SL3 A summary of the hemostatic reactions after the bathing in very hot hot-spring

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Background: Japanese loves very hot hot-spring bathing although it has some adverse reactions. Jikan-yu (timed bathing), or repeated head-out water immersion in Kusatsu hot-spring at 47°C, 4 times a day, each for 3 minutes, is a traditional bathing method continued since more than 200 years ago in Kusatsu spa resort, Japan. We previously reported that a very hot hot-spring bathing might result in cerebral or myocardial infarction, although appropriate hyperthermia is beneficial for human body. We summarize the effects on hemostasis after 3-minutes bathing at 47°C.

Methods and Subjects: Healthy subjects aged from 22 to 40 years old bathed up to the shoulder level in a sitting position in acidic hot-spring at 47°C for 3 minutes. Blood pressure, blood viscosity, coagulation and fibrinolytic markers, as well as ultrastructure and P-selectin of circulating platelets were analyzed before and after the bathing.

Results: Blood pressure increased during bathing but decreased after the bathing. A trend toward an increase in blood viscosity after the bathing was observed. Plasma tissue plasminogen activator decreased slightly and plasminogen activator inhibitor increased transiently but markedly after the bathing at 47°C. In contrast, the coagulation and fibrinolytic markers were not changed significantly after the bathing at 40 or 42°C. Ultrastructural changes (folds, pseudopods, vacuoles and centralization) were increased after the bathing at 47°C. Flowcytometry demonstrated an increase in P-selectin on the surface of platelets after the bathing at 47°C. See References 1-8.

Discussions: It is suggested that the bathing at 47°C leads to a thrombotic state, and further to a thrombosis when combined with endothelial dysfunction or atherosclerosis.

Keywords: Very hot hot-spring, Hemostasis
