

Research Letter

Effect of Waon Therapy in Individuals With Heart Failure: A Systematic Review

To the Editor:

Complementary and alternative treatments have been proposed for heart failure (HF), including Waon therapy, a kind of sauna therapy; however, studies have been shown divergent results.¹⁻⁵ Therefore, the main objective of this study was to perform a systematic review about the effect of sauna therapy on left ventricular ejection fraction (LVEF), blood pressure, natriuretic peptides (NP), and noradrenaline in patients with HF.

Search Strategy and Data Extraction

We performed this study following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis statement and the Cochrane Collaboration Handbook⁶ without language restrictions. We searched trials published until June 2017 from PubMed, Scopus, and Bireme. Our strategy (participants, intervention, comparison, outcomes, and study type) was: (1) population: patients with HF under standard medical therapy; (2) intervention: Waon therapy; (3) comparison: control group; (4) Outcomes: LVEF, blood pressure, NP, and noradrenaline; and (5) study type: randomized clinical trials. Any study comparing another intervention associated with Waon therapy was excluded. Search terms used: “sauna,” “Waon therapy,” and “heart failure.” We also performed a hand search of cross-references from original articles and reviews. Two independent reviewers searched for the relevant studies according to title and abstract. We defined the treatment effects of Waon therapy on the outcomes of interest as mean difference and 95% confidence intervals (CIs). To calculate the effect size, means and standard deviations were obtained from each study group and outcome of interest.

A Forest plot was used to graphically present the effect sizes and the 95% CIs. A 2-tailed P value of $<.05$ was used to determine significance. Statistical heterogeneity was assessed by using the Cochran Q test⁷ and quantified by the I^2 index.⁸ We conducted all analyses using Review Manager 5.3 (Cochrane IMS, Copenhagen, Denmark).

Results

Our search identified 247 potentially eligible studies. After evaluation of duplicates and eligibility by title and abstract, we obtained 10 articles for full content evaluation. After a

complete reading, 5 studies were excluded because of lack of randomization; 5 studies¹⁻⁵ met the eligibility criteria and were included in our analysis (Supplementary Fig. S1).

All included studies evaluated inpatients with New York Heart Association classes II–IV under standard medical treatment.

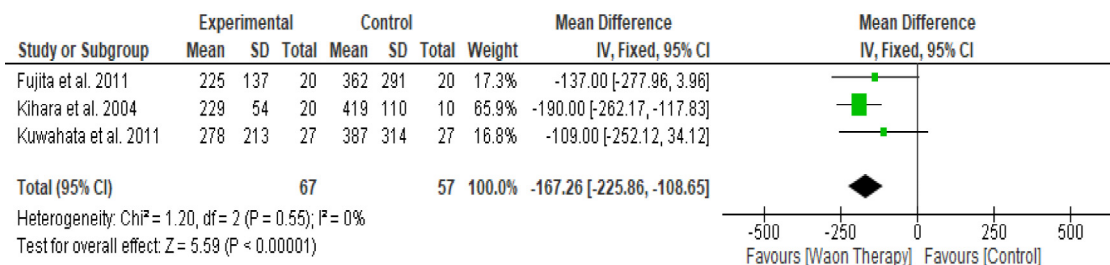
The intervention protocol was homogenous in the studies: 15 minutes in a 60°C dry infrared sauna followed by 30 minutes lying down with blankets and oral hydration to compensate for water loss resulting from sweating. Patients were weighed before and after the intervention to guide rehydration. Three to 5 sessions were conducted per week over 2–4 weeks. No side effects were reported. Waon therapy resulted in a significant reduction of brain natriuretic peptide (–167.3 pg/mL; 95% CI –225.8 to –108.6; $P < .00001$), atrial natriuretic peptide (ANP; –48.7 pg/mL; 95% CI –72.1 to –25.3; $P < .0001$), systolic blood pressure (SBP; –6.1 mmHg; 95% CI –10.8 to –1.3; $P = .01$) and diastolic blood pressure (–4.7 mmHg; 95% CI –8.7 to –0.7; $P = .02$) (Fig. 1). Values for LVEF (1.6%; 95% CI –0.1 to 3.4; $P = .07$) and noradrenaline (–48.5 pg/mL; 95% CI –99.5 to 2.6; $P = .06$) (Fig. 1) did not show statistically relevant differences in relation to the control group (Supplementary Fig. S2).

Discussion

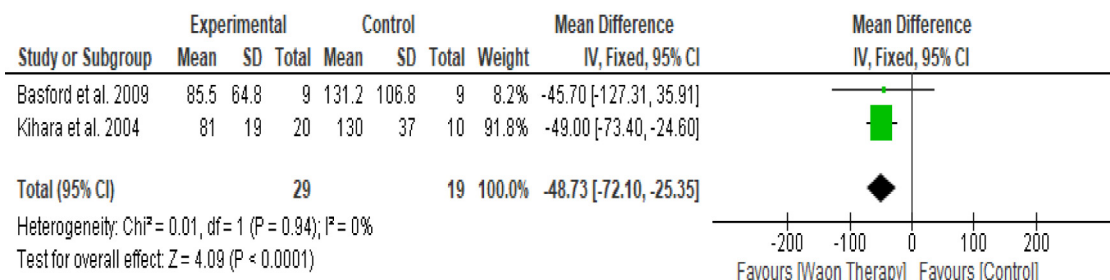
Our systematic review showed favorable effects of Waon therapy on NP and blood pressure in patients with HF. The studies in this systematic review are limited by lack of blinding and small sample size. The main physiological mechanism of Waon therapy has been proposed to be neurohumoral modulation and, therefore, reverse cardiac remodeling.⁹ However, this systematic review do not totally support this physiological mechanism. We did not find differences in noradrenaline levels and LVEF. On the other hand, we found a positive effect of Waon therapy on ANP, brain natriuretic peptide, and blood pressure (–6 mmHg for SBP; –4.7 mmHg for diastolic blood pressure). This blood pressure and ANP reduction could be explained by vasodilation and salt loss. Blood pressure reduction may be significant in the clinical setting, considering that reductions of 5 mmHg in SBP are associated with a 13% reduction in cerebrovascular events.¹⁰

Although side effects were not reported, this systematic review cannot make a pragmatic recommendation about the use of Waon therapy as an adjuvant intervention in patients with HF. Studies with high-quality methodology and long-term intervention are necessary to better understand the effects of Waon therapy in patients with HF.

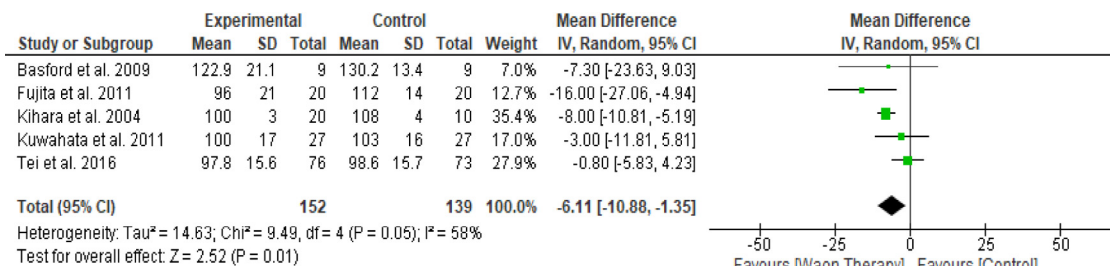
a) BNP



b) ANP



c) SBP



d) DBP

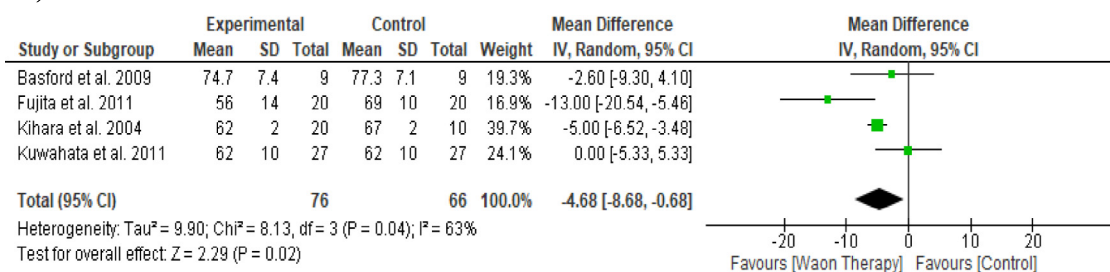


Fig. 1. Forest plot showing a meta-analysis for sauna therapy group vs control group on (A) brain natriuretic peptide, (B) atrial natriuretic peptide, (C) systolic blood pressure, and (D) diastolic blood pressure. ANP, atrial natriuretic peptide; BNP, brain natriuretic peptide; CI, confidence interval; diastolic blood pressure, ; SBP, systolic blood pressure; SD, standard deviation.

Disclosures

None.

Supplementary Data

Supplementary data related to this article can be found at
[doi:10.1016/j.cardfail.2018.01.008](https://doi.org/10.1016/j.cardfail.2018.01.008).

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<https://doi.org/10.1016/j.cardfail.2018.01.008>