

Title:

Redefining the “Crown”: Approaching Chemotherapy-Induced Alopecia among Black Patients with Breast Cancer

Short running title:

Redefining the “Crown”

Authors:

Versha A. Pleasant, MD, MPH*

Ava S. Purkiss, PhD**

Sofia D. Merjaver, MD, PhD***

Affiliations:

*University of Michigan, Department of Obstetrics and Gynecology

**University of Michigan, Department of Obstetrics and Gynecology; University of Michigan College of Literature, Science, and the Arts

***University of Michigan, Department of Internal Medicine, Rogel Cancer Center

Corresponding author’s contact information:

Versha A. Pleasant, MD, MPH

1500 East Medical Center Drive

University of Michigan

Ann Arbor, Michigan 48109

Phone: 302-562-2602 (Cell)

Email: vershap@med.umich.edu

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Versha A. Pleasant, MD, MPH- None

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Precis:

Chemotherapy-induced alopecia (CIA) can be a devastating side effect of breast cancer treatment for all racial groups, but may carry unique historical, social, political, and cultural significance for Black patients. Oncologists should gain a deeper understanding of the impact of CIA among their Black patients.

Key words: chemotherapy; alopecia; breast cancer; race; breast neoplasm

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For centuries, hair has been critical to how human beings understand racial categories, gender designations, class status, and personal worth. For Black women in particular, hair has been and continues to be deeply tied to ethnic identity. Its history is complex, ranging from the 1960-70s “Black is Beautiful” movement which popularized the Afro and other non-Eurocentric styles as symbols of self determination and political protest [1], to Black hair being denigrated in schools and workplaces [2–5]. Black hair has even necessitated legislation to protect its expression [6]. In light of this contentious history, Black communities have informally adopted the word “crown” when referring to Black hair in an effort to redefine Black beauty and create a positive cultural consciousness.

Hair loss, therefore, can be a devastating experience— perhaps even more so when associated with a breast cancer diagnosis. Research demonstrates that chemotherapy-induced alopecia (CIA) is associated with low body esteem, low self-efficacy, and negative coping behaviors related to cancer diagnosis among women [7–9], with some declining cancer treatment altogether to avoid hair loss [10,11]. While most of the data on CIA include predominantly White cohorts, there is a paucity of research regarding the specific impact of CIA among Black women— who are disproportionately affected by more aggressive disease in which chemotherapy (particularly neoadjuvant chemotherapy) is more likely to be administered [12–17]. One literature review of CIA among African American women showed only 4 studies specifically characterizing CIA outcomes among African American women, with data suggesting that this group may be at higher

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risk of diffuse, permanent alopecia and may achieve poor results in hair preservation interventions [18]. A qualitative study of 38 Black breast cancer survivors revealed disturbing implications of CIA, such as hair loss being perceived by participants as more traumatic than the loss of breast tissue and experiencing physiological side effects of illness stemming from the loss of patients' hair [11], sentiments also echoed by patients in other CIA studies [9,19,20]. Perhaps distinctive to Black women were the concerns about the inability to wear wigs that were not designed for Black hair color or textures, with the author highlighting the need for practitioners to better understand such unique psychological effects of CIA on Black women [11]. Given the racial and gendered context of CIA, the aim of this commentary is to illuminate the cultural relevance of Black hair to the breast oncology community and explore how therapeutic options for CIA may uniquely impact Black breast cancer survivors.

The extent of CIA can vary by patient based on factors such as drug dose, administration, age, medical comorbidities, nutritional status, and preexisting alopecia [21]. CIA tends to be most profound for patients receiving anthracyclines (such as doxorubicin), taxanes (such as paclitaxel and docetaxel), cyclophosphamide, or etoposide [22,23]. While hair regrowth can restart up to 6 months following chemotherapy, the texture and appearance of hair may undergo permanent changes and, rarely, some patients may experience permanent alopecia [21]. Some of these predisposing factors may be more present in the Black community. Black women already suffer from higher rates of alopecia at baseline [24–26], although there have been no studies closely

examining how this trend intersects with CIA. In a 10-year retrospective study examining women experiencing CIA after breast cancer treatment, 13 total had been identified as having permanent alopecia, with 10 of those patients identifying as African American and 3 identifying as White. African American women in this cohort also experienced more diffuse hair loss [27]. Another study demonstrated that many Black breast cancer survivors were conflicted about their new hair growth and texture after CIA, partly due to historically racialized perceptions of Eurocentric beauty [11].

Research regarding effective pre-chemotherapy interventions as well as medications to address CIA has been modest. Scalp compression with tourniquets and medicinal Chinese herbs have been studied, but none have demonstrated consistent or significantly improved hair loss outcomes [28]. Scalp dermoscopy (trichoscopy) and bloodwork have been suggested to determine pre-existing risk of hair loss and improve chemotherapy treatment management [21]. Topical vasoconstrictors have also been proposed, but formulations such as topical epinephrine and norepinephrine have only proven effective on animal models [29]. Stimulators of hair regrowth post-chemotherapy such as minoxidil have demonstrated some efficacy [21,22,28,30] but neither minoxidil nor any of the other aforementioned treatments have been extensively studied in Black women with CIA.

Scalp cooling, however, is the only intervention for CIA prevention that has been approved by the U.S. Food and Drug Administration [31] and demonstrates positive response rates from 50 to 80% [22,32–36]. The “Paxman” or “DigniCap”

cooling systems, also referred to as “cold caps” or “cold capping,” work by reducing the temperature of the scalp from 34.4 degrees C to 18.3 degrees C before, during, and immediately after chemotherapy. Scalp cooling can reduce blood flow to 25% to hair follicles through vasoconstriction and decrease intrafollicular metabolic rate with the aim of decreasing chemotherapy uptake and susceptibility to toxicity at the follicle [23,36].

One particular multicenter prospective cohort study examined outcomes of patients undergoing scalp cooling with stage I or II breast cancer receiving adjuvant or neoadjuvant chemotherapy regimens (excluding anthracyclines). Hair loss of 50% or less (the definition of treatment success in this study) was seen in 66.3% of participants undergoing scalp cooling along with improvement in quality of life measures. Regarding self-perception, 27.3% of patients who underwent scalp cooling felt less physically attractive compared to 56.3% of control group patients. Overall, scalp cooling was associated with less hair loss 4 weeks after chemotherapy compared to control group outcomes. Of the total cohort (101 in the scalp cooling group and 16 in the control group), 9.0% were Black (compared to 77.0% White) [35]. However, efficacy across racial groups was not examined in this particular study.

While cold caps have demonstrated some benefit in White populations who constitute the majority of research participants, there are limited data on its efficacy among Black patients. One particular phase II trial examined the effects of cold capping on 15 Black patients receiving at least 4 cycles of both non-anthracycline and anthracycline regimens. The modified Dean scale (MDS) and

the Chemotherapy Alopecia Distress Scale (CADS) were used to measure the extent of alopecia and patient distress, respectively. However, this trial was terminated early due to lack of efficacy. Both scores increased, with most patients experiencing grade 3 alopecia with > 50% hair loss ($p < 0.001$ and $p = 0.4$ for MDS and CADS, respectively) and only one patient demonstrating successful hair retention [37].

This trial calls attention to the need for further research on how the mechanism behind cold capping can be modified to increase effectiveness for all users. Hair texture, particularly hair thickness, has been shown in computer models to have an inverse relationship with the ability of the cap to effectively cool the scalp as the cap must make direct contact with the scalp [38,39]. This requirement can create challenges when certain textures of Black hair become curlier (and therefore thicker) when wet [40]. These factors should be taken into consideration in the design of cold capping to better accommodate Black patients' hair needs.

It is critical for oncologists to be knowledgeable about other options that may be available to Black women at risk for CIA. Cranial prostheses can serve as acceptable alternatives in the setting of CIA. However, as previously illuminated in a prior qualitative study of Black breast cancer survivors [11], most cranial prostheses targeted to breast cancer patients may not mimic the natural hair texture of Black patients, making the patient's medical condition even more apparent. Many Black CIA sufferers may turn to their local beauty supply store for a more "natural" looking wig. From this demand, there have emerged a

number of companies focused on creating wigs tailored to Black breast cancer survivors. *Coils to Locks* is a budding organization established by a Black breast cancer survivor whose goal was to create more ethnically appropriate (“coily” and curly) wigs that are covered by health insurance [41]. Similarly, the founder of *Shades of Melanin* was inspired by a loved one who was diagnosed with breast cancer and created an online store providing ethnic hair care options for those experiencing hair loss [42].

For those Black breast cancer patients who prefer not to undergo scalp cooling or wear a cranial prosthesis, decisions regarding scalp care and hair styling are important. Gaining a deeper understanding of alternative hairstyles for Black women may be valuable for oncologists. Although seemingly out of the realm of expertise, oncologists may consider discussing hair styling with Black patients. New hair growth may be fragile and may not initially support hairstyles that create significant tension in the scalp (such as cornrows or braided extensions) [43,44] or chemical treatment of the hair (such as relaxers and hair dye) [45,46]. Despite the increased levels of melanin in many Black individuals, sunscreen with SPF and covering the scalp can provide protection against sunburn and skin cancer [47].

Given their significant influence and presence in the Black community, hair stylists represent a group that has the potential to play a more prominent role in conversations regarding the impact of CIA. Hair stylists have historically been involved in interventions regarding breast cancer education among Black people [48], with Black hairdressers even being considered ideal “lay health advisors” to

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their African American female clients [49–52]. This powerful role of cosmetologists could potentially extrapolate to CIA, as Black clients have indicated they are more likely to accept hairdresser-issued health advice about chronic diseases if that advice is directly linked to hair issues [53]. Indeed, several studies have shown that Black hair stylists foster high levels of trust, relatability, and credibility with their clients [48,52,53]. The safe cultural space fostered between Black women and their hairdressers could be leveraged by oncologists to explore CIA concerns and options with their patients. An unconventional but possibly beneficial approach could involve including hairdressers in conversations about hair regrowth through peer education, with the patient's enthusiastic consent, as part of their holistic care.

It is imperative to acknowledge the unique and highly variable texture of Black hair for which the effectiveness of a single intervention may not be entirely feasible. With the heterogeneity of Black hair textures comes the diversity of perspectives within the Black community regarding hair loss in the setting of breast cancer treatment. Therefore, while we explore general cultural implications in this commentary, each individual's view of their hair and their emotional experience as they navigate breast cancer may vary within the Black community.

Ultimately, Black patients undergoing breast cancer treatment may experience CIA which could impact their self-perceptions of beauty, femininity, and personal worth. Their hair loss may produce especially profound psychological side effects given the unique socio-cultural weight of hair in Black

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communities [11]. Oncologists should engage their Black patients in discussions exploring how CIA may affect them and their breast cancer care, eliciting any specific needs, concerns, fears, or barriers. The breast oncology community would greatly benefit from more studies that examine the psychosocial impact of CIA on Black women and its effect on breast cancer care (Figure 2). This research could take the form of both quantitative and qualitative data collection among Black breast cancer survivors that offer more insight into how CIA could impact psychological and clinical outcomes. Tools that have proven efficacious in White populations (such as cold capping) should be tailored to the diversity of Black hair textures to increase efficacy. We hope breast oncologists will be inspired to advocate for a more diverse cranial prosthesis selection at their respective institutions to provide more aesthetic options to Black patients. Culturally relevant approaches to Black hair that decrease the impact of CIA should be prioritized, such as those that engage Black hair stylists in discussions of healthy hair care. Oncologists should be knowledgeable about how hair may impact the care and treatment of breast cancer among Black patients, in order to empower them with options that allow them to redefine their crown.

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Figure Legend:

Key points- provides a summary of the significance of CIA among Blacks.

Considerations for CIA Among Black Patients – Provides a summary of key points for oncologists to consider regarding CIA among Blacks

Key Points

- Black hair has significant historical, social, political, and cultural implications for Black patients.
- Chemotherapy-induced alopecia (CIA) can be a devastating side effect of breast cancer treatment for all racial groups, but may have unique implications for Black patients.
- Oncologists should gain a deeper understanding of the impact of CIA among Black patients.

Considerations for CIA Among Black Patients

- Oncologists should engage their Black patients in discussions exploring how CIA may affect them and their breast cancer care.
- There is a need for more quantitative and qualitative studies among Black breast cancer survivors that illuminate the impact of CIA on psychological and clinical outcomes.
- Tools that have proven efficacious in White populations (such as cold capping) should be tailored to the diversity of Black hair textures to increase efficacy.
- Breast oncologists should advocate for a diverse cranial prosthesis selection at their respective institutions to provide more aesthetic options to Black patients.
- Culturally relevant approaches to Black hair that decrease the impact of CIA should be prioritized, such as those that engage Black hair stylists in discussions of healthy hair care.