Supplementation and hair growth: A retrospective chart review of patients with alopecia and laboratory abnormalities

To the Editor: Alopecia is associated with abnormalities in thyroid stimulating hormone, ferritin, zinc, and vitamin D.[1,2] Despite limited evidence of improved hair growth with supplementation, treatment of nonscarring alopecia frequently involves laboratory testing and empiric repletion.[3] To our knowledge, no study has evaluated the relationship between supplementation and hair growth in individuals using baseline and follow-up laboratory data. The purpose of this study was to characterize the impact of supplementation on hair growth.

We performed a retrospective analysis of 138 nonscarring patients with alopecia treated at New York University between January 1, 2008, and October 1, 2021. Patients completed 2 visits in which trichometric measurements and laboratory tests were collected. Laboratory values were defined as abnormal using laboratory reference ranges and literature guidance for supplementation of patients with alopecia. Hair density (hairs/cm^2) and hair caliber (μm) were measured at the centroparietal region of the scalp (12 cm superior to the glabella). The primary exposure variable was supplemented categories versus nonsupplemented. Multivariate regression was conducted adjusting for baseline trichometric measurements, days to follow-up, number of concomitant medications and supplements taken, and number of micronutrient tests at the initial visit. Predicted mean and 95% confidence intervals (CIs) for each category of exposure were reported (R Statistical Software).

Among 138 patients (80.4% female), the most common diagnoses were androgenetic alopecia and/or telogen effluvium (97.0%). At the initial visit, 70 patients had laboratory abnormalities; 39 (28.3%) with low ferritin, 35 (25.4%) with low vitamin D, 6 (4.3%) with abnormal thyroid stimulating hormone, and 4 (2.9%) with low zinc levels. Fifty-two patients received supplementation, with 17 demonstrating normalized levels at the follow-up (Table I).

Deficient patients who were supplemented and later normalized had a greater increase in hair density (Δ5.04 hairs/cm^2) than deficient, nonsupplemented patients, although the difference was not

Table I. Baseline characteristics

Characteristics	Population, *N* = 138
Female sex, *n* (%)	111 (80.4%)
Age	
Mean ± SD	41.6 ± 15.7
Median (range)	38 (17, 79)
Length of follow-up in days, mean ± SD	141.3 ± 101.8
Diagnosis at initial visit, *n* (%)	
Androgenetic alopecia	66 (47.8%)
Androgenetic alopecia and telogen effluvium	50 (36.2%)
Telogen effluvium	18 (13.0%)
Androgenetic alopecia and alopecia areata	3 (2.2%)
Androgenetic alopecia and alopecia areata and telogen effluvium	1 (0.7%)
Participants who received supplementation at initial visit, *n* (%) 57(41.3%)	
Iron	31
Zinc	3
Vitamin D	29
Thyroid hormone	6
Participants with laboratory abnormalities at initial visit, *n* (%) 70 (50.7%)	
Ferritin	39
Zinc	4
25 (OH) VitD	35
TSH	6
Number of supplements used by patient before visit, median, (range) 0 (0, 3)	
Participants using supplements before the initial visit, *n* (%) 31(22.5%)	
Iron	6 (4.3%)
Zinc	5 (3.6%)
Vitamin D	15 (10.9%)
Thyroid hormone	11 (8.0%)
Number of treatments prescribed at initial visit, median (range) 2(0, 5)	
Participants who received each of the following treatments at initial visit *n* (%)	
Finasteride	46/138 (33.3%)
Dutasteride	2/138 (1.4%)
Kenalog injections	2/138 (1.4%)
Topical minoxidil	58/138(42.0%)
Oral minoxidil	85/138 (61.6%)
Clobetasol	116/138 (84.1%)
Spironolactone	30/138 (21.7%)
Platelet-rich plasma	11/138 (8.0%)
Ketoconazole shampoo	60/138 (43.5%)

TSH, Thyroid stimulating hormone.
Cutoff levels for each laboratory test were as follows: TSH <0.45 mU/L or TSH >4.50 mU/L, Vitamin D <30 ng/mL, ferritin <40 ng/mL, and zinc <56 ng/mL. TSH and zinc levels were defined as abnormal using New York University laboratory guidelines. Vitamin D and zinc levels were defined as abnormal based on literature guidance for supplementation in patients experiencing hair loss.

Table II. Adjusted regression analyses for change in hair density and hair caliber compared with deficient, nonsupplemented patients

Patient supplementation categories	Change in hair density, hairs/cm^2 (95% CI)	*P* value	Change in hair caliber, μm (95% CI)	*P* value
Nonsupplemented patients with evidence of initial deficiency	Reference	—	Reference	—
Patients supplemented without evidence of initial deficiency	−10.28 (−31.17, 10.61)	.33	1.69 (−8.18, 11.56)	.73
Patients supplemented for deficiency with nonnormalized laboratory values at follow-up	3.17 (−11.39, 17.72)	.67	0.91 (−5.98, 7.79)	.79
Patients supplemented for deficiency with normalized laboratory values at follow-up	5.04 (−8.88, 18.96)	.48	4.04 (−2.54, 10.62)	.23

Regression adjusted for deficiency at baseline, initial trichometric measurements, days to follow-up, number of ordered medications, number of supplements being taken, and number of micronutrients tested for initial visit.

statistically significant ($P = .48$). Similarly, patients who were supplemented but had nonnormalized follow-up laboratory values had a greater change in hair density (Δ3.17 hairs/cm^2) than deficient, nonsupplemented patients, although again the difference was not statistically significant ($P = .67$). There was no statistically significant difference in predicted change in hair density between deficient, supplemented patients (Δ21.01 hairs/cm^2; 95% CI = 15.64, 26.39) and deficient, nonsupplemented patients (Δ20.11 hairs/cm^2; 95% CI = 11.36, 28.86).

Supplemented patients who normalized on follow-up had a greater increase in hair caliber (Δ4.04 μm) than deficient, nonsupplemented patients, although the difference was not statistically significant ($P = .23$). Deficient patients who were supplemented with nonnormalized follow-up laboratory values also had a positive change in hair caliber (Δ0.91 μm) compared with deficient, nonsupplemented patients, although again the difference was not significantly different ($P = .79$). There was no statistically significant difference in predicted change in hair caliber between deficient, supplemented patients (Δ5.38 μm; 95% CI = 2.72, 8.03) and deficient, nonsupplemented patients (Δ 5.07 μm; 95% CI = 0.74, 9.39) (Table II).

These results fail to demonstrate a statistically significant association between supplementation and hair growth. The findings may be affected by our small cohort and short follow-up interval. Given the cost of blood draws to patients, use of a daily multivitamin, rather than targeted micronutrient repletion, may be sufficient for promoting hair growth, though larger studies are needed.[4] Studies comparing a daily multivitamin with targeted repletion are warranted.

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Conflict of interest

Dr Adhikari has research grants from Johnson & JohnsonJohnson & Johnson. Dr Shapiro is a consultant for Aclaris Therapeutics, Incyte, and RepliCel Life Sciences. Drs Shapiro and Lo Sicco have been investigators for Regen Lab and Pfizer. Dr Lo Sicco is a consultant for Pfizer. Authors Klein, Karim, and Li have no conflicts of interest to declare.

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