Narrow-band UVB PHOTOTHERAPY for Skin Diseases

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HISTORICAL ASPECT

- In 1978: Irradiation cabin with broad band UVB tubes was introduced for psoriasis & uremic pruritus.
- In the 1980s: Therapeutic effect of UVB in ameliorating psoriasis centered at the 313-nm wavelength.
HISTORICAL ASPECT

- In 1984: Introduction of fluorescent bulbs (Phillips model TL-01) that deliver UVB in range: 310 to 315 nm, peak at 311 nm.
- Narrow spectrum of emission.
- Reduction in erythemogenic wavelengths in the 290-305 nm range.
- 5-6 fold increased emission of the longer UVB wavelengths.
Broad Band vs Narrow Band UVB
Broad Band vs Narrow Band UVB

- Conventional broad band UVB lamps: ranging from 280-330 nm.
- Narrow band UVB: emit only wavelengths 311-312 nm.
- Peak therapeutic effectiveness of UVB at 295-313 nm.
- Wavelengths below 300 nm: cause erythema, severe burning and increase risk of skin cancer.
Nb-UVB Cabin
In the skin, NB-UVB radiation is absorbed by DNA and urocanic acid.

- Inhibits DNA synthesis.
- Inhibits epidermal keratinocyte hyperproliferation.
- Induces T-cell apoptosis.
- Induces immunosuppression.
- Induces anti-inflammatory cytokines.
- Alters antigen presenting cell activity.
Thus, the ability of NB-UVB radiation to systemically suppress the major components of cell mediated immune function is linked to its beneficial effect in several inflammatory skin diseases.
The breakthrough: 1988; narrow-band UVB (NB-UVB) phototherapy was introduced for psoriasis by Van Weelden et al. and Green et al.
INDICATIONS

- Psoriasis
- Vitiligo
- Early stage MF (stage I & II)
- Pityriasis lichenoides chronica
- Lichen planus
- Atopic Dermatitis
- Achromia parasitica
- Generalized pityriasis alba
- Uremic pruritus
**Nb-UVB in Psoriasis**

- **15 - 20 treatments** to achieve > 50% improvement in psoriasis.
- **63-80%** of all patients achieve **clearance** with Nb-UVB.
- **NB-UVB compared with broad band**: greater improvement, reduced incidence of burning episodes, increased efficacy and longer remission.
- **NB-UVB compared with PUVA**: little overall difference in efficacy.
- **Others**: Efficacy of Nb-UVB was slightly lower than but approached that of PUVA in patients.
In 1997: Westerhof and Nieuweboers-Krobotova first reported NB-UVB phototherapy for vitiligo.

NB-UVB compared with topical PUVA: 67% of patients showed repigmentation versus 46% of patients after 4 months of therapy.
Nb-UVB in early MF

- Effective in clearing skin lesions of small plaque parapsoriasis and early stage of MF (1999; 2000).

- Produces complete clearance in 75% of patients with patch stage MF < 10% of body surface area (2002).

- However, relapses occurred within a mean time of 6 months.
Nb-UVB in Atopic Dermatitis

- Moderate-to-severe atopic dermatitis
- Favorably accepted by patients.
- Effective alternative to steroids for chronic AD.
Two regimens are most commonly used.

1- Determination of the individual's minimum erythema dose (MED).

2- Using ready calibrated tables.
1- Determination of MED

- Area tested: Hip, back.
- All body covered and this area covered with garment having 6 openings 2 cm²
- Openings receive Nb-UVB doses as: 0.8 J, 1 J, 1.2 J, 1.4 J, 1.6 J, 1.8 J (for skin types IV-VI).
- Openings covered and examined next day.
- +ve reading: identifiable erythema within opening.
1- Minimal Erythema dose (MED)

- Determination of the individual's minimum erythema dose (MED).
- 70% of the MED value is used for the first treatment.
- Thereafter 20% or 10% increments depending on skin type tolerance.
2- Ready Calibrated Tables

- Supplied with the Nb-UVB device.
- Standard starting dose \((0.3 \text{J/cm}^2)\), with stepwise increase (usually 20%) depending upon the patient's erythema response.
- In case of mild erythema, the irradiation dose is held constant for subsequent treatments.
The goal of therapy is to achieve persistent asymptomatic mild erythema.
General Guidelines

- Regimen: 3 times/week.
- Eyes and male genitalia should be covered during sessions.
- Session duration varies between seconds to minutes according to the skin type.
BEWARE

- In case of painful erythema, “with or without edema/blistering”, further treatment is withheld till the symptoms subside.

- After resolution: the dose administered is 50% of the last dose, subsequent increments by 10%.
Advantages

- Lack of psoralen-related side effects, no drug induced nausea and no drug costs.
- No need for post-treatment eye protection.
- Safe use in children and pregnant or lactating women.
- It has shorter irradiation times which aid patient’s compliance.
Adverse Effects

- Erythema.
- Blistering of plaques.
- Dry skin with pruritus.
- Increased frequency of herpes simplex reactivation.
- Long-term adverse effects: photodamage.
Prolonged Safety

- Insufficient data available to provide recommendations regarding the maximum safe duration and cumulative NB-UVB dose.

- Skin saving principles, i.e. covering the parts that have improved satisfactorily and shielding the genitals.

- Shield the face: to prevent photoaging.
Responsive patients can be given this treatment for a **maximum of 24 months**.

In **children**, the maximum duration allowed is **12 months**.
Maximum Safe Duration

- After the first course of one year, a resting period of 3 months to minimize the annual cumulative dose.
- Subsequently, if required, only limited areas should be exposed.
- If no response is observed after six months, further therapy should be discouraged.
Contraindications

- Xeroderma pigmentosum.
- Systemic lupus erythematosus.
- A history of skin cancer.
Home Appliances

- Inconvenience and cost of travelling to the phototherapy clinic for the numerous exposures.

- Home delivery of Nb-UVB phototherapy may be suitable for some patients; however, appropriate training is required.
First-line phototherapy option due to the safety and convenience of avoiding psoralen therapy.

However, Nb-UVB may be insufficiently aggressive to clear severe disease.
THANK YOU