



Effects of Preoperative Warming on Hemodynamic Changes Before Cataract Surgery

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»» Abstract Summary:

We assessed preoperative hemodynamic changes in patients receiving warming before cataract surgery and compared them with those who did not receive warming. Significant differences were found in the hemodynamic variability. Preoperative warming can reduce perioperative hemodynamic change.

»» BACKGROUND

Cataracts are the leading cause of visual impairment worldwide. Numerous studies show that physical function, mental health, emotional well-being, safety, and overall quality of life can be enhanced when visual function is restored by cataract extraction (Olson et al., 2016).

Patients report the highest levels of anxiety preoperatively (Akhtar et al., 2016), with anxiety being common when anticipating surgery and being a major factor contributing to hemodynamic changes before entering the operating room (Tanaka et al., 2015).

Preoperative warming has been shown to have a positive effect on thermal comfort and sense of well-being among patients. To the best of our knowledge, no study has assessed the effect of warming on preoperative hemodynamic change in patients undergoing cataract surgery.

»» Purpose:

The aim of this prospective, randomized, controlled study was to assess the effect of preoperative warming on hemodynamic changes before cataract surgery.

»» METHODS

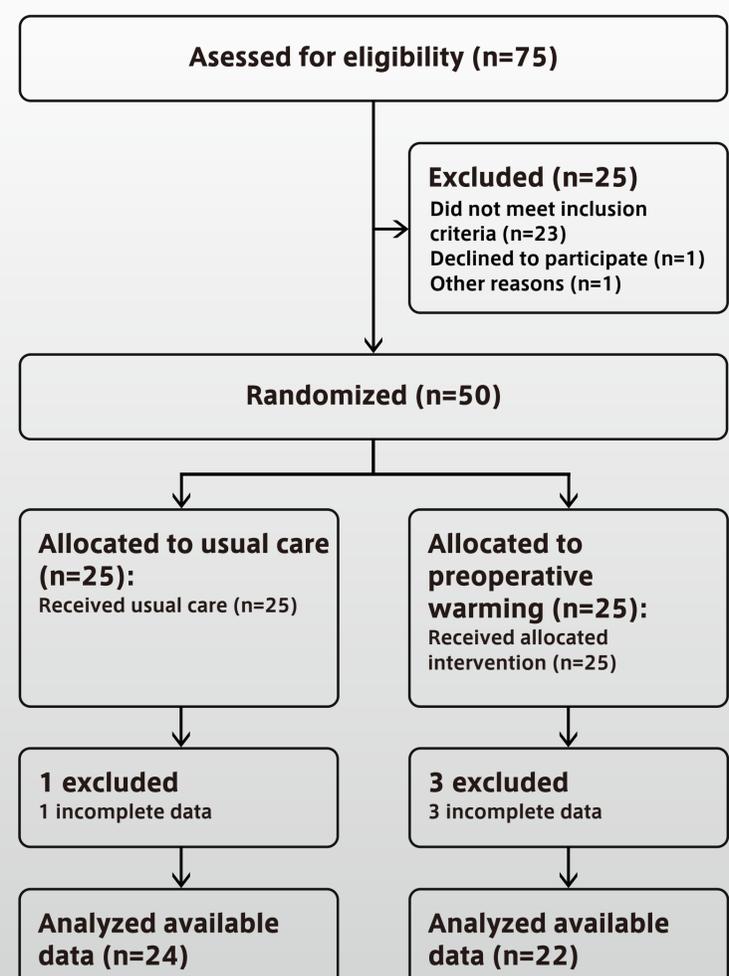
Study participants:

This study enrolled patients (20 years old or above) undergoing elective cataract surgery. The study protocol was approved by the ethics committee of the hospital, and informed consent was obtained from all patients.

Randomisation:

Patients were randomized into preoperative warming or control groups using sealed, opaque envelopes containing computer-generated random numbers.

Patients were then randomly allocated to receive either a resistive heating blanket (SmartCare: Geratherm Medical AG, Germany) or a cotton blanket.



Scheme diagram of study design.

Monitoring:

All patients were placed on a hospital bed 30 min before transfer from the ward to the operating room where non-invasive blood pressure monitoring and pulse oximetry were performed. We measured and recorded the heart rate, systolic and diastolic blood pressure, and the perfusion index at baseline, with the patient in a supine position. When the patient entered the operating room, routine monitoring equipment was connected and the hemodynamic parameters were recorded again 5 min after entering the operating room.

Warming:

In the warming group, the resistive heating blanket was then switched on for 15 min and kept at 37°C; in the control group, the standard cotton blanket was used without active heating.

Results:

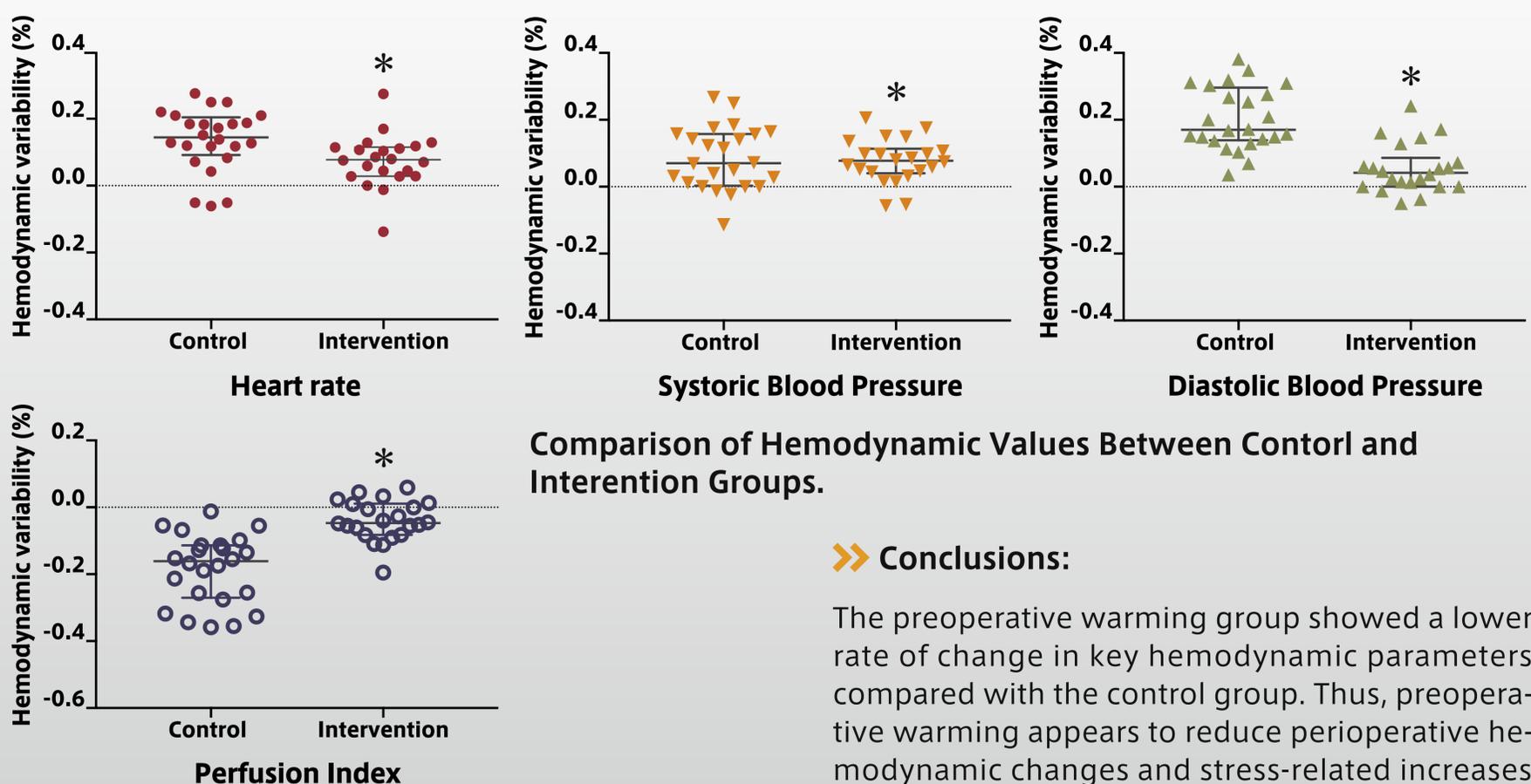
Of the 50 patients enrolled in the study, four patients were excluded because they could not complete the study. Therefore, 22 and 24 patients were randomized to the warming and control groups, respectively, with no statistically significant differences in characteristics between the groups. In addition, baseline hemodynamic parameters were not statistically significant within the warming and control groups.

After entering the operating room, hemodynamic variability parameters were better in the warming group than in the control group, with the changes in heart rate (7.49 ± 7.82 beats/min vs. 13.59 ± 9.32 beats/min), systolic blood pressure (7.62 ± 6.56 mmHg vs. 20.24 ± 9.36 mmHg), and perfusion index (-3.99 ± 6.023 vs. -18.50 ± 10.38) being significant ($p < 0.01$).

Demographic and clinical characteristic of the study groups.[☆]

Variable	Control group (n = 24)	Warming group (n = 22)	p-value
Age (years)	70 (49-81)	66 (43-79)	0.52
Gender (male/female)	11 (49) / 13 (54)	12 (50) / 10 (45)	0.77
Body Mass Index (kg/m ²)	21.36 (17.71-29.09)	21.42 (18.89-27.01)	1.00
History			
Previous surgery	13 (54)	13 (54)	0.77
Cardiovascular disease	8 (33)	4 (18)	0.32
Diabetes mellitus	6 (25)	5 (23)	1.00
Hemodynamic parameters			
Heart rate, per beats/ min	67 (58-82)	70 (58-81)	0.30
Systolic blood pressure, mmHg	125 (100-144)	124 (92-150)	0.91
Diastolic blood pressure, mmHg	73 (54-88)	70 (56-84)	0.63
Perfusion Index	16.10 (10-19)	16.95 (13-20)	0.21

[☆] Data are represented as median (range) or number (%).



* $p < 0.01$ vs control group.

Hemodynamic variability:

$([\text{after entering the operating room} - \text{baseline}] / \text{baseline}) \times 100$.

Data are presented as median with interquartile range.

Conclusions:

The preoperative warming group showed a lower rate of change in key hemodynamic parameters compared with the control group. Thus, preoperative warming appears to reduce perioperative hemodynamic changes and stress-related increases in activity of the sympathetic nervous system.