Efficacy of Ultraviolet A1 Phototherapy in Recalcitrant Skin Diseases

Kee Suck Suh, M.D., Jin Seuk Kang, M.D., Jae Woo Baek, M.D., Tae Kwon Kim, M.D., Jin Woo Lee, M.D., Young Seung Jeon, M.D., Min Soo Jang, M.D., Sang Tae Kim, M.D.

Department of Dermatology, Kosin University College of Medicine, Busan, Korea

Background: Ultraviolet (UV) radiation has been used for decades to treat a variety of skin diseases. UVA1 was used initially as an effective treatment for acute exacerbated atopic dermatitis. Since then, UVA1 has been attempted for recalcitrant skin diseases. Objective: This study examined the efficacy of UVA1 phototherapy in three recalcitrant skin diseases. Methods: This retrospective study reviewed the efficacy and follow-up of 26 patients with atopic dermatitis (AD), mycosis fungoides (MF) and localized scleroderma (LS). SUPUVASUN 3000 (Mutzhas Co., Munich, Germany) and SELLAMED 3000 (Sellas Medizinische Gerate GmbH, Gevelsberg, Germany) were the UVA1 equipment used. Irradiation was performed in accordance with the disease. Low-dose (20 J/cm²), medium-dose (65 J/cm²) and high-dose regimens (100 J/cm²) of UVA1 therapy were employed. The frequency of the therapy ranged from 3 to 5 times weekly. The therapeutic effectiveness was assessed according to the clinical examination before and after the last treatment. Results: In patients with AD, complete and partial remission was achieved in four (80%) and one (20%) patient, respectively. In patients with MF, complete and partial remission was observed in thirteen (86.7%) and two (13.3%) patients, respectively. In patients with LS, complete and partial remission was observed in three (50%) and three (50%) patients, respectively. Conclusion: UVA1 phototherapy is an effective treatment modality for acute exacerbated AD, MF and LS. (Ann Dermatol 22(1) 1~8, 2010)

-Keywords- Recalcitrant skin disease, UVA1

INTRODUCTION

Ultraviolet (UV) radiation has been used for decades to treat a range of skin diseases. UVA1 therapy was developed in the early 1980s and found to induce T-cell apoptosis by mediating singlet oxygen damage. In addition, it may increase collagenase (matrix metalloproteinase-1) expression, and decrease the interferon (IFN)-γ level, the number of Langerhans cells and mast cells in the dermis. The therapeutic effect of UVA1 is related to the long-wavelengths that penetrate the dermis more deeply than UVB and PUVA.

In early 1990s, UVA1 therapy was used initially as an effective novel treatment modality for acute exacerbated atopic dermatitis. Since then, UVA1 phototherapy has been attempted for recalcitrant skin diseases with a T-cell abnormality and sclerotic conditions. This study examined the efficacy of UVA1 phototherapy in patients with atopic dermatitis, mycosis fungoides and localized scleroderma.

MATERIALS AND METHODS

Patients

A total of 26 patients were enrolled in this study after providing informed written consent. All patients were collected from the Department of Dermatology, Kosin University College of Medicine, Busan, South Korea, from June 2002 to July 2008. This retrospective clinical study included the patient’s age, gender, diagnosis, duration of disease, previous treatment, UVA1 dose, frequency of therapy, cumulative UVA1 dose, responses to treatment, side effects, and follow-up. The conditions examined included
atopic dermatitis (AD; 5 patients), mycosis fungoides (MF; 15 patients) and localized scleroderma (LS; 6 patients). Patients who were pregnant or lactating, had a history of photosensitive dermatitis and were currently using photosensitizing drugs were excluded.

Phototherapy

The patients were treated with low-dose (20 J/cm²), medium-dose (65 J/cm²) and high-dose (100 J/cm²) UVA1 therapy. In AD, a high-dose regimen (100 J/cm²) of UVA1 was used. In MF, a low, medium and high-dose regimen (20 J/cm, 65 J/cm² and 100 J/cm²) of UVA1 was used. In LS, a low and high-dose regimen of UVA1 (20 J/cm² and 100 J/cm²) was used. The dose and frequency of UVA1 were determined from the literature. Low-dose (20 J/cm²) UVA1 was delivered by SUPUVASUN 3000 (Mutzhas Co., Munich, Germany) and the medium-dose (65 J/cm²) and high-dose (100 J/cm²) UVA1 therapy was delivered by SELLAMED 3000 (Sellas Medizinische Gerate GmbH, Gevelsberg, Germany). The main wavelengths ranged from 340 nm to 440 nm. The irradiation intensity of SUPUVASUN 3000 and SELLAMED 3000 was 27 and 70 mW/cm² at a distance of 30 cm, respectively. The UVA1 irradiance was measured using an IL 1700 photometer (International Light, Newburyport, MA, USA). The frequency of therapy ranged from 3 to 5 times weekly.

Assessment of therapeutic effectiveness

The therapeutic effectiveness was assessed by the same dermatologists before and after UVA1 therapy, and was graded as complete, partial remission or no response. In recalcitrant skin diseases, complete and partial remission were assessed above and below 95% clinical clearing, respectively. In addition, the therapeutic effectiveness of AD was measured using the SCORAD index.

RESULTS

Atopic dermatitis

Five patients with atopic dermatitis received 10−15 sessions (mean, 11.2 sessions) of high dose (100 J/cm²) UVA1 therapy (Fig. 1). The cumulative UVA1 doses were 1,000−1,500 J/cm² (mean, 1,120 J/cm²) (Table 1). Four and 1 of the 5 patients showed complete remission and partial improvement, respectively (Table 2). UVA1 phototherapy led to a 69.9% decrease in the median SCORAD score after 2 weeks. No serious side effects were observed except for some hyperpigmentation.

Table 1. Demography of the patients treated with UVA1

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No. of patients (n=26)</th>
<th>No. of irradiations</th>
<th>Single dose (J/cm²)</th>
<th>Cumulative doses (J/cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>5</td>
<td>11.2±1.94</td>
<td>100</td>
<td>1,120±193.91</td>
</tr>
<tr>
<td>MF</td>
<td>3</td>
<td>16.67±8.18</td>
<td>20</td>
<td>333.33±163.57</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>26.25±11.52</td>
<td>65</td>
<td>1,698.13±748.51</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>24.5±8.5</td>
<td>100</td>
<td>2,450±850</td>
</tr>
<tr>
<td>LS</td>
<td>3</td>
<td>35±17.38</td>
<td>20</td>
<td>700±347.56</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>56±30.01</td>
<td>100</td>
<td>5,533.33±2,935.23</td>
</tr>
</tbody>
</table>