Acute Hair Loss 3 Years after Bone Marrow Transplant

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Question

A 23-year-old female developed acute scalp hair loss 3 years after allogeneic peripheral stem cell transplantation for acute lymphoid leukemia. Physical examination showed short and thinning hair. The pull test was positive (Fig. 1a). Extensive poikiloderma and keratosis pilaris-like lesions were noted on the extremities. Body hair was unaffected. Trichoscopy showed diffuse hair thinning with increased hair shaft diameter diversity, an increased number of intermediate and vellus hairs, and an increased number of single hair units. Overall, there was a lower hair follicle density. Some circle hairs and Z hairs have been seen, but no specific signs of inflammatory or cicatricial alopecias were present (Fig. 1b). We performed a scalp biopsy (Fig. 2).

What Is Your Diagnosis?

Fig. 1. **a** Diffuse short and thinning hair. **b** Trichoscopy shows diffuse scalp involvement with lower hair follicle density and an increased number of intermediate and vellus hairs as well as circle hairs (red arrows) and Z hairs (blue arrows).

Fig. 2. Histopathology. Hematoxylin and eosin stain. $\times 10$ and $\times 40$.

Answer

Graft-versus-host disease (GVHD) with non-scarring alopecia.

GVHD is a life-threatening complication that may occur following allogeneic hematopoietic stem cell transplantation. The parafollicular bulge is an early target, and its involvement can cause hair disturbances as a sign of GVHD activity; however, acute hair loss is not a common manifestation of chronic GVHD [1, 2]. Skin manifestations are present in more than 90% of the patients, and the skin is frequently the first organ affected [2]. Body hair and scalp alterations alone are insufficient to establish a diagnosis, but other features could signal chronic GVHD activity [2]. Recently, cicatricial alopecia of the scalp was reported in a case of GVHD in which the patient had features of female-pattern hair loss and lichen planus pilaris. This condition is known as fibrosing alopecia in a pattern distribution [3].

GVHD is a major complication of allogeneic transplantation and an impediment to further allotransplantation [4]. GVHD is divided into acute and chronic forms that are conventionally differentiated by onset before or at least 100 days after transplantation [2–6]. However, evolving transplantation practices have altered the typical onset of acute and chronic disease manifestations. A reclassification of acute and chronic disease based primarily on clinical manifestations and histologic findings was proposed, with acute GVHD defined as classic, persistent, recurrent, or late onset, and chronic GVHD defined as classic or overlap syndrome [2, 6]. Our patient initially developed a cutaneous lichenoid form typical of chronic GVHD, with later evolution to non-scarring alopecia. Distinctive features of chronic GVHD include new scarring, non-scarring scalp alopecia, and body hair loss. Other characteristics of chronic follicular GVHD include premature graying, thinning, or brittleness of hair, as well as a lichenoid follicular rash and comedonal lesions [2–7] (Table 1).

Other causes of hair loss after allogeneic transplant are much more common and are ruled out by blood tests, trichoscopy, and scalp biopsy. These include persistent alopecia after recovery from chemotherapy and radiotherapy, medications, metabolic causes, endocrine dysfunction, scalp infection, telogen and androgen effluvium, androgenetic alopecia, and alopecia areata [6]. Sex mismatch is a risk factor for alopecia areata after transplantation, but our patient received a sex-matched unrelated donor transplant [9]. In our case, trichoscopic features were nonspecific, circle hair and Z hair could be

Table 1. Most common hair disturbances in chronic cutaneous GVHD

Scalp and body hair	Sufficient for diagnosis of GVHD	Isolated finding insufficient for diagnosis of GVHD	Other features
<i>Scalp</i>			
Scarring alopecia	–	+	
Non-scarring alopecia	–	+	
Thinning scalp hair	–		+
Dull-appearing hair	–		+
Premature graying	–		+
<i>Body hair</i>			
Body hair loss	–	+	
Scaling	–	+	
Papulosquamous lesions	–	+	
Comedonal lesions [8]	–		+
Lichenoid follicular rash [4]*	–		+

* Found in both chronic and acute GVHD. Adapted from Filipovich et al. [2].

seen in multiple conditions as tinea capitis, alopecia areata, and trichorrhexis nodosa. The Z hair is a zigzag-shaped hair with sharp bends at multiple points of the hair shaft as a result of focal weakening. Circle hair is a short, vellus hair that is thinned [10, 11]. The scalp biopsy showed basal-cell vacuolization of the follicular epithelium with lymphocytic exocytosis, a typical lichenoid reaction seen in GVHD. Five months later, she recovered, with regrowth of all scalp hair after using topical clobetasol propionate solution 0.05% and minoxidil 5% for 1 month with no relapses.

As our patient did not have a common manifestation, we report this case to highlight the fact that new onset of non-scarring alopecia after transplantation could be a sign of chronic GVHD.

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Statement of Ethics

All ethical aspects have been taken into consideration by all authors during the conception of this paper. The patient discussed gave her written informed consent.

Disclosure Statement

The authors have no conflicts of interest to declare.

Author Contributions

Laura Silva, Maria Natália De Fraia Souza, Solange Teixeira, Flavia Sternberg, and Juliana Dumet Fernandes made substantial contributions to the conception or design of the work, drafting of the work, and revising it critically for important intellectual content. They all gave final approval of the version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Keywords

Graft-versus-host disease · Chronic cutaneous graft-versus-host disease · Hair loss

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