

Hair loss (alopecia) from chemotherapy is one of the most feared side effects of many patients, particularly women. Many patients and their healthcare providers believe that cryotherapy can help prevent or mitigate these changes. Scalp cooling has been used for more than 30 years to prevent alopecia caused by chemotherapy, particularly taxanes and anthracyclines. This article presents an overview of the evidence for this strategy, as well as its impact on nursing care provision.

#### AT A GLANCE

- Alopecia is a distressing side effect of chemotherapy that affects men and women.
- The U.S. Food and Drug Administration approved one device (the Dignicap® system) to reduce the incidence of hair loss related to chemotherapy.
- The use of scalp cooling devices requires additional chair time that may affect patient flow in chemotherapy units.

#### KEYWORDS

scalp cooling; chemotherapy-induced alopecia; hair loss; metastases

#### DIGITAL OBJECT IDENTIFIER

10.1188/17.CJON.413-415

# Scalp Cooling

## The prevention of chemotherapy-induced alopecia

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**S**usan, a patient who will undergo chemotherapy for treatment of ovarian cancer, requests a meeting with the unit manager to discuss her wish to use a scalp cooling device to prevent hair loss from chemotherapy. The manager of the unit is unsure whether her request can be accommodated. She does not know how useful it will be in preventing hair loss and has concerns about the impact it might have on patient flow through the unit, as well as on nursing resources.

Hair loss is one of the sentinel side effects of chemotherapy that is feared by many individuals with cancer (Lemieux, Maunsell, & Provencher, 2008). Many patients and their healthcare providers believe that cryotherapy can help prevent these changes. Scalp cooling has been used for years to prevent chemotherapy-induced alopecia, but what evidence supports its use?

Women who are distressed by hair loss also tend to be depressed and have lower emotional, role, and social functioning (Choi et al., 2014). Although it is often assumed that alopecia affects women worse than men, men report distress with hair loss, particularly body hair, compared to women, who report distress with loss of hair on the head, as well as the eyebrows and eyelashes (Hilton, Hunt, Emslie, Salinas, & Ziebland, 2008).

The degree of alopecia is, in part, dependent on medication dose, as well as whether it is used with other chemotherapeutic agents (Breed, 2004). One scalp cooling device, the Dignicap® system, was approved by the U.S. Food and

Drug Administration in December 2015. The system has sensors that measure the scalp temperature, as well as two independent cooling systems that allow the coolant to flow through the front and back separately (see Figure 1). The caps are attached to a unit, and users do not need to change caps during treatments, as is required for other devices, such as Penguin Cold Caps. Hair loss is most frequently graded using either the World Health Organization Toxicity scale grading system or the Dean scale (see Table 1); some studies measure the success or failure of cryotherapy by whether a wig or head covering is deemed necessary by the patient.

#### Review of the Literature

A PubMed search was conducted using the keywords *scalp cooling*, *alopecia*, and *prevention of chemotherapy-induced alopecia*, and three studies using the Dignicap system were reviewed. In addition, four reviews of the effectiveness of scalp cooling have been published. The earliest (Grevelman & Breed, 2005) concluded that, although scalp cooling appears effective, particularly for patients receiving taxanes or anthracyclines, the 53 studies reviewed were small and poorly designed. The authors noted that great variation exists in scalp cooling success rates, which may be related to different cooling times and temperatures, as well as different chemotherapy regimens. A more recent review (Komen, Smorenburg, van den Hurk, & Nortier, 2013) of 32 studies revealed the same conclusions. Kadakia, Rozell, Butala, and Loprinzi (2014) included eight studies