

Original Research Article

Bath PUVA versus oral PUVA in the treatment of chronic palmo-plantar psoriasis

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ABSTRACT

Background: Psoriasis is a chronic, recurring inflammatory disease of the skin with an unpredictable course and variable prognosis. Palms and/or soles are involved in 10% to 21.1% of all psoriasis cases. Palmo-plantar psoriasis is a therapeutically challenging condition that can significantly impact quality of life. It is frequently resistant to traditional topical therapies, such as potent steroids, calcipotriol and anthralin but show good response to photochemotherapy (PUVA). Aim of the study was to compare the efficacy and safety of bath PUVA versus oral PUVA in patients with chronic palmo-plantar psoriasis.

Methods: This randomized clinical open trial was conducted in the department of dermatology and venereology, BSMMU, Dhaka from 1st September 2007 to 28th February 2008. Patients clinically diagnosed with chronic palmo-plantar psoriasis were selected by simple random sampling. A sample size of 50 patients was taken, 25 for bath PUVA and 25 for oral PUVA group. Psoriasis area and severity index (PASI) score was used to determine the percentage of reduction of Palmo-plantar psoriasis in both groups. Data were analysed with computer-based program SPSS version.

Results: Reduction of psoriasis at 1st follow-up in bath PUVA and oral PUVA were 29.85±8.95 and 31.93±11.55 respectively. At 2nd follow-up were 85.86±7.33 and 28.48±39.32 respectively. Significantly higher improvement was observed in Bath PUVA group than oral PUVA group, both at 1st and 2nd follow-up (p=0.001).

Conclusions: Bath PUVA was significantly more effective at reducing Palmo-plantar psoriasis than oral PUVA.

Keywords: Psoriasis, Bath PUVA, Oral PUVA, Palmo-plantar, Chronic

INTRODUCTION

Psoriasis is one of the longest known illnesses of humans. Psoriasis is a common, chronic, inflammatory disease of the skin characterized by round, circumscribed, erythematous, dry, scaling plaques of varying sizes and covered by silvery-white, imbricated and lamellar scales.¹ The disease is universal in occurrence. However, its prevalence in different populations varies from 0.1% to 11.85% according to published reports.² Several studies

have indicated that ethnic factors (i.e., genetic and behavioural factors) may influence the prevalence of psoriasis. Psoriasis is more common among northern European Caucasians, less common among Asian or African populations and least common among natives to North and South America.¹ Psoriasis affects both sexes equally and can occur at any age, although it most commonly appears for the first time between the ages of 15 and 25 years. The symptoms of psoriasis can manifest in a variety of forms. Psoriasis can occur as chronic

palmo-plantar disease that leads to distinct impairment of everyday life. Palms and/or soles are involved in 10% to 21.1% of all psoriasis cases.³ Palmo-plantar psoriasis, associated or un-associated with psoriasis elsewhere on the body, can express many different morphologic patterns ranging from predominantly pustular lesions to thick, hyperkeratotic plaques, with a spectrum of overlap of these two polar entities. Palmo-plantar pustulosis presents as sterile, yellow pustules on a background of erythema and scaling affecting palms and/or soles. It more commonly affects women (9:1), presents more commonly between ages of 40 and 60 years, and has a very striking association with smoking, either current or past, in up to 95% subjects.⁴ Palmo-plantar psoriasis is a therapeutically challenging condition that can significantly impact patient's quality of life. It is frequently resistant to traditional topical therapies such as potent steroids, calcipotriol and anthralin but can show good response to orally given psoralen plus ultraviolet A (PUVA).^{5,6} However, oral PUVA has the potential disadvantage of nausea, headache and hepatotoxicity after taking 8-methoxypsoralen (8-MOP) tablets and leads to photosensitization of the entire skin for at least 6-12 hours. To avoid these systemic side effects, the administration of 8-MOP in dilute bathwater solution, so-called local bath PUVA therapy, was successfully established in the treatment of chronic palmo-plantar eczema and psoriasis.^{7,8} Nevertheless, until now a direct comparison of oral PUVA with bath PUVA therapy has not been performed for palmo-plantar psoriasis. Such comparisons only exist for plaque-type psoriasis suggesting that the efficacy of both treatment modalities is comparable but smaller cumulative UVA doses and lower numbers of exposures are required with bath PUVA therapy.^{9,10} The purpose of this study is to compare the effectiveness and side effects of bath PUVA vs oral PUVA for patients with chronic palmo-plantar psoriasis.

METHODS

This randomized clinical open trial was conducted in the department of dermatology and venereology, BSMMU, Shahabag, Dhaka from 1st September 2007 to 28th February 2008. Patients clinically diagnosed as chronic palmo-plantar psoriasis were selected by simple random sampling. A sample size of 50 patients was taken, 25 for bath PUVA and 25 for oral PUVA group according to following the inclusion and exclusion criteria. The diagnosis was made on clinical basis and severity measured by assessing the percentage of involved body surface, degree of erythema, scaling and induration of the lesion. The surface area of two palms and two soles was expressed as 100% of the total trial area. So, each palm and sole area will be counted as 25% and response will be calculated accordingly. PASI combines the assessment of the severity of lesions and the area affected into a single score in the range 0 (no disease) to 72 (maximal disease). Percentage of palmo-plantar surface area involved, erythema, scaling and induration was recorded in a 3-point scale before treatment and evaluated after

every 14 days interval after giving bath PUVA and finally after 8 weeks. In bath PUVA (topical Psoralen with ultraviolet A light) group, 1 ml of 8-methoxypsoralen lotion (10 mg/mL) was mixed with 1 litre of plain tap water and then both hands and feet were immersed into psoralen mixed water for half an hour. immediately after immersion the palm and sole were exposed to UVA lamp. The initial dose of ultraviolet A was 2.5 J/cm². Dose was increased weekly by 0.5 J/cm² (20% increment) up to 6.5 J/cm². In oral PUVA group, 8-methoxypsoralen tablet or capsule were given for ingestion, according to weight of the patients, two hours before UVA exposure. The initial dose of ultraviolet A was 1 J/cm². Dose was increased by 0.5 J/cm² weekly (20% increment) up to 5 J/cm². Improvement was noted on the basis of erythema, induration and scaling. These data were finally analysed at the end of trial period, i.e., after 8 weeks. Data were analysed with computer-based program SPSS Version.

Inclusion criteria

Inclusion criteria for the study included patients with chronic palmo-plantar psoriasis.

Exclusion criteria

Exclusion criteria for the study excluded female patients with pregnancy, patients with known hypersensitivity to ultraviolet ray and patients having any other medication for palmo-plantar hyperkeratosis.

RESULTS

Out of all patients of bath PUVA group 20.0% patients had age up to 30 years 60.0% belonged to 45-60 years and 20.0% above 60 years. In Oral PUVA group maximum patients belonged to up to 30 years age group followed by 32.0% within 45 to 60 years and 8.0% more than 60 years age group. Mean (\pm SD) age was 45.72 (\pm 15.0) and 37.28 (\pm 16.94) years of both bath PUVA and oral PUVA group respectively (Table 1). In bath PUVA group 40.0% were male and 60.0% were female and in oral PUVA group 60.0% were male and 40.0% were female. No statistically significant difference was observed between groups in term of sex (Table 2). Almost all patients of both groups had scaling and plaque. 80% patients of bath PUVA group had fissure and erythema. In oral PUVA group, 100% had fissure and 80% had erythema (Table 3). 40.0% patients of bath PUVA group and 80.0% of oral PUVA group had total palm involvement. The rest had half palm involvement (Table 4). 60.0% patients of bath PUVA group had total and 40.0% had half-sole involvement. On the other side, in oral PUVA, 60.0% patients had total and 40% patients had half-sole involvement (Table 5). The baseline PASI in bath PUVA and oral PUVA were 6.96 \pm 4.8 and 11.9 \pm 2.8 respectively. In 1st follow up, PASI in bath PUVA and oral PUVA were 4.96 \pm 3.48 and 8.02 \pm 1.94 respectively and in last follow up, PASI in bath PUVA and oral PUVA were 0.76 \pm 0.43 and 7.88 \pm 3.38 respectively. Significant improvement was observed in

Bath PUVA group, both in baseline to 1st follow up and 2nd follow up ($p<0.05$) (Table 6). The percent of improvement in baseline to 1st follow in bath PUVA and oral PUVA were 29.85 ± 8.95 and 31.93 ± 11.55 respectively. In baseline to 2nd follow up percent of improvement in bath PUVA and oral PUVA were 85.86 ± 7.33 and 28.48 ± 39.32 respectively and in 1st follow up to 2nd follow up the percent of improvement in bath PUVA and oral PUVA were 78.22 ± 14.98 and -16.21 ± 88.90 respectively. Significant improvements were observed in Bath PUVA group both in baseline to 2nd follow up and 1st follow up to 2nd follow up ($p<0.05$) (Table 7).

Table 1: Distribution of age by group, (n=25).

Variables	Groups		P
	Bath PUVA	Oral PUVA	
Age (years)			
≤30	05 (20.0)	15 (60.0)	----
45-60	15 (60.0)	08 (32.0)	
>60	05 (20.0)	02 (8.0)	
Total	25 (100.0)	25 (100.0)	
Mean (±SD)	45.72 (±15.0)	37.28 (±16.94)	

T test was done to measure the level of significance.

Table 2: Distribution of sex by group, (n=25).

Variables	Groups		P
	Bath PUVA	Oral PUVA	
Sex			
Male	10 (40.0) #	15 (60.0)	0.157
Female	15 (60.0)	10 (40.0)	
Total	25 (100.0)	25 (100.0)	

#Chi-square test was done to measure the level of significance.

Table 3: Distribution of chief complaints by group, (n=25).

Chief complains	Groups		P
	Bath PUVA	Oral PUVA	
Scaling	25 (100.0) #	25 (100.0)	Not done
Plaque	25 (100.0)	25 (100.0)	
Fissure	20 (80.0)	25 (100.0)	Not done
Erythema	20 (80.0)	20 (80.0)	

#Chi-square test was done to measure the level of significance, **Fisher's exact test was done to measure the level of significance.

Table 4: Psoriasis involvement in palm by group, (n=25).

Palm involvement	Groups		P
	Bath PUVA	Oral PUVA	
Total involvement	10 (40.0)	20 (80.0)	---
Half involvement	15 (60.0)	05 (20.0)	
Total	25 (100.0)	25 (100.0)	

Chi-square test was done to measure the level of significance.

Table 5: Psoriasis involvement in sole by group, (n=25).

Sole involvement	Group		P
	Bath PUVA	Oral PUVA	
Total involvement	15 (60.0)	15 (60.0)	---
Half involvement	10 (40.0)	10 (40.0)	
Total	25 (100.0)	25 (100.0)	

Table 6: Distribution of patients by PASI, (n=25).

PASI	Group		P
	Bath PUVA	Oral PUVA	
Baseline	6.96±4.8	11.9±2.8	---
1st follow-up	4.96±3.48	8.02±1.94	
Last follow-up	0.76±0.43	7.88±3.38	

Fisher's exact test was done to measure the level of significance.

Table 7: Distribution of percentage of improvement by group (based on PASI), (n=25).

Percentage of improvement	Group		P
	Bath PUVA	Oral PUVA	
Baseline to 1st follow-up	29.85±8.95	31.93±11.55	0.482
Baseline to 2nd follow-up	85.86±7.33	28.48±39.32	0.001
1st to 2nd follow-up	78.22±14.98	-16.21±88.9	0.001

T test was done to measure the level of significance, Data is shown as Mean±SD.

DISCUSSION

In the present study the age distribution of the patients of both groups was noted. Out of all patients of bath PUVA group 20.0% had age up to 30 years 60.0% belonged to 45 to 60 years and 20.0% above 60 years. In Oral PUVA group maximum patients belonged to up to 30 years age group followed by 32.0% within 45 to 60 years and 8.0% more than 60 years age group. Mean±SD age was 45.72 (±15.0) and 37.28 (±16.94) years of both bath PUVA and oral PUVA group respectively. The sex distribution of the patients showed that in bath PUVA group 40.0% were male and 60.0% were female and in oral PUVA group 60.0% were male and 40.0% were female. In the present study married people were dominant in both groups. Wahba et al carried out a study over a total of 50 cases (30 male and 20 female) of 20 to 50 years age group.¹¹ In their study bath PUVA was given thrice in a week initially and then twice and once in a week according to the response of the patient. Amelioration of symptoms in different degrees was observed in mild 62%, moderate 50% and severe cases 25%. It appears that bath PUVA is safer and effective in mild and moderate cases of PPPS if treated earlier. Relative contraindications are age <10

years, pregnancy, photosensitizing medications, non-melanoma skin cancers, severe organ dysfunction. Recommended total treatments are <200 (or <2000 J/cm² UVA) combination with oral retinoid can reduce cumulative UVA exposure.¹² In the present study 60.0% patients of bath PUVA group had total and 40.0% had half-sole involvement. The present study showed that the baseline PASI in bath PUVA and oral PUVA were 6.96±4.8 and 11.9±2.8 respectively. In 1st follow-up, PASI in Bath PUVA and oral PUVA were 4.96±3.48 and 8.02±1.94 respectively and in last follow-up, PASI in bath PUVA and oral PUVA were 0.76±0.43 and 7.88±3.38 respectively. Significant improvements were observed in bath PUVA group both in baseline to 1st follow up and 2nd follow up (p<0.05). Treating psoriasis with bath PUVA has been described in detail by the Swedish since.¹³ The efficacy of this treatment has been well established by studies done in the United States and Europe.¹⁴ In the present study the percentage of improvement in baseline to 1st follow-up in bath PUVA and oral PUVA were 29.85±8.95 and 31.93±11.55 respectively. In baseline to 2nd follow up percentage of improvement in bath PUVA and oral PUVA were 85.86±7.33 and 28.48±39.32 respectively and in 1st follow up to 2nd follow up the percentage of improvement in bath PUVA and oral PUVA were 78.22±14.98 and 16.21±88.90 respectively. PUVA is a treatment for eczema, psoriasis and vitiligo, and mycosis fungoides.¹⁵ It is believed that the mechanism of action of PUVA is via depletion of lymphocyte populations in the skin.¹⁶ If MPD testing is impractical, a regimen based on skin type may be used. Initial dose is 0.5-2.0 J/cm² depending on skin type (or MPD). Treatment is done twice weekly, with increments of 40% per week until erythema, then maximum 20% per week.¹⁷ Significant improvement was observed in bath PUVA group both in baseline to 2nd follow up and 1st follow up to 2nd follow up. Hofer et al carried out a clinical trial to assess the efficacy and side effects of the different treatment modalities in a randomized half-side comparison.¹⁸ In their study both bath PUVA and oral PUVA achieved a reduction of the mean initial SI from 5.9 (95% confidence intervals (CI) 4.58.0) to 3.3 (1.8-6.0) (44% SI reduction, p<0.005, student's paired t test) and 6.0 (5.0-7.8) to 2.9 (1.8-4.0) (52% SI reduction; p<0.005), respectively. The statistical comparison of the entire 4-week study period revealed a significant better effect in lesions treated with oral PUVA compared with bath PUVA (p=0.033). However, at 4 weeks, there was no significant difference between the achieved SI reduction of oral PUVA and bath PUVA. Systemic side effects (nausea and/or dizziness) were only observed after oral PUVA.¹⁸

Limitations

The study was conducted for a period of 6 months with a small sample size. The study population was recruited from a selected hospital in Dhaka city. Therefore, the results of the study may not reflect the exact picture of the country.

CONCLUSION

Current study was carried out to evaluate the efficacy of bath PUVA in the treatment of palmo-plantar psoriasis, comparing with oral PUVA. Significant reduction of palmo-plantar psoriasis was noticed with bath PUVA, which is better than the oral PUVA. In the light of this study, we recommend bath PUVA as a better therapeutic modality in the treatment of palmo-plantar psoriasis.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Neimann, AL, Porter, SB, Elfand JM. The epidemiology of psoriasis. *Expert rev dermatol*. 2006;1(1):63-75.
2. Terui T, Ozawa M, Tagami H. Role of neutrophils in induction of acute inflammation in T-cell-mediated immune dermatosis, psoriasis: A neutrophil-associated inflammation-boosting loop. *Exp Dermatol*. 2000;9(1):1-10.
3. Kansky A, Pavicic Z. Dermatological lesions of palms and soles. *Yugoslavia Ajda Pasic*. 1986;29-40.
4. Griffiths CEM, Camp RDR, Barker JNWN. Psoriasis. In Burns, T, Breathnach, S, Cox, N, Griffiths, C, (eds.) *Rook's textbook of dermatology*. 7th edi, Blackwell publisher, Massachusetts. 2004.
5. Morison WL, Parrish JA, Fitzpatrick TB. Oral methoxsalen photochemotherapy of recalcitrant dermatoses of palms and soles. *Br J Dermatol*. 1978;99:297-302.
6. Bruynzeel DP, Boonk WJ. Zur PUVA-Therapie von chronischen Dermatosen der Handflächen und Fußsohlen. *Z Hautkr*. 1980;55:523-9.
7. Calzavara-Pinton PG, Ortel B, Honigsmann H. Safety and effectiveness of an aggressive and individualized bath PUVA regimen in the treatment of psoriasis. *Dermatol*. 1994;189:256-9.
8. Hawk JLM, Le Grice P. The efficacy of localized PUVA therapy for chronic hand and foot dermatoses. *Clin Exp Dermatol*. 1994;19:479-82.
9. Cooper EJ, Herd RM, Priestley GC, Hunter JAA. A comparison of bathwater and oral delivery of 8-methoxypsoralen in PUVA therapy for plaque psoriasis. *Clin Exp Dermatol*. 1999;25:111-4.
10. Lowe NJ, Weingarten D, Bourget T, Moy LS. PUVA therapy for psoriasis: comparison of oral and bathwater. Delivery of 8-methoxypsoralen. *J Am Acad Dermatol*. 1986;14:754-60.
11. Wahba A, Cohen H. Therapeutic trials with oral colchicine in psoriasis. *Acta Derm Venereol (Stockh)*. 1980;60:515-20.
12. Kevin RS, Daniel JP, Steven RF. Targeted UV therapy in the treatment of psoriasis. *J Dermatological Treatment*. 2008;19(3):141-5.

13. Berne B, Fischer T, Michaelsson G, Noren P. Long-Term safety of trioxsalen bath PUVA treatment: An 8-year follow-up of 149 psoriasis patients. *Photodermatol*. 1984;1:18-22.
14. Lowe N, Weingarten D. PUVA therapy for psoriasis: Comparison of oral and bath-water delivery of 8-methoxypsoralen. *J Am Acad Dermatol*. 1986;14:754-60.
15. William JD, Timothy BG. *Andrews' Diseases of the Skin: clinical Dermatology*, Saunders Elsevier. 2006;686.
16. Vallat VP, Gilleaudeau P, Battat L, Wolfe J, Nabeya R, Heftier N et al. PUVA bath therapy strongly suppresses immunological and epidermal activation in psoriasis: A possible cellular basis for remittive therapy. *J Exp Med*. 1994;180:283-96.
17. Johann EG, James TE. Psoriasis', In Fitzpatrick's dermatology in general medicine 7th edi. McGraw-Hill publisher, San Fransisco, USA. 2007;169-93.
18. Hofer A, Fink-Puches R, Kerl H, Quehenberger F, Wolf. Paired comparison of bathwater versus oral delivery of 8-methoxypsoralen in psoralen plus ultraviolet: A therapy for chronic palmo-plantar psoriasis. *Photodermatol Photoimmunol Photomed*. 2006;22(1):1-5.

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