Ultraviolet phototherapy

Psoriasis

The improvement in psoriasis that frequently follows exposure to natural sunlight led to the development of treatment with UV-emitting lamps, often used in combination with tar (Goeckerman regimen) or dithranol (Ingram regimen). Psoriasis does not improve if treated with wavelengths below 296 nm (UVC and short wavelength UVB), even though erythema (sunburn) is easily achieved. Lamps used traditionally for treating psoriasis (mercury arc or conventional UVB fluorescent lamps), which were still being used in about half of UK phototherapy and dermatology departments in 1994, have significant emission below 296 nm and are therefore likely to achieve only suboptimal results. Better response is seen with newer lamps which have insignificant emission below 296 nm. A fluorescent lamp with a very narrow emission spectrum centred on 311 nm (Philips TL-01) has been developed specifically for phototherapy of psoriasis. No randomised trials using clearance of psoriasis as the end-point have been published, but several reports suggest that better results are achieved with these 'narrow-band' lamps than with conventional UVB lamps, and that they may even be as effective as psoralen and UVA (PUVA) therapy.

No association has been demonstrated between UVB phototherapy for psoriasis and melanoma or non-melanoma skin cancer, although there have been no large epidemiological studies. Studies in mice suggest that the new narrow-band UVB lamp is likely to be more carcinogenic than conventional lamps, but it has been argued that the faster response to treatment reduces any risk to that equivalent to, or even less than, that of conventional phototherapy.

Other disorders

Atopic dermatitis. Phototherapy is also used increasingly in atopic dermatitis, with the intention of reproducing the benefit reported by many patients following sun exposure. Several studies have documented improvement of atopic dermatitis with UVA, conventional or narrow-band UVB. It is, however, difficult to assess disease severity in atopic dermatitis, and there have been few placebo-controlled trials.

Further reading

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Ultraviolet phototherapy

Phototherapy is a key part of the treatment for dermatological conditions such as psoriasis. It involves exposing the skin to artificial sources of ultraviolet (UV) radiation, which can help to reduce inflammation, improve skin texture, and improve the appearance of affected areas. The choice of wavelength is crucial, as different wavelengths of UV light have varying effects on the skin. For psoriasis, the most effective wavelengths are those in the UVB range, which can be achieved with UVB lamps. These lamps produce a narrow band of UVB light, which is not found in terrestrial sunlight.

The phototherapy regimen typically involves several sessions per week, with the duration and frequency of treatment depending on the individual's needs. It is important to monitor the patient's response to treatment and adjust the regimen as necessary. Phototherapy can be a highly effective treatment for psoriasis, but it is important to weigh the benefits against the potential risks, such as the risk of skin cancer.

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Photosensitive disorders. Many of the acquired idiopathic photosensitive skin disorders are mediated by the UVA component of sunlight, and are therefore not easily prevented by application of topical sunscreens (which tend to block UVB more than UVA). The commonest example is polymorphic light eruption, an itchy, papular rash of very variable severity, which may affect around 15% of women in the UK. In both this and some of the other less common photosensitive disorders, either complete or partial tolerance to sun exposure can be achieved by UVB phototherapy. Typically, treatment is started in the spring, and a course of 15–20 exposures may be required. The protective effect is temporary, with treatment required each year. The success of treatment is likely to be due to an immunological action rather than to UVB-induced physical changes in the skin (eg increase in pigmentation and thickness).

Porphyria. Preliminary reports suggest that narrow-band UVB phototherapy may also be helpful in some forms of porphyria, particularly erythropoietic protoporphyria.

Sunbeds

'Sunbeds', with mainly UVA-emitting fluorescent lamps, were first developed in the early 1980s, and are now available for use at home, in beauty salons and leisure/sports centres. A suggestion that about 20% of UK adults have acquired a sunbed tan is likely to underestimate current usage. A recent study from Stockholm reported sunbed use by 57% of school students aged 14–19 years.

Sunbed exposure induces melanin synthesis, resulting in a 'suntan'. This occurs relatively easily in subjects who tan well with natural sunlight. However, intensive sunbed use can also cause a tan in a proportion of subjects who tan poorly or not at all with natural sun exposure. A sunbed or UVA-induced tan occurs without much epidermal hyperplasia, and is therefore less protective against sunburn than a naturally acquired tan.

Skin cancer

The risk of skin malignancy with long-term sunbed use is unknown. Extrapolation from animal data suggests that, with relatively infrequent sunbed use (<20 exposures per year), the average risk of non-melanoma skin cancer is likely to be increased by a factor of two. Of greater concern is whether sunbed use will prove to be a significant risk factor for the development of malignant melanoma. Recent case-control studies suggest that it may be a weak risk factor, but the true situation will be known only with much longer follow-up of sunbed users. Until this information is available, current recommendations that sunbed use for cosmetic tanning should be discouraged, especially in children or young adults, seem appropriate.

Psoriasis

Given their wide availability, it is not surprising that up to 50% of patients with psoriasis have used sunbeds in an attempt to treat their disease. A beneficial effect has been reported in uncontrolled studies in both psoriasis and atopic eczema. No general recommendation for home UV phototherapy can be given, however, until clear evidence is available of the degree of improvement to be expected with a treatment course that is unlikely to result in significant skin damage, for example 10–20 exposures per year.

Psoralen and ultraviolet A therapy

Although the photosensitising action of plant-derived psoralen chemicals has long been exploited in an attempt to achieve repigmentation in vitiligo, the marked improvement in psoriasis with PUVA (oral or topical 8-methoxypsoralen (8-MOP), followed by UVA exposure) was recognised widely only in the 1970s. Nearly every dermatology unit in the UK now has facilities for PUVA. Treatment is usually given twice weekly, with whole-body or localised UVA exposures (each of 2–15 min) given two hours after oral administration of 8-MOP.
8-MOP or immediately after topical (bath) application.

Psoriasis

PUVA is one of the most effective treatments available for psoriasis. With efficient treatment regimens, complete clearance of psoriasis in patients with plaque-type disease may be achieved with a median of 12 exposures and a median cumulative UVA dose of around 50 J/cm² (Fig 2). About 50% of patients will remain clear or have minimal disease relapse three months after finishing treatment. Not surprisingly, PUVA is popular with patients, allowing disease clearance with relatively little disruption to their lifestyle. Once treated with PUVA, it can be difficult to persuade patients to resume messy and time-consuming topical treatment.

It is now clear that patients treated with PUVA have a higher risk of developing squamous cell (SCC) and basal cell carcinoma. Insufficient data are available to compare the relative risks of PUVA with 8-MOP given orally and topically. Long-term follow-up studies from the US have shown that, compared with a normal population, there is a relative risk of about 33 for the development of SCC in high-dose PUVA patients, and metastatic spread has occurred in some cases. Our own experience is that 19% of high-dose PUVA patients have developed one or more SCC, and that 50% have dysplastic or potentially premalignant keratoses. In this context, 'high-dose' is more than 200 PUVA exposures, or a cumulative UVA dose of greater than 2,000 J/cm². These data have been acquired from

Figure 1. Psoralen and ultraviolet A therapy (PUVA) cabinet.

Figure 2. Clearance of psoriasis with psoralen and ultraviolet A therapy (PUVA) according to (a) number of treatments, (b) cumulative UVA dose. Reproduced, with permission of Blackwell Science Ltd, from Ref 20.
Other disorders

A number of other skin disorders may also be treated with PUVA. Use in atopic dermatitis is now likely to be restricted to patients unresponsive to narrow-band UVB phototherapy. Although repigmentation may be achieved in vitiligo, it is rarely permanent and long treatment courses are often required. When disease in the early stages of cutaneous T-cell lymphoma (mycosis fungoides) is restricted to patches or plaques on the skin, it is responsive to PUVA. However, it is not known whether PUVA treatment alters the long-term prognosis.

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