The Use of Narrow-Band Ultra-Violet B Photo Therapy in Treatment of Dermatitis Herpetiformis in Iraqi Patients (A Pilot Study)

Mohammed Kadhim AL- Hattab
College of Medicine, University of Babylon, Hilla, IRAQ.
E-mail: alhattab68@yahoo.com

Received 15 December 2013 **Accepted 13 January 2014**

Abstract

Dermatitis herpetiformis (DH) is an intensely pruritic chronic and recurrent papulovesicular disease affecting patients mainly between the ages of 20 -55 years. Several drugs are used for treatment of DH mostly dapsone and sulfapyridine with side effects like hemolytic anemia and methaemo globulinemia. Narrow band UVB refers to a specific wave length of ultraviolet radiation 311 – 312 nm. It has been used for treatment of pruritus and some of skin diseases that associated with pruritus like lichen planus, atopic dermatitis, cutaneous lymphoma and dermographism. NB UVB was arranged as a trial therapy for treatment of DH.

A total of 16 patients with D.H were enrolled in the study for a period extended from January 2011 to April 2013. Fourteen patients completed the study. Patients ages ranged from 24 – 55 years, mean ± S.D ; 38.21 ± 9.20 years. There were 12 males and 2 females, male : female ratio was 6:1.

NB UVB was found to be very effective in reducing the severity of pruritus in D.H patients as there was dramatic reduction in VAS score in all 14 patients (100%). The number of patients responded to NB UVB therapy regarding reduction in number of lesions at the end of treatment was 13 patients (92.8%) , this included all grades of improvement (mild 14.3 % , moderate 14.3% and dramatic 64.3%). The number of sessions of NB UVB ranged from 24 – 32, mean ± S.D 29.7 ± 3.75 . The maximum irradiation time was 9 minutes
(3000 mJ/ cm^2).

NB UVB was safe and effective for treatment of DH and it can be used as an alternative therapy for those patients who not respond to dapsone or developed side effects from it. To the best of our knowledge, this is the first study in Iraq and a broad to use NB UVB in the management of D.H.

Key words: Narrow band UVB, Dermatitis herpetiformis (D.H)

استخدام الأشعة فوق البنفسجية المكثفة نوع ب في علاج مرض أيوب لدى المرضى العراقيين، دراسة تجريبية

الخلاصة

هناك أدوية أو عقارات متعددة تستخدم في علاج مرض أيوب مثل عقار الدابسون أو السلفابريدين وغالباً ما يصاحبها أعراض جانبية كفقر الدم مثلاً . لذا تم استخدام جهاز الاشعة فوق البنفسجية المكثفة نوع ب في علاج هذا المرض. تم دراسة ١٤ حالة أكملت العلاج بصورة تامة. تراوح اعمار المرضى بين ٢٤ –٥٥ سنة ، ١٢ حالة ذكور واثنان أناث. كانت نسبة الذكور : الإناث ١:٦ .

كان تأثير الأشعة فوق البنفسجية المكثفة نوع ب فعالاً جداً في التخلص من الحكة الشديدة المصاحبة للمرض وبنسبة ١٠٠% تم كذلك الاستجابة والتخلص من الحبيبات والفقاعات التي هي من العلامات الاساسية للمرض بنسبة ٩٢,٨ % تراوح عدد الجلسات التي تعرض لها المرضى المصابين ما بين ٢٤ –٣٢. وصلت مدة أعلى تعرض للأشعة إلى ٩ دقائق وبنسبة ٣٠٠٠ mJ/ Cm^3 .

أثبتت الدراسة فعالية الاشعة فوق البنفسجية المكثفة نوع ب في علاج مرض أيوب وبدون تأثيرات جانبية ، وهي أول دراسة في العراق وتقريباً في العالم أثبتت فعالية هذا العلاج في هذا المرض.

Introduction

Dermatitis herpetiformis (D.H) is a rare intensely pruritic, chronic and recurrent papulo vesicular disease. The eruption is symmetrical and pleomorphic consisting of erythematous, urticarial, papular , vesicular or bullous lesions. Dermatitis H. presents mainly between the ages of 20 – 55 years, but can present both in childhood and old age. The onset may be acute or gradual and pruritus is usually the first and predominant symptom [1].

Early lesions on the skin are erythematous papules, urticarial weals or groups of small vesicles often excoriated so rapidly that it may be impossible to find one intact. The vesicles are usually grouped together on plaques of erythema and rarely blisters 1 – 2 cm in diameter occur. The distribution of the lesions is characteristic. The extensor aspects of the limbs especially the knees, just below the point of the elbows, buttocks and the natal cleft are affected in the majority of patients. The axillary folds, shoulders , trunk, face and scalp are all frequently involved [1 ,2].

The mucous membranes are involved in rare cases. Itching and burning are usually intense and their paroxysmal quality provokes scratching to the point of bleeding and at times scarring. Spontaneous remissions lasting as long as a week and terminating abruptly with a new crop of lesions are characteristic feature of the disease [3].

Dermatitis H. has characteristic immunofluorescence finding. There are granular deposits of Ig A in the dermal papillae [4]. There may be also C3 and Ig G. Direct immuno fluorescence is always positive [4]. Ig A deposits have been shown to be chemo attractant to neutrophils [5].

Regarding the pathology of D.H, diagnostic histological changes are best seen in the vicinity of early blisters and eosinophils accumulate within the dermal papillae and form micro abscesses. The surrounding collagen is degraded resulting in detachment of the epidermis and sub epidermal vesicles. Multi locular vesicles may coalesce to form blisters; at that stage, the cellular infiltrate is mixed and distinction from pemphigoid may be difficult [1].

There are often associated autoimmune diseases particularly thyroid disease, pernicious anaemia and diabetes [2,6]. A variety of organ specific and non – organ specific auto anti bodies have been detected in patients with D.H , notably thyroid antibodies [7].

Lymphoma is a well-recognized complication of D.H, as are other malignancies [8,9], although a recent study contradicts this [10]. Moreover, the protective role of gluten – free diet for intestinal lymphoma has been established [11].

Dapsone is the most widely used treatment for D.H. The dose needed for the average case is 100 -200 mg / day but a few may require 400 mg / day. It is wise to start at 25 – 50 mg / day in an adult and slowly increase to a dose that keeps the patient comfortable and without significant side effects. Too rapid an increase in the dose often result in hemolytic anemia [12]. Methaemoglobin anemia is common reaching a steady state after a bout 2 weeks and may cause cyanosis, breathlessness and angina. Dapsone syndrome (lymphadenopathy and hepatitis) and agranulocytosis are serious early complications. Motor neuropathy may also occurs. Most

complications can occur within the first 3 months of treatment [12].

Sulfa pyridine up to 3 g/ day or sulfa methoxy pyridazine 0.5 – 1.5 g / day is an alternative in patients who cannot tolerate dapsone. Side effects include nausea, lethargy, laemolytic anemia and bone marrow suppression, their incidence increasing with doses above 1 g /day [13].

Although systemic steroids are in the main ineffective and not indicated, topical steroids may be helpful in lessening symptoms (12). Heparin with or without tetracycline, in combination with nicotinamide / niacinamide are advocated for patients who cannot tolerate dapsone or sulfonamides [14].

A gluten free diet is the treatment of choice in the long term. It has been shown not only to improve the enteropathy but also to allow discontinuation of the drug therapy, often dapsone can be discontinued altogether after 2 -3 years on a strict gluten – free diet but some patients take much longer [15]. Re introduction of gluten in selected patients produced a relapse in skin lesions [16] The gluten free diet After 5 – 10 years protects patients from lymphoma and this is an additional reason to recommend a gluten free diet [11].

Narrow band UVB refers to a specific wavelength of ultraviolet radiation 311 – 312 nm. This range of UV radiation has proved to be the most beneficial component of natural sun light for psoriasis. NB – UVB may also be used in the treatment of many other skin conditions including atopic eczema, vitiligo, pruritus, lichen planus, polymorphous light eruption, early cutaneous T – cell lymphoma and dermographisim [17, 18].

Compared with broad band UVB, In NB UVB :

1- The exposure times are shorter but of higher intensity.

2- The course of treatment is shorter.

3- It is more likely to clear skin condition, and

4- Longer periods of remissions occur before it reappears.

Narrow band UVB lamps emit light over a very short range of wave length concentrated in the therapeutic range and minimally in the sunburing range. NBUVB is therefore theoretically safer and more effective than broad band UVB, but requires either longer treatment times or equipment with more bulbs [17, 18].

Aim of Study

NB UVB has been used for treatment of pruritus and some of skin disease that associated with pruritus like lichen planus [17]. Also one of our notifications that during treatment of psoriasis with NB UVB, the itching associated with psoriasis in some patients was relieved even before the disappearance of psoriatic patches so we arranged to use NB UVB as another option for treatment of dermatitis herpetiformis.

Patients and Methods

A total of 16 patients with D.H were enrolled in an opened clinical trial study (pilot study) for a periode extended from January 2011 to April 2013. These patients treated with a NB UVB in a private center of dermatology at Hilla city.

A clinical history was taken from each patient including name, age, sex, duration of the disease and related symptoms especially itching. Physical examination regarding types of lesions whether papules or vesicles and sites of involvement of skin by these lesions. A biopsy was taken from each patient to prove the diagnosis of D.H. Most of our patients had persistent severly pruritic and annoying D.H. lesions for a long time and some of

them developed side effects from dapsone therapy like anemia or methemoglobulinemia especially in large doses. All the patients stopped taking treatment whether topical or systemic for at least one month. All the patients where on gluten free diets.

Narrow band UVB device used in the study was from SOLARC Systems Inc. [19]. Exclusion criteria for treatment with NB UVB were: patients with history of skin cancer or dysplastic naevus syndrome, photosensitivity or using photo sensitizing medications, psychiatric or epileptic disorders and individuals with hyperthyroidism or with a pacemaker implant [19].

All patient were treated with N B UVB machine twice weekly (not consecutive days). The patients before taking the dose of radiation should take a good bath in their house and putting a thin film of emollients (vaseline) to reduce the corneal layer of skin, so both procedures will increase UVB penetration. Then after, the patient entered the machine room. Total body was exposed especially the affected sites except genitalia and nipples that were shielded in all cases with clothes and sunscreens.

The same schedule used for treatment of psoriasis was applied in our patients. The skin types of patients enrolled in the study were either ΠI (sometimes burns, always tan) or IV (never burns, always tan). The initial irradiation time was 1 minute :30 seconds (500 mJ/cm^2) which increased gradually each visit by 0.18 seconds (100 mJ/cm^2) to a maximum 9 minutes (3000 mJ/cm^2) if no or
minimally noticeable side effects. This regimen was twice per week for 4 months (32 sessions).

It patients developed the following effects 12 – 24 hours after the last treatment session, so do the followings [19]:

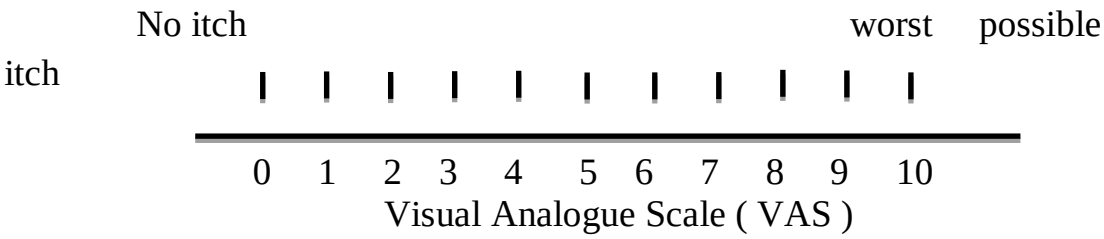
1- If patients developed light pink, very mild burn" sub erythema, " keep the same treatment time.

2- If patients developed significant erythema (burns), skip next 1 or 2 treatment sessions and reduce the time to previous session and 10% of the dose increases in subsequent sessions.

3- If patients developed significant erythema (burns), oedema or blisters, so stop the treatment till complete recovery, then reduce exposure dose to the half and 10% of the dose increased in subsequent sessions.

Oral consent was taken from each patient before trial after a full explanation of method of treatment and duration of follow up.

Assessment of response to treatment was done for each patient every 2 weeks regarding the severity of itching and reduction in the number of lesions. The severity of itching was assessed by the patients themselves by using a visual analogue scale (VAS) which is a measunent instrument that tries to measure a characteristic attitude that is believed to range across a continuum of values which cannot easily be directly measured, for example, the amount of pain or itching that a patient feels ranges across a continuum from non to an extreme amount of pain or itching. Our patients record the severity of their pruritus every 2 week on this scale which consists of a 10 cm horizontal line marked from 0 (no itch) to 10 (worst possible imaginable itch) as appear in this diagram:



Grading of response to treatment by measuring the reduction of skin lesions as follows :

Grading 0 (no response) : same number of lesions.

Grade I (mild response): less than one third of lesions reduction.

Grade Π (moderate response): more than one third and less than two thirds reduction of lesions.

Grade ΠI (dramatic response): more than two thirds of lesions reduction.

The patients were divided into 3 groups as follows:

Group 1 : those patients with initial skin lesions less than 15.

Group 2 : those patients with initial skin lesions between 15 – 30.

Group 3 : those patients with lesions more than 30.

Statistical Analysis

All data coded and computerized using SPSS 7.5 (statistic package for social science). Response to treatment was measured by using paired and unpaired t – test, chi-square test and analysis of variance (ANOVA) test. P value < 0.05 was considered significant.

Results

Sixteen patients with DH were included in this study. Two patients did not complete the treatment and considered as default for unknown reasons. The remaining 14 patients who completed the study were 12 males and 2 females (male : female ratio was 6 :1) (figure 1).

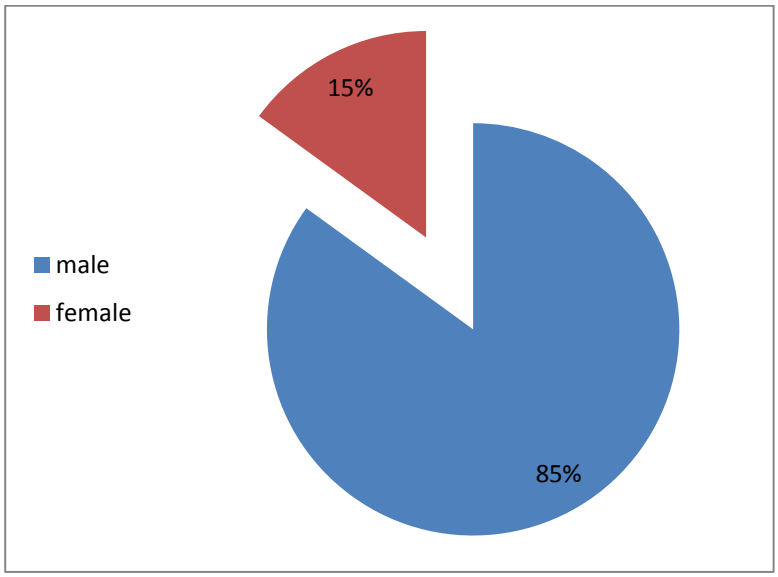


Figure 1 Sex distribution of DH patients

Patients ages range from 24 -55 years with a mean ± SD of 38.21 ± 9.20 years (figure 2).

The severity of itching was assessed by visual analogue scale (VAS) as follows: Before treatment, the median score was 10, this

decreased to 9 in the second week of treatment. The score continued to decrease to reach 7 at the end of first month and became 3 at the end of second month. This was a significant reduction and finally the median score reached zero at the end of third month of treatment. The gradual and significant reduction in VAS score for all 14 patients over a period of 4 months was seen in table 1.

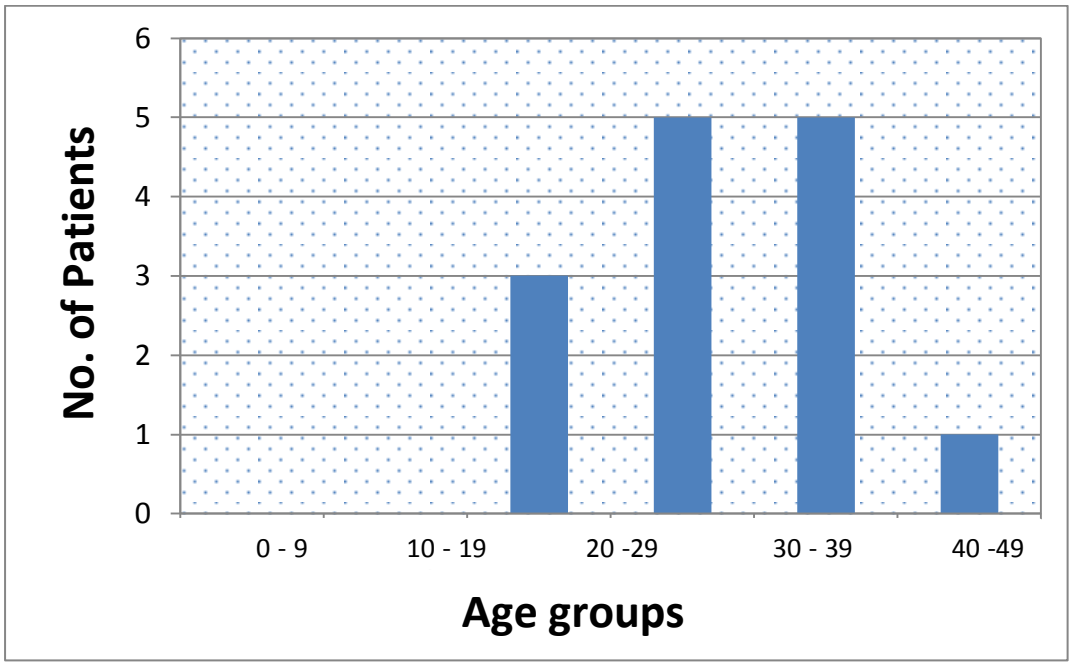


Figure 2 Age distribution of DH patients

Table 1 VAS score of 14 patients over 4 months of treatment

Patients No.	0 week	2 weeks	1 month	2 months	3 months	4 months
1	9	8	6	4	2	0
2	10	9	7	3	1	0
3	10	9	7	2	0	0
4	10	10	7	3	1	0
5	10	10	6	2	1	0
6	10	9	6	3	0	0
7	10	10	8	3	0	0
8	10	10	8	4	0	0
9	10	10	8	2	0	0
10	9	9	7	0	0	0
11	9	8	7	1	0	0
12	10	9	8	2	1	0
13	10	9	6	4	1	0
14	9	8	6	3	0	0
Median	10	9	7	3	0	0

Clinically our D.H patients presented as excoriated papules (10 patients) or vesicles (4 patients), one of them had bullae in addition to vesicles. All of them presented as grouped lesions involving elbows, knees , buttocks, scapular region, lower back, extensor surfaces of forearms, extensor

surfaces of legs and scalp, associated with various degrees of D.H, showing sub – epidermal blister contains predominantly neutrophils specially for newly formed lesions, in addition to dermal papillary edema and neutrophils infiltration associated with a superficial perivascular lymphocytic infiltration .

Assessment of response according to the reduction in the number of lesions for the 3 groups of patients were as follows:

Group I (patients with mild DH) : 4 patients.

The results of mild DH treated with NB UVB were shown in table 2. The mean number of lesions before treatment was 11 ± 3.41. After 1 month (1300 mJ / cm^2), became 7± 1.15. This number continued to decrease to 4 ± 0.81 at the end of second month (2100 mJ /cm^2). Then nearly with complete dis appearance of lesions at the end of third month (2900mJ / c m^2). P value was 0.012 which is statistically significant.

Table 2 Response to treatment of group I patient with mild DH**.**

Time	Patients	Mean No. of lesions	SD	P value
Before treatment	4	11	3.412	
1 months	4	7	1.154	
2 months	4	4	0.817	
3 months	4	0.5	0.5 77	
Before treatment	4	8.5		0.012
After 3 months	4	0.5		significant

The response grading was as follows at the end of 12 weeks of treatment (table 3):

Table 3 The gradual reduction in the number of lesions of group I patient over 3 months of NB UVB therapy:

Patients No.	Number of lesions				Grading
	Before therapy	1st month	2nd month	3rd month	
1	10	6	3	1	3
2	8	6	4	0	3
3	12	8	5	1	3
4	14	8	4	0	3
Mean	11	7	4	0.5	
SD	3.412	1.154	0.817	0.577	

All the patients with mild DH had a dramatic response to treatment with NB UVB (Grade 3) .

Group Π (patients with moderate DH) : 8 patients.

The results of moderate DH patients treatment with NB UVB was shown in table 4. The mean number of lesions before treatment was 22± 3.31, after 1 month (1300 mJ / cm^2) , it became 18 ± 3.5. This number continued to decrease to 14± 3.99 at the end of second month (2100 mJ /cm^2), then 11 ± 5.62 at the end of third month (2900 mJ/ cm^2) then finally 7 ± 6.67 at the end of fourth month (maximum 3000 mJ/ cm^2). P value was 0.0001 which is statistically significant.

Table 4 Response to treatment of group Π patients with moderate D.H.

Time	Patients No.	Mean number of lesions	SD	P value
Before treatment	8	22	3.314	
1 month	8	18	3.536	
2 months	8	14	3.991	
3 months	8	11	5.629	
4 months	8	7	6.676	
Before treatment	8			0.0001
After 4 months	8			significant

The grading response and gradual reduction in the number of lesions of group Π patients over 4 months of NBUVB therapy was shown in table 5:

Table 5 The gradual reduction in the number of lesions of group Π patients over 4 month of therapy:

Patient No.	Number of lesions					Grading
	Before therapy	1st month	2nd month	3rd month	4th month	
1	25	22	20	20	18	1
2	28	24	20	18	14	2
3	24	22	18	16	12	2
4	20	16	12	8	4	3
5	22	18	14	7	2	3
6	20	16	12	8	0	3
7	18	14	10	6	2	3
8	20	18	12	8	4	3
Mean	22	18	14	11	7	
SD	3.314	3.536	3.991	5.629	6.676	

Grade 1 : 1 patient (12.5%)
Grade 2 : 2 patients (25%)
Grade 3 : 5 patients (62.5 %)

Group ΠI (patients with severe DH) : 2 patients.

It consists of 2 patients only. They presented mainly with grouping vesicles, one of them showed large bullae in addition to vesicles and excoriated papules. One of these 2 patients had mild improvement of lesions (grade 1) and the other patient with large bullae showed no response for lesions, but only improvement of pruritus.

The number of sessions for NB UVB were 24 for 4 patients in group I and 32 for 10 patients in groups Π and ΠI. The mean number of exposure sessions was 29.7 ± SD 3.750.

Those patients who respond to treatment in groups I and Π continued on maintenance treatment with NB UVB therapy once per week for 1 month, then once every 2 weeks for the next months. Follow up was continued for up to 6 months with no recurrence of lesions or pruritus except in 2 patients who returned back to the usual regiemn of treatment .

The treatment with NB – UVB therapy was safe and there were no side effects recorded during the period of treatment.

Discussion

Dermatitis herpetiformis or Duhring's disease is a chronic blistering skin condition, characterized by blisters filled with a watery fluid. The age of onset is usually about 15 – 50 years, but DH can also affect children and elderly. Men and woman are equally affected [20,21]. The mean age of our patients in this study was 38.2 ± 9.2 and this was comparable to what's reported in the literature. Male: female ratio was 6 :1 and this was different to what's reported propably because of small sample size in this study.

A small number of patients was included in our study (only 14 patients over a period of 2 years). This small sample size because we choose only selected cases of D.H, especially those patients who get no response to treatment with traditional drugs like dapsone or sulfa pyridine, or developed side effects from dapsone like hemolytic anemia or methemoglobulinemia, or patients could not follow the prolonged course of therapy (poor compliance) and also because of exclusion criteria for NB UVB therapy.

There were certain reports showed that phototherapy of pruritus can be effective due to treatment of underlying disease such as atopic dermatitis, lichen planus or lymphoma. Symptomatic improvement can also be achieved by phototherapy in pruritus associated with uremia, primary biliary cirrhosis, macular amyloidosis and Hodgkin's lymphoma [22]. Baldo etal showed NBUVB to be effective for treatment of pruritus associated with polycythemia vera [23]. Patients with lichen planus have successfully been treated with NB UVB, pruritus responded early and a complete flattening occurred within 30 -51 radiations and no relapse was seen during follow – up of 20 months [24 , 25]. From our observation that during treatment of psoriasis (in which part of its pathology, there was neutrophils chemotaxis and accumulation in epidermis), some cases that associated with pruritus, get improvement of pruritus also together with flattening of plaques during treatment with NB UVB. Also NB UVB has been successfully used for treatment of subcorneal pustular dermatosis (Snedden – Wilkinson's disease) which is one of neutrophilic dermatoses in which part of effects of NB UVB through the decrease of neutrophil infiltration in this disease [26].

In a study for NB UVB in treatment of atopic dermatitis, it showed that NB UVB resulted in a significant decrease of not only epidermal T cells, neutrophils and Langerhans cells but also in a significant decrease in dermal T cells, eosinophils and neutrophils. This is in contrast to the expected penetration of UVB which is thought to be mainly restricted to the epidermis. This effect can be a direct apoptotic effect on dermal cells or it might be via indirect effect on epidermal keratinocytes or Langerhans cells [27]. These above reports and observations encouraged us to use NB UVB therapy for treatment of D.H in which there is sever pruritus in most of patients and the main pathology is neutrophils accumulation in the dermal papillae and the lysosomal enzymes released from neutrophils cleave the weakest point of basement membrane (lamina lucida) and subepidermal blister results [20].

The mechanism by which NB UVB improves D.H may be through the same effect on atopic dermatitis or lichen planus lesions. NB UVB was found to be very effective in reducing the severity of pruritus in D.H patients as there was dramatic reduction in VAS score in all 14 patients (100%). The median score started from 10

before treatment to reach 0 at the end of 3 months of treatment, so it was obviously appeared that NB UVB can omit the most annoying symptom of D.H even before the disappearance of skin lesions.

The number of patients that responded to therapy regarding reduction in number of lesions at the end of treatment course was 13 patients (92.8 %), this included all grades of improvement (mild 14.3 % , moderate 14.3 % and dramatic 64.3%).

Patients with mild D.H in group I when number of lesions less than 15 (4 patients), showed marked improvement (100%) with nearly complete disappearance of lesions at the end of 3 months (24 sessions).

Patients with moderate D.H in group Π when number of lesions between 15 – 30 (8 patients), showed marked improvement at the end of fourth month (32 sessions) in only 5 patents (62.5%), moderate improvement in 2 patients (25%) and mild improvement in only 1 patient (12.5%).

Patients with severe D.H in group IΠ when number of lesions more than 30 (2 patients), showed mild improvement in only 1 patient and the other patient with large bullae had no response to NB UVB.

From the above results, NB UVB was markedly effective in mild and some moderate cases of DH, when there was less number of lesions, with moderate effect in larger number of lesions, while not effective in sever DH when there was a great number of lesion and when large bullae present throughout the lesions. NB UVB showed marked improvement regarding pruritus in all types of D.H.

Conclusions

NB UVB is safe and effective therapy for D.H patients and it is an alternative treatment for those who cannot tolerate dapsone or developed side effects from it.

To the best of our knowledge, this is the first study to use NB UVB in the management of D.H. The limitations of our study were smaller number of patients and limited period of follow up. Further studies on large number of patients and longer follow up are needed to further validate our findings.

References

1. Wojnarowska Fand Venning VA. Immunobullous Disease, Dermatitis herpetiformis. In : Rook's Text book of Dermatology by Burns T, Breathnach S, Cox N, Griffith's C, eds , publications, 2010; chapter 40: 40.58.
2. Fry L. Dermatitis herpetiformis: problems, progress and prospects. Eur J Dermatol. 2002; 12: 523 – 31.
3. James WB, Berger TG, Elston DM. Chronic Blistering Dermatoses, Dermatitis herpetiformis. In : Richard BO, William DJ, Timothy GB, eds. Andrews' Diseases of the skin, Clinical Dermatology. 11th edn. W.B. Saunders Co. 2011; chapter 21: 468 -9.
4. FryL, Seah P. Dermatitis herpetifermis: an evaluation of diagnostic creteria. Br J Dermatol 1994; 90 : 301 -6.
5. Karpati S, Meurer M, Stalz W. Dermatitis herpetiformis : ultrastructural study on the skin in patients using direct pre embedding immunogold labelling. Arch Dermatol 1990; 126: 1469 -74.
6. Gawkrodger DJ, Black well JN, Gilmour HM. Dermatitis herpetiformis : diagnosis, diet and dermography. Gut 1984; 25 : 151: 7.
7. Fraser NG. Auto antibodies in dermatitis herpetiformis. Br J Dermatol. 1970; 83 : 609 – 13.
8. Reunala T, Helin H, kuokkanen K. lymphoma in D.H : repot in 4 cases. Acta Derm Venereol. 1982; 62: 343 – 6 .

9. Hervonenk, Vornanen M, Kautiainen H. Lymphoma in patients with D.H and their first degree relatives. Br J Dermatol. 2005; 152: 82 – 6.
10. Lewis NR, Logan RF, Hubbard RB . No increase in risk of fracture, malignancy or mortality in D. H: a cohort study . Aliment pharmacol Ther 2008; 27: 1140 – 7.
11. Lewis HM, Renaula TL, Garioch JJ. Protective effect of gluten – free diet against development of lymphoma in D.H Br J Dermatol. 1996; 135:363 – 7.
12. Wojnarowska F, kirtschig G , Khumalo N. Treatment of sub epidermal immunobullous disease. Clin Dermatol. 2001; 19 : 768 – 77.
13. Mc Fadden J , Leonard J, powles A. Sulphamethoxy pyridazine for D.H, Linear Ig A disease and cicatricial pemphigoid. Br J Dermatol. 1989; 121 : 759 – 62 .
14. Shah SA, Ormerod AD. D.H effectively treated with heparin, tetracycline and nicotinamide. Clin Exp Dermatol 2000; 25 : 204 – 5.
15. Garioch JJ, Lewis HM, Sargent SA. Twenty – five years experience of a gluten free diet in the treatment of D.H. Br J Dermatol 1994; 131: 541 – 5.
16. Leonard J, Haffenden G, Tucker W . Gluten challenge in D.H. N Engl J Med 1983; 308: 816 – 9.
17. Agati G, Fusi F. New trends in photobiology. Biological effects of narrow – band (311 nm TL0l) UVB irradiation: a review. J photochem photobiol B. 1997 ; 38: 99 – 106.
18. Krutmann J, Morita A, Elmets CA. Mechanism of photo (chemo) therapy. In : Krutmann J, Honing – Smann H, Elmets CA, Bergstresser PR, eds. Dermatological phototherapy and photodiagnostic methods. New York : Springer, 2001; 54 – 65.
19. SOIR1000 series, Ultraviolet phototherapy Lamp unit. USER'S MANUAL: UVB Narowband Model: 1790 UVB – NB. Six foot – 10 Bulb panel, HC PCS code E0693.
20. Rapini, Ronald P, Bolognia, Jean J, Jorizzo, Joseph L.(2007). Dermatology: 2 – volume set. St. Louis : Mosby.
21. Van L, Browning JC, Krishnan RS, Kenner Bell BM, HSUS (2008). Dermatitis Lerpetifemis: potential for confusion with linear IGA bullous dermatosis on DIF. Dermatology on line Journal: 14 (1): 21.
22. Kaptanoglu AF, Oskay T. Ultra violet B treatment for pruritus in Hodgkin's lymphoma. J Eur Acad Dermatol venereal 2003; 17 : 489 – 90 .
23. Baldo A, Sammarco E, Plaitano R, Martinelli V, Monfrecola G. Narrowband (TL – 01) ultra violet B phototheray for pruritus in polycythaemia vera. Br J Dermatol 2002 ; 147: 979 – 81.
24. Taneja A, Taylor CR. Narrow – band UVB for lichen planus treatment. Int J Dermatol 2002; 41: 282 – 3.
25. Saricaoglu H, Karadogan JK, Baskan EB, Tunali S. Narrow band UVB therapy in the treatment of lichen planus. Photodermatol Photoimmunol Photomed 2003; 143 : 964 – 8.
26. Cameron H, Dawe RS. Subcorneal pustular dermatosis (Snedden – Wilkinson disease) treated with NB UVB (TL – 01) phototherapy. Br J Dermatol 1997; 137: 150 – 1.
27. Majoie IML, oldhoff JM, Weelden HV, Krutmann J, Bergstresser PR. NB UVB and medium – dose UVA1 are equally effective in treatment of moderate to severe atopic dermatitis. Dermatological phototherapy and photo diagnostic Methods . 1,1. 2001.