Hair Care Practices in Black Women With and Without Scarring Alopecia: A Retrospective Cohort Study

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The role of hair care practices in the development of scarring alopecia has not been well-studied. In black women, there is a particular preponderance of hair loss with little consistent scientific data to support a mechanism for scarring alopecia. This retrospective cohort study examined the hair care practices of black women with and without scarring alopecia to determine behaviors that may be associated with this specific form of hair loss. Forty-four participants were surveyed: 21 with scarring hair loss on the frontal and vertex areas of the scalp that fit no other diagnosis, and 23 without scarring hair loss. All participants in the group without alopecia were currently using chemical-relaxing agents or had done so in the last 6 months. A 36-item questionnaire was administered to each participant and results were entered into a computer database. Questions included information on general health, history of autoimmune disease, family history of alopecia, medication use, and specific hair care practices (both current and past). Our results showed that family history of alopecia was statistically significant in participants reporting personal hair loss ($P=.002$) as well as current use of chemical relaxers ($P=.042$). Other statistically significant associations included prior history of hair dyeing ($P=.049$) and prior use of hair weaves ($P=.015$). Results showed that certain hair care practices were associated with scarring hair loss, and with larger clinical trials, it is likely that patterns in hair care practices will arise among these participants to help elucidate the mechanism of hair loss in scarring forms of alopecia.
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The role of hair care practices in the development of scarring alopecia has not been well-studied. Hot combs, chemical curling and straightening agents, braids, glued hair weaves, and other practices have all been implicated as causes of scarring hair loss in black women. Few studies have examined hair care practices either prospectively or retrospectively. This retrospective cohort study evaluated possible relationships between forms of scarring alopecia and hair care methods practiced by black women. Participants were evaluated clinically and histologically via biopsy studies.

METHODS

The study evaluated a sample of 21 black women who presented to a university dermatology department with hair loss and were determined to have scarring alopecia by clinical examination and histologic examination of punch biopsy specimens. For inclusion in the study, a participant's scarring hair loss had to be located at least in part over the frontal and vertex areas of the scalp with no other primary diagnosis or explanation. A final diagnosis of central centrifugal cicatricial alopecia was not a criterion in this study. Histologic samples were examined for the presence of scarring using the following criteria: diminished number of follicles, perifollicular fibroplasia, follicular fusion, foreign body granulomatous inflammation to naked hair shafts, and mild to moderate nonspecific inflammation. All biopsy specimens demonstrated each of these findings. For comparison, 23 black women who presented to the clinic for other dermatologic problems and were clinically determined to not have hair loss also were evaluated. Biopsies were not taken in individuals without clinical evidence of alopecia.

A 36-item questionnaire was administered to each participant after each one provided consent. The survey included questions about history of autoimmune disease and keloid scars, medications, and alopecia, as well as prior and current hair care practices (Table 1). Participants were asked about the presence or absence of pain, itching, scaling, and papules/pustules. All participants in the group without alopecia were currently using chemical-relaxing agents or had done so in the last 6 months. Data were entered using a Web-based application with HTML front end and ColdFusion as the common gateway interface between the front end and the database. All data were analyzed using SAS.

Table 1

Hair Care Practices Evaluated

- Prior and current use of chemical relaxers
- Duration of chemical relaxer use
- Type of chemical relaxer currently used (lye or no lye)
- Prior and current use of hair dye
- Current use of braids
- Prior and current use of hairpieces woven into the hair
- Current use of chemical curling agents
- Current use of hair conditioner
- Current use of hair pomade
- Current use of hair shaft moisturizer
- Current use of hair spray
- Current use of hair gel
- Current use of hot comb
- Professional styling versus self-styled hair

RESULTS

Of the 44 participants who completed the questionnaire, 21 were diagnosed with scarring alopecia, while 23 showed no evidence of scarring hair loss. The participants ranged in age from 19 to 57 years.

Hair loss that was limited to the frontal and vertex areas of the scalp was present in 19 (90.5%) of 21 participants with scarring alopecia (Figure 1). One (4.8%) participant presented with hair loss in only a few spots on the scalp and 1 (4.8%) presented with diffuse hair loss over the entire scalp. History of thyroid disease, lupus, rheumatoid arthritis, ulcerative colitis/Crohn disease, diabetes mellitus, and keloids were not clinically significant factors in our study (Table 2).

Chemical Relaxers, Hair Dye, and Chemical Curling Agents

An overwhelming majority of women in both groups were currently using chemical relaxers (Table 3). Thirty-two (72.7%) participants reported current use of chemical relaxers: 12 participants had scarring alopecia and 20 did not have scarring alopecia. Analysis of this

practice in both groups revealed that significantly fewer participants with scarring alopecia were using chemical relaxers (P=.042 [2-sided Fisher exact test]); however, the duration of use was significantly longer in participants with scarring alopecia (18.6 vs 13.0 years; P<.01 [t test]). Prior use of chemical relaxers and the type of chemical relaxer used (lye, no lye, unknown) were not clinically significant.

The use of hair dye also was significant, with 18 (85.7%) participants with scarring alopecia reporting prior use of hair dye (P=.049). Current use of hair dye and chemical curling agents were not clinically significant factors in our study.

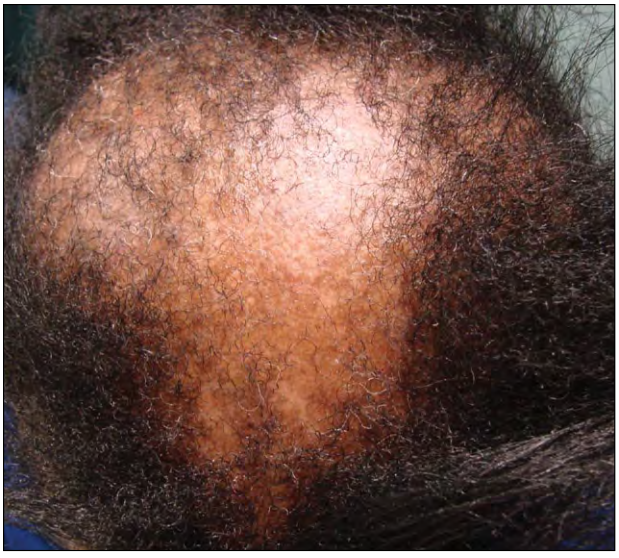

Figure 1. Severe scarring hair loss over the frontal and vertex areas of the scalp.

Hair Weaves

Prior use of hairpieces that were woven into natural hair also was a significant factor in our study, with this practice being more common in participants with scarring alopecia (P=.015). There was no significant difference in current use of woven hair weaves between the 2 groups.

Hair Enhancement Products

Most participants were currently using hair pomade (25/44 [56.8%]) and hair shaft moisturizers (27/44 [61.4%]), but there were no significant differences between those with and without scarring alopecia. Thirty-seven (84.1%) participants surveyed were currently using a professional for hairstyling and chemical treatments.

There were no significant differences between participants with and without scarring alopecia in the reported use of braids, hair conditioner, hair spray, hair gel, and hot combs.

Table 2

Autoimmune Disease and Keloid History of Participants With and Without Scarring Alopecia

Parameter Evaluated	Affected, n (%) (n=21)	Nonaffected, n (%) (n=23)	Total, n (%) (N=44)
History of thyroid disease	3 (14.3)	1 (4.3)	4 (9.1)
History of lupus	1 (4.8)	0 (0)	1 (2.3)
History of rheumatoid arthritis	0 (0)	0 (0)	0 (0)
History of ulcerative colitis/Crohn disease	0 (0)	0 (0)	0 (0)
History of diabetes mellitus	1 (4.8)	1 (4.3)	2 (4.5)
History of keloid scars	3 (14.3)	4 (17.4)	7 (15.9)

Table 3

Hair Care Practices in Participants With and Without Scarring Alopecia

Parameter Evaluated	Affected (n=21)	Nonaffected (n=23)	*P* Value
Mean age (SD) at enrollment, y	45.1 (9.7)	36.9 (9.3)	.982
Mean age (SD) at onset of alopecia, y	50 (11.6)	N/A	N/A
Reported family history of alopecia, n (%)	16 (76.2)	6 (26.1)	.002
Chemical relaxers			
Past, n (%)	21 (100)	22 (95.7)	.962
Current, n (%)	12 (57.1)	20 (87.0)	.042
Mean (SD) duration of chemical relaxer use, y	18.6 (7.4)	13.0 (6.3)	<.01
Hair dye			
Past, n (%)	18 (85.7)	13 (56.5)	.049
Current, n (%)	4 (19.0)	7 (30.4)	.494
Braids			
Current, n (%)	3 (14.3)	7 (30.4)	.287
Hair weave			
Past, n (%)	14 (66.7)	7 (30.4)	.015
Current, n (%)	4 (19.0)	2 (8.7)	.393
Chemical curling agents			
Current, n (%)	4 (19.0)	2 (8.7)	.403
Hair conditioner			
Current, n (%)	21 (100)	22 (95.7)	.962
Hair pomade			
Current, n (%)	13 (61.9)	12 (52.2)	.557

Table 3 (continued)

Parameter Evaluated	Affected (n=21)	Nonaffected (n=23)	*P* Value
Hair shaft moisturizer			
Current, n (%	13 (61.9)	14 (60.9)	.962
Hair spray			
Current, n (%)	6 (28.6)	10 (43.5)	.528
Hair gel			
Current, n (%)	7 (35.0)	13 (56.5)	.223
Hot comb			
Current, n (%)	3 (14.3)	1 (4.3)	.335
Professional styling, n (%)	16 (76.2)	21 (91.3)	.335
Scalp signs/symptoms			
Pain, n (%)	4 (19.0)	0 (0)	.048
Itching, n (%)	13 (61.9)	6 (26.1)	.030
Scaling, n (%)	6 (28.6)	4 (17.4)	.488
Papules/pustules, n (%)	5 (23.8)	3 (13.0)	.457

Abbreviations: SD, standard deviation; N/A, not applicable.

Scalp Signs/Symptoms

Scalp pain and itching were more prominent in participants with scarring alopecia ($P=.048$ and $P=.030$, respectively). The presence of scaling and papules/pustules were not significantly different between the 2 groups.

Histology

All histologic findings revealed folliculosebaceous units that were dramatically diminished and destroyed. There was prominent perifollicular hyperplasia, fibroplasia, and fibrosis (Figure 2). Some biopsies showed classic "onion skin" perifollicular fibroplasia. A perifollicular lymphocytic infiltrate was observed in most specimens. There also was foreign body–type and mononuclear inflammation present in each biopsy.

COMMENT

The pathogenesis of scarring alopecia is not well-understood. One variant of scarring alopecia observed in black women has been called hot comb alopecia, follicular degeneration, and more recently central centrifugal cicatricial alopecia.[1] Although names have changed over the years, there is still no uniting theory as to how or why such

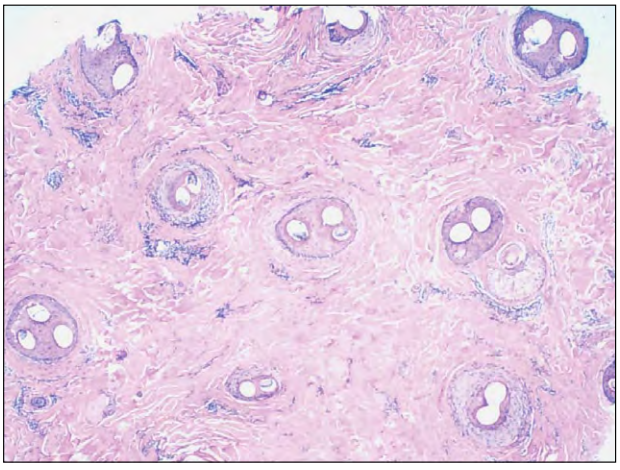

Figure 2. Histology of a representative biopsy from a participant with scarring alopecia showed follicular fusion and fibrosis (H&E, original magnification ×400).

scarring occurs in many black women. Our study compared historical health information, hair care practices, and symptoms of the frontal and vertex areas of the scalp in black women with and without scarring alopecia.

A study by Gathers et al[2] evaluated 101 black women (51 affected with scarring hair loss; 50 unaffected) who used a specific hair-grooming instrument. The authors found a strong association between sewn-in hair weaves and braided hairstyles with artificial hair extensions and the presence of central centrifugal cicatricial alopecia.[2]

Our results show several differences in hair care practices between the 2 groups. Participants with scarring alopecia used chemical relaxers less frequently than nonaffected participants, but the overall duration of use was longer, and they also reported increased use of woven hair weaves versus women without alopecia. Our chemical relaxer findings differed from the Gathers et al[2] study, which found no correlation between scarring and chemical relaxer use, but our findings of increased use of hair weaves in those with scarring alopecia is complementary to the findings of Gathers et al.[2] Most participants in our study, both affected and unaffected, reported use of hair pomade and no-lye relaxers as well as use of a professional hairstylist rather than self-styling.

Overall, hot combing was not a prominent hair care practice among the participants in this study. Similar findings were reported by Gathers et al.[2] The hot comb was one of the first methods designed for black women to achieve manageably straight hair. In 1968, an association between the hot comb straightening method and alopecia was examined by LoPresti et al.[3] The study reported an association between the use of hot combs and alopecia, stating that chronic inflammation of hair follicles from hot combing led to degeneration of the external root sheath, which destroys the hair follicle and replaces it with a follicular collagen scar.[3] Research by Sperling and Sau,[4] however, has challenged the association of hot combs with scarring alopecia, reporting similar scarring to that described by LoPresti et al[3] in patients with no history of hot comb use. In recent years, chemical relaxers have become more popular because they impart a long-term straightened state to hair as opposed to the transient straightening from hot combs. As clinical experience suggests that large numbers of black women are still affected by severe scarring hair loss despite never having used a hot comb, there is no longer a clear link between hot combing and scarring hair loss.

Current use of chemical relaxers among the study participants was clinically significant ($P=.042$), as was duration of use ($P<.01$). The study results suggest a possible relationship between use of chemical relaxers and scarring. The low number of participants with scarring alopecia that reported current use of chemical relaxers may be the result of attempts to minimize potentially damaging hair care practices following the onset of hair loss. There was no significant difference between the use of lye-containing and no-lye relaxers. Recall bias could play a role in the lack of significance of this factor because most participants admitted that they had their hair treated by professional hairstylists and participants may or may not know the chemical makeup of relaxers utilized.

Prior use of hair dye was a clinically significant factor in this study ($P=.049$), while current use was not ($P=.494$), which suggests that the chemical formulations of hair dyes and coloring agents may exert more long-term effects on the user's hair and scalp, thereby making prior use of coloring agents a potential cause of scarring alopecia.

Thirteen (61.9%) of the affected participants reported itching compared with 6 (26.1%) of the nonaffected participants. Additionally, 4 (19.0%) participants with scarring alopecia reported pain and none of the nonaffected participants experienced this symptom. These findings may suggest that hair loss is related to an inflammatory process of the scalp. This theory is supported by the histologic findings of perifollicular lymphocytic infiltrates and inflammation observed in the clinical biopsies.

Prior use of hair weaves also was a significant factor in this study ($P=.015$), which may support a theory that chemical glue formulations for the application of hairpieces or traction from a weave may cause long-term damage on hair and the scalp. Hair weaves augment natural hair and usually originate from the surface of the scalp when glue is used as the attachment modality. When the

Table 4

Clinical Pearls

- Use of hair dyes or weaves as well as prolonged use of chemical relaxers may be associated with scarring alopecia in black women. Interestingly, use of hot combs does not appear to play a major role in the development of scarring alopecia.
- Pain and itching of the scalp are strongly associated with scarring alopecia and may be symptoms that indicate an underlying scarring inflammatory process, warranting a scalp biopsy.
- Scarring alopecia most likely represents a polyfactorial process of potentially traumatizing hair care practices in patients with a genetic predisposition to alopecia.

attachment method is sewing, a tract or collection of hair often is sewn into a cornrow braid. An alternative method of applying a hair weave is adding hair directly into a braid from the woman's scalp. These styles can cause mechanical traction on the scalp, which can loosen hairs from the follicles and cause inflammation.[5] Tension folliculitis can result from braiding the hair too tightly and may lead to severe hair loss, particularly around the hairline. In our study, current use of braids was not a clinically significant factor in the development of scarring alopecia. The impact of braiding hair may take years to manifest into scarring alopecia, showing the need for a longer follow-up period in future studies.

In the time since our study was performed, a study evaluating 529 black women showed central scalp hair loss in 5.6% of participants. This study introduced a central scalp photographic scale and questionnaire that provided a template to further study potential etiologic factors for the causation of scarring hair loss.[6]

CONCLUSION

Our findings suggest that inflammatory symptoms often accompany scarring hair loss in black women and hair care practices may play a role in a complicated mix of factors leading to the scarring hair loss seen frequently in black women (Table 4). We are currently undertaking a large-scale study to further delineate the relationship of hair care practices in this at-risk patient population.

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