七324 Circulatory Adjustment during Prolonged Exercise.

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<Objective> During prolonged exercise, a phenomenon known as cardiovascular drift occurs, in which an increase in heart rate (HR) counteracts a reduction in stroke volume (SV) to maintain cardiac output. But there is little observation on the course of reduction in SV during prolonged exercise. This study determined whether the decline in SV during prolonged exercise is related to an increase in skin blood flow (SBF) and an increase in muscle blood flow (MBF).
<Methods> Nine normal men, aged 19-22 years, exercised on a bicycle ergometer for 60 min. at a constant work load requiring 50% of maximal oxygen uptake ($\dot{V}O_2max$) for each subject. HR, cardiac output (CO), SV, SBF and MBF were measured during the prolonged exercise. Tympanic temperature was measured every 5 min. during exercise.
<Results> HR increased 11.9% (i.e., 129±9 to 144±8 beats/min) from 10 to 60 min. of exercise. SV decreased 9.7% (i.e., 113±18 to 102±9 ml/beat) and CO was maintained during prolonged exercise. SBF increased during the first 40 min and reached a plateau thereafter. MBF increased during prolonged exercise. Temperature just prior to termination of the 60 min. of exercise was 1.7℃ higher that before exercise (i.e., 36.6t±0.51 to 38.3±0.34℃).
<Discussion> Previous studies have emphasized that thermal stress invokes cutaneous vasodilation, which displaces the circulating blood volume into cutaneous veins and thereby lowers central blood volume, cardiac filling pressure and, subsequently, SV during prolonged exercise. In the present study, however, whereas SV decreased during prolonged exercise, SBF reached a plateau during the latter 40-min of exercise. MBF increased during prolonged exercise. Furthermore, it is suggested the decline in SV is related to an increase in SBF and MBF.
<Keywords> prolonged exercise, stroke volume, skin blood flow, muscle blood flow

七325 Comparison of Artery Structure in Athletes

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<Objective>
The purpose of this study was to examine the artery structure by using both an ultrasonic and Doppler method in athletes.
<Materials and Methods>
The subjects were 10 weight lifters and 10 sprinters, 8 middle distance runners, and 7 long distance runners from 18 to 22 years of age. The arteries of the body segments were A. ascendens, A. carotis communis (right and left), A. radialis (right and left), A. dorsalis pedis (right and left). The artery diameter was measured by using the Doppler method concomitantly with an ultrasonic apparatus and measured in B and M mode screen.
<Results and Discussion>
In total diameter of all arteries , the long distance runner showed the highest value (4.768 cm), next was the weight lifter (4.698 cm), followed by the middle distance runner (4.533 cm), and sprinter (4.282 cm). In total diameter of all arteries to the surface area (TDA/SA), the long distance runner (3.036 cm/m^2) showed the highest value, followed by the middle distance runner (2.623 cm/m^2), sprinter (2.534 cm/m^2), and weight lifter (2.392 cm/m^2).
Therefore, we suggest that athletes in low intensity and long duration at exercise develop larger artery structures.
〈Key words〉 Sports event, Artery structure, Ultrasonic