RESEARCH LETTERS

Eyelash Preservation During Chemotherapy and Topical Prostaglandin Therapy

Hair loss is a common adverse effect of chemotherapy and has an impact on self-image. It may include loss of eyelashes, which trap particulate matter from the ocular surface. There is evidence that topical prostaglandins induce ocular hair growth.[1] Their effect on eyelash prominence is further highlighted by the recent approval of the prostaglandin analog bimatoprost, 0.03% (Allergan Inc, Irvine, California), by the Food and Drug Administration for treatment of hypotrichosis of eyelashes. Herein, I describe a patient who was treated with a topical prostaglandin and retained eyelashes during chemotherapy treatment for breast cancer.

Report of a Case. A 59-year-old woman with an 8-year history of open-angle glaucoma treatment was referred for continuation of care. At her initial evaluation, she was treated with bimatoprost, 0.03%, and timolol, 0.5%, in each eye. Her intraocular pressures were 13 mm Hg in the right eye and 14 mm Hg in the left eye. Cup to disc ratios were 0.7 and 0.8 in the right and left eyes, respectively. The remaining ocular examination and medical history were remarkable for seasonal allergies. Given ocular sensitivity to these medications, her therapy was continued with preservative-free timolol and latanoprost, which was subsequently changed to travoprost (Travatan Z; Alcon Inc, Hünenberg, Switzerland), with a dose of 1 drop daily at bedtime in each eye. Two years later, she was diagnosed as having breast cancer and was treated with 4 cycles of intravenous doxorubicin hydrochloride (Adriamycin; Pharmacia & Upjohn, New York, New York) and cyclophosphamide (Cytoxan; Bristol-Myers Squibb Company, Princeton, New Jersey). Approximately 4 weeks after completing chemotherapy, she had complete scalp hair loss and partial eyebrow hair loss but retained her eyelashes (photographs could not be obtained at that time owing to adverse effects of chemotherapy). She subsequently received localized radiation treatment to the breast area for 7 weeks without additional reported hair loss. One week after completing radiation treatment, her scalp and eyebrow hair were in a regrowth stage and her eyelash appearance was unchanged (**Figure**).

Figure. Appearance of scalp hair, eyebrows, and eyelashes approximately 12 weeks after chemotherapy completion and 1 week after completion of radiation treatment. A, Scalp hair and eyebrows in regrowth stage; B, eyelash appearance unaffected by chemotherapy (eye makeup present).

Comment. Hair follicles progress through the following 3 phases: anagen or growth, catagen or involution, and telogen or resting phase.[2] The mechanism of chemotherapy-induced hair loss involves disruption of mitosis in hair matrix cells in the anagen phase.[2] Hair loss may be prominent within weeks of drug administration.[3] Scalp hair is greatly affected because 85% to 90% of hair follicles in the scalp are in the anagen phase, and the duration of the anagen phase is greater in scalp hair (2-6 years) compared with eyelashes (1-1.5 months).[2] The epidemiologic characteristics of chemotherapy-induced hair loss has not been systematically described, but the combined chemotherapy of cyclophosphamide and doxorubicin caused hair loss in 92% of the patients, with distributions of 3.3% for thinning, 19.9% for greater than 50% alopecia, and 69.5% for complete alopecia.[4]

Latanoprost, travoprost, and bimatoprost are prostaglandin analogs that effectively lower intraocular pressures. An interesting not adverse side effect is the change in eyelashes. A prospective study of 43 patients treated unilaterally with latanoprost showed an increase in eyelash number, thickness, and length.[1] The proposed mechanism of prostaglandin-induced hypertrichosis is thought to involve induction of follicles into the anagen phase.[1] This is supported by prostaglandin-related mitogen activity inducing expression of particular genes leading to DNA replication.[5]

Additional evidence for the potential hair protective property of topical prostaglandin administration was observed in an animal model during chemotherapy. Mice treated with topical misoprostol (prostaglandin E1 analog) before doxorubicin therapy had an increased number of residual hairs compared with mice treated with chemotherapy alone.[6]

In conclusion, the potential cytoprotective effect of topical prostaglandins was observed in this case of preserved eyelashes during chemotherapy with concurrent topical prostaglandin treatment. These findings warrant further investigation, which may provide additional evidence for prostaglandin protection against hair follicle injury.

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Financial Disclosure: In the past 5 years, Dr Moroi has received honorariums for participation in a Speakers' Bureau supported by Pfizer Inc, Allergan Inc, and Alcon Inc.
Additional Contributions: Agnieszka Trzcinka, MD, contributed to the research for this case report. The Photography Department at the Kellogg Eye Center provided photographs for this case report.

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Lifestyle and Adiponectin Level: Four-Year Follow-up of Controlled Trials

The adiponectin adipocyte-secreted adipokine has both insulin-enhancer and anti-inflammatory properties[1] and is the most consistent biochemical predictor of type 2 diabetes mellitus. Higher adiponectin levels are consistently associated with a lower risk of type 2 diabetes in 13 prospective studies of diverse populations with a total of 14 598 participants and 2623 incident cases of type 2 diabetes, with a relative risk of 0.72 (95% confidence interval, 0.67-0.78) per 1-log μg/mL increment in adiponectin levels.[2] Identification of lifestyle changes able to increase adiponectin circulating levels may help refine the strategy against the current diabetes epidemics.

Methods. This was a post hoc analysis of randomized controlled trials[3-5] to see whether adiponectin levels were related to success in achieving lifestyle changes. A total of 410 subjects (219 men and 191 women) were originally randomized to an intervention group, based on improvement of quality of diet and increased physical activity, or to a control group (general information about healthy food choices and exercise). The goals of the dietary intervention were a reduction in intake of saturated fat to less than 10% of energy consumed, an increase in intake of monounsaturated fat to 10% or more of energy consumed, and an increase in fiber intake to at least 15 g per 1000 kcal. The goal of physical activity was moderate exercise for at least 30 min/d for at least 5 d/wk. Frequent ingestion of whole-grain products, vegetables, fruits, nuts, low-fat milk, and olive oil was recommended. The subjects also received individual guidance on increasing their level of physical activity: endurance exercise (such as walking, jogging, swimming, aerobic ball games, or skiing) was recommended. The study subjects were ranked according to their success in achieving the goals of the intervention at the 4-year examination. We calculated the percentage of subjects in both groups who had an adiponectin level of 1 μg/mL or more above the median of the sample in each success score category (0, no goal achieved; 1, dietary goal achieved; 2, physical activity goal achieved; and 3, dietary + physical activity goals achieved). Adiponectin levels were assayed with a radioimmunoassay from Linco Research, St Charles, Missouri, which has an intra-assay coefficient of variation of 1.78% to 6.21%.

Results. At baseline, the mean (SD) age of subjects in the intervention and control groups was 41 (6.6) and 41.2 (6.8) years, respectively, and the mean (SD) body mass index (calculated as weight in kilograms divided by height in meters squared) was 32.4 (5.5) and 32.6 (6.2), respectively.