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SAUNA BATHING AND THE CARDIOVASCULAR SYSTEM

Cardiology

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ABSTRACT

Sauna bathing is a form of thermal therapy that has been utilized for generations primarily in the Scandinavian countries as a health tonic to improve well being. Current research into sauna bathing has found that not only is it extremely safe for most people, it appears to have significant health benefits for the cardiovascular and cerebrovascular systems. These vascular benefits are the most likely reason that regular sauna bathing has been associated with a decreased rate of dementia, lower mortality, and improvements in people with heart failure. Sauna bathing is safe but not entirely without risk. To minimize any risk of an adverse health event, alcohol should be avoided when sauna bathing, and bathing should not be done alone. Taking short cooling breaks when sauna bathing may maximize benefits by decreasing vascular stiffness and helping the blood vessels become more responsive to heat and other forms of stress.

KEYWORDS

Sauna bathing, heat therapy, dementia, vascular diseases

Sauna bathing has been utilized for health benefits by gently increasing the body temperature. It is a common practice in the Scandinavian countries, and in particular Finland, where there is approximately 1 sauna for every 5 people (Crinnion, 2011). Sauna bathing induces several physiological effects, including cardiovascular and hormonal changes. It is generally safe and well tolerated by most healthy adults and children. There have been multiple reports of various health benefits of sauna exposure ranging from improving heart failure, decreasing the risk of Alzheimer's disease, and decreasing all-cause mortality (Blum & Blum, 2007; Laukkanen, Khan, Zaccardi, & Laukkanen, 2015; Laukkanen, Kunutsor, Kauhanen, & Laukkanen, 2017). A common mechanism for these multiple medical benefits may be the beneficial effects sauna bathing has upon the vascular system and lipid profiles (Gryka, Pilch, Szarek, Szygula, & Tota, 2014; Pilch et al., 2010).

Heart Failure

Heart failure affects about 1% of people aged 65 or older. It is difficult to treat effectively, with readmission rates of up to 50% by 6 months after hospitalization. Heart failure primarily affects the elderly, so as the population ages, the incidence of heart failure is also increasing. Treatment primarily consists of medical therapy, cardiac rehab, and in selected patients, cardiac device implantation. Although not widely utilized, sauna bathing may be an additional treatment modality that can improve the clinical symptoms of patients with heart failure. In addition, there is some evidence that sauna therapy may also be beneficial in the primary prevention of atherosclerotic disease in patients with risk factors, which may help prevent heart failure (Blum & Blum, 2007).

The mechanism underlying the robust health benefits observed from sauna therapy in patients with heart failure appears to be related to an improvement in vascular function. In one study, 20 people underwent 8 weeks of repeated hot water immersion treatments, and experienced increased flow-mediated dilation and reduced arterial stiffness (Brunt, Howard, Francisco, Ely, & Minson, 2016). Waon therapy, a form of dry heat therapy similar to sauna bathing, also has been shown to have beneficial structural and molecular effects on the vascular system. Another study compared the vascular effects of Waon therapy with statin therapy. This study in laboratory rats found that the structural and molecular vascular effects of Waon therapy were similar to the effects of fluvastatin (Ihori et al., 2016). A clinical trial of 20 healthy young women found that sauna bathing every other day for two weeks resulted in a statistically significant 8% drop in total cholesterol (Pilch et al., 2010).

These vascular effects of sauna bathing appear to have significant health benefits in heart failure. In a study of 153 heart failure patients, Waon therapy improved the 6-minute walk distance, the cardiothoracic ratio, and the New York Heart Association (NYHA) functional classification (Tei et al., 2016). Another study of 54 patients with chronic heart failure also found that sauna therapy significantly improved the ambulation grade, cardiothoracic ratio, and NYHA functional classification (Haseba, Sakakima, Kubozono, Nakao, & Ikeda, 2016). A third study of 49 heart failure patients found that Waon therapy improved the 6-minute walking distance, left ventricular ejection fraction, flow mediated dilation of the brachial artery, and overall quality of life (Sobajima et al., 2015).

Alzheimer's Disease

The cardiovascular system plays a critical role in overall health, including brain function. Because decreased cerebral perfusion plays a critical role in the development of Alzheimer's disease, it makes sense that an improvement in cerebral blood flow brought about by improvements in the vascular system would decrease the risk of Alzheimer's and other cognitive diseases (Daulatzai, 2017).

A recent study of 2315 apparently healthy Finnish men looked at this hypothesis. The men were aged 42 to 60 years at baseline, and they underwent a median follow-up of 21 years. During this time the cohort developed 204 cases of dementia and 123 cases of Alzheimer's disease. After adjusting for multiple cardiovascular risk factors, this study found that more frequent sauna bathing sessions decreased the risk of both dementia and Alzheimer's disease. Compared to men who engaged in only 1 sauna bathing session per week, those who engaged in 2 to 3 sessions per week had an approximate 20% decreased risk of dementia or Alzheimer's disease. Thos who engaged in 4 to 7 sauna bathing sessions per week did even better. Their risk of dementia or Alzheimer's disease was decreased by about 65% (Laukkanen et al., 2017). Note, in this study, it was found that nearly all Finnish men engaged in regular sauna bathing (at least once a week). Out of 3433 men randomly selected, 2327 had complete information on sauna bathing and only 12 men did not use a sauna.

Overall Mortality

Given sauna bathing's effects upon the cardiovascular system, it has been hypothesized that this form of heat therapy might result in a decreased overall mortality rate. To test this hypothesis, a prospective cohort study was performed on a samle of 2315 middle-aged Finnish men. During the median follow-up period of 21 years it was found that those who sauna bathed 4 to 7 times per week had a 39% lower all-cause mortality compared to those who bathed only 1 time per week. Those who bathed 2 to 3 times a week had a 31% lower mortality compared to the once a week group. In a multivariate analysis adjusting for cardiovascular risk factors, the mortality benefit was 40% for the 4 to 7 times a week group compared to the once a week group. This study also found that all-cause mortality was decreased by 17% in those who sauna bathed for 20 minutes or more a session, compared to thoes who bathed for 10 minutes or less (Laukkanen et al., 2015).

Minimizing Risk and Maximizing Benefits

Although sauna bathing is extremely safe, it has been associated with adverse events including death in rare cases. The most common cause of adverse events is in people who combine alcohol consumption with sauna bathing. In perhaps the largest review to date of deaths related to sauna bathing, out of 77 deaths identified over an 11 year period in Sweden, 71% of the bathers had alcohol in their system. In 65 of the 77 cases, a major disease was identified that could have explained the death. In the 77 deaths, all but 2 were found bathing alone (Rodhe & Eriksson, 2008). To minimize the small but still present risks of sauna

bathing, bathers should not bathe alone, and should not combine alcohol with sauna bathing. When on medications or with a chronic disease, checking with a physician should be done prior to sauna bathing. Short as opposed to long sauna bathing times may greatly decrease any risks while still confering significant health benefits. It is always safest for people to check with their primary care provider or cardiologist before starting a regular sauna bathing program.

Like other parts of the body, it appears that the vascular system responds to interval training. By exposing the body to heat alternating with cold or normal temperatures, the blood vessels are stimulated to expand and contract. This type of vascular exercise appears to have widespread positive effects on the vascular system, similar to what is seen in sedentary people who start exercise training. This improved responsiveness of the vascular system may in part be mediated by an increase in nitric oxide dependent dilation (Brunt, Eymann, Francisco, Howard, & Minson, 2016). A study of 20 young women divided the women into two groups. Group I engaged in a single 30 minute sauna bathing session every other day for two weeks. Group II underwent sauna bathing in two 20 minute sessions, interrupted by a 5 minute break of cooling down, also every other day for two weeks. Group II, but not Group I, had a statistically significant drop in their total cholesterol after two weeks (Pilch et al., 2010). Although not proven, this research suggests that frequent short sessions of sauna bathing, broken up by brief episodes of mild cooling, may maximize the benefits of sauna therapy.

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