

Hairpin-Induced Alopecia: Case Reports and a Review of the Literature

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The estimated time to complete this activity is 1 hour.

GOAL

To understand hairpin-induced alopecia to better manage patients with the condition

LEARNING OBJECTIVES

Upon completion of this activity, you will be able to:

1. Describe causes of secondary scarring alopecia.
2. Evaluate and diagnose secondary scarring alopecia.
3. Discuss with patients how to prevent damage to the hair and scalp.

INTENDED AUDIENCE

This CME activity is designed for dermatologists and general practitioners.

CME Test and Instructions on page 246.

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Traumatic hair loss is a scalp injury that can cause secondary scarring alopecia. It can result from different types of physical and chemical injury. Hair loss induced by certain hair-styling techniques has been discussed, but

we describe a preceding ulcerative process. We describe 3 black adolescent girls with hairpin-induced alopecia that started with an ulcer and ended with a scar. We also review the dermatologic literature.

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Hair loss due to physical or chemical trauma is a cause of scarring alopecia initiated by events outside of the follicular unit and has been termed *secondary cicatricial alopecia*.^{1,2} Alopecia in black women is common and has been reported as the

fifth most common dermatosis in black individuals, with traumatic alopecia cited as the predominant type.³ Biochemical and structural differences of hair⁴ result in hair texture variability among ethnic groups and possibly differences in hairstyling preferences. Hairstyling techniques used by black women such as thermal or chemical hair straightening and hair braiding or weaving may increase the risk for traumatic alopecia.⁵ Pressure alopecia is another type of alopecia, occurring after surgical procedures that require extensive periods of immobilization.⁶⁻¹¹

Hot-combing is a type of thermal hair straightening frequently used by black individuals to temporarily straighten hair. With this technique, a metal comb is heated to high temperatures (66°C–260°C) by a heat source such as a small electric warmer, gas burner, or hot flame. An ointment-based lubricant is used to treat the hair and the hot comb is pulled through small sections of hair.¹² Moderate to severe burns from accidental contact with the hot comb¹³ may result in alopecia, a common scalp problem associated with hot comb use.

Chemical hair straightening in black individuals commonly involves the use of hydroxide relaxers that act by changing the cysteine disulfide bonds in the hair¹² responsible for kinking or curling. Relaxers containing sodium hydroxide and potassium hydroxide are the strongest and also are the most likely to cause scalp and hair damage.¹² A reported complication with these relaxers is fibrosis and inflammation of the scalp associated with alopecia.¹⁴

Hair braiding and weaving are popular in the black community because these hairstyles may be maintained with relatively little upkeep on a daily basis. Additionally, hair thickness and styling choices can be augmented. Tight braids or hairpieces

attached with glue or tight stitches may result in traction alopecia, a common form of hair loss in black individuals. Traction alopecia occurs with loss or thinning of hair in any area of the scalp caused by tension.¹²

Hairstyling trends in black individuals may occur because of current and historical models. Convenience and time also may dictate style choices.¹² Sculptured hairstyles are popular and commonly involve chemically relaxed or heat-straightened hair that is molded using styling gels and/or hair spray. This style is appealing because it usually can be maintained for 1 to 2 weeks before the hair is washed and restyled, but such practices may be harmful to the well-being of the hair and scalp,¹³ causing hair breakage and resulting in dry and brittle hair.¹² Scarring alopecia induced by hairpins has not been formally described. We present a complication of sculptured hairstyles requiring multiple hairpins. Three black adolescent girls experienced ulcerative lesions on the vertex of the scalp where hairpins were used to secure the hairstyles.

Case Report

Patient 1—A 17-year-old black adolescent girl reported a sore on her scalp of 1 month's duration. She reported wearing a hairstyle secured with multiple hairpins concentrated at the crown of the scalp. At this site, a tender pus-filled lesion developed that healed with a scab. The patient denied any pruritus. She had no remarkable medical history, medications, or allergies. Her family history was notable for diabetes mellitus. On physical examination she had a 2×3-cm wound with a thick yellow crust and obvious hair loss. Debridement was performed and revealed beefy red granulation tissue at the base (Figure 1A). The



Figure 1. Beefy red granulation tissue with exudate at the base of a debrided wound on the vertex of the scalp (A). At 2-week follow-up, reepithelization of the ulcer was demonstrated with surrounding alopecia (B). There was some repigmentation and hair regrowth bordering the ulcer.

patient was afebrile and had no lymphadenopathy. There were no other remarkable findings. A traumatic ulcer on the vertex of the scalp was diagnosed. The patient was prescribed oral cephalexin for secondary bacterial infection and advised to apply a warm water compress and antibiotic ointment to the lesion daily.

At 2-week follow-up, the patient and her mother reported that the wound was much improved and there was no longer any drainage. On physical examination the crown of the scalp showed re-epithelization of the ulcer with surrounding alopecia. There was no tenderness. The wound was smaller (0.5×1 cm) and there was some repigmentation and hair regrowth bordering the ulcer (Figure 1B).

Follow-up 3 weeks later demonstrated a well-healed alopecic, pink, hypopigmented plaque. Some new hair growth surrounded the plaque. The patient was counseled regarding scar evolution and the likelihood of permanent hair loss at this site.

Patient 2—A 15-year-old black adolescent girl presented with a bald spot on her scalp at the site of a crusty sore that had developed 3 to 4 months prior to presentation. At that time, she reported wearing a tight hairdo with many bobby pins securing the hair in the area of concern. She admitted to picking the scab off of the site. She had no remarkable medical history, family history, medications, or allergies. On physical examination there was a stellate, shiny, pink plaque with alopecia on the vertex of the scalp. Posttraumatic alopecia with scarring was diagnosed. The patient was educated on hairstyling and the risks for use of chemical processing and other styling implements.

Patient 3—A black adolescent girl was seen at an outside clinic with a history similar to the first 2 patients. She reported wearing a hairstyle with several hairpins that resulted in an open sore, followed

by an area of missing hair. On physical examination the scalp showed a well-healed alopecic, hypopigmented, pink plaque with areas of repigmentation and hair growth. There was a small area of beefy granulation tissue that was in the process of healing (Figure 2).

Comment

Hair loss may be caused by traction as well as other forms of trauma. Traction alopecia can be clinically distinguished from other forms of traumatic alopecia. Local trauma to the scalp can result in plaques of erythema with or without scales or pustules.¹⁵ Traction alopecia typically shows a symmetric loss or thinning of hair around the frontal and temporal hairline; however, traction alopecia can be present in any area of the scalp where tension has been put on the hair.¹² Biopsies in patients with traumatic or traction alopecia often are not diagnostic¹⁵ and may not be performed if there is a relevant history, consistent findings on physical examination, and resolution and limitation of wounds at follow-up or at presentation.

Prior trauma to the scalp with hairpins and certain hairstyles with nonmarginal hair loss have been described in the literature.¹⁶⁻¹⁸ Yosefy et al¹⁶ described scalp trauma attributed to yarmulkes held in place by special metal pins. These pin fasteners had irritating qualities and caused continuous trauma due to intermittent movements throughout the day as well as the action of placing and releasing the pins. Damaged hair follicles and inflammatory changes were seen in these patients, and they did not respond to topical steroids.¹⁶ Hwang et al¹⁷ reported traction alopecia caused by hairpins holding a nurse cap. Prolonged traction caused physical stress on the hair and scalp that resulted in a well-delineated form of traumatic alopecia.¹⁷ Chignon, or hair bun, alopecia was described by Trüeb¹⁸ as a localized alopecia on the occipital scalp caused by the traction and twisting needed to produce the chignon. Trüeb¹⁸ suggested that the main factor in the development of alopecia was the duration of wearing the tight hair bun. However, none of these studies reported a patient with an ulcerated scalp initially, as observed in our patients.

Differential diagnoses to consider in the setting of scarring alopecia include central centrifugal cicatricial alopecia, discoid lupus erythematosus, and chemical alopecia. Central centrifugal cicatricial alopecia clinically starts around the vertex and spreads centrifugally. It usually is seen in middle-aged women of African descent.¹⁹ In discoid lupus erythematosus, patients often report hair loss, increased shedding, and pruritus. There is centrifugal spread and a discoid plaque forms with follicular plugging



Figure 2. Well-healed alopecic, hypopigmented, pink plaque with areas of repigmentation and hair growth. The lower right corner shows a small area of beefy granulation tissue.

and adherent scale that can be hyperkeratotic. There is no site predilection and the initial lesion often is an erythematous papule or small plaque. Age of onset typically is 20 to 40 years, and there is an increased prevalence in black women.²⁰ Chemical alopecia can result from injury due to acids, alkalis, and metallic salts. Depending on the agent's concentration and the duration of exposure, these agents may cause irreversible scalp damage. Once formed, scarred areas usually are sharply demarcated and irregularly shaped.²¹

Our patients had limited alopecia with improvement and some hair regrowth after removal of the hairpins and healing of the ulcer. They were otherwise healthy and did not report recent chemical exposure. The scarring alopecia experienced by our patients was caused by recurrent scalp trauma from hairpins.

Conclusion

By understanding differences in hairstyling methods among ethnic groups, dermatologists will be able to effectively offer proper preventative counseling and management to female patients with alopecia. Specifically, patients should be educated on hair care practices, such as the discontinuation of all methods that cause repeated trauma to the hair and scalp. Hairstyles that require numerous hairpins placed in a localized area should be avoided as well as hairstyles that cause considerable tension.

REFERENCES

- Olsen EA, Bergfeld WF, Cotsarelis G, et al. Summary of North American Hair Research Society (NAHRS)-sponsored Workshop on Cicatricial Alopecia, Duke University Medical Center, February 10 and 11, 2001. *J Am Acad Dermatol*. 2003;48:103-110.
- Whiting DA. Traumatic alopecia. *Int J Dermatol*. 1999;38(suppl 1):34-44.
- Halder RM, Grimes PE, McLaurin CI, et al. Incidence of common dermatoses in a predominantly black dermatologic practice. *Cutis*. 1983;32:388, 390.
- Rook A. Hair II: racial and other genetic variations in hair form. *Br J Dermatol*. 1975;92:599-600.
- Callender VD, McMichael AJ, Cohen GF. Medical and surgical therapies for alopecias in black women. *Dermatol Ther*. 2004;17:164-176.
- Regev E, Goldan O, Orenstein A, et al. Permanent pressure alopecia after microsurgical breast reconstruction. *Plast Reconstr Surg*. 2006;117:2095-2096.
- Dominguez E, Eslinger MR, McCord SV. Postoperative (pressure) alopecia: report of a case after elective cosmetic surgery. *Anesth Analg*. 1999;89:1062-1063.
- Wiles JC, Hansen RC. Postoperative (pressure) alopecia. *J Am Acad Dermatol*. 1985;12:195-198.
- Boyer JD, Vidmar DA. Postoperative alopecia: a case report and literature review. *Cutis*. 1994;54:321-322.
- Lawson NW, Mills NL, Oschner JL. Occipital alopecia following cardiopulmonary bypass. *J Thorac Cardiovasc Surg*. 1976;71:342-347.
- Bruce IA, Simmons MA, Hampal S. "Horseshoe-shaped" post-operative alopecia following lengthy head and neck surgery. *J Laryngol Otol*. 2002;116:230-232.
- McMichael AJ. Hair and scalp disorders in ethnic populations. *Dermatol Clin*. 2003;21:629-644.
- Joyner M. Hair care in the black patient. *J Pediatr Health Care*. 1988;2:281-287.
- Nicholson AG, Harland CC, Bull RH, et al. Chemically induced cosmetic alopecia. *Br J Dermatol*. 1993;128:537-541.
- Thiedke CC. Alopecia in women. *Am Fam Physician*. 2003;67:1007-1014, 1017-1018.
- Yosefy C, Ronnen M, Edelstein D. Pseudo alopecia areata caused by skull-caps with metal pin fasteners used by Orthodox Jews in Israel. *Clin Dev Immunol*. 2003;10:193-195.
- Hwang SM, Lee WS, Choi EH, et al. Nurse's cap alopecia. *Int J Dermatol*. 1999;38:187-191.
- Trüeb RM. Chignon alopecia: a distinctive type of nonmarginal traction alopecia. *Cutis*. 1995;55:178-179.
- Whiting DA, Olsen EA. Central centrifugal cicatricial alopecia. *Dermatol Ther*. 2008;21:268-278.
- Ross EK, Tan E, Shapiro J. Update on primary cicatricial alopecias. *J Am Acad Dermatol*. 2005;53:1-37.
- Finner AM, Otberg N, Shapiro J. Secondary cicatricial and other permanent alopecias. *Dermatol Ther*. 2008;21:279-294.

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