Original Article

Comparison of PUVA and UVB therapy in moderate plaque psoriasis

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Abstract

Background Ultraviolet light (UV) is one of the standard psoriasis treatments and has good effects for the majority of psoriatics, whether it comes from the sun or from UVB cabinets. It also suppresses the immune system of the skin and helps create vitamin D.

Objective: The aim of the study was to evaluate the efficacy of UVB and PUVA therapy in moderate plaque psoriasis.

Patients and Methods A total of fifty patients of either sex with multiple large plaque psoriasis, aged more than 30 years and having disease of more than one year duration, were included in the study. They neither had received any phototherapy, nor were they taking any systemic treatment during last one year. Patients were randomly divided in two equal groups of twenty five each. Group-I was given 12, thrice weekly sessions of PUVA treatment, while similar number of treatments of UVB was provided to group-II patients. To access the efficacy, Psoriasis area severity index (PASI score) was recorded at baseline, after 12 sessions of treatments and after one month follow up. Results were analyzed by using software program 'Instat" and statistical significance was found out by analysis of variance test (ANOVA) and student "t" test.

Results Both the groups showed significant improvement after 12 sessions of the treatments ($p<0.001$) and it continued to some extent in follow up phase ($p>0.05$). But by comparing over all improvements in two groups, no statistically significant difference was found ($p>0.05$).

Conclusion Both PUVA and UVB phototherapy are effective in moderate plaque psoriasis. However, UVB phototherapy having lesser short term adverse reactions, should be the first choice phototherapy (where facilities exist).

Key words
Psoriasis, PUVA, UVB.

Introduction

Phototherapy offers many advantages in the treatment of psoriasis, providing better clearance of lesions than systemic drugs, the potential for relatively long-lasting remission, and a safe side-effect profile.[1,2] Since ancient times the beneficial effect of sun light radiation on wide variety of skin disorders, has been recognized, and a variety of therapies based on these observations have been developed. The first artificial light source, in the form of carbon arc, was used in the treatment of lupus vulgaris by Neils Finsen in 1903.[3] Phototherapy is indicated for patients of generalized plaque, guttate psoriasis or palmoplantar psoriasis

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who have not responded adequately to conventional topical therapies.[1-3] A major breakthrough in the treatment of psoriasis was made with the introduction of PUVA. This treatment involves the ingestion of 8-methoxypsoralen (8-MOP), which takes between 1 and 3 hours to reach peak levels in the skin depending on the formulation used. Some patients treated with PUVA are able to achieve long-term remissions even without maintenance therapies[4]. Treatments are administered 2 or 3 times per week and after 20 to 30 treatments, nearly 90% of patients achieve marked improvement or clearing.[5] The dosage of phototherapy treatments is based either on minimal erythema dose testing or on Fitzpatrick skin types.[6] Detailed reviews on the indications, contraindications, and methodology of administration of PUVA are available.[6-8] The most common side effect of PUVA therapy is nausea that develops shortly after methoxsalen is ingested. Nausea can be avoided by dividing the psoralen dose over 15 minutes and by ingesting the dose with food. Fifteen hundred milligrams of ginger ingested 20 minutes before the psoralen may also prevent nausea. PUVA treatments later in the day are less likely to result in nausea than those administered in the morning. Finally, in particularly sensitive patients, PUVA can be administered in a bath, avoiding the gastrointestinal tract.[9] Most of the other side effects of PUVA are related to phototoxicity. PUVA is associated with an increased risk of nonmelanoma skin cancer and possibly also of cutaneous malignant melanoma. Topical 8-MOP PUVA has been shown to cause malignant skin tumors in mice.[10]

UVB phototherapy is the time tested older type of treatment. It consists of the administration of a variety of ultraviolet B rays emitted by high energy light bulbs. It is easier to administer and does not involve the use of oral photosensitizing medication, therefore, this form of phototherapy is usually selected before PUVA There are several types of UVB radiation in clinical use: (1) traditional or broad band UVB lamps deliver radiation in the range of 280-320nm. (2) selective UVB phototherapy (SUP) has peaks at 305-325nm and (3) narrow band UVB lamps (TL01) deliver almost exclusively 311nm radiation.[11] Treatments are initially administered three or more times per week and are progressively tapered once remission is achieved, usually after 20-30 treatments in about 70% of patients. Narrow Band UVB is a relatively new type of treatment. It consists of the administration, by specialized bulbs, of a high concentration of the specific type of ultraviolet B rays that are most effective in reversing the changes of psoriasis. Treatments are initially administered three times per week and are likewise progressively tapered once remission is achieved, usually after 15-25 treatments.[11] It has been shown that clear emollients such as petrolatum or mineral oil improve the optical properties of skin, enhancing the efficacy of UVB phototherapy.[12] It should be pointed out that thick application of creams and ointments can actually block UVB.[13] The dosage of UVB phototherapy treatments is similarly based either on minimal erythema dose testing or on Fitzpatrick skin types.[6] Common side effects of UVB phototherapy include; erythema (sunburn reaction), photoaging (wrinkling, coarseness, laxity, fragility, mottled

pigmentation, telangiectases and atrophic or fibrotic areas). UVB phototherapy adds to increased cumulative life time exposure to UVB radiations, but there is no significant increase in risk of non melanoma or melanoma skin cancers.[14] Phototherapy with either UVB or PUVA can be used as a component of combination therapy, where two or more agents with synergistic or complementary action are used concomitantly, allowing lower-dose, toxicity-sparing regimens of each of the agents. Some of the most widely used combination therapies are acitretin with UVB or PUVA, methotrexate with UVB, PUVA with UVB, and methotrexate with cyclosporine.[15] Phototherapy remains an essential treatment option for patients with moderate to severe psoriasis. The refinement of ultraviolet light delivery has continued during the past century, primarily based on the observation of beneficial effects that natural and artificial light sources have on disease severity.[16]

Patients and methods

A total of fifty patients of either sex with moderate degree of psoriasis, aged more than 30 years and having disease of more than one year duration, were included in the study. Only the large plaque psoriatic patients with multiple lesions on various sites of the body were considered. Other all variants of psoriasis were excluded. The patients included in the study neither had received any phototherapy, nor were they taking any systemic treatment (methotrexate, retinoids or cyclosporine) during last one year. Patients were randomly divided in two equal groups of twenty five each. A thorough medical history was taken and detailed medical survey was carried out. Base line investigations including blood complete picture, liver function tests were done and psoriasis area severity index (PASI score) was calculated in all cases. Group-I was given 12, thrice weekly sessions of PUVA treatment. Two hours before each session, these patients were given 8-methoxypsoralen (8-MOP) tablets (10 mg/kg body weight). The dose of UVA was calculated according to the skin phototype of the patient and with the help of a described formula and accordingly exposure time was adjusted on PUVA machine (skin phototype X 16.7⁄meter reading). PUVA chamber used was "London photochemotherapy apparatus" by Rank Stanley Cox medical equipment. Two hours after oral ingestion of 8-MOP patients were exposed to UVA with his or her clothes off and protective goggles on, for a prescribed period of time. After scheduled exposure, patients were advised to keep wearing the protective glasses for whole day. Similar sessions of treatments were carried out with UVB in group-II patients but exposure (as calculated according to skin phototypes) time was quite less in these cases and there was no advice regarding wearing of protective sun glasses in post treatment phase. UVB cabin used was of National Biological Corporation Cleveland, Ohio with 26 fluorescent tubes mounted on all six sides and the dose (J/cm^2) delivered to the patients was calculated with the help of a conversion scale. Two days after 12^{th} session of treatment in both groups, PASI score was again recorded and difference in score was calculated. A final reading of PASI was noted after one month follow up period. In between treatment sessions and during follow up phases, only emollient (emulsifying ointment) was applied topically

on psoriatic lesions. No other topical or systemic treatment was offered. Results were analyzed by using soft wear program 'Instat" and statistical significance was found out by analysis of variance test (ANOVA) and student "t" test.

Results

The patients included in the study belonged to a heterogeneous group of population. They were mostly serving or retired armed forces personnel from various geographical regions of the country. Due to this fact, a large majority of the patients were male (94%). Few civilians fulfilling the criterion were also included. The mean age of the patients was 41 years (41.8 in group-I and 40.2 in group-II). The duration of the disease among the patients ranged from 1-27 years (1-27 in group-I and 1-24 years in group-II). In group-I the PASI score readings at baseline, after 12 sessions of treatment and after one month of follow up, were PASI-1=20.32, PASI-2= 6.11and PASI-3=3.43. In group-II these were PASI-1=18.90, PASI-2= 7.15and PASI-3=3.10. Comparative PASI scores in both groups are shown (**Figure 1**). Overall clinical improvement in both the groups was quite significant after 12 sessions of the treatments ($p<0.001$) and it continued to some extent in follow up phase ($p>0.05$). But the difference was not significant when both the groups were compared with each other ($p>0.05$). The deposition of patients in both groups is summarized in a flow chart (**Figure 2**).

Discussion

The benefits of sunlight for psoriasis were known long before phototherapy units were introduced for the treatment of psoriasis. Inpatient phototherapy of psoriasis was refined by William Goeckerman in the early part of the 20th century. In the original Goeckerman regimen, patients soaked in crude coal tar all day and night, removing the tar just before exposure to a hot quartz mercury vapor lamp.[17] Patients were expected to spend several weeks in the hospital to complete that treatment. During the years since the introduction of the Goeckerman regimen, several modifications have been made. In the 1950s Ingram[18] introduced his regimen in which anthralin was substituted for the crude coal tar used in the Goeckerman regimen. Properly used UVB therapies do not seem to increase one's risk for skin cancer.[14] PUVA, on the other hand, does carry some risk,[10] but properly-trained dermatologists will limit the UVA exposure as much as is possible while still allowing a therapeutic dose (lifetime 'limits' are not so much based on number of treatments, as is often thought, but rather on total exposure). In our study, both PUVA and UVB were found almost equally effective modalities of treatments in moderate to severe plaque psoriasis Our results were in agreement with other international and local studies.[3,4,16,19,20] Although there were no serious short term adverse reactions seen in our study, but due to oral ingestion of a photosensitizing psoralen in PUVA therapy, the incidence of adverse reactions in this modality is expectedly higher and more over, there is an established risk of developing cutaneous malignancies with prolong use of PUVA.[10] There is no such risk involved in UVB phototherapy.[14] The combination of UV therapy with the new biologic agents for long term control of psoriasis is considered

an overall best approach to therapy these days.[15,21]

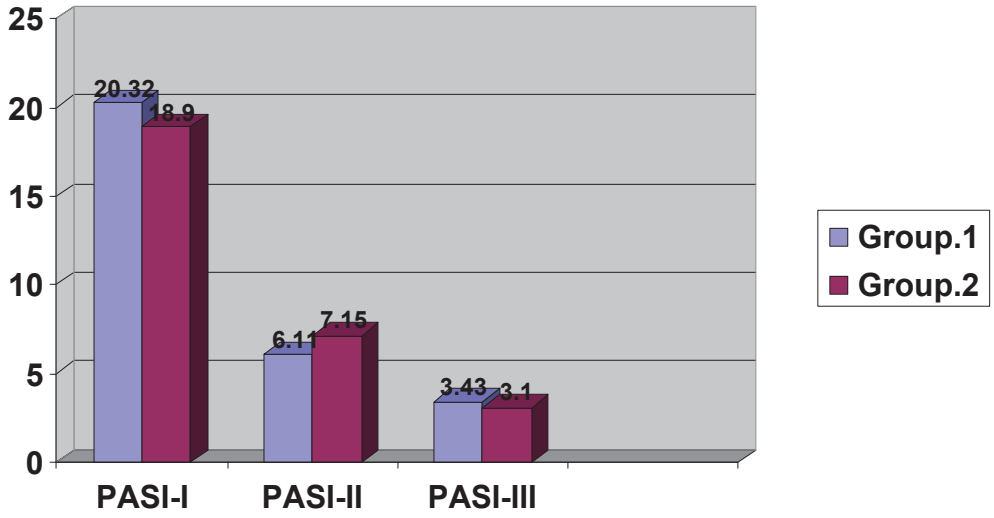

Figure 1 Comparative PASI scores in both groups. PASI-I=baseline, PASI-II=after 12 sessions, PASI-III=after 1 month follow up.

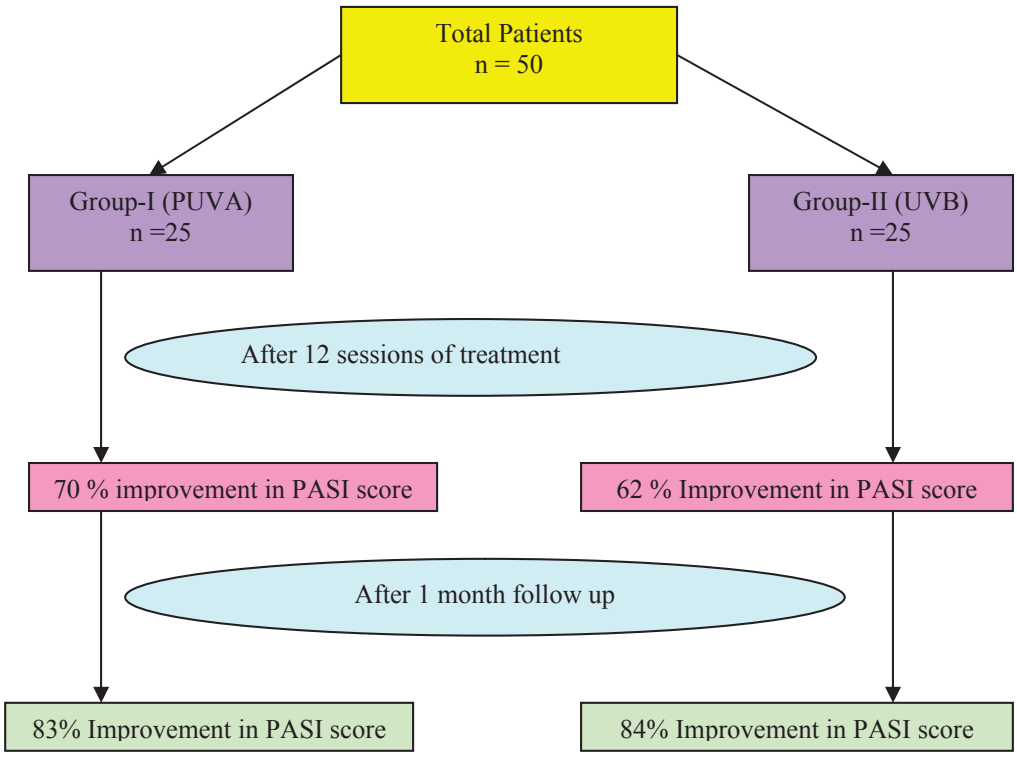

Figure 2 Flow diagram showing disposition of patients in both the groups.

Conclusion

Phototherapy in its various forms, including PUVA and UVB, is likely to continue to play an important role in the approach to

treatment of psoriasis. Despite the concerns for long term PUVA therapy and skin carcinogenesis, the duration of remission obtained with PUVA make it a continued viable option. However, UVB phototherapy being non carcinogenic and having lesser short term adverse reactions should be the first choice phototherapy if facilities exist. NBUV therapy delivered by conventional fluorescent tubes, lasers, or other methods will serve as a very useful adjunct for treatment of resistant localized plaques of psoriasis or hard to clear areas.

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