

# Effectiveness, Safety, and Tolerance of Scalp Cooling for Chemotherapy-Induced Alopecia

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**PROBLEM IDENTIFICATION:** There is a lack of guideline recommendations about the use of scalp cooling for preventing chemotherapy-induced alopecia (CIA). This overview was conducted to summarize effectiveness, safety, and tolerance of scalp cooling for CIA based on systematic reviews.

**LITERATURE SEARCH:** PubMed®, Embase®, Cochrane Library, and CNKI were searched from inception to May 15, 2021.

**DATA EVALUATION:** AMSTAR 2 was used to assess the methodologic quality. Qualitative and quantitative synthesis methods were used to identify the effectiveness, safety, and tolerance of scalp cooling.

**SYNTHESIS:** 14 systematic reviews were identified, and the quality assessment was poor. Scalp cooling has been considered to be effective for preventing chemotherapy-induced alopecia and has been confirmed in patients with breast cancer and other solid tumors. Most adverse effects were mild and moderate, and scalp cooling did not increase the risk of scalp metastases.

**IMPLICATIONS FOR RESEARCH:** This overview could guide nurses to provide access to scalp cooling to reduce the risk of severe or total chemotherapy-induced alopecia for patients undergoing chemotherapy. The large-scale application of scalp cooling may be promoted by establishing reimbursement mechanisms and increasing available devices in the future.

**KEYWORDS** cryotherapy; scalp cooling; drug therapy; chemotherapy; systematic review

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Chemotherapy-induced alopecia (CIA) is a reversible but common and highly distressing side effect that particularly refers to different levels of hair loss led by a single or combined chemotherapy regimen (Komen et al., 2013). In general, CIA starts one to three weeks after the first cycle of chemotherapy treatment and recovers within three to six months after chemotherapy ends (Oshima et al., 2001). Incidentally, some instances of permanent CIA could occur, likely because of high-dose combined drug therapy (Tosti et al., 2005; Trüeb, 2009). CIA inevitably occurs because about 85%–90% of scalp hair follicles are in the anagen phase at any given time (Koch et al., 2020), and just like malignant cells, they are sensitive to chemotherapy drugs because of increasing oxidation/reactive oxygen species levels and stimulating apoptosis of cells (Panieri & Santoro, 2016). Studies have shown that the incidence of CIA ranges from 10% to 100%, with rates from 10% to 50% for antimetabolites, greater than 60% for alkylating agents, greater than 80% for antimicrotubule agents, and from 60% to 100% for topoisomerase inhibitors (Roe, 2014; Trüeb, 2010). Although hair loss is a non-life-threatening condition, it causes negative body image and reminds people of cancer or other physiological suffering (Choi et al., 2014; van den Hurk et al., 2013). Patients experiencing CIA tend to have great psychological stress, such as anxiety, confusion, and depression, particularly for women and young men (Hilton et al., 2008). Meanwhile, CIA could affect self-esteem and social relationships. Women experiencing hair loss have expressed that it was more difficult to cope with than losing a breast (Chan et al., 2018). As a result, as many as 8% of patients refused to receive chemotherapy treatment or chose a less effective regimen to avoid severe alopecia (Hesketh et al., 2004).

In contrast to many other side effects of chemotherapy that have been treated by marked progress (including infection, pain, emesis, bone marrow suppression, and thrombosis) (Hesketh et al., 2004),