PUVA "PHOTOCHEMOTHERAPY" IN THE TREATMENT OF PSORIASIS RETROSPECTIVE STUDY IN QATAR

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ABSTRACT:

PUVA alone was used on 20 patients with moderate to severe psoriasis (PS) with different clinical presentations. these psoriatics were of different age groups, skin types and nationalities. After PUVA treatment there was marked improvement or complete remission of (PS) in all patients.

95% of the patients had (PS) on their Extensors and Upper extremeties with more than one site involvement. Treatment was tolerated. Mean duration of treatment with PUVA was 10 weeks. mean dose/session was 10.5 Joules. Mean number of sessions was 18, mean total cumulative dose (TCD) was 202.9 Joules. Mean dose for initial response was 6.29 J. Mean dose for maximal improvement was 16J. Mean number of sessions for maximal improvement was 13 sessions. PUVA treatment had no effect on all laboratory tests done in our patients . Treatment was convenient for (85%) of the patients.

Psoriasis, photochemotherapy and details of our treatment protocol and its results are discussed with a review of the literature.

Aims of work :

The main aim of this study was to evaluate the efficacy and results of systemic PUVA alone in the treatment of psoriasis.

Other aims were to find the mean effective dose, mean maximal improvement dose, mean maximal improvement number of session, mean maintenance dose, mean total number of sessions, mean duration of treatment in weeks, mean total cummulative dose, registeration of all acute and long term side effects in these patients, with the needed laboratory investigation and finally to see if there is any relation between skin type and other factors in the response.

INTRODUCTION:

This clinical retrospective study was held in dermatology clinic of Hamad Medical Corporation Doha Qatar.

Since 1984 we have been using PUVA to treat hundreds of patients suffering from moderate to severe psoriasis (PASI score more than 10). Randomly we selected twenty patients who were treated with PUVA alone, without any adjunct or combind specific antipsoriatic therapy. Other non specific treatments such as emollients antihistamines and occasional topical steroids were allowed and registered.

Psoriasis comes in many different degrees of severity and responsiveness to treatment modalities. Some cases are very mild and quite responsive to treatment, while others are so severe, chronic and recalcitrant that they test the skill and ingenuity of the best clinicians. Fortunately, there are also many different treatment options. Topical therapies include crude coal tar, anthralin, corticosteroids, calcipotriol, and tazarotene. Phototherapy may be a better choice in patients with more extensive psoriasis; UVB or psoralen plus subsequest UVA (PUVA) can be used. There are also a host of systemic therapies (cyclosporine, methotrexate, acitretin), which can be chosen in recalcitrant cases, or when topical or phototherapy is impractical. Importantly, significant increases in efficacy can be obtained by combining multiple therapies (Re-PUVA, topical calcipotriol plus topical halobetasol) and significant decreases in side effects can be obtained by transitioning through or rotating between therapies (cyclosporine transitioning into acitretin) [1] .

Psoralen in conjunction with UVA (PUVA) is perhaps the most effective treatment for psoriasis[2].

MATERIALS AND METHODS.

Twenty patients with moderate to severe psoriasis (PASI score more than 10) underwent PUVA therapy alone. An evaluation sheet was completed for each patient giving personal details, medical history, description of lesions, treatment details, response and side effects.

These patients (15 males and 5 females) were given psoralen compounds either topically in two patients (10%) or systemically in 18 patients (8-MOP) either Oxoralen (5%) or Neo-Meladenine (85%) in a dose of about 0.6 mg /kg two hours prior to UVA exposure, using whole body machines from Daavlin Corporation or National Biologic Corporation. Each machine emitted UVA radiation ranging from almost 310 nm to 380 nm with a peak of 338 nm. Doses of UVA were given in a dose related to skin type (Table 1).

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Five patients (25%) were above the age of 50 years, fifteen (75%) were younger, giving a mean age of 40 years. The eldest patient was 60 years. Non of the patients was below 21 years (Table 2).

The patients were of eight different nationalities (Table 3) with skin types varying from 1 to 6 on the Fitzpatrick scale (Table-4).

The duration of the disease varied from one month to 20 years(Table 5), mean duration 102 months (almost 8.5 years).

65% of the patients had both discoid and plaque type psoriasis, non had pustular, erythrodermic nor arthropathic psoriasis (Table 6).

Non of the patients reported a family history of psoriasis.

Lesions were present on various parts of the body but most commonly the Extensores & Upper extrimities which were affected in 95% of patients (Table 7). All patients had more than one site or location affected majority of patients had scalp, trunk , upper and lower extremeties involvement, non of the patients had mucous membrane nor dorsae of the hands involvement.

The majority of the patients under treatment were suffering from moderate to severe psoriasis.

Mean PASI score was 18. In 95% of patients PASI score was more than 10, half of the patients (50%) - 10 patients, had moderate psoriasis with PASI score ranging from 10 -20, only one patient (5%) had mild psoriasis with PASI score less than 10 (Table 8).

The dose of UVA was increased each session according to the tolerance of the patient and was reaching near minimal tolerated erythemal dose. The intention was that each patient should undergo a schedule that involved a clearing phase with sessions three times a week until the psoriasis was controlled at which time the frequency of the sessions would be reduced to a suitable maintenance level.

RESULTS:

1- The mean duration of treatment with PUVA was 10 weeks, the shortest duration of treatment was four weeks and the longest duration was 36 weeks (4-36 weeks) using a mean dose/session of 10.5 Joules(5.3-12.6 Joules/session) for a mean of 18 sessions (9-44 sessions).
2- This resulted in a mean total cumulative dose (TCD) of 202.9 Joules (70-663 Joules).
3- Generally the treatment was tolerated well with only six patients (30%) complaining of pruritis, generalized tanning was also noticed in another six patients (30%) , while erythema was observed in only two patients (10%). Non of the patients complained of nausea or vomitting.
4- All patients showed complete remission of psoriasis but after variable UVA doses and number of sessions.
5- Doses necessary for an initial detectable improvement were recorded and it was found that the mean dose for initial response was 6.29 J (1.3-12 J) which meant that some patients started to respond after the second session.
6- The mean number of sessions for earliest response was 3.6 sessions (2-10 sessions).
7- The mean dose for maximal improvement was 16 J (9-25J) and the mean number of sessions for maximal improvement was 13 sessions (5-27 sessions).
8- The mean maintenance dose was 16 joules (7-25J)
9- It was noticed that the smaller the lesion the better and faster the response and the larger the lesion the slower the response, that is guttate lesions cleared faster than discoid which cleared faster than plaque type lesions, regardless duration of psoriasis, sex, nationality or age of the patient.
10- Mean dose per session in relation to skin type showed that skin type 2 is the best responsive to relatively lower doses than other types as shown in (tab-9).
11- Mean dose per session was almost the same in both severe and moderate psoriasis but it was reduced by 30% in mild psoriasis (table-10).
12- The need to use topical and steroids was reduced during and after treatment in all patients.
13- Patients were encouraged to use emollients freely and frequently and most continued to do so and the use of emollients was reduced in all patients after but not during or before treatment.
14- It seems that PUVA treatment had no effect on CBC, liver function tests, kidney function tests, serum triglyceride level, serum cholestrole level, ANA and Anti DNA. Although six patients had had high serum triglyceride level and seven patients had had high serum cholesterol level before treatment, all these high values were unchanged during or after treatment.
15- The treatment was inconvenient for (15%) of

the patients because of working hours and/or duty responsibility (work, studies, etc), while all others attended without facing any professional problem.

Discussion:

Although our patients underwent PUVA therapy alone, we are going to mention briefly other psoriasis-related phototherapy subjects such as (narrow band UVB 311, UVA1) and photochemotherapy (other systemic photosesitizers) with selected combined therapies such as REPUVA and some clinical trials related to phototherapy and photochemotherapy.

We selected new articles about phototherapy and related subjects in the treatment of psoriasis (turbo PUVA), with some rare and common acute and long-term side effects.

An individualized treatment regimen is necessary for each patient with psoriasis because of the diverse nature of the disease. The manifestation of psoriasis, the severity and extent of the lesions, and the medical history and lifestyle of the patient are important factors that determine the selection of treatment, but in general therapies with the fewest side effects are preferred. First-line topical treatments are corticosteroids, calcipotriene, and tazarotene. If topical treatments are unsuccessful, phototherapy with ultraviolet B or photochemotherapy with psoralens plus ultraviolet A (PUVA) are the next choices. If psoriasis fails to respond to an adequate trial of topical therapy or phototherapy, systemic therapies including methotrexate, acitretin, or cyclosporin should be initiated[3].

suberythemal UVA doses:

We treated 90% of our patients with suberythemal UVA doses and this was effective in clearing psoriasis. Tanew tried Half-side comparison of erythemogenic versus suberythemogenic UVA doses in oral photochemotherapy of psoriasis and concluded that PUVA-induced erythema is not a prerequisite for effective psoriasis treatment and that a low-dose UVA regimen is a promising approach to increase the short- and long-term safety of photochemotherapy [4].

PUVA therapy may be considered as maintenance phase preceeded by a clearing, or "quick-fix" phase and the transitional phase eg. an acute exacerbation of psoriasis is brought under control promptly with the use of cyclosporine at maximum dermatologic dose (5 mg/kg daily). After 1 month, the transitional phase is initiated with the gradual introduction of acitretin as a maintenance agent. Once the maximum tolerated dose of acitretin has been established, cyclosporine is gradually tapered and acitretin is continued for long-term maintenance with phototherapy (UVB or PUVA) added for improved control if needed [5].

Mechanism of action:

Previous studies have suggested that PUVA's mechanism of action in psoriasis is a result of its direct lymphotoxic effects. Trimethylpsoralen (TMP), a potentially safer compound, has been found to be effective in psoriasis during bath water delivery. In this study the author examined the relative antilymphocytic effects of TMP and 8-MOP through both flow cytometry and tissue analysis on lesional skin during clinical treatment were examined. Based on FACS analysis on phytohemagglutinin-activated lymphocytes, TMP was found to be nearly 10,000 fold more lymphotoxic compared to 8-MOP. In addition, lymphocytes treated with 8-MOP or TMP with UVA displayed DNA degradation patterns typical of apoptotic cell death. These findings were consistent with the results of investigation of treated psoriatic skin, with virtual elimination of epidermal CD3+ T-cells following bath water treatment with TMP or 8-MOP. These results support the theory that the therapeutic effects of PUVA stem from its toxic effects on activated lymphocytes. If further investigation supports TMP's lack of carcinogenicity, this potent lymphotoxic treatment may prove to be one of the safest and most effective treatments for psoriasis[6].

The data of Schmid pilot study indicate an enhanced stress-induced autonomic response and diminished pituitary-adrenal activity in psoriasis patients. PUVA treatment seems to interfere with the cardiovascular and NK cell response to acute psychological stress. Future studies may analyze the stress-induced neuroimmunological mechanisms in psoriatics in more detail [7].

Combination therapy:

Combination therapy of psoriasis with acitretin and phototherapy (psoralen-ultraviolet A [PUVA] or ultraviolet B [UVB]) offers multiple advantages over use of either modality alone. As monotherapy, acitretin in doses of 50 mg/day is moderately effective, but is associated with numerous side effects. Single modality treatment with UVB or PUVA in-

volves multiple visits over a period of months and is also associated with dose-limiting side effects. When used in combination, lower doses of both modalities can be used more effectively, helping to reduce side effects. In addition, clearing occurs much more quickly, reducing treatment time and number of phototherapy visits. Moreover, patients whose psoriasis does not clear with monotherapy will often achieve significant clearing with the combination of acitretin and phototherapy[8].

Acitretin and bath PUVA:

Muchenberger reported four patients with severe erythrodermic, pustular psoriasis, or plaque-type psoriasis, who were treated with a combination of acitretin and bath PUVA. After 4 weeks of ambulatory out-patient treatment, the psoriasis in all patients had improved by > or = 90%. No patient had relapsed when reviewed 3 months later. No significant side-effects were seen with the combined retinoid/bath PUVA treatment. Acitretin and bath PUVA may be safely combined for the treatment of severe psoriasis[9].

Cyclosporin and PUVA :

A patient with acute generalized pustular psoriasis was successfully treated with a combination of oral cyclosporin (6 mg/kg per day) and photochemotherapy (PUVA). Although early inpatient treatment with weak topical steroids and PUVA produced initial improvement, the patient's clinical condition fluctuated, with the subsequent development of erythroderma. The addition of oral cyclosporin produced dramatic improvement within 1 week of its commencement. The patient remained in remission 12 months following cessation of therapy[10] .

Daivonex and UVB

Koo-J reported that topical calcipotriol enhances the effect of UVB and PUVA phototherapy[11] .

Therapeutic trials:

Isotretinoin and PUVA:

Breier reported treatment of Generalized pustular psoriasis of pregnancy (impetigo herpetiformis). Treated incompletely with sytemic steroids but after delivary therapy was switched to retinoid photochemotherapy with isotretinoin and PUVA that resulted in rapid and complete clearing of the eruption[12].

Trimethylpsoralen (TMP) bath PUVA:

Treatment with TMP bath PUVA was effective in treating moderate to severe psoriasis, even in darker pigmented individuals. It is likely that this treatment ameliorates psoriasis through direct effects on activated leukocytes in lesional skin[13].

Turbo-PUVA:

Turbo-PUVA is the protection of uninvolved skin by dihydroxyacetone (DHA, a colorless sugar in "sunless" tanning lotions, binds to stratum corneum to form a UV-A-protective brown pigment.) during PUVA treatment which allows higher UV-A exposures to be tolerated, demonstrates faster clearing, and requires fewer treatments to clear psoriasis. By reducing the total body dose received, Turbo-PUVA may also reduce long-term risks[14].

Shower PUVA:

a shower PUVA has been developed as an alternative in local PUVA therapy. This involves moistening the patient's skin - with the exception of the head and neck area - in a shower using water containing psoralen (TMP concentration 0,27 mg/l). The advantages of shower PUVA method are that time, space and cost savings are possible and that only a slight amount of physical exertion is required by the patient standing in the shower compared to immersing the whole body during bath PUVA therapy. The efficacy and practicability of shower PUVA were evaluated using the minimal phototoxic dose (MPD) for healthy volunteers assessing water temperature (33-38 degrees C), shower time (5-10 min), and UVA dose (0,06-1,0 J/cm(2)). Additionally, the time course of TMP-induced photosensitivity was observed over a period of 4 hours after the shower. Using a TMP concentration of 0,27 mg/l, the MPD for skin type I-II lay between 0,125-0,375 J/cm(2) and for skin type III-IV between 0,375-1,0 J/cm(2). Photosensitivity was induced by shower PUVA within 5-10 minutes shower time and at 33-38 degrees C water temperature. MPD exhibited an inverse correlation to temperature but no differences were apparent for shower times between 5 and 10 minutes[15].

UVB 311 & LOCAL BATH PUVA :

Psoralen sensitization does not modify the erythematous threshold to 311 nm radiation. However, 311 nm exposures enhances the phototoxic activity of bath-PUVA. Bath-PUVA-311 nm cleared psoriasis with fewer exposures and lower cumulative UVA doses under the same minimally erythemogenic conditions. Combination with 311 nm exposures enhanced the phototoxic and therapeutic activities of bath-PUVA[16] .

topical 5-aminolaevulinic acid photodynamic therapy:

Topical 5-aminolaevulinic acid photodynamic therapy was tried on plaque psoriasis in 22 patients and showed variable response after a single treatment. There was a relationship between photodynamic dose and clinical response. Efficacy may improve by achieving consistent protoporphyrin IX levels or by using multiple treatments[17].

Comparison Study:

five systemic treatments for severe psoriasis were reviewed. These included ultraviolet B (UVB), photochemotherapy (PUVA), methotrexate (MTX), retinoids (RET) and cyclosporin A (CYA).

PUVA therapy was associated with the highest average proportion of patients with clearance (70%), and the highest proportion of patients with good response (83%), followed by UVB (68%) and CYA (64%). Incidence of side-effects per week was highest in the RET group and lowest in the phototherapy groups. But no study on MTX could be included.This review may provide a basis for the development of guidelines for the treatment of psoriasis[18].

SAFETY AND SIDE EFFECTS OF PHOTOCHEMOTHERAPY:

Because psoralens sensitize skin to ultraviolet A light, phototoxic reactions are the most frequent adverse effect of this treatment. Sunburn may sometimes be a major injury in psoralen users because high doses or inappropriate use of the drug may render the skin extremely sensitive[19].

Inhibition of microsomal enzyme activity:

PUVA, etretinate and RePUVA inhibit microsomal enzyme activity in the liver. Possible drug interactions with other P subset450 inducing or inhibiting agents should be considered in the therapy of psoriatic patients[20].

hepatitis from 5-methoxypsoralen:

Non of our patients who received 8 MOP showed any changes in the liver function tests. Hepatitis from 5-methoxypsoralen occurred in a 55-year-old woman with psoriasis vulgaris patient with previous flucloxacillin hepatitis when she was treated with oral 5-methoxypsoralen and UVA photochemotherapy [21] .

Carcinogenicity:

Stern found that high-dose exposure to PUVA is associated with a persistent, dose-related increase in the risk of squamous cell cancer, even among patients lacking substantial exposure to other carcinogens and among patients without substantial recent exposure to PUVA. Exposure to PUVA has far less effect on the risk of basal cell cancer. The use of PUVA for psoriasis should be weighed against the increased cancer risk[22].

The major mid-term adverse effect, squamous cell carcinoma of the skin, has been well documented in a number of large-scale epidemiological studies that have led to recommendations such as to restrict the lifetime number of treatments. Although squamous cell carcinoma is potentially life-threatening, it is usually slow growing and can be adequately managed by proper surveillance, treatment and follow-up[23] .

The situation is quite different for malignant melanoma, which is often fast growing and fatal. Except for anecdotal reports, malignant melanoma has not been observed in PUVA patients until recently. However, a report of a cohort of 1380 patients with psoriasis has concluded that about 15 years after the first treatment the risk of melanoma is increased approximately 5-fold in patients treated with high doses. Although this report needs to be confirmed by other multicentre trials, it is alarming since the association between exposure to ultraviolet light and development of melanoma is well established both in humans and in experimental animals[23].

Until the study of the increased incidence of malignent melanoma in PUVA treated patients is valid, it is recommended that the guidelines for PUVA therapy should be rigorously followed and that the contra-indications should be extended to include history or family history of melanoma and patients who have already received > 200 treatments[23].

type p53 mutations:

Because UV and PUVA induce different types of DNA damage resulting in unique types of p53 mutation, Nataraj investigated whether skin cancers from PUVA-treated psoriasis patients have PUVA-type or UV-type p53 mutations. Analysis of 17 squamous cell carcinomas (SCCs) from Austrian PUVA-treated patients revealed a total of 25 p53 mutations in 11 SCCs. A majority of p53 mutations occurred at 5'TpG sites. Although previous studies have shown that 5'TpA sites are the primary targets for PUVA mutagenesis, substitutions at 5'TpG sites are also quite common. Interestingly, a sizable portion of p53 mutations detected were C—>T or CC—>TT transitions, characteristic of UV-induced mutations.

Because some psoriasis patients had substantial exposure to UVB before PUVA therapy and because the light sources used in PUVA therapy contained small but significant wavelengths in the UVB region, it is possible that the C—>T and CC—>TT transitions detected in SCCs from PUVA-treated patients were induced by UVB. Nonetheless, our results indicate that both PUVA and UVB may play a role in the development of skin cancer in Austrian psoriasis patients who undergo PUVA therapy(24).

Reflective non-invasive assays of treatment-induced DNA damage:

Psoralen in conjunction with UVA (PUVA) is effective treatment for psoriasis ,but there is a need to develop non-invasive assays reflective of treatment-induced DNA damage. Ahmad-J report the assessment of two important lesions, thymine dimer (T<>T) and 8-oxo-2'-deoxyguanosine (8-OHdG), in the urine of psoriasis patients. It was found that, once corrected for urine concentration, the psoriatic group had significantly higher (P<0. 0001) urinary levels of thymine dimers compared to the control group. No significant differences in urinary 8-OHdG levels were noted between the psoriatic, atopic dermatitis and control groups. Therefore biomonitoring of therapy from the very start with this simple and non-invasive assay could perhaps be an effective measure of the risk involved with the treatment allowing optimization for minimal-risk therapy[2].

8-MOP bath PUVA and cancer:

Hannuksela concluded that there is no association between cutaneous cancer and 8-MOP bath PUVA, but the statistical power of his study alone is not adequate to warrant definite conclusions. The results can be used in a meta-analysis as soon as other studies on the carcinogenicity of 8-MOP bath PUVA are published [25].

Carcinogenic risk of bath PUVA in comparison to oral PUVA therapy:

The potential carcinogenic risk of bath PUVA therapy was compared to that of systemic (oral) PUVA. An analysis of the epidemiological data on cancer risk following bath PUVA with trimethylpsoralen does not support the conclusion that bath PUVA per se is less carcinogenic than systemic PUVA with 8-methoxypsoralen (8-MOP) [26].

Is PUVA really not harmful:

On the other hand Momtaz reported that Psoralen + UVA (PUVA) photochemotherapy has been applied to the treatment of more than 24 heterogeneous groups of diseases, especially psoriasis and mycosis fungoides. After 24 years of experience in thousands of patients with psoriasis and 23 other skin disorders, virtually the only risk is the development of squamous-cell carcinomas. This risk is low with two exceptions: previous history of treatment with ionizing radiation or inorganic trivalent arsenic, and patients with recalcitrant psoriasis who require continuous treatment for many years. In a recent report from a large USA clinical trial, melanoma developed in a few patients with psoriasis treated with PUVA. This prospective clinical trial did not have a control population, and therefore, the conclusion that PUVA can cause melanoma is tentative[27].

Green tea protects against psoralen plus ultraviolet A:

Zhao demonstrated that green tea and constituent polyphenols protect against ultraviolet B-induced carcinogenesis and reduce the growth rate of established tumors in skin. Also he showed that pre- and post-treatment with standardized green tea extract in psoralen plus ultraviolet A treatment populations abrogates the psoralen plus ultraviolet A-induced photochemical damage to skin. Oral administration of 0.4% or 0.8% standardized green tea extract 1 d after psoralen plus ultraviolet A treatment was effective in reducing psoralen plus ultraviolet A-induced inflammatory responses including erythema and edema formation [28].

Green tea seems to have a lot of effects that reduces the hazards of both topical and systemic PUVA.

UVB 311:

Narrowband UV-B is comparably as effective as PUVA and, given the lack of photosensitizer-related adverse reactions and the possibly lower long-term cancer risk, can be considered as first-line treatment for plaque-type psoriasis. Treatment with PUVA, on the other hand, remains the mainstay for patients with high PASI scores who do not respond or whose psoriasis cannot be controlled adequately by narrowband UV-B[29].

UVB 311 AND BB UVB:

Narrowband (NB UV-B) offers a significant therapeutic advantage over broadband UVB (BB UV-B) in the treatment of psoriasis, with faster clearing and more complete disease resolution. The erythema response to NB UV-B treatment was significantly more intense and persistent compared with BB UV-B. Considerably more necrotic keratinocytes were observed in histopathological sections of skin

treated with NB UV-B after a single 2.0-minimum erythema dose exposure. Treatment should be coupled with obligate minimum erythema dose testing to NB UV-B and close clinical observation during dose increases[30].

UVA-1 light:

Lamps producing long wave UV radiation are available: UVA-I light. Owing to its longer wavelength it penetrates more deeply into the skin and gives less risk of development of skin cancer than other forms of UV radiation[31] .

Table -1
Initial doses in relation to skin type

Skin type	Initial dose
1	0.5 J
2	1.0 J
3	1.5 J
4	2.0 J
5	2.5 J
6	3.0 J

Table - 2
Percentage of patient in relation to duration of soriasis

Percentage	**Duration**
5%	Less than a year
35%	1-5 years
30%	6-10 years
10%	11-15 years
20%	16-20 years

Table - 3
Showing the percentage - Nationalities of treated patients

% of patients	nationality
40%	Qatari
25%	Indian
10%	Tunesian
5%	syrian
5%	Palestinian
5%	Bangladish
5%	Pakistani
5%	Jordanian

Table - 4
Showing the percentage of patients in relation to their skin type.

Percentage	Skin Type
35%	4
25%	3
15%	5
15%	2
5%	6
5%	1

Table - 5
Percentage of patient in relation to duration of soriasis

Percentage	Duration
5%	Less than a year
35%	1-5 years
30%	6-10 years
10%	11-15 years
20%	16-20 years

Table - 6
The percentage of type of psoriasis:

Percentage	Type of psoriasis
65%	Both Plaque and discoid psriasis
30%	Guttate psriasis
10%	P P P alone
5%	Guttate and plaque
00%	pusrular,
00%	Erythrodermi
00%	Arthropathic

Table - 7
Distribution of lesions and the affected sites considering that all patients had more than one site affected at the same time:

Percentage	Affected sites
95%	Extensores & Upper extrem.
90%	Lower extremeties
90%	Trunk
65%	Scalp
20%	Nails
10%	Face
10%	Palms

Table - 8
showing pretreatment PASI score:

Percentage of pt.	Type of psoriasis	PASI score
45%	Severe	More than 20
50%	Moderate	Between 10-20
5%	Mild	Less than 10

Table - 9
Mean dose per session in relation to skin type

Skin type	Mean dose /session (J/S)
1	15
2	6.4
3	9.4
4	10.9
5	12.2
6	9.5

Table 10
Mean dose per session in relation to severity

Type of psoriasis	Mean dose /session (J/S)
Severe	10.9
Moderate	10.2
mild	7.77

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The secand message from Dr. Adel F. Matar, a Cardiac Surgeon in Portland Oregon, USA. with the title :

I Often Wonder

1) Why does the sun lighten our hair, but darken our skin?
2) Why can't women put on mascara with their mouth closed?
3) Why doesn't glue stick to the inside of the bottle?
4) Why don't you ever see the headline "Psychic Wins Lottery"?
5) Why is "abbreviated" such a long word?
6) Why is a boxing ring square?
7) Why is it called lipstick if you can still move your lips?
8) Why is it considered necessary to nail down the lid of a coffin?
9) Why is it that doctors call what they do "practice"?
10) Why is it that rain drops but snow falls?
11) Why is it that to stop Windows 95 or 98, you have to click on "Start"?
12) Why is it that when you're driving and looking for an address, you turn down the volume on the radio?
13) Why is lemon juice made with artificial flavor and dishwashing liquid made with real lemons?
14) Why is the man who invests all your money called a broker?
15) Why is the third hand on the watch called a second hand?
16) Why is the time of day with the slowest traffic called rush hour?
17) Why is the word dictionary in the dictionary?
18) Why isn't there a special name for the tops of your feet?
19) Why isn't there mouse-flavored cat food?