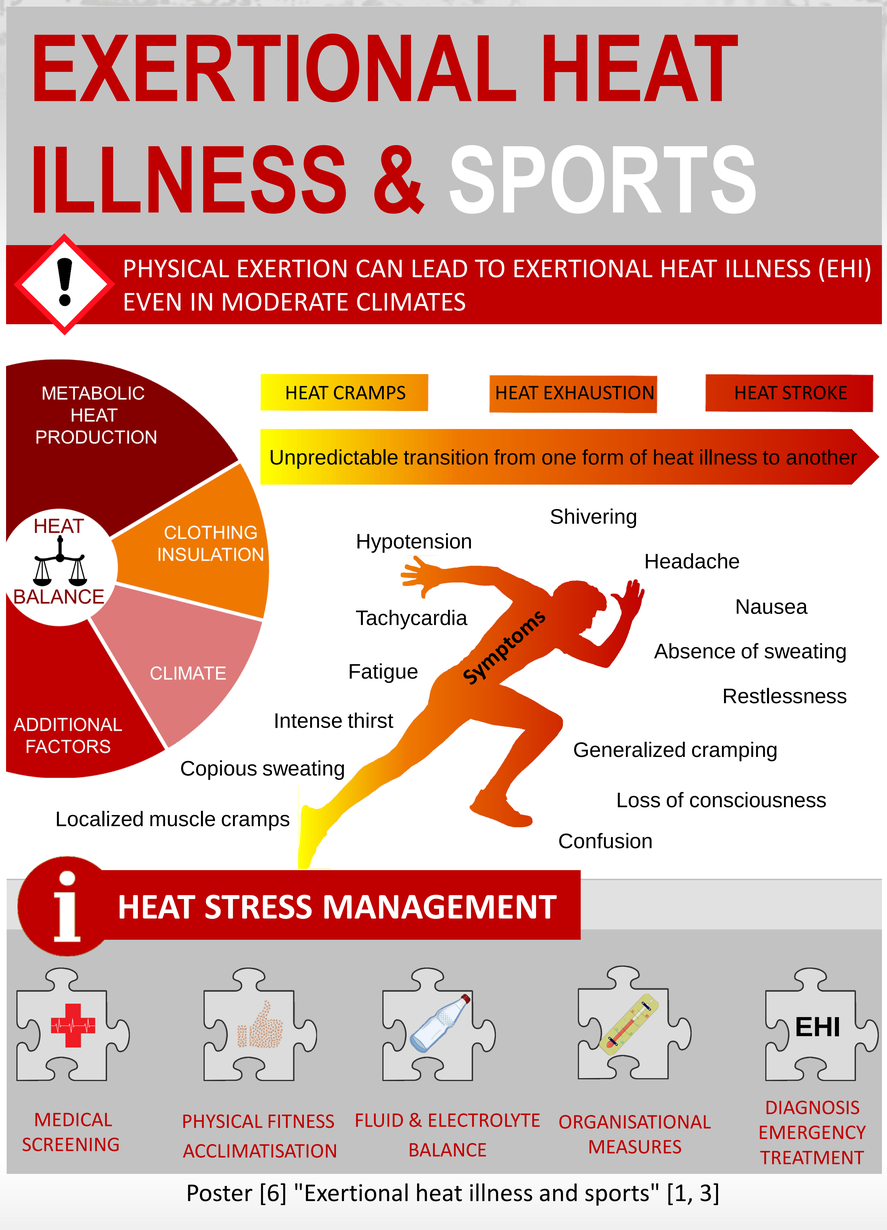
A compensated body heat balance is prerequisite for health and physical performance. To dissipate the metabolic heat of strenuous muscular work, appropriate conditions (clothing insulation, climate) are essential.
However, recreational and elite athletes are faced with hot climatic conditions (increasing global warming; international competitions at hot venues: Tokyo, Qatar, Melbourne etc.), resulting in a growing risk for exertional heat illness (EHI). This abstract focusses on risk factors, preventive measures and emergency treatment of severe EHI.

METHODS

A selective literature research was conducted in PubMed associated with the topic clusters: exertional heat illness, sports, climate, risk factors, prevention, treatment. In addition, current guidelines and expert recommendations were considered.

RESULTS

Besides metabolic heat production, clothing insulation, and climate, additional factors contribute to the risk of uncompensable heat stress: Abrupt heat waves, or rapid change of climate zones (air travel) do not allow for adequate heat acclimatisation. Characteristics present in recreational athletes (e.g. overweight, cardio-vascular risk factors) as well as acute infections, dehydration i. a. in all athletes reduce heat tolerance [1].
Preventive measures need to be merged into a comprehensive heat stress management [2] including: medical screening [3], organisational measures to reduce heat exposure (temporal & geographical relocation of sports events), recommendations for fluid and electrolyte intake, and education about physical fitness and adequate acclimatisation [4].



Poster [6] "Exertional heat illness and sports" [1, 3]

RESULTS (sequel)

Basically, exertional heat stroke (EHS) is a life-threatening incident! It may manifest itself seemingly without warning. Information for the timely diagnosis and the subsequent immediate initialisation of emergency measures must be disseminated: Successful therapy of EHS (cold immersion) depends on effective cooling (core temperature <<40 °C) within the first 30 min to improve the prognosis [1, 5].

DISCUSSION & CONCLUSION

Our literature research shows that physical exertion can lead to EHI even in moderate climates. Higher risks may be present for sport beginners and returnees compared to elite athletes as e.g. some 58% of recreational long-distance runners had no pre-emptive medical check-up [3]. As EHS is more likely to occur in persons with undetected pre-existing medical conditions, more attention should be paid to preventive as well as emergency measures.
To reduce heat related hazards during sports events, a proactive estimation of the potential risk imposed by climatic conditions is strongly recommended by using a climate index (e.g. WBGT).
Moreover, support staff (medical assistants, physicians) should be trained in the diagnosis and emergency treatment of EHI. Reliable measurements of core temperature (rectal!), measures of immediate and effective cooling before and during transfer to hospital are required for a successful clinical treatment.

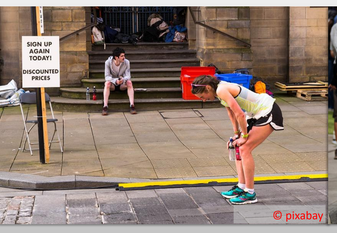
REFERENCES

1. Leyk D et al.: Dtsch Arztebl Int 116, 537-44, 2019
2. NATO: RTO-TR-HFM-187, 2013
3. Leyk D et al.: Dtsch Arztebl Int 105, 609-14, 2008
4. ACSM: Exertional Heat Illness during Training and Competition, 2007
5. Epstein Y, Yanovich R: N Engl J Med , 2449-59, 2019
6. Krapick, M.: pers. communication, 2020

RELATED LINKS

Poster download

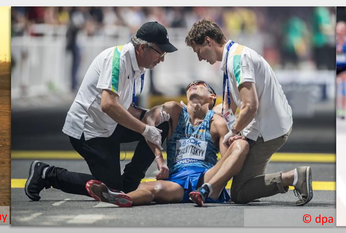
www.IPMBw.de



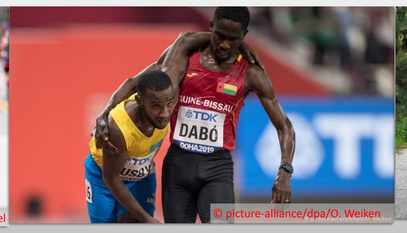
© pixabay


© Chaled Nahar


© pixabay


© dpa


© kestrel



© picture-alliance/dpa/O. Weiken


© pixabay


© Adams et al. 2020