PHOTOTHERAPY IN CHILDHOOD: A 17-YEAR RETROSPECTIVE STUDY REGARDING EFFECTIVENESS AND SAFETY

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Introduction

Extensive childhood dermatosis are often a challenge owing to their potential impact in the child's psychological development and the need of safe therapeutic alternatives given the importance of avoiding systemic agents' toxicity. Phototherapy is therefore widely used as a safe alternative treatment option for photoresponsive dermatosis such as psoriasis, vitiligo, pityriasis lichenoides, alopecia areata (AA) or atopic eczema[2,3].

Several phototherapeutic options are available – narrowband UVB (UVB-nb), broadband UVB (UVB-bb), systemic and topic psoralen-UVA photochemotherapy (PUVA and topic PUVA, respectively) and excimer laser therapy[3] – which are selected on a case-to-case basis according to diagnosis, disease severity, skin phototype and age.

Treatment protocol ranges from 2 to 5 weekly sessions, starting with 70% of the predetermined minimal erythema dose (MED) for UVB and 75% of the minimal phototoxic dose (MPD) for UVA, with an increase of 10-20% at each session[1,2] if no erythema occurs.

Objective and Methods

This observational retrospective study aims to assess the efficacy and safety of phototherapy to treat moderate to severe dermatological conditions in our paediatric population.

Relevant clinical data relative to patients aged ≤ 18 years treated with phototherapy over the last 17 years was collected from phototherapy charts and clinical records (January 1996 to December 2012). Patients treated with UVB between 2006-2009 were excluded, as the equipment did not allow quantification of the radiation dose in J/cm^2 (21 patients).
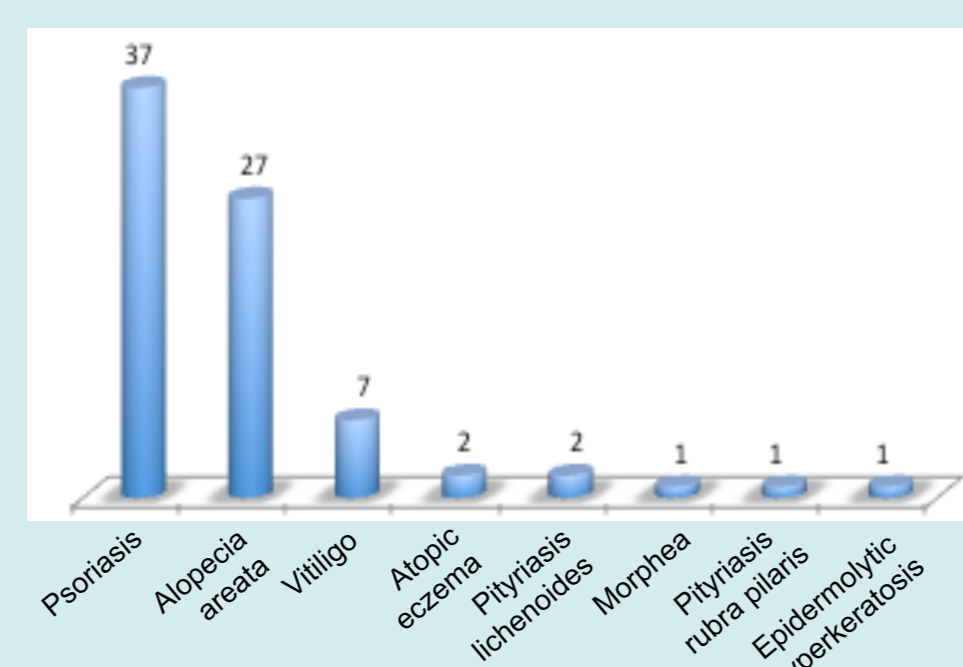
Treatment was administered according to a standardized protocol – starting at 0,08 J/cm^2 with 10% dose increase at each session for UVB and at 0,5 J/cm^2 with subsequent increase of 0,5 J/cm^2 for UVA. MED and MPD were not calculated routinely. Statistical analysis was performed with Gnu S and Excel.

Results

78 children met the inclusion criteria, of which 50 (64%) were female. Mean age was 13 years (range 2-18). Personal and familiar medical history remarks are summarized on table 1.

Phototype III was the most prevalent (42; 53,8%), followed by II (23; 29,5%), IV (14,1%) and V (2; 2,6%). None was classified as phototype I.

Distribution according to diagnosis is shown on graphic 1. All children were previously and concomitantly treated with topical agents. Systemic agents used before and during phototherapy treatment are shown on table 1.

Graphic 1 – Number of patients with each diagnosis

Type of psoriasis	UVB-nb				UVB-bb				Systemic PUVA			
	No. of patients / No. of cycles	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome	No. of patients / No. of cycles	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome	No. of patients / No. of cycles	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome
Plaque psoriasis Patients = 17 Mean no. cycles = 1,6 (range: 1-5) Total no. cycles = 43	8 / 9	22,1 (13-32)	15,1	Improvement = 8 (88,9%) No response = 0 Withdrawal = 1 (11,1%)	7 / 8	15,5 (5-26)	12,6	Improvement = 5 (62,5%) No response = 0 Withdrawal = 3 (37,5%)	17 / 26	17,6 (2-35)	115,9	Improvement = 23 (88,5%) No response = 1 (3,5%) Withdrawal = 3 (11,5%)
Guttate psoriasis Patients = 9 Mean no. cycles = 1,3 (range: 1-4) Total no. cycles = 12	3 / 3	28,7 (21-36)	21,3	Improvement = 3 (100%) No response = 0 Withdrawal = 0	-	-	-	-	4 / 6	13,7 (7-31)	87,6	Improvement = 6 (100%) No response = 0 Withdrawal = 0

Diagnosis	Personal history	Familiar history	Previous systemic therapeutics	Concomitant systemic therapeutics	Type of phototherapy	Outcome	Adverse events
Psoriasis Patients = 37 Female 67,6% Male 32,4% Mean age 14,1 years	2 obesity (5,4%) 1 dislipidemia	15 psoriasis (40,5%)	12 retinoid (32,4%) 5 cyclosporine (15,6%)	12 retinoid 4 cyclosporine 1 MTX	UVB PUVA	80,0% improvement 20,0% withdrawal 94,4% improvement 5,6% withdrawal	2 erythema 1 second grade burn 2 nausea 1 erythema 1 second grade burn
Alopecia Areata Patients = 27 Female 59,3% Male 40,7% Mean age 10,0 years	3 atopy (11,1%)	4 AA (14,8%) 2 vitiligo (7,4%) 1 psoriasis 1 atopy	3 corticosteroid (11,1%)		PUVA	13,9% total regrowth 41,7% partial 25% no regrowth 19,4% withdrawal	4 erythema 2 second grade burn
Vitiligo Patients = 7 Female 57,1% Male 42,9% Mean age 15,1 years	-	3 vitiligo (42,9%)	-	-	UVB PUVA	50% improvement 50% withdrawal 28,6% improvement 14,3% no response 57,1% withdrawal	2 erythema -
Atopic eczema Patients = 2 (females) Mean age 13,0 years	-	1 atopy	-	2 cyclosporine	UVB-bb PUVA	1 withdrawal 1 withdrawal	-
Pityriasis lichenoides Patients = 2 Female 50% Mean age 18,0 years	-	-	2 retinoid 1 corticosteroid	1 retinoid 1 corticosteroid	PUVA 1 cycle each 15,5 mean treatment/cycle 72,2 J/cm^2 mean dose/cycle	2 improvement	-
Pityriasis rubra pilaris Patients = 1 (female) Age 13,0 years	-	Psoriasis	Retinoid	1 cyclosporine	Topical PUVA 1 cycle 22 treatments 87 J/cm^2	No response	1 second grade burn
Generalized morphea Patients = 1 (female) Age 13,0 years	-	-	Corticosteroid	-	7 PUVA cycles 14,3 mean treatment/cycle 99,9 J/cm2 mean dose/cycle	Improvement in every cycle	-
Hyperkeratosis epidermolytic Patients = 1 (male) Age 15,0 years	-	-	Retinoid	1 retinoid	1 PUVA cycle 39 treatments 297 J/cm^2	No response	-

Table 1 – Population characteristics and outcomes according to diagnosis

Type of psoriasis	Topical PUVA			
	No. of patients / No. of cycles	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome
Palmo-plantar psoriasis Patients = 3 Mean no. cycles = 1,3 (range: 1-2) Total no. cycles = 4	3 / 4	15,3 (5-31)	44,5	Improvement = 5 (62,5%) No response = 0 Withdrawal = 3 (37,5%)

Type of Alopecia Areata (AA)	Topical PUVA			Systemic PUVA		
	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome
Localized AA Patients = 14 Mean no. cycles = 1,3 (range: 1-2) Total no. cycles = 19	33,6 (4-77)	115,3	Total regrowth = 4 (21,0%) Partial regrowth = 9 (47,4%) No regrowth = 4 (21,0%) Withdrawal = 2 (10,5%)	-	-	-
AA totalis Patients = 5 Total no. cycles = 5	23,6 (13-30)	73,9	Total regrowth = 1 (20,0%) Partial regrowth = 1 (20,0%) No regrowth = 0 Withdrawal = 3 (60,6%)	-	-	-
AA universalis Patients = 8 Mean no. cycles = 1,35 (range: 1-2) Total no. cycles = 12	34,5 (10-59)	134,4	Partial regrowth = 3 (37,5%) No regrowth = 4 (50,0%) Withdrawal = 1 (12,5%)	28,5 (3-52)	184,6	Partial regrowth = 2 (50,0%) No regrowth = 1 (25,0%) Withdrawal = 1 (25,0%)

Type of vitiligo	Topical PUVA		
	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome
Localized vitiligo Patients = 4 Mean no. cycles = 1,2 (range: 1-2) Total no. cycles = 5	14,4 (4-27)	23,8	Improvement = 1 (20%) No response = 0 Withdrawal = 4 (80%)

Type of vitiligo	UVB-nb			Systemic PUVA		
	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome	Mean treatment per cycle (range)	Mean total dose (J/cm^2)	Outcome
Generalized vitiligo Patients = 3 Mean no. cycles = 1,3 (range: 1-2) Total no. cycles = 4	42,5 (1-84)	59,0	Improvement = 1 No response = 0 Withdrawal = 1	35,5 (30-41)	93,7	Improvement = 1 No response = 1 Withdrawal = 1

Tables 2-6 – Type and characteristics of phototherapy treatment for psoriasis, alopecia areata and vitiligo

Topical and systemic PUVA were the first choice in 37% and 40% of the patients respectively, while nb-UVB and bb-UVB were used in 11,5% each. The mean number of cycles was 1,5 (range 1-7) with an average of 16,3 treatments per cycle and a mean cumulative dose of 107 (UVA) and 17 J/cm^2 (UVB). 71% were treated with one single cycle. Type and characteristics of phototherapy treatment and the respective outcome for each specific diagnosis are summarized on tables 2-6.

Short term side effects (table 1) occurred in 16 patients (21%), were mild to moderate and none led to therapeutic interruption. No significant statistical correlation was found between side effects and phototype or concomitant systemic therapeutics (p>0.05).

Discussion

Of the 37 psoriasis patients treated, 83,3% improved and 16,7% withdrew the treatment. Alopecia areata and vitiligo patients had lower response rates – 55,6% and 33,3%, and also higher withdrawal rate – 19,4% and 55,5%, respectively. Furthermore, psoriasis patients did significantly less treatments per cycle and shorter cycles (p<0.05) and had globally better outcomes (p<0.05) when compared to other diagnosis, as concluded by previous published data[1,2,3].

We recognize the lack of assessment of long term oncogenic risk, namely for PUVA patients, as a limitation of this study. On the other hand, the diagnosis prevalence might have been skewed by the exclusion of 21 patients treated with UVB for a period of time (which explains the small group of atopic eczema patients included).

According to our data, phototherapy appears to be a safe and effective option for childhood photoresponsive dermatosis, specially psoriasis, without significant difference between its clinical type. However, the significant withdrawal rate and scholar absenteeism might be an important limitation.

Bibliography

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