Hand Cooling or Compression Can Relieve Chemo-Induced Neuropathy

Limiting blood flow to the hands during chemotherapy administration may reduce this common side effect.

September 29, 2022 By Liz Highleyman

[Update: Results from this study were published in JAMA Oncology in March 2025.]

Women who wore frozen or tight-fitting gloves during chemotherapy for breast cancer were less likely to develop moderate to severe peripheral neuropathy, according to research presented at the European Society for Medical Oncology (ESMO) Congress 2022. While both methods were effective, the compression method is more accessible and was better tolerated.

Certain commonly used chemotherapy drugs can cause peripheral neuropathy, or damage to the nerves in the extremities. This can lead to pain, burning, tingling, numbness or reduced sensation in the hands and feet, which can interfere with daily activities and worsen quality of life.

One approach for lessening peripheral neuropathy—known as cryotherapy or hypothermia—uses cold temperatures to limit the circulation of blood to the hands and feet, which reduces the amount of toxic drugs that reach the peripheral nerves. A previous study found that breast cancer patients who wore gloves and socks containing a frozen gel during chemotherapy were less likely to develop symptoms of nerve damage in their hands and feet. Compression of the hands and feet may have a similar effect. A related approach uses tight-fitting cooling caps to limit blood flow to the scalp, which reduces chemo-induced hair loss.

Laura Michel, MD, of University Hospital and the German Cancer Research Center in Heidelberg, and colleagues conducted a study to see whether cooling or compression of the hands during chemotherapy could reduce peripheral neuropathy.

The POLAR study included 122 breast cancer patients undergoing weekly chemotherapy using paclitaxel (Taxol) or nab-paclitaxel (Abraxane), drugs in a class known as taxanes. About three quarters received chemotherapy before surgery while the rest did so after surgery. Some participants also received platinum-based chemotherapy or trastuzumab (Herceptin).

Half of the participants wore an Elasto-Gel frozen glove and the other half wore two tight-fitting surgical gloves (one size smaller than a standard tight fit) on their dominant hand while the

opposite hand was left untreated. The gloves were worn for 30 minutes prior to chemotherapy, during the infusions and for 30 minutes afterwards.

Neuropathy was assessed using self-reported questionnaires, magnetic resonance imaging of peripheral nerves and nerve conduction studies. The study also assessed skin problems, nail damage and quality of life, as well as the need for chemotherapy dose reduction or treatment discontinuation due to neuropathy.

The researchers found that hand cooling and compression were both highly effective in preventing moderate to severe (Grade 2 or higher) chemotherapy-induced peripheral neuropathy.

During chemotherapy, 29% of participants in the cooling group developed at least Grade 2 neuropathy in the frozen-glove hand, compared with 50% in the untreated hand. In the compression group, 24% had neuropathy in the tight-glove hand versus 38% in the untreated hand. Both differences were statistically significant. Patients who received nab-paclitaxel, especially at higher doses, were more likely to develop high-grade peripheral neuropathy.

One month after completion of chemotherapy, fewer people in both the cooling and compression groups had neuropathy in the treated hand compared with the untreated hand. But neuropathy symptoms decreased over time with or without treatment. Six to eight months later, neuropathy rates were 3% in the hands that wore frozen gloves versus 8% in untreated hands. In the compression group, the neuropathy rate was the same (5%) in treated and untreated hands.

Both neuropathy management methods were safe and generally well tolerated. Most people who stopped chemotherapy did so due to neuropathy. Among the nine people who dropped out of the hand study in the cooling group, six cited intolerance of the frozen gloves. Bu among the 12 who dropped out in the compression group, only one cited intolerance of the tight gloves.

One advantage of the tight-glove method is that surgical gloves are cheap and readily available, whereas frozen gel gloves can be expensive and must be prepared in advance.

Michel concluded that although the effectiveness of cooling and compression were similar, the compression method was “easily accessible, inexpensive and better tolerated,” suggesting it should be further evaluated in larger trials.

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