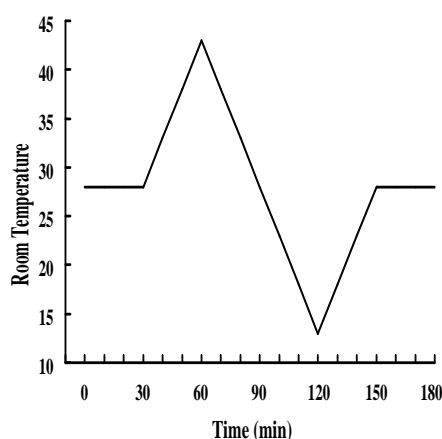


THERMOREGULATORY AND CARDIOVASCULAR RESPONSES OF YOUNG AND ELDERLY MEN TO AIR TEMPERATURE CHANGE

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The purpose of this study was to investigate the effect of room temperature change on physiological and subjective responses in the elderly and the young. The subjects were all healthy, medically-screened volunteers: 9 young men (mean age 22.3 years) and 9 older men (mean age 69.6 years). They wore only shorts during the experiment. Ambient temperature (T_a) of the climatic chamber was set at 28°C for 30 min. The T_a increased linearly to 43°C 30 min later, and decreased to 13°C 60 min after that. From 13°C the T_a moved to 28°C in 30 min and remained there for 30 min more as shown in the Figure below. Rectal temperature (T_{re}), skin temperatures at 10 points, blood flow and sweat rate were measured continuously during the three hour experiment. Heart rate (HR), blood pressure, thermal sensation and thermal discomfort were measured every 10 min. The experiments were carried out in summer. Average T_{re} of both groups were almost the same for 120 min, however, when the T_{re} of the elderly decreased more deeply at the end of the experiment, the difference between the groups became significant. As shown by hand skin temperature, the elderly could not reduce heat loss by vasoconstriction as could the young. HR in the young during the heat exposure was significantly higher than in the elderly, but there were no significant differences in HR between the groups during the cold exposure and the second 28°C period. On the other hand, systolic blood pressure (SBP) was similar in both groups during the first 28°C period and during heat exposure, but during the cold exposure SBP in the elderly were significantly higher than in the young. These differences in SBP continued even when T_a increased. Although the elderly subjects had less vasoconstriction in their extremities, due to the decreased sensitivity of their baroreceptor reflexes, SBP increased more during cold exposure than in the young. The elderly's lower core temperature probably caused their much higher blood pressure in the latter part of the experiment. There were no differences in thermal sensations between the groups during the experiments, but the degree of thermal discomfort for the elderly during heat and cold exposures were significantly smaller than for the young. Physiological after effects from cold exposure were more marked for the elderly, but they seemed less aware of them than the young.



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