Research Paper

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Acute Diffuse and Total Alopecia of the Female Scalp Associated with Borrelia-Infection

Medical Science

KEYWORDS : *Borrelia* -infection, co-morbidity, diffuse alopecia areata

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ABSTRACT

A case of acute diffuse and total alopecia of the female scalp associated with Borrelia-infection (acrodermatitis chronica atrophicans) is presented. Today, acute diffuse and total alopecia of the female scalp is recognized as a distinct variant of alopecia areata (AA) predominantly observed in women. Cases of AA have formerly been reported in association with infections. AA is understood to represent an organ-specific autoimmune disease of the hair follicle. It is conceivable that the antigenic stimulus provided by the infection may act as a trigger for alopecia. Vice versa, alopecia may act as a marker for detection of undiagnosed infection. Treatment of the patient with intravenous ceftriaxone led to the resolution of cutaneous borreliosis, and in addition to topical clobetasol foam to complete recovery of hair.

INTRODUCTION

Alopecia areata (AA) is a common dermatologic condition with the typical clinical presentation of nonscarring hair loss in patches. Since AA is considered to represent an organ-specific autoimmune disease, the clinical appearance would seem sufficient to make a diagnosis, and further laboratory investigations would seem unnecessary or even inappropriate. Nevertheless, in unusual cases, or patients presenting with extensive disease, certain laboratory investigations may be indicated to detect associated autoimmune diseases and/or co-morbid conditions that may be relevant to the disease course. An increased incidence of other autoimmune diseases, such as autoimmune thyroid disease,[1] pernicious anemia,[2] and celiac disease,[3] is seen among AA patients, while serum ferritin[4] or vitamin D levels[5] may have an influence on the disease course. Finally, there have been some reports of AA in association with various infections.[6,7,8,9,10,11,12] Here, we report a case of successful treatment of acute diffuse and total alopecia of the female scalp associated with *Borrelia*-infection.

CASE REPORT

A 65-year-old female patient presented with a 3 months history of scalp hair loss in tufts. She also complained of swelling and bluish red discoloration of the right lower limb and of fatigue.

Clinical examination revealed diffuse alopecia [Figure 1] with a positive pull test and cutaneous swelling of the right lower extremity with a bluish red discoloration.

Diffuse alopecia prior to treatment

A hair pluck test (trichogram) revealed 53% (frontal) to 62% (occipital) telogen roots with a proportion of 6% dystrophic anagen roots.

Laboratory evaluation (AA co-morbidity, heavy metal, and vasculitis screening) revealed elevated thyroid peroxidase and thyroglobulin antibodies (>600 resp. 464 IU/mL; normal: <34 resp. 115 IU/mL), elevated thyreotropin (TSH) levels (15.29 mIU/L; normal: 0.27–4.20 mIU/l), and vitamin D deficiency (42.9 nmol/L). CRP, ferritin, Vitamin B_{12}, antinuclear antibodies (ANA), anti-SSa-60/52(Ro), anti-SSB (La), anti-Sm, anti-nRNP (ribonuclein), anti-histone, anti-Jo-1, anti-dsDNS (ELIA), anti-parietal cell antibodies, anti-TSH receptor antibodies, cardiolipin antibodies IgG and IgM, antineutrophil cytoplasmic antibodies myeloperoxidase/PR3 antibodies, anti citrullinated protein antibody, anti HBs, Bcore, and C antibodies, complement factors C3 and C4 levels, creatine phosphokinase, copper, cadmium, and mercury levels were all normal. *Borrelia* serology (Western blot) tested positive for VLsE IgMG (different genospecies), p41 IgG (B. sensu

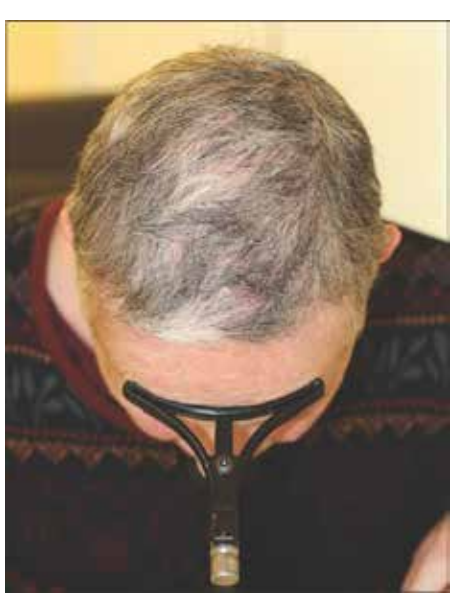
strictu), and p41 IgM (B. sensu strictu).

A diagnosis of acute diffuse and total alopecia of the female scalp associated with *Borrelia*-infection (acrodermatitis chronica atrophicans), autoimmune thyroid disease, and vitamin D-deficiency was made.

The patient was prescribed intravenous ceftriaxone 2 g daily for 3 weeks, topical clobetasol propionate 0.05% foam twice daily on 5 consecutive days/week for 6 months, thyroid supplementation therapy, and oral vitamin D3 1500 IU/day.

Figures Figures2–3 (at 3 months), (at 6 months) and (complete remission at 10 months) show the photographic sequence of the alopecia in the course of treatment. The swelling and discoloration of the lower right limb resolved completely, and the patient reported lesser fatigue.

Initial regrowth of hair after 3 months



Partial regrowth of hair after 6 months

DISCUSSION

The patient presented clinically with acute diffuse and total alopecia of the female scalp as originally described in 2002 by Sato-Kawamura *et al.*[13] Today it is recognized to be basically identical with a subtype of AA presenting with diffuse hair loss as originally proposed in the German literature by Braun-Falco and Zaun as early as 1962.[14] AA incognita is yet another synonymous designation for the condition proposed by Rebora in 1987.[15] The condition predominantly affects women and is characterized by diffuse hair shedding in the absence of typical patches.

Today, AA is understood to represent a T-cell mediated, organ-specific autoimmune disease of the hair follicle,[16] that nevertheless may occur in association with other autoimmune phenomena, such as circulating autoantibodies[17] and autoimmune diseases.[18]

Presence of one or more additional diseases co-occurring with a primary condition or the effect of such additional diseases, is generally termed as co-morbidity. While the concept of co-morbidities has emerged in dermatologic disease, such as psoriasis,[19] it has largely been ignored in the management of hair loss patients.

Co-morbid conditions reported to be associated with AA include: Autoimmunity (thyroid, celiac disease, parietal cell),[1,3,20] deficiencies (iron, vitamin D, zinc),[4,5,21] allergies (atopic disease),[22,23] and infections.[6,7,8,9,10,11,12] The latter have included reports on: Epstein-Barr Virus,[8] human immunodeficiency virus,[9] swine flu,[6] viral hepatitis,[11] cytomegalovirus,[12] dental infections,[7] and*Helicobacter pylori*.[10] If such associations are confirmed by epidemiological studies designed for this purpose, new therapeutic options could be available for these patients.

Previously, *Borrelia burgdorferi* has been linked to pseudopelade Brocq,[24] but so far no association of*Borrelia*-infection with AA has been reported. *Ixodes* tick[25] and other insect bites[26] have been associated with localized patches of hair loss at the site of the bite. However, this rather seems to be a pharmacologic or toxic than immunologic effect.

The patient herein reported presented diffuse AA, associated with acrodermatitis chronica atrophicans, autoimmune thyroid deficiency, and vitamin D deficiency. She was successfully treated with topical clobetasol propionate 0.05% foam twice daily on 5 consecutive days/week for 6 months, intravenous ceftriaxone 2g daily for 3 weeks, thyroid supplementation therapy, and oral vitamin D3.

Although the various reported associations of AA with infectious agents have remained controversial and need to be confirmed by epidemiological studies, it remains conceivable that the antigenic stimulus provided by co-morbid infections may entertain the autoimmune reaction underlying AA. In the same line is the observation of AA triggered by recombinant hepatitis B vaccination.[27] Therefore, detection and treatment of possible infection associated with AA should be taken into consideration. *Vice versa*, AA may act as a marker for detection of hitherto undiagnosed co-morbid conditions, such as thyroid disease, Vitamin D deficiency, and potentially serious infection.

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