Abstract

**Background:** Chronic urticaria is a common dermatological disorder that causes a great deal of distress in patients and affects daily life. Narrow band ultraviolet B (NBUVB) has been shown to be an effective treatment in chronic urticaria in few studies. However, the data regarding its role in chronic urticaria are limited. **Aims and Objectives:** The aim of this study was to determine the role of NBUVB in the treatment of chronic urticaria in combination with antihistamine. **Materials and Methods:** A total of 80 patients of chronic urticaria were recruited, out of which 40 were allocated to NBUVB-loratadine group and 40 to loratadine group. Patients were assessed using urticaria activity score (UAS) at same point of time, i.e. after 4 weeks (8 sessions), 8 weeks (16 sessions) and at follow up of 4 weeks after stopping the treatment. **Results:** On comparing the two groups, the mean UAS was significantly lower after 8 and 16 sessions in NBUVB-loratadine group (12.03 v/s 21.43 and 3.54 v/s 17.16, respectively). The difference in reduction of UAS in two groups was seen to be statistically significant (P value < 0.01). **Conclusion:** Thus we conclude that NBUVB may be useful in the treatment of chronic urticaria.

**Key Words:** Antihistamines, chronic urticaria, narrow band UVB

Introduction

The word ‘urticaria’ is derived from the latin word ‘urtica’ meaning to burn or hive. It is a skin condition characterized by raised, red and itchy swellings.[1] About 15–20% of the population is affected once or more during lifetime.[2] In around 30% patients of urticaria, recurrence occurs for months or years. Chronic urticaria (CU) is defined by recurrent episodes that occur at least twice a week for 6 weeks.[3] It occurs more commonly in female than in male.[4] CU results in lower quality of life (QoL) in patients.[4,5] Antihistamines, both sedating and non-sedating are used as first line of treatment in CU. Steroids and leukotriene antagonists form the second line of treatment.[6] Cyclosporine and IV immunoglobulins have been used in resistant and severe cases of CU.[7,8] Oral tacrolimus, low-dose methotrexate, hydroxychloroquine, sulfasalazine and dapsone, all have been tried in the treatment of CU.[6]

Narrow band ultraviolet B (NBUVB) (311 nm) is effective in the treatment of psoriasis and a variety of other skin conditions.[9] The mechanism of action is different for different diseases and includes anti-inflammatory, anti-proliferative and immunosuppressive effects. NBUVB has also been used to treat CU, however, there is paucity of literature regarding the same. The aim of this study was to determine the role of NBUVB in the treatment of CU.

Materials and Methods

In this study, patients of CU in the age group of 13–62 years attending our outpatient department from June 2015 to January 2016 were enrolled. Patients who had received treatment other than antihistamines like steroids, immunosuppressive drugs and dapsone for CU or for any other illness in the preceeding 3 months, patients suffering from any other systemic illness or infection and those with a history of photosensitivity were excluded from the study. Patients with angioedema, physical urticaria, food allergy and drug allergy were also excluded. Pregnant and lactating females were not included in the study.

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Baseline investigations that were done in all patients included complete blood count with erythrocyte sedimentation rate, liver function test, renal function test, routine urine examination, stool examination, thyroid profile and antinuclear antibody test. Autologous serum skin test was performed in all patients. The study was approved by the ethical committee of our college.

The patients of CU who attended our outpatient department and agreed to come for phototherapy twice a week were put in the NBUVB-loratadine group. This group of patients received NBUVB twice weekly (Tuesdays and Saturdays) for 8 weeks along with loratadine 10 mg daily. The other group of patients received loratadine 10 mg daily without phototherapy. Patients of both the groups were followed and assessed up to 4 weeks of stopping the treatment.

Prior to treatment, the patients put in NBUVB-loratadine group were explained the treatment fully and a written consent was obtained from them. No phototesting was done before starting phototherapy. Most of the patients had Fitzpatrick skin type III/IV and phototherapy was started with the initial dose of 200 mJ/cm². The dose was increased by 10–20% at every session with maximum dose of 1630 mJ/cm². The patients were assessed for any side effects like itching, erythema and blistering at every session. All patients used goggles for eye protection and males used genital shield during phototherapy.

Patients of both the groups were assessed using urticaria activity score (UAS7). All the patients were asked to keep a weekly record of number of wheals and severity of itch. The number of wheals were scored from 0 to 3: 0 = no wheals, 1 = 1–6 wheals, 2 = 7–12 wheals and 3 = >12 wheals. The severity of itch was scored as 0 = no itching, 1 = mild, 2 = moderate and 3 = severe. Both the scores were added to get the total daily score. Thus the daily score ranged from 0 to 6 and weekly score ranged from 0 to 42. Both the treatment groups were assessed at 4 and 8 weeks, and then after 4 weeks of stopping the treatment. The reduction in UAS7 score was statistically significant both after 8 weeks and after16 sessions (P<0.01 for both the times). The mean UAS7 scores in NBUVB-loratadine group and loratadine group show statistically significant differences at session eight (12.03 v/s 21.43) as well as session 16 (3.54 v/s 17.26) (P<0.01 in both the sessions) [Figure 2 and Table 2].

The patients in both NBUVB-loratadine group and loratadine group were assessed after 4 weeks of stopping the treatment. The mean UAS7 score reduced from 3.54 after 16th session to 2.70 after 4 weeks of follow up in NBUVB-loratadine group. In loratadine group, the mean

### Statistical analysis
Statistical analysis was done using the SPSS software and results were compared using t-test. P value < 0.05 was considered significant.

### Results
A total of 80 patients fulfilled the inclusion criteria and were included in the study. Of the 40 patients in the NBUVB-loratadine group, 3 patients were lost to follow up. From the loratadine group which initially consisted of 40 patients, 5 patients were lost to follow up. Thus a total of 72 patients completed the study [Figure 1].

The demographic characteristics and baseline UAS7 scores of two groups are given in Table 1. There were no significant differences in baseline scores as well as demographic features. Autologous serum skin test (ASST) was performed in every patient. Of 37 patients in NBUVB-loratadine group and 35 patients in loratadine group, ASST was positive in 11 and 10, respectively.

### Table 1: Characteristics of the patients in the NBUVB-loratadine and loratadine groups

| Characteristics                  | NBUVB loratadine group (n=37) | Loratadine group (n=35) |
|----------------------------------|--------------------------------|-------------------------|
| Mean age (years)                 | 30.54                         | 33.40                   |
| Sex (n)                          |                                |                         |
| Male                             | 10                             | 13                      |
| Female                           | 27                             | 22                      |
| Mean duration of disease in months | 18.95                         | 15.66                   |
| Mean baseline UAS7 score*         | 33                             | 31.97                   |

*UAS7: Urticaria activity score (weekly). NBUVB: Narrow-band ultraviolet B
UAS7 score increased from 17.26 after 16 sessions to 25.51 after 4 weeks of follow up. The mean UAS7 scores in two groups showed statistically significant differences after 4 weeks of follow up.

Most of the patients tolerated phototherapy well except one who developed mild erythema. However, he continued to receive treatment according to the protocol after the erythema settled.

Discussion

Our study was designed to determine the role of NBUVB as a treatment option for patients of CU. Pathogenesis of CU involves degranulation of mast cells as an important phenomenon, with the release of numerous proinflammatory mediators and cytokines. In many patients, CU is associated with some autoimmune disorders, indicating an underlying autoimmune mechanism involving abnormality in cell-mediated immunity. Under certain circumstances, T cells cause activation of mast cells and histamine release.

The data regarding the role of NBUVB as a treatment option for urticaria are limited and unconvincing. Though efficacy of NBUVB in CU has been shown in a few studies, the exact mechanism of action of NBUVB in CU is unclear. It has a suppressive effect on systemic immune responses and lowers peripheral natural killer cell activity, lymphocyte proliferation and immune regulatory cytokine production by both Th1 (IL-2, IFN-g) and Th2 (IL-10) T-cell populations. NBUVB has an inhibitory effect on these proinflammatory mediators and cytokines which can explain its role in CU. However, the effect of NBUVB on the number of mast cells and its depletion is still not clear.

In our study, we found that NBUVB could be an effective adjuvant treatment along with antihistamines in patients of CU. This combination brought a greater reduction in urticaria activity score than the antihistamine alone. Also, after 1 month of stopping the treatment, the urticaria activity score remained low in patients of NBUVB-loratadine group, whereas it increased in patients of loratadine group showing that NBUVB in combination with antihistamines might also increase the remission period of the disease.

In our study, the initial dose of phototherapy was started at 200 mJ/cm² based on our phototherapy experience, since data regarding the use of phototherapy in CU were limited and correlation between dose and effectiveness was unclear. In a study by Berroeta et al., the median number of treatment sessions of phototherapy was 22 in patients of CU. In a study by Engin et al., the number of treatment sessions given to the patients was 20. In our study, a total of 16 sessions over a period of 8 weeks were given and the results were comparable.

The side effects of NBUVB include erythema, pruritus and vesiculation. However in our study, the therapy was well tolerated by patients except only one patient who developed erythema. The treatment was continued after the erythema subsided.

However, our study had few limitations. The sample size was small and the study was a regional one. Large-scale multicentre studies would be needed in future to establish the role of NBUVB and antihistamine as a viable combination in the treatment of CU.

Conclusion

To conclude, NBUVB can be used as an effective treatment in CU in patients not responding to antihistamines alone. NBUVB when given in combination with antihistamine causes greater reduction in disease activity as determined by urticaria activity score compared to antihistamines alone. Also, the combination of NBUVB and antihistamine keep the disease activity lower for a longer period of time after cessation of therapy.

![Figure 2: Comparison of mean UAS7 score between group 1 (loratadine-NB UVB group) and group 2 (loratadine group)](image)

### Table 2: Mean±SD reduction of urticaria activity score (UAS) from baseline value in the two treatment groups

|                        | NBUVB-loratadine group | Loratadine group | Difference (95% CI) | P  |
|------------------------|------------------------|------------------|---------------------|----|
| After 8 sessions       | 20.9±7.97              | 10.54±4.74       | 10.43 (7.3-13.5)    | <0.01 |
| After 16 sessions      | 29.45±10.57            | 14.71±5.81       | 14.74 (10.7-18.7)   | <0.01 |
| After 1 month of stopping treatment | 30.29±10.88 | 6.45±4.28 | 23.84 (19.9-27.7) | <0.01 |

NBUVB: Narrowband ultraviolet B, CI: Confidence interval, SD: Standard deviation
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Conflicts of interest
There are no conflicts of interest.

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