LETTER TO THE EDITOR

EXCIMER UV RADIATION IN DERMATOLOGY

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Ultraviolet B (UVB 290-320 nm) radiation has been used in the treatment of different skin diseases. Light sources with narrowband UVB output spectrum have been developed with the aim of increasing the rates of “beneficial to side effect” profile of the treatment. Narrowband UVB phototherapy using fluorescent lamps (TL01, 311±2nm) has been widely adopted over the past 10 years. Monochromatic Excimer Light (MEL) represents a new source of narrow-band UVB emitting at 308 nm and guarantees a safe and effective approach to different chronic and recurrent skin diseases thanks to its potent and selective immunosuppressant action.

Ultraviolet B (UVB 290-320 nm) radiation has been used in the treatment of different skin diseases. Light sources with narrowband UVB output spectrum have been developed with the aim of increasing the rates of “beneficial to side effect” profile of the treatment. Narrowband UVB phototherapy using fluorescent lamps (TL01, 311±2nm) has been widely adopted over the past 10 years. An original source of narrow-band UVB is Monochromatic Excimer Light (MEL) emitting at 308 nm, within the UVB spectrum. This source is now a well considered option in treating different immunomediated skin diseases.

308 nm light can be emitted as coherent (laser) or non-coherent light (1). Both seem effective even if the cost effectiveness ratio seems more favourable to the light. This is effective in the treatment of the following disorders: plaque psoriasis, flexural psoriasis, scalp psoriasis, palmoplantar pustulosis, alopecia areata, lichen planus, vitiligo and patch stage mycosis fungoides (2-8).

Recent studies stated the advantages of using this novel light source such as accurate lesion targeting, avoidance of UV damage to healthy skin, short treatment time, faster clearance and reduced UV cumulative dose, probably reducing oncological risks. Regarding its mechanisms of action, clinical remissions have been reported to occur in psoriatic skin partially through the decrease of cytokine expression (9). In fact, the efficacy of MEL in psoriatic skin is associated with significant T-cell depletion, alterations in apoptosis-related molecules, accompanied by a decreased proliferation index (10). Furthermore, many reports show immunomodulative mechanisms. These proposed hypothetic mechanisms of action are similar to those described following TL01 and broadband UVB and suggest the potential application of MEL in other inflammatory skin diseases (11).

Dermatological applications of Monochromatic Excimer Light

Different clinical studies reported the use of MEL...
in a wide variety of chronic and resistant localized dermatoses. These comprise psoriasis, palmoplantar pustulosis, vitiligo, mycosis fungoides and alopecia areata, genital lichen sclerosus, prurigo nodularis, localized scleroderma and granuloma annularis. All of this has been showed in a prospective study that included 279 patients affected by common and persistent skin diseases selected from the Dermatology Department of the University of Rome “Tor Vergata”. More specifically, the study included 152 patients with stable and localized plaque psoriasis, 47 with palmoplantar psoriasis, 7 with palmoplantar pustulosis, 32 with vitiligo (generalized and acro-facial type), 11 with prurigo nodularis, 9 with mycosis fungoides (MF) stage Ia, 8 with alopecia (2 universalis and 6 areata), 5 with localized scleroderma, 5 with genital lichen sclerosus, and 3 with granuloma annulare. Many of these diseases share a common pathogenetic pathway and this may explain their response to UV treatments.

The 308 nm excimer monochromatic non-coherent light (Excilite - Deka Medical Lasers, Florence, Italy) was used at a fluence rate of 48 mW/cm² with a maximum irradiation area of 512 cm² at 15 cm from the skin. Minimal erythematosus dose was calculated on healthy unexposed skin in order to determine the starting dose (usually 0.5-0.7 MED), and the treatments were carried out with 1 or 2 sessions per week until clinical remission occurred. In the majority of cases, clinical improvements were evident after few treatment sessions.

We observed only mild side effects such fair erythema (in at least 50% of patients) after the first and second application, mild pruritic sensation and transient hyperpigmentation in the treated areas which resolved spontaneously at 2 weeks post treatment. The treatment was overall well tolerated.

CLINICAL RESULTS AND DISCUSSION

MEL produces a therapeutic response in various common and UV responsive diseases, such as psoriasis and vitiligo, but also on photoresistant skin diseases such as prurigo nodularis, localised scleroderma, genital lichen sclerosus and granuloma annulare. In particular, we observed a remission in 80% of patients with prurigo nodularis, a partial remission in 60% of patients affected with localized scleroderma, a complete remission and a partial remission in 80% and 20%, respectively, of patients affected with genital lichen sclerosus, and a complete remission in 67% of granuloma annulare.

The clinical remission observed in these conditions might be explained by the immunosuppressive effect on T cells and cytokine responses of MEL. These conditions are difficult to treat and therapies are generally unsatisfactory (12-18). Current therapies may be associated with side effects, such as the local atrophy associated with local corticosteroid application, and the lack of effectiveness over the long-term. Consequently, there is a need for effective and safe treatment. The response to MEL of prurigo nodularis, localised scleroderma, genital lichen sclerosus and granuloma annulare reflects a considerable advance in their treatment.

The different studies considered demonstrated the effectiveness and the advantages of MEL such as the selective use of high doses, with a reduction in the number of treatment sessions compared with traditional phototherapy for the treatment of psoriasis, vitiligo and MF (19-22). The results obtained were encouraging although the poor availability of the devices and the small number of centres able to provide this treatment modality, are a limiting factor. More studies will be necessary to evaluate different therapeutical schemes and to evaluate any long-term side effects such as DNA damage and carcinogenesis.

CONCLUSIONS

In conclusion, we confirm that the use of MEL is a valid choice for the treatment of common dermatological diseases, difficult-to-treat chronic skin conditions and selected variants of psoriasis, vitiligo and MF with a good overall efficacy in absence of topical or systemic drugs. In fact, MEL produces a therapeutic response in different common and resistant skin diseases such as prurigo nodularis, localised scleroderma, genital lichen sclerosus and granuloma annulare. These findings represent an important advance in their treatment suggesting MEL as a valid and new therapeutic option (1).

REFERENCES

1. Nisticò SP, Saraceno R, Schipani C, Costanzo A,


