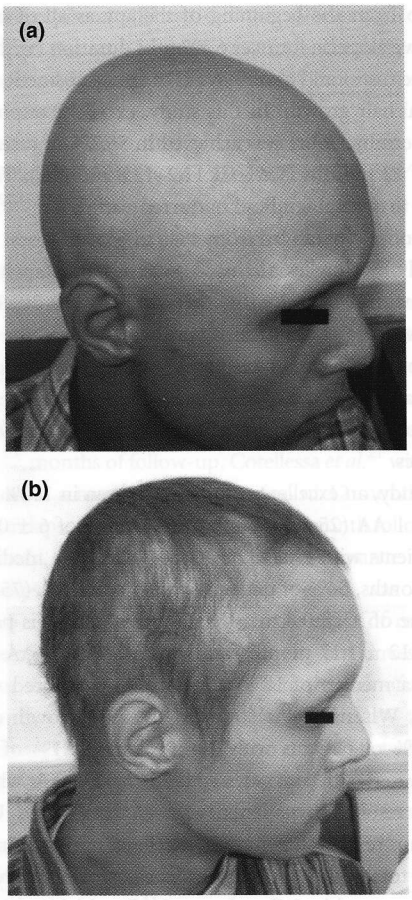

Figure 2 (a) Alopecia universalis patient before treatment; (b) 8 months after Diphencyprone therapy with excellent response.

Side-effects

Cervical lymphadenopathy occurred in 50% of our cases, but that was not considered as a side-effect and patients were reassured. Clinically, significant side-effects occurred in 33/135 patients (24.4%) (Table 4). Some side-effects did not lead to the discontinuation of therapy including the development of blistering and severe irritation requiring rest for 1 week and the use of topical steroids and systemic antihistaminics in 19 patients (14%) and hyperpigmentation of the scalp and nape of the neck in seven patients (5.2%), which was treated by the use of a suitable topical de-pigmenting agent. Other side-effects necessitated stopping DPC therapy including development of localized vitiligo (head and neck) in three patients (2.2%) and development of tolerance to DPC in four patients (2.9%). These seven patients were shifted to alternative therapies for AA.

Table 3 Clinically significant (>75%) hair regrowth according to the baseline extent of AA

Baseline extent of AA (%)	Percentage of patients with excellent growth	Median time to regrowth in months ± SD (95% CI)
Grade 1: 25–49	100	6 ± 0.4 (5.3–6.7)
Grade 2: 50–74	77	12 ± 0.8 (10.4–13.6)
Grade 3: 75–99	54	12 ± 0.8 (10.4–13.6)
AA totalis	50	12 ± 1.17 (9.7–14.3)
AA universalis	41	18 ± 5.5 (7.3–28.7)

AA, alopecia areata; SD, standard deviation; CI, confidence interval.

Table 4 Side-effects in patients treated by Diphencyprone

Side-effect	Percentage of patients (no. patients)
Severe irritation	14 (19)
Hyperpigmentation	5.2 (7)
Vitiligo	2.2 (3)
Tolerance	2.9 (4)

Hyperpigmentation was probably post-inflammatory and was more common in our cases, as most of them were of skin types 3 and 4 in addition to sunny weather we have all the year around, while vitiligo was probably related purely to DPC application as none of the patients had vitiligo before DPC and recovery occurred on stopping DPC and on application of topical steroids and sunscreen.

Tolerance is defined as the absence of immunological response to a foreign antigen; in immunotherapy of AA, Van der Steen *et al.*[14] defined tolerance as the continuous increase in the concentration of applied DPC until a concentration of 2% is reached without producing an adequate dermatitis resulting in the loss of all regrown hair.

Relapse

Relapse after achievement of hair regrowth was defined as loss of >25% of re-grown hair during therapy. This happened in 9.5% cases.

Follow-up and maintenance therapy:

Of the 55 cases who achieved excellent response to DPC therapy, nine cases had just achieved excellent response at the time of collection of our data and therefore did not have a follow-up period. The remaining 46 were followed up for a period ranging from 1 to 48 months (mean 18.2 ± 12.9 m). Thirty-nine of these 46 (84.8%) continued on maintenance therapy every 1–4 weeks during this follow-up period upon our recommendation, while seven patients chose to stop therapy and were followed up for periods ranging from 2 to 20 months. Hair fall > 25% occurred in 7/39 patients on maintenance (17.9%) and 4/7 patients without maintenance therapy (57.1%) denoting a statistically significant difference between the two groups (P-value = 0.025; Table 5)

Discussion

The immune-modulating effect of topical immunotherapy is unclear. According to the most recent theory about the pathogenesis of AA introduced by Paus *et al.*, in 2005 focusing on a breach of