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Research article



Effects of High-Intensity Endurance Exercise on Epidermal Barriers against Microbial Invasion

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ABSTRACT

For athletes, preventing infectious disease on skin is important. Examination measurement of epidermal barriers could provide valuable information on the risk of skin infections. The aim of this study was to determine the effects of high-intensity endurance exercise on epidermal barriers. Six healthy adult males (age; 22.3 ± 1.6 years) performed bicycle exercise at 75%HR_{max} for 60 min from 18:30 to 19:30. Skin surface samples were measured 18:30 (pre), 19:30 (post), 20:30 (60 min), and 21:30 (120 min). Secretory immunoglobulin A (SIgA) and human β-defensin 2 (HBD-2) concentrations were measured using an enzyme-linked immunosorbent assay (ELISA). SIgA concentration at pre was significantly higher than at post, 60 min and 120 min (p < 0.05). HBD-2 concentration at post and 120 min was significantly higher than at pre (p < 0.05). Moisture content of the stratum corneum was significantly higher at post than at pre, 60 min, and 120 min (p < 0.05). On the chest, moisture content of the stratum corneum was significantly lower at 120 min than at pre (p < 0.05). The number of staphylococci was significantly higher at post than at pre (p < 0.05), and tended to be higher at 60 min than at pre on the chest (p = 0.08). High-intensity endurance exercise might depress the immune barrier and physical barrier and enhance the risk of skin infection. On the other hand, the biochemical barrier increases after exercise, and our findings suggest that this barrier might supplement the compromised function of other skin barriers.

Key words: Staphylococcus, skin infections, athletes, secretory immunoglobulin a, beta-defensins

Key Points

- The immune barrier and physical barrier might be depressed and the risk of skin infection might be enhanced by high-intensity endurance exercise.
- The biochemical barrier increases after high-intensity endurance exercise and might supplement the compromised function of other skin barriers.

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