Successful treatment of Alopecia Totalis with calcitriol and paricalcitol in two girls aged 3 and 7-years

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No disclosures

Background

Alopecia areata (AA) is a T cell mediated autoimmune disease directed at the hair follicle (HF):
- limited to patchy hair loss over the scalp (focalis)
- total loss of scalp hair (totalis)
- loss of both scalp and body hair (universalis).
HF is a micro organ with its own immune and hormonal microenvironment. During the anagen segment of hair cycle, HF epithelium generates and maintains an area of immune privilege, which is mainly characterized by:
- low expression of MCH class Ia antigens,
- local production of immunosuppressive agents.
This HF immune privilege (HFIP) is important for the protection of the anagen and melanogenesis associated antigens from immune recognition by autoreactive CD8+ T-cells. Collapse of mechanisms that maintain the HFIP:
- renders the HF susceptible to inflammatory assault,
- is through to contribute to development of AA.
Growing evidence implicates the INfy in triggering HFIP collapse.

Conclusions

- The functions of vitamin-D, far beyond calcium metabolism, related to autoimmune diseases are under continual investigation, because of the significant anti-inflammatory and immunomodulatory properties of this powerful nuclear receptor-activating hormone.
- We tried to induce immunomodulation by oral calcitriol.
- With 0.5 mcg/day the 7-year-old girl grew hair within 6m (except from a small region at the rear of the scalp) and the result is maintained for 4.5 yrs now with normal calcium metabolism: Ca 10.1mg/dl, P 5.1mg/dl, ALP 318 IU/L, PTH 26 ng/ml, 25(OH)D 41 ng/ml, 1-25(OH), D3 30 ng/ml, 2hr Urine sample Ca/CR= 0.08.
- With 0.5 mcg x 3/day p.o. the 3-year-old girl developed asymptomatic hypercalcemia at 3m (Ca 14 mg/dl, URINE Ca/CR= 1.37) and was switched to the equivalent and slightly higher dose of paricalcitol 2 mcg x 3/day p.o. Calcium metabolism normalized: Ca 9.8 mg/dl, P 3.8 mg/dl, ALP 146 IU/L, PTH 22.4 pg/ml, 25(OH)D3 61 ng/ml, 1-25(OH), D3 38 ng/ml apart from mild hypercalcuria closely monitored 2hr Urine sample Ca/CR= 0.5.
- Complete hair regrowth (scalp hair, eyebrows, eyelashes) was achieved by 6m of treatment.

Figure 1. Alopecia Areata pathogenesis: "Hair follicle immune privilege" collapse model

Management can be challenging, and despite multiple treatment modalities, no therapy still stands.
- While localized AA may respond well to topical corticosteroids, many patients require more aggressive second-line therapy.
- Pediatric age and more extensive disease with resistance to initial therapies may sometimes benefit from a cocktail of established therapies. The likelihood of complete spontaneous regrowth in AT/AU is <10%, but even then, relapses are common and frustrating.

Figure 2. Vitamin D and immunomodulation

Figure 3. Hair regrowth in the 7-year old girl (top) and the 3-year old girl (bottom)