

Low Dose Ultraviolet A1 (340-400 nm) Phototherapy for Erythrodermic Cutaneous T-cell Lymphoma

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Three patients suffering from widespread erythrodermic cutaneous T-cell lymphoma were treated with low-dose UVA1 phototherapy with a single dose of 20 - 30J/cm², resulting in cumulative doses of 520 - 1890 J/cm². Two patients showed complete responses, while other had a partial improvement.

Key words : UVA1 phototherapy, cutaneous T-cell lymphoma, mycosis fungoides

INTRODUCTION

UVA1 penetrates deeply into the dermis and can affect infiltrating cells in the dermis. Pathognomonic cells in the dermis can be devastated through UVA1 triggering apoptotic cascade. These observations explain why UVA1 phototherapy is very effective in the treatment of several skin diseases such as atopic dermatitis, urticaria pigmentosa and cutaneous T-cell lymphoma (CTCL) [1]. Numerous treatments are currently being used for CTCL, but adverse effects may limit their use. Medium-dose (50-60 J/cm² per single dose) UVA1 phototherapy for stage IB CTCL [2] and high-dose (130 J/cm²) UVA1 phototherapy for advanced stage of mycosis fungoides [3] have been reported to be effective and appears to have a comparatively excellent risk/benefit ratio. In the present

study we assessed whether it is possible to treat erythrodermic CTCL with low-dose (20-30 J/cm² per single dose) UVA1 phototherapy.

MATERIALS AND METHODS

Patients

Three patients (2 male, 1 female) with erythrodermic stage of CTCL were treated with low-dose UVA1 phototherapy after informed consent. At the time of enrollment, staging examination did not give any indication of internal or lymph node involvement. The patients' profiles are summarized in detail in Table 1.

Equipment

The UVA1 treatment was performed in a UV 7001(Waldmann, Germany) emitting wavelengths exclusively between 360 and 390 nm. The irradiance at body distance was 15 mW/cm², resulting in a dose of 0.9J/cm² per minute.

Phototherapy

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Table 1. Characteristics and clinical response of patients with CTCL treated with UVA1 phototherapy

	Patient 1	Patient 2	Patient 3
Sex (M/F)	M	F	M
Age (y)	78	61	89
Stage	III	III	III
Single UVA1 dose (J/cm ²)	20	20	30
No. of exposure	26	40	63
Cumulative UVA1 dose (J/cm ²)	520	800	1890
Response	CR	PR	CR
Follow-up (mo)	22		1

Whole-body phototherapy was administered 5 times a week at a single dose of 20 to 30 J/cm² per day. UVA1 phototherapy was given as monotherapy.

Assessment of therapeutic effectiveness

Therapeutic effectiveness was assessed by clinical examination of skin lesion as well as photodocumentation of the overall skin status. For histological evaluation, biopsy specimens were taken from lesional skin before the first and from an adjacent skin area after the last UVA1 exposure.

RESULTS

In each of the two patients (*patient 1 and 3 in Table 1*), significant improvement was observed from the clinical and histological examination (**Fig. 1**), while other (*patient 2*) had a partial improvement. Cumulative UVA1 doses of 520 to 1890 J/cm². Except a profuse tanning, no serious side effects were observed in any patients. Patient 1 were observed 22 months of follow-up after the end of the phototherapy cycle and remained stable remission receiving two week interval of a single low-dose UVA1 phototherapy (**Table 1**). Patient 2 did not visit our clinic. Twenty month after cessation of treatment, she had diffuse erythroderma and received chemotherapy.



Fig 1. A, Lesional skin before UVA1 phototherapy (*Patient 1*). There are infiltrates of atypical lymphocytes in upper dermis. B, Same skin lesion after UVA1 phototherapy (26 ×20 J/cm²). Note that only a few lymphocytic infiltrates are left in the dermis.

Table 2. Reviewed cases received UVA1 phototherapy for CTCL (References 1-3)

Patient	Age/Sex	Stage	Single UVA1 dose (J/cm ²)	No. of exposure	Cumulative UVA1 dose (J/cm ²)	Response	Recurrence (mo)	Follow-up (mo)
1	56/M	IA	130	20	2600	CR		
2	69/M	IA	130	20	2600	CR		
3	70/F	IB	60	16	960	CR		
4	68/M	III	60	15	900	CR		
5	84/M	IIB	100	25	2500	CR	12	
6	65/F	IB	100	20	2000	CR	9	
7	81/M	III	100	15	1500	CR	3	
8	71/F	IB	100	25	2500	CR	8	
9	55/F	IIB	100	30	3000	CR	6	3
10	35/M	IB	100	20	2000	CR	6	3
11	29/M	IB	100	15	1500	PR		
12	52/F	IB	70	20	1430	CR	8	
13	85/F	IIB	100	15	1500	CR	4	2
14	56/F	IIB	100	25	2500	PR		
15	30/F	IB	100	10	1000	CR	8	
16	36/M	IB	100	30	3000	CR	7	
17	62/M	IB	100	35	3500	CR	8	2

DISCUSSION

Our results demonstrate that UVA1 phototherapy, even dose of only 20 to 30 J/cm² at each treatment session, is effective and safe treatment for patients with erythrodermic CTCL. For these doses, no significant risks of acute side effects are known or likely to occur. For atopic dermatitis, therapeutic effectiveness is UVA1 dose-dependent, and it has been suggested that the optimal therapeutic effect require a high-dose UVA1 [4]. This is in contrast to the previous study that exposure to 60 J/cm² UVA1 was equally effective to a 130 J/cm² UVA1 dose regimen for patients with CTCL [2]. However, reported cases which demonstrated the effectiveness of medium-dose UVA1 phototherapy for CTCL were only 3 cases. Moreover, little data exist on the efficacy of low-dose UVA1 phototherapy and potential long-term safety risks, particularly of the high dose regimen. It should be noted, however, that in this study, even low-dose UVA1 phototherapy was effective for CTCL. Further studies are required to clarify

the question whether low dose of 20 to 30 J/cm² UVA1 per single treatment allow therapeutic effects comparable to those of high dose above 100 J/cm² when more frequent irradiation are applied.

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