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#### Systematic review and quality analysis of studies on the efficacy of topical diphenylcyclopropenone treatment for alopecia areata



*To the Editor:* Since 1983, topical diphenylcyclopropenone (DPCP) immunotherapy has been used for the treatment of alopecia areata (AA). Despite several reports showing positive results,<sup>1,2</sup> there are still questions about its efficacy. In this study, we aimed to evaluate the efficacy of topical DPCP treatment for AA by performing a systematic review and quality analysis of relevant articles.

The PubMed, EMBASE, and Cochrane Library databases were searched for articles published from 1983 through 2015. Retrieved articles were scored using a modified version of the quality score originally developed for randomized clinical trials (RCTs).<sup>3</sup> Each study had different standards of assessing the clinical response to DPCP immunotherapy. To calculate average response rate, we categorized patients according to the assessment criteria used in each of the studies. Then, the median

value was calculated from the range of different response rates in the individual studies, and the overall estimated average, standard error, and 95% confidence intervals (CIs) were then calculated. All effects were computed using the Comprehensive Meta-Analysis version 2.2.064 software (Biostat, Englewood, NJ).

Of the 26 studies included in the final analysis (Supplementary Fig 1; available at <http://www.jaad.org>), 5 studies enrolled  $\leq 20$  patients, 7 studies enrolled 21-40 patients, and 14 studies enrolled  $> 40$  patients. Seventeen studies had no information regarding controls, 3 involved the use of parallel concurrent controls, and 6 were self-controlled trials. None were randomized, blinded, or RCTs. The results of quality analysis of individual items are reported in Table I.

The average response rate of DPCP treatment in 26 studies was 53.75%  $\pm$  0.79% (95% CI 52.20%-55.30%; Fig 1). The average response rate of DPCP treatment for alopecia totalis (AT) and alopecia universalis (AU) was 47.65%  $\pm$  1.69% (95% CI 44.34%-50.96%) when considering the 9 studies that separately analyzed the results of patients with AT and AU. Although little is known about the natural course of AA, at least 50% of patients with patchy AA  $< 1$  year experienced spontaneous remission.<sup>4</sup> However, in extensive AA, such as AT and AU, the chance of full recovery is  $< 10\%$ .<sup>5</sup> The types of adverse events caused by DPCP treatment were recorded in 15 articles representing a total of 800 patients. The common adverse events included extensive eczematous reaction of the scalp (20.8%), occipital or cervical lymphadenopathy (13.5%), disseminated contact eczema (8.5%), hyperpigmentation (6.8%), severe generalized itching (6.4%), hypopigmentation (1.6%), and others (eg, erythema multiforme-like reaction, urticaria; 1.3%).

There were several potential limitations to this study. First, the search was restricted to articles written in the English language. Second, the relative advantage of DPCP over placebo was not clear because most studies did not have a control group. Third, because different alopecia scoring systems were used in different studies, combining the data was challenging and required some approximations. To minimize this problem in future studies, use of a standardized scoring tool, such as Severity of Alopecia Tool, is advisable.

In conclusion, we found evidence to support the efficacy of topical immunotherapy with DPCP for AA. However, better designed RCTs with a clinically relevant endpoint (eg, long-term overall regrowth) and a well-selected population are essential.

**Table I.** Quality analysis of frequency distribution of different items

Study characteristics	Studies, n
Criteria for entry	
Adequate (description of inclusion and exclusion criteria)	7
Partial (description of inclusion or exclusion criteria)	3
Inadequate (no description of inclusion and exclusion criteria)	16
Description of clinical features associated with prognostic factors	
Adequate (>3)	13
Partial (1 or 2)	1
Inadequate (none)	12
Therapeutic regimen	
Adequate (detailed description of DPCP sensitization and maintenance)	24
Inadequate (no descriptions of DPCP sensitization and maintenance)	2
Results of follow-up after termination of treatment	
Adequate (assessment of recurrence after treatment termination)	4
Inadequate (recurrence not assessed after treatment termination)	22
Evaluation of prognostic factors for efficacy assessment	
Adequate (>3)	6
Partial (1 or 2)	7
Inadequate (none)	13
Criteria for response to treatment	
Adequate (quantitative assessment and type of regrown hair)	3
Partial (either quantitative assessment or type of regrown hair)	22
Inadequate (neither)	1
Analysis of treatment withdrawal	
Adequate (information on causes of treatment withdrawal)	1
Inadequate (no information on causes of treatment withdrawal)	25
Discussion of adverse events	
Adequate (type and frequency of adverse events reported)	15
Partial (only type of adverse events reported)	0
Inadequate (neither reported)	11
Long-term follow-up data	
Adequate (≥2 years)	3
Inadequate (none or <2 years)	23

DPCP, Diphenylcyclopropenone.

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	Response rate (%)	Range (%)	Relative weight
Tosti et al, 1986	63.64	54.08-73.21	2.63
Hatzis K et al, 1988	29.22	18.48-39.96	2.09
Hull et al, 1988	35.71	23.97-47.45	1.75
Ashworth et al, 1989	22.35	16.75-27.96	7.67
Monk et al, 1989	61.11	52.72-69.50	3.42
Hull et al, 1991	48.91	38.21-59.61	2.10
Shapiro et al, 1993	58.93	54.01-63.85	9.95
Gordon et al, 1996	35.11	26.43-43.79	3.20
Schuttelaar et al, 1996	39.20	25.74-52.67	1.33
Pericin et al, 1998	49.19	40.43-57.95	3.14
Sharma et al, 1998	65.00	50.79-79.21	1.19
Cotellessa et al, 2001	58.65	46.81-70.49	1.72
Wiseman et al, 2001	63.51	59.49-67.53	14.92
Aghaei et al, 2005	49.82	38.81-60.84	1.99
Singh et al, 2007	75.00	68.34-81.66	5.42
Sotiriadis et al, 2007	59.74	51.98-67.50	4.00
Akhiani et al, 2008	52.19	39.20-65.19	1.43
Avgerinou et al, 2008	59.26	49.64-68.88	2.60
El-Zawahry et al, 2010	61.73	56.75-66.71	9.72
Ohlmeier et al, 2012	53.44	46.99-59.89	5.79
Salsberg et al, 2012	37.90	28.49-47.31	2.72
El Khoury et al, 2013	48.15	36.14-60.17	1.67
Luk et al, 2013	37.41	24.83-49.99	1.52
Chiang et al, 2015	57.65	50.99-64.31	5.42
Durdu et al, 2015	51.23	32.16-70.30	0.66
Pan et al, 2015	51.31	40.16-62.46	1.94
	53.75	52.20-55.30	

**Fig 1.** Average response rate to diphenylcyclopropenone immunotherapy in alopecia areata in 26 studies shown in Supplementary Fig 1.

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### Unusual patterns of presentation of frontal fibrosing alopecia: A clinical and trichoscopic analysis of 98 patients



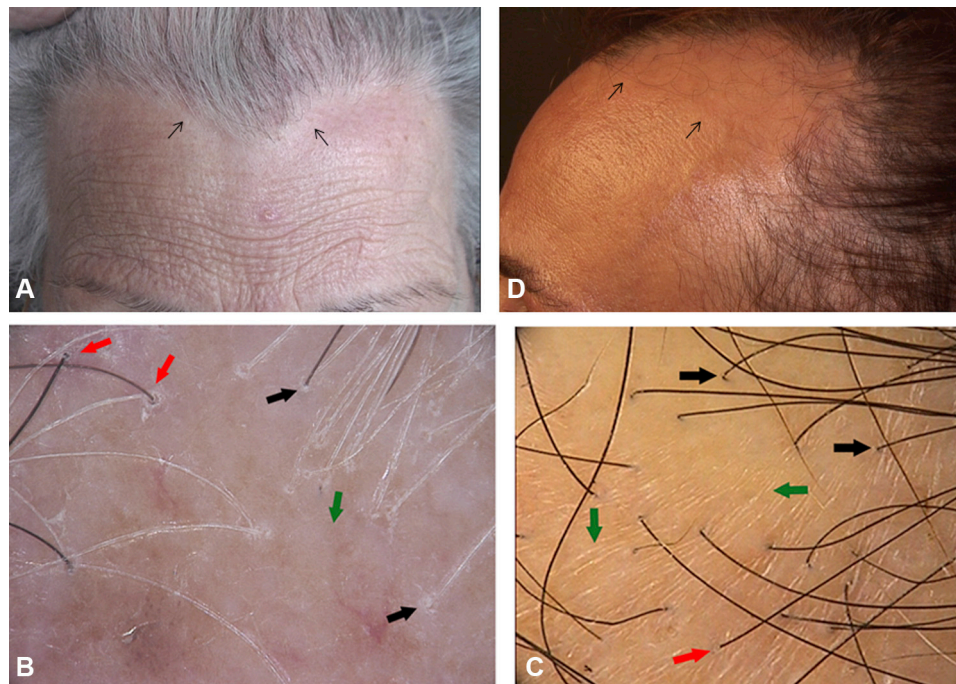
*To the Editor:* Frontal fibrosing alopecia (FFA) is a primary lymphocytic scarring alopecia that mainly affects postmenopausal women.<sup>1</sup> In the past 2 decades, an increasing number of cases have been reported.<sup>2</sup> Recognizing FFA may be a challenge when it manifests with unusual features.

The aim of this study was to evaluate clinical and trichoscopic features of FFA in a large series of patients.

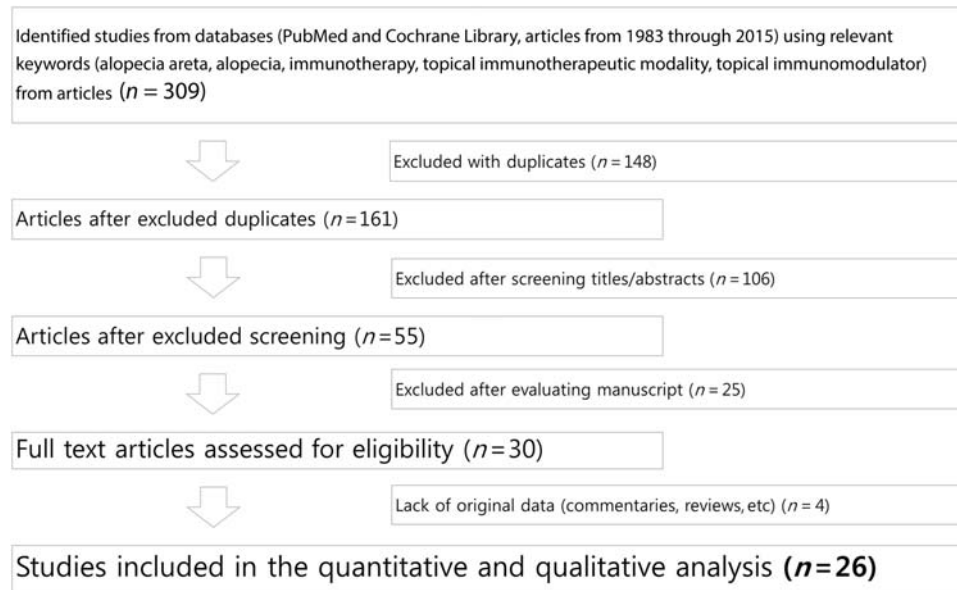
We performed a retrospective, monocentric study of trichoscopic images of 98 patients (4 men and 94

women) with FFA seen at our Dermatologic Clinic between 2003 and 2016. The diagnosis of FFA was based on clinical (symmetric frontal or frontotemporal hairline recession) and typical trichoscopic findings (absence of follicular openings, lone hairs, and single-hair pilosebaceous units). All patients were white, without familial history of FFA. Two patients were premenopausal at the onset.

In our case series in 80 patients, FFA manifested with typical clinical features, whereas in 18 postmenopausal patients (18.4%), we observed unusual patterns of disease. In particular, 12 women presented with marked and symmetric recession of frontotemporal hairlines, with a peculiar sparing of the paramedian frontal hairline, mimicking male pattern androgenetic alopecia (AGA). We named this peculiar clinical presentation “AGA-like pattern” (Fig 1, A and C). Trichoscopic examination revealed typical findings of FFA (Fig 1, B and D). Moreover, in 2 patients we observed bilateral oval patches of alopecia in the temporal regions, with peculiar sparing of a band of temporal hairlines, in addition to typical recession of frontal hairline (Fig 2, A).



**Fig 1.** Frontal fibrosing alopecia (male androgenetic alopecia-like pattern) (A and C). Two cases of female patients had marked and symmetric recession of frontotemporal hairlines, with a peculiar sparing of the paramedian part of frontal hairline and the presence of bandlike atrophic areas with some terminal hairs in scarring outcome (*black arrows*). Frontal fibrosing alopecia (male androgenetic alopecia-like pattern) (B and D). Trichoscopic examination: scarring white patches with lack of follicular openings (*green arrows*), mild perifollicular scaling and erythema (*red arrows*), and some terminal hairs and single-hair pilosebaceous units (*black arrows*).



**Supplementary Fig 1.** Flow diagram showing the identification of relevant studies.