CRYOCOMPRESSION vs CONTINUOUS-FLOW COOLING: OPTIMAL METHOD TO DELIVER LIMB HYPOTHERMIA IN PREVENTING CHEMOTHERAPY-INDUCED PERIPHERAL NEUROPATHY


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## Faculty Disclosure

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Unmet clinical need
Chemotherapy-induced peripheral neuropathy

- Damage to peripheral nerves due to neurotoxic chemotherapeutic agent
- Occurs in 57-83% of patients treated with taxane and platinum chemotherapy
- Only symptomatic treatment – pain killers/Dose limitation and reduction

“Glove-and-Stocking” distribution of CIPN symptoms

SB Park et al., CA Cancer J Clin, 2013.
Background

Limb hypothermia for preventing CIPN

Chemotherapy
- Paclitaxel
- Ulnar nerve
- CIPN
- Ulnar vein

Limb hypothermia
- Paclitaxel
- Limb hypothermia
- Reduced blood flow
- Reduced CIPN

US Patent Application No.: 14/761,239
Background

Temperature-dependent hemodynamics

Background

Modes of limb hypothermia for preventing CIPN

http://pioneerintrees.com/tag/cryotherapy/
US Patent Application No.: 14/761,239
https://www.huffingtonpost.co.uk/laura-price/my-chemotherapy-diary-part-iii_b_2130557.html
Healthy volunteers were recruited for study

Limb hypothermia with continuous, multi-channel temperature monitoring

Results

Safety and tolerability of limb hypothermia in healthy volunteers

Continuous-flow cooling
(cooling without pressure)

Cryocompression
(cooling + pressure)

Frozen gloves

Results

Safety and tolerability of limb hypothermia in cancer patients

Continuous-flow cooling (cooling without pressure)  
\[ N = 21 \]  
22°C  
60 120 180  
218 cycles

Cryocompression (cooling + pressure)  
\[ N = 19 \]  
11°C  
60 120 180  
167 cycles

R. Sundar, A.Bandla et al., ASCO, 2018.
Results

Skin temperature changes in healthy volunteers

Conclusions

• Continuous-flow cooling and Cryocompression are **safe and well tolerated** by healthy volunteers for a duration of 3 hours.

• Frozen gloves were minimally/not tolerated for a duration of 3 hours.

• Cryocompression allows for limb hypothermia at **lower temperatures** than continuous-flow cooling, with similar safety profile.

• Cryocompression may provide greater efficacy in preventing CIPN in cancer patients, with clinical trials currently ongoing (NCT03248193).
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Thank You!
Experiment set-up

Measures of tolerability

**Visual analogue pain scale (VAS)**

- 10 = Agonizing
- 9 = Horrible
- 8 = Dreadful
- 7 = Uncomfortable
- 6 = Annoying
- 5 = Registration
- 4 = Registration
- 3 = Registration
- 2 = Registration
- 1 = Registration
- 0 = None

**Shivering assessment scale (SAS)**

- 0 – none
- 1 – mild
- 2 – moderate
- 3 – severe

**Subjective tolerance scale (STS)**

- 0 = tolerated
- 1 = no problem maintaining
- 2 = tolerating cooling, but not without discomfort
- 3 = only barely tolerated
- 4 = intolerable

**Composite Tolerability Score (CTS)**

Intolerable

- >7 on VAS OR >2 on SAS OR >3 on STS
- OR
- >6 on VAS AND >1 on SAS AND >1 on STS

Hypothermia for preventing chemotherapy-induced neuropathy – a pilot study on safety and tolerability in healthy controls
Aishwarya Bandla, Raghav Sundar, Lun-De Liao, Stacey Sze Hui Tan, Soo-Chin Lee, Nitish V. Thakor & Einar P. V. Wilder-Smith

Limb Hypothermia for Preventing Paclitaxel-Induced Peripheral Neuropathy in Breast Cancer Patients: A Pilot Study
Raghav Sundar, Aishwarya Bandla, Stacey Tan, Nesaretnam Barr Kumarakulasinghe, Yiding Huang, Sally Ang.

Cryocompression for enhanced limb hypothermia in preventing paclitaxel-induced peripheral neuropathy.
Raghav Sundar, Aishwarya Bandla, Stacey Tan, Nesaretnam Barr Kumarakulasinghe, Yiding Huang, Sally Ang.
December 28, 2017

URGENT: MEDICAL DEVICE RECALL NOTICE
Hypothermia Caps, Mittens and Slippers

Southwest Technologies, Inc is voluntarily recalling all Hypothermia products including Caps, Mittens and Slippers for the intended use of reduction of chemotherapy induced alopecia, onycholysis and skin toxicity. Serious injuries have occurred or could occur due to the failure mode associated with this recall. We have reports of two (2) serious injuries.

Reason for the Voluntary Recall:
Products (hypothermia mitts, hypothermia slippers and hypothermia caps) entered into the market are misbranded for use during Chemotherapy treatments. In addition Southwest Technologies, Inc. has been informed that two (2) instances of frostbite to digits have occurred in the last year while using the hypothermia mitts.

Risk to Health:
The device has not passed FDA clearance for the intended use and may cause frostbite to digits on patients with but not limited to diabetic neuropathy, Raynaud’s disease, Distal metastasis, Distal arteriopathy, and cold intolerance.

How to recognize that the device may fail. If patients are using the above products, they may feel pain in digits prior to the frostbite occurring. Discontinue use immediately at the first indication of pain.

Actions to be taken by the Customer/User:
DISCONTINUE USE OF PRODUCT IMMEDIATELY! You the customer/distributor may do one of three actions to aid Southwest Technologies, Inc. in this recall.

1). DISCONTINUE use of the product IMMEDIATELY and Return the attached Medical Device Recall Return Response within 30 days of receipt of this notice.
2). DISCARD any remaining product in your possession IMMEDIATELY and Return the attached Medical Device Recall Return Response within 30 days of receipt of this notice.
3). RETURN any product to Southwest Technologies, Inc. and Return the attached Medical Device Recall Return Response within 30 days of receipt of this notice.