HILOTHERAPY

The thermal procedure, controllable to the nearest degree

HILOTHERM® GmbH

What is HILOTHERAPY?

HILOTHERAPY is a form of physical thermo-therapy that involves applying constant temperature within the range +5 to +25 °C in a localized and targeted manner. During this procedure, applications lasting several hours without temperature deviations can be implemented. When deployed prophylactically, HILOTHERAPY can significantly reduce the risk of chemotherapy-induced polyneuropathy.

Chemotherapy-induced polyneuropathy (CIPN)

One frequent complication of chemotherapy which occurs with specific zytostatic drugs, such as carboplatin, capecitabin, 5-Fu, cyclophosphamide, cytarabine, docetaxel, doxorubicin, oxaliplatine, paclitaxel, sorafinide and sunitinib, is hand-foot syndrome.

This comprises side effects affecting the hands and feet, which may occur right after the start of chemotherapy, during ongoing application of the same or even some months later.

Symptoms

- Numbness in the hands and feet with unsteady gait
- Impaired sense of taste
- Loss of depth sensitivity
- Loss of temperature perception
- Burning pains
- Disruption to coordination
- Hypersensitivity of the skin, e.g. to the touch

Hand-foot syndrome also often includes polyneuropathy.

Three degrees of severity for hand-foot syndromes

According to the definition of the World Health Organization (WHO) and the National Cancer Institute (NCI), three degrees of severity can be used to distinguish symptoms.

- ***Grade 1:***

Numbness, dysesthesia, paresthesia. Difficulties which do not impact on everyday life.

- ***Grade 2:***

Painful swellings and/or erythema. Difficulties which impact on everyday life.

- ***Grade 3:***

Extensive blistering; oozing, scaly skin; ulcerations, severe pains. This often results in onycholysis, namely losing one or more nails. Considerable difficulties, which render everyday life impossible.

The lack of any causal therapy for both complexes of clinical signs means that in the worst case scenario, chemotherapy may have to be suspended or abandoned.

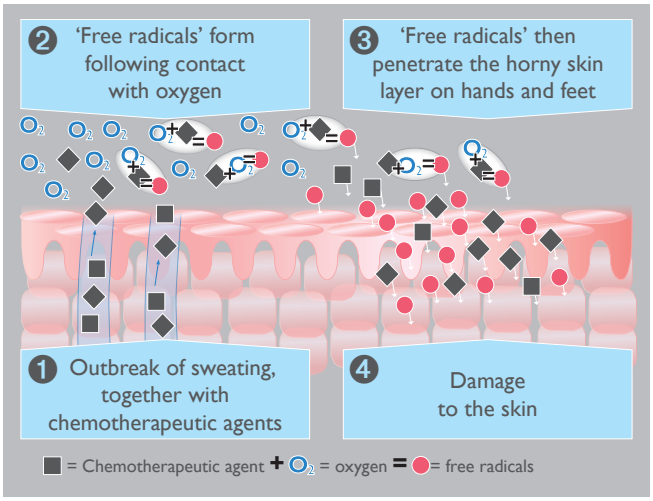
+5 to +25 °C

How does CIPN develop?

The general understanding is that any attack on the sensitive nervous system is exacerbated when the blood supply to these nerve cells is populated by fenestrated capillaries. In other words, the altered protein composition of the cell wall is more permeable to specific chemotherapeutic substances. The substances in question then inflict fundamental damage on the nerve cells. This damage to cellular as well as mitochondrial DNA, plus disrupted calcium balance and oxidative stress, are what encourage the dissolution of ganglion cells. Since the long nerve fibers are more sensitive to these damaging impacts, CIPN tends to be considered length-dependent, with a focus on the lower extremities.

How does hand-foot syndrome develop?

Portions of the chemotherapeutic agent are conveyed via the sweat glands to the surface of the skin, where they form 'free radicals' in contact with oxygen. These damage the tissue cells of the skin, particularly where the horny layer of skin is thickest and the substance is soaked up like a sponge: at the palm and on the soles of the feet.



How does HILOTHERAPY prevent hand-foot syndrome?

To prevent the chemotherapeutic agent from penetrating the capillaries of extremities, both blood circulation and metabolism have to be slowed down. This is done by lowering the tissue temperature. For example, lowering the temperature by 10°C already reduces the metabolic rate by 50%.

Using HILOTHERAPY, the localized tissue temperature in the area of the hands and feet can be configured to an individual value and both can be kept constantly cool. Reducing metabolism and blood circulation to a constant level limits the penetration of the chemotherapeutic agent in the extremities and hence the amount which is discharged via the sweat glands.

The function of HILOTHERAPY

HILOTHERAPY functions with the HILOTHERM *Chemocare* device, which forms a closed-loop system with cuffs and piping, through which the coolant flows.

Monitor sensitive sensors ensure constancy of temperature throughout the entire therapy period – even over many hours.

HILOTHERM Chemocare with two hand and foot cuffs

The cuffs

When using HILOTHERAPY to combat hand-foot syndrome, two special cuffs are deployed:

Hand cuff

Foot cuff

A comparison of cold therapies

The ability of this method to maintain a constant temperature gives it a key advantage compared to conventional alternatives, such as ice gloves etc. These will thaw and lose their cooling effect and have to be changed throughout the therapy during the treatment process. They also involve the risk of skin burns due to the nature of the extremely cold temperatures used.

Trial prophylactic use

Specialist practice for gynecological oncology
Dipl.-Med. René Schubert
Specialist in gynecology and obstetrics/ Sp Gynecological Oncology
09481 Scheibenberg:

"Allowing a half-hour lead time before therapy starts is a tried and tested approach. Patient feedback suggests that consistent exposure to cold is more tolerable than cooling with ice gloves. Trial usage to date has shown significantly fewer side effects (around 10% minor sense impairment) compared to ice gloves (40% sense impairment). Without any cooling at all, the rate of side effects involving polyneuropathies rises to around 80%. HILOTHERAPY, when prophylactically applied, is currently the only method which largely eliminates peripheral chemotherapy-induced polyneuropathy."

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