Update on African American Hair and Scalp Disorders

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Central Centrifugal Scarring Alopecia

- Progressive scarring alopecia on the vertex of the scalp but does not assume a particular cause
- “Cicatricial” and “Scarring” frequently used interchangeably
- Prevalence 2.7% (S. Africa) - 5.7% (NAHRS)
- Although inflammation was absent in the original description, current consensus is that inflammatory papules may be present in early disease

Central Centrifugal Cicatricial Alopecia - What’s New?
CCCA - Autosomal Dominant

- Fourteen index African families in South Africa
- 31 immediate family members participated in the initial screening
- The female to male ratio was 29:2
- Average age of 50.4 years
- Average age of onset 41 years
- All patients displayed histologic features typical for CCCA
- Pedigree analysis suggested an autosomal dominant mode of inheritance

Hair grooming markedly influenced disease expression

**CHLG greater than 2**
- 48% practiced frequent braiding and weaving for hair grooming
- 29% gave a history of braiding or weaving on chemically processed hair relaxed or permed

**CHLG 0 to 1**
- 35% had natural virgin hair, had never used any chemicals or traction on their hair, and maintained short hairstyles
- These were either very young (<15 years) or very old (>75 years) female participants who had escaped the latest hair-grooming trends, or males who had kept natural short haircuts

In this study:

- 35% patients presented with thinning and breakage of the vertex hair as the main symptom
- 29% were asymptomatic
- 35.5% patients presented with either painful papules, tender scalp, dandruff, or pruritus

CCCA severity is associated with cowhage-induced itch

- Cowhage spicules elicit itch by stimulating protease-activated receptor (PAR)-2 in the skin
- PAR-2 is a well-known mediator involved in chronic pruritus
- May suggest a role for PAR-2 in the pathogenesis of CCCA
- Tetracycline attenuates the effect of PAR-2 and PAR-2-mediated downstream signaling
- May also explain why tetracycline has been shown to be effective in treating CCCA.

Factors affecting Severity

- There were also no significant differences between hair care practices between patients with early-stage and those with late-stage hair loss
  - Ex: Relaxers, hot combs, hair extensions
- There were no significant differences in the reporting of medical conditions between patients with early-stage and those with late-stage hair loss
  - Ex: acne, yeast infections, seborrheic dermatitis
- Duration of hair loss was found to be strongly positively associated with degree of hair loss.

Central Centrifugal Cicatricial Alopecia

Possible associations
- Traction
- Damage
- Cornrows
- Braids/Extensions
- Family History
- Hx of tinea capitis
- Use of hair dyes
- Type 2 Diabetes

No association
- Hot Combs
- Reaction to hair care product
- Male pattern hair loss in fathers
- Seborrheic dermatitis
- Bacterial infection

Kyei A Arch Dermatol. 2011;147(8):909-914
Gathers, RC J Am Acad Dermatol. 2009 Apr;60(4):574-8
McMichael AJ, Cosmetic Derm 2011;24:331-337
Olsen, E J Am Acad Dermatol, Volume 64, Issue 2, Pages 245-252
What about relaxers?
Conflicting Data on the Use of Relaxers

- 101 subjects surveyed (51 with CCCA and 50 controls)¹
  - No difference in rate of relaxer use between the two groups
  - Note: strong association with the use of sewn in extensions, cornrows, and braids

- 529 subjects (5.6% with “central scalp hair loss”)³
  - No association with relaxer or hot comb use, history of seborrheic dermatitis or reaction to a hair care product, bacterial infection, or male pattern hair loss in fathers of subjects
  - Note: there was an association with a history of tinea capitis

Conflicting Data on the Use of Relaxers

- 39 subjects (20 “scarred alopecia” 19 “nonscarred alopecia”)
  - Prolonged and frequent use of relaxers was more common in the scarring alopecia group compared to the nonscarring alopecia group (23.2 ± 9.3 years)

- 44 subjects (21 with scarring alopecia and 23 with no hair loss)
  - Current use of relaxers was lower in the scarring alopecia group
  - Duration of use was significantly longer in the scarring alopecia group (18.6 vs 13.0 years)

What about relaxers?

- Most authors suggest stopping relaxers
- No clear evidence to *universally* stop relaxers in all patients
  - Ask patient if they have hair symptoms with relaxers
- Apply a base to the scalp prior to relaxers
- Decrease frequency of relaxer touch-ups
  - Every 8 weeks or less
CCCA Treatment

- IL TAC 4-5mg/cc q 4-6 weeks
- Clobetasol topically
- Biotin
- Minoxidil 5%
- “Other” hair vitamins
- Oral antibiotics
  - Doxycycline 100-200mg QD
  - Tetracycline
  - Rifampin/Clindamycin
Key points-
Set realistic Expectations

- **1st goal**- no further hair loss
  - No further hair loss is a clinical success
- **2nd goal**- possible growth of new hair
  - 10-30% regrowth is a clinical success depending on the stage
Central Centrifugal Cicatricial Alopecia

- Before and after treatment with clobetasol foam and intralesional triamcinolone 4mg/cc
Hair Transplantation in CCCA

- Case report of 2 African American female patients with CCCA with 5 to 6 years of progressive hair loss on the crown of the scalp
- After a scalp biopsy and transplant test session, both patients underwent hair transplantation with the use of round grafts
- Hair growth was visibly observed at the recipient sites in both patients beginning between 4 to 5 months post-test session
- No postoperative scarring in the recipient or donor areas of the scalp were noted in either patient
- Hair transplantation is a safe well-tolerated procedure to improve hair loss in African American women with end-stage CCCA who histologically display a lack of inflammation on scalp biopsy.

Hair Transplantation

Traction Alopecia: What’s New?
“All hairstyles are not created equal”

<table>
<thead>
<tr>
<th>High risk</th>
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<tbody>
<tr>
<td>• Frequent use of tight buns or ponytails</td>
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<tr>
<td>• Application of weaves and/or braids to relaxed hair</td>
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<tr>
<td>• Hair extensions applied to relaxed hair</td>
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<tr>
<td>• Tight braids/cornrows/dreadlocks</td>
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<tr>
<td>• Any hairstyle causing symptoms such as pain, stinging, crusting, tenting, or pimples</td>
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<thead>
<tr>
<th>Moderate risk</th>
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<tbody>
<tr>
<td>• Loosening of braids/cornrows/dreadlocks</td>
</tr>
<tr>
<td>• Weaves and braids applied to natural hair</td>
</tr>
<tr>
<td>• Hair extensions applied to natural hair</td>
</tr>
<tr>
<td>• Wigs worn with cotton or nylon wig caps</td>
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<tr>
<td>• Permanent waving</td>
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<table>
<thead>
<tr>
<th>Low risk</th>
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<tbody>
<tr>
<td>• Loose, low-hanging ponytails and buns</td>
</tr>
<tr>
<td>• Wigs worn with satin cap</td>
</tr>
<tr>
<td>• Natural/unprocessed hair</td>
</tr>
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</table>

Haskin, Alessandra, and Crystal Agu. "All hairstyles are not created equal: What the dermatologist needs to know about black hairstyling practices and the risk of traction alopecia (TA)." *Journal of the American Academy of Dermatology* 75.3 (2016): 606-611.
Don’t just say “Avoid tight hairstyles”

- Loosen the application of braids, especially around the hairline
- Leave braided styles in the hair for no longer than 2-3 mo
- Opt for larger diameter braids and dreadlocks
- Hair extensions should only be used sparingly for short periods of time and immediately removed if they are causing pain or irritation
- When applying weaves, avoid using bonding glues; instead, opt for loosely sewn-in weaves
- Remove hair weaves/extensions every 3-4 wk
- Take breaks between wearing braided and/or sewn-in styles
- Alternate hairstyles when possible; avoid frequently styling the hair in “up-dos”
- Decrease the use of thermal straightening on chemically relaxed hair; patients should avoid thermal straightening and styling for at least 1-2 wk after chemical relaxing
- Decrease the frequency of thermal straightening and use lower heat settings on flat irons and blow dryers
- When possible, give hair a break from all styling practices to allow it to recover from stress; this can be done by adopting a natural hairstyle or by temporarily protecting the hair with the use of wigs or scarfs

Haskin, Alessandra, and Crystal Aguah. “All hairstyles are not created equal: What the dermatologist needs to know about black hairstyling practices and the risk of traction alopecia (TA).” *Journal of the American Academy of Dermatology* 75.3 (2016): 606-611.
Each hair follicle in the scalp contains an arrector pili muscle that, when contracted, erects the hair.

The smooth muscle in the arrector pili expresses $\alpha_1$ adrenergic receptors ($\alpha_1$-AR).

Contraction of the arrector pili muscle via an $\alpha_1$-AR agonist would increase the threshold of force required to pluck hair during cosmetic procedures.

α1 Adrenergic Receptors in Traction Alopecia

- Blinded, 15 female subjects, ages 18-40
- Applied topical 10% phenylephrine, a selective α1-AR agonist
- 80% of subjects demonstrated reduced shedding on days using phenylephrine compared to days using a placebo solution
- Average reduction in hair loss was approximately 42%
- Force threshold required for epilation increased by approximately 172% following topical phenylephrine application

Frontal Fibrosing Alopecia
Frontal Fibrosing Alopecia

- Hair loss on the frontal hairline, and may also cause hair loss in other areas such as the eyebrows or axilla
- In the differential diagnosis of traction alopecia
- Clinically characterized by
  - perifollicular erythema
  - follicular hyperkeratosis
  - scarring
Frontal Fibrosing Alopecia: Background

Kossard first described FFA in 1994 as a scarring hair loss generally seen in postmenopausal Caucasian women and resulting in progressive destruction and recession of the frontotemporal hairline.

Frontal Fibrosing Alopecia in patients of African Descent

- Authors presented 18 cases of frontal fibrosing alopecia affecting African American patients.
- Reviewed all published cases of frontal fibrosing alopecia involving patients of African descent.
  - 66 published cases in AA subjects since 2010.
- Age of onset tends to be earlier in AA women.
  - 39-75% present pre-menopause AA.
  - 5-17% present pre-menopause Caucasian.

FFA: Possible association with facial moisturizers and sunscreen use

- 105 women with FFA and 100 age- and sex-matched control subjects
- Completed questionnaire
- The use of sunscreens was significantly greater in the FFA group compared with controls
- Subjects with FFA also showed a trend towards more frequent use of facial moisturizers and foundations but, compared with controls, the difference in frequencies failed to reach statistical significance

FFA: Possible association with facial moisturizers and sunscreens

- Multiple follow up papers have questioned the statistical analysis in this paper and have failed to demonstrate an association with sunscreens.
- The search for an explanation for the increased prevalence continues!

Involvement of facial vellus hairs could explain the follicular prominence on the forehead.

Frontal Fibrosing Alopecia

- **Treatment**
  - IL TAC 4-5mg/cc q 4-6 weeks
  - Topical steroids (use caution close to the face)
  - Topical tacrolimus
  - 97% of treated patients with intralesional corticosteroids had a reduction in symptoms and hairline stabilization (n=62)
  - 31% of patients were able to stop treatments and remained in remission for six months to six years.

- **Recent associations**
  - Lichen planus pigmentosus
  - 14% of patients have autoimmune connective tissue disease

A, Lichen planus pigmentosus and frontal fibrosing alopecia. Diffuse hyperpigmentation of upper chest, neck, and cheeks with loss of eyebrow hair and recession of frontal hairline. B, A punch biopsy demonstrates an atrophic lichenoid dermatitis with many perijunctional necrotic keratinocytes and melanophages, as is typical of lichen planus pigmentosus. C, Transverse sectioning of a punch biopsy of the scalp demonstrates concentric perifollicular fibrosis, limited compound follicle formation, and a modest lymphocytic infiltrate. This combination is diagnostic of a lymphocyte-mediated primary cicatricial alopecia, and clinicopathologic correlation favored a diagnosis of frontal fibrosing alopecia.
Scarring alopecia stable with treatment for 9 years - treated with tacrolimus
New onset dermal pigmentation on the neck present for 4 months
Alopecia: The Role of Biotin
What does Biotin do?

- Coenzyme for carboxylase enzymes that assist various metabolic reactions involved in the transfer of carbon dioxide

- **Important in fatty acid synthesis**, branched-chain amino acid catabolism, and gluconeogenesis

- Biotin's function in protein synthesis and keratin production, explains its contribution to healthy nail and hair growth.

Biotin Deficiency

- Average dietary biotin intake estimated at 35-70 μg/day
- Biotin deficiency is thought to be rare because intestinal bacteria produce more biotin than the body's daily requirements
- Often recommended as a dietary supplement for strengthening hair and nails
- However, scientific data supporting the use of biotin for hair growth are weak unless there is a proven biotin deficiency

Biotin Deficiency - Risk Factors

- Gastrointestinal disease
  - Since endogenous biotin production occurs in the intestine, dysbacteriosis of the gastrointestinal tract (due to inflammatory bowel disease or broad-band antibiotic treatment) could impair the body to generate biotin on its own

- Medications
  - isotretinoin
  - antibiotics
  - anti-epileptics

Biotin Deficiency - Other Risk Factors

- Smoking
- Alcoholism
- Advanced Age (elderly)
- Athletes
- Pregnancy
- Lactation
- Partial gastrectomy

Biotin Deficiency - Defined

- Biotin levels < 200 ng/l are considered as biotin deficiency
- Serum biotin levels demonstrate daily fluctuations up to 100 percent
- So for practical purposes levels <100 ng/l were considered deficient for the study

Biotin in Alopecia

- Serum biotin levels were performed on 541 female patients presenting to Center for Dermatology and Hair Diseases
- 75 women who had already been taking 5 mg oral biotin at the time point of the consultation were excluded from the study
  - They all had biotin levels >1000 ng/L
- Retrospectively looked at these subjects to analyze the rate of biotin deficiency and associated findings in biotin deficient subjects

Biotin in Alopecia - Results

- 38% had biotin deficiency (<100 ng/L)
- 13% optimal biotin levels (>400 ng/L)
- 49% suboptimal biotin levels (100ng/L-400ng/L)

### Table 2

<table>
<thead>
<tr>
<th>Serum biotin level (ng/l)</th>
<th>Number age (mean in years) (n=503)</th>
<th>Diffuse telogen effluvium/number of trichograms performed</th>
<th>Associated seborrheic-like dermatitis</th>
<th>Personal history of risk factors for biotin deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal (&gt;400) (%)</td>
<td>65 (13)</td>
<td>7/29 (24)</td>
<td>0/7 (0)</td>
<td>1/65 (1.5)</td>
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<tr>
<td></td>
<td>49±15 SD</td>
<td></td>
<td></td>
<td>1 drug: Antibiotic</td>
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<tr>
<td>Suboptimal (100-400) (%)</td>
<td>249 (49)</td>
<td></td>
<td>8/23 (35)</td>
<td>21/189 (11)</td>
</tr>
<tr>
<td>Deficient (&lt;100) (%)</td>
<td>189 (38)</td>
<td>23/97 (24)</td>
<td></td>
<td>8 gastrointestinal disease</td>
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<tr>
<td></td>
<td>34±17 SD</td>
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<td>6 isoretinoin</td>
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<td>6 antibiotics</td>
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<td>1 antiepileptic</td>
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SD – Standard deviation

Biotin Recommendations

- Author conclusion- only supplement with biotin if biotin deficiency is established
  - Recommend 5000mcg daily
- My conclusion- 87% of subjects who presented to the clinic were biotin deficient (38%) or had suboptimal levels of biotin (49%)
- It may be reasonable to offer biotin supplementation to all patients who present to our clinics with a chief complaint of hair loss
Alopecia and seborrheic-like dermatitis in a patient with biotin deficiency (a) before, and (b) after treatment with 5 mg oral biotin for 3 months.
Traction alopecia:
Before and after 3 months of hair vitamin containing biotin 5000mcg and other hair growth vitamins
Conclusion—What’s New

- CCCA may have an autosomal dominant transmission
- PAR-2 pathway may play a role in the pathogenesis of CCCA
- Hair transplantation is a safe well-tolerated procedure to improve hair loss in African American women with end-stage CCCA
- The prevalence of FFA is rising and is not uncommon in AA women
  - Lichen planus pigmentosus is associated with frontal fibrosing alopecia
  - There may be an environmental factor that is driving the increase in FFA in our patients although that remains unclear
  - New research suggests that this may be a systemic disease (check ANA)
- Women presenting with hair loss are frequently biotin deficient and it is reasonable to offer biotin supplementation in this population
Thank You!