BODY TEMPERATURE AND THERMAL SENSATION OF THE ELDERLY IN HOT AND COLD ENVIRONMENTS

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INTRODUCTION

Most Japanese do not have central cooling and heating systems in their homes, and they only use cooling and heating instruments in their rooms. Therefore, there are large temperature differences between cooled or heated rooms (e.g. living room, bedroom) and the others (e.g. toilet, passage). It is known that these large temperature differences cause serious diseases such as stroke. Especially, the elderly people tend to suffer from these diseases because of the reduction of physiological functions due to aging. The purpose of this experiment is to investigate the thermal responses of the elderly due to the temperature differences which are experienced during winter and summer in Japanese houses.

METHOD

Ten elderly females (EF), aged from 66 to 79, and 10 college-aged females (CF), aged from 20 to 22, served as the subjects in cold environment (10°C, 60% RH). Nine EF, aged from 62 to 72, and 12 CF. aged from 21 to 26, served as the subjects in hot environment (35°C, 60% RH). Air velocities were kept at 20 cm/s in both environments.

The subjects stayed in neutral environment (25°C, 60%) for more than 23 minutes. thereafter they exposed to cold or hot environments for 49 minutes. Then again, they returned to the neutral environment, and stayed for 47 minutes. Skin temperatures at 10 sites, systolic hlood pressure (SPP), thermal sensation and sensation of wet were measured during the experiments (119 minutes). The subjects wore standard clothing (0.63 clo) in both environments.

RESULTS

There were no significant differences of mean skin temperature between EF and CF in both experiments. However, there were some differences of local skin temperatures between the groups. Figure 1 showed the changes in finger skin temperature in both groups and .environments. Before the cold or heat exposures, finger skin temperatures were almost the same for both groups. However, finger skin temperatures of EF during cold exposures were significantly higher than those of CF. These results indicate that EF decrease their abilities of cutaneous vasoconstriction at the extremities to prevent heat loss. On the other hand, there were no differences of finger skin temperatures between the groups at the end of the hot exposures. However, the rates of increase in finger skin temperatures of EF were significantly smaller than those of CF at the beginning of the heat exposures. These results may show that the heat losses due to the increase of cutaneous hlood flow of EF were delayed than those of CF.

Figure 2 showed the changes in SBP in both groups and environments. Increases of SBP by cold exposures of EF were fairly larger than those of CF. On the other hand, changes in SBP by heat exposures were small for both groups.

and cooling systems which includes the rooms where the people do not stay for a long period of time (e.g. toilet,