LASER TREATMENT OF PSORIASIS

ISSUE

Blue Shield has received requests for coverage of the 308nm-excimer laser treatment for psoriasis. The Medical Policy Committee on Quality and Technology last reviewed the published data regarding the efficacy and safety of this new technology in clinical practice on 6/13/01 and concluded at that time that it did not meet the Blue Shield of CA TA criteria and therefore was not eligible for coverage. Blue Shield has been asked to reconsider this decision based on data published since the last review.

BACKGROUND

Psoriasis is a common benign, acute or chronic inflammatory skin disease (Berger, 2001). It is estimated to affect about 1 percent of the population in the U.S., with about 150,000-250,000 new cases diagnosed each year. The typical clinical findings of psoriasis of erythema and scaling are the result of hyperproliferation and abnormal differentiation of the epidermis, plus inflammatory cell infiltrates and vascular changes.

Several clinical types of psoriasis have been described: plaque, guttate, pustular, inverse and nail psoriasis. Most patients have a mild to moderate form of the disease. Plaque-type psoriasis is characterized by red, scaly, thickened areas of skin (plaques) that can cause disfigurement, itching and discomfort.

Psoriasis is a perplexing disease for which there are many palliative treatments but no definitive therapy (Ruiz-Esparza, 1999). The pathogenesis of psoriasis is unknown, although several findings suggest that it is an immunologically mediated disease, specifically a T-cell-mediated immunological disorder (McCalmont, 2000). In addition, it has been reported that the capillary loops of psoriatic lesions become dilated and tortuous before epidermal hyperplasia ensues. The microvasculature may play a modulating role in psoriasis (Ros et al, 1996).
BACKGROUND, continued

Choice of treatment for psoriasis depends on type, location, extent and severity of the disease. Treatments include topical agents (corticosteroids, coal tar derivatives, vitamin D analogs, and retinoids), light therapy (UVB phototherapy), a combination of light therapy with an oral medication (psoralen-UVA [PUVA] photochemotherapy or acitretin-UVB or -PUVA), and systemic immunosuppressive chemotherapy (e.g., methotrexate or cyclosporine) (Berger, 2001). In addition, for plaque-type psoriasis, dermabrasion, freezing, and even surgery have been used. Each of these therapies is associated with potential shortcomings, including limited efficacy, discomfort and potentially serious complications.

Ultraviolet B (UVB) phototherapy is a well-established and widely used treatment for psoriasis. Generally, 25 to 30 phototherapy treatments are required to produce clearing (Asawanonda et al, 2000b). High-intensity (supraerythemogenic fluences) UVB phototherapy and psoralen-UVA (PUVA) photochemotherapy can result in rapid clearing of psoriasis (Speight et al, 1994). Psoriatic lesions can tolerate more UV irradiation than uninvolved skin. Unfortunately, with conventional phototherapy and photochemotherapy, the whole body is often unavoidably exposed to UV radiation. Adjacent uninvolved (non-psoriatic) skin may tolerate high fluences poorly, with short-term adverse effects such as sunburn, blistering and pruritus and long-term effects such as accelerated photaging and development of skin cancer (Asawanonda et al, 2000b).

Over the past decade, narrow band phototherapy has been introduced. It utilizes narrow-band fluorescent bulbs (Philips model TL-01) that deliver UVB at a peak wavelength of 311-nm. Such narrow band phototherapy has been found to be effective in the treatment of psoriasis (Green et al, 1988; van Weelden et al, 1988; van Weelden et al, 1990). Although long-term follow-up of narrow band 311-nm UVB phototherapy is not yet available, it is thought that this new modality might prove to be less carcinogenic than traditional phototherapy (Young, 1995). 

Recently, several different laser treatments have been used in a variety of manners to treat chronic, plaque-type psoriasis. Devices used include the carbon dioxide laser, the flashlamp pulsed dye laser, the Nd:YAG laser, and the xenon chloride excimer laser.
Laser Treatment of Psoriasis

The rationale for use of lasers in treating psoriasis stems from the fact that the biological effects of laser light differ from those of incoherent light of the same wavelength.

The argon laser and the carbon dioxide (CO₂) laser have been used sporadically since 1985-86 to vaporize plaque psoriasis (Harrison et al, 1985; Bekassy et al, 1986). The CO₂ laser has been used for laser resurfacing, that is the removal of epidermis and papillary dermis, sites thought to be important in the pathogenesis of psoriasis. Dilated vessels, the major component of psoriatic dermal papillae, can be selectively destroyed with yellow light lasers (Zelickson et al, 1996).

However, the carbon dioxide laser often requires local anesthesia and involves healing by secondary intention, which may require 3 to 6 weeks (Ruiz-Esparza et al, 1999).

The flashlamp pulsed dye laser, which has been successfully used to treat port wine stains, has also been used to treat psoriatic plaques (Kataugampola et al, 1995). The wavelength of light produced is 585 nm. It is thought to produce thermally-mediated damage to small blood vessels under the psoriatic plaque, inducing regression of the targeted plaque (Ros et al, 1996; Lanigan et al, 1997). Blood vessels can be injured to a depth of >1 mm (Kataugampola et al, 1995). A disadvantage of the Laser flashlamp pulsed dye laser is that, because it needs to be delivered in individual pulses of 5 to 10 mm in diameter each and repetition rates of only 1 to 2 pulses per second, treatments can be very time-consuming (Ruiz-Esparza et al, 1999).

More recently, a xenon chloride (XeCl) excimer laser has been used to generate 308-nm light for irradiation of psoriatic lesions. The excimer laser phototherapy system consists of a laser light source, which utilizes a xenon chloride gas mixture to generate ultraviolet light at a 308 nm wavelength; a keypad and display; a fiberoptic delivery system; a foot switch; and a handpiece. Use of this device allows treatments to be directed at the psoriatic plaque and to spare the surrounding normal skin. A total of 6-10 treatments are administered in a physician’s office over a period of 4 weeks.
Laser Treatment of Psoriasis, continued

It is known that the action spectrum for the phototherapy of psoriasis consists of 300 nm to 313 nm (Parrish et al, 1981). The wavelength of the 308-nm xenon excimer laser is within that action spectrum. In contrast to traditional phototherapy techniques, the excimer laser UV-B therapy is selectively directed toward lesional skin, thus sparing the surrounding normal skin from unnecessary radiation exposure (Asawanonda et al, 2000b).

Patients undergoing xenon excimer laser treatments are treated once or on multiple occasions. The maximal size of treated areas is approximately 5-10 cm². In order to increase laser light penetration into dry, hyperkeratotic psoriatic plaques, a thin layer of mineral oil is often applied to the lesion immediately prior to the laser irradiation (Ros et al, 1996; Asawanonda et al, 2000b). Anesthesia is not required.

There are no known contraindications to xenon excimer laser treatment for psoriasis (Katugampola et al, 1995) but long term follow-up is limited. The potential advantages of using xenon excimer lasers to treat psoriasis includes the fact that there is no bleeding associated with the treatment and that patients report no or only a mild-moderate, short-duration pain, which does not require use of an anesthetic (Bjerring et al, 1997). In addition, these lasers have the capacity to deliver high fluences within a relatively short time period (Asawanonda et al, 2000b). The ability to use directed high fluences may allow for a significant reduction in the number of treatment sessions needed. Lasers also offer the ability to spare the surrounding unaffected tissue from unnecessary irradiation. Finally, lasers can be used to treat psoriasis in difficult locations, such as on the scalp and in the nail folds.

On the other hand, the great variability in thickness of psoriatic plaques limits the penetration of laser light and the wide variety of clinical manifestations of psoriasis has made it difficult to use lasers in it’s therapy (Ruiz-Esparza et al, 1999). In addition, laser treatments may not be practicable in widespread psoriasis.
TECHNOLOGY ASSESSMENT (TA)

TA Criterion 1: The technology must have final approval from the appropriate government regulatory bodies.

The Excimer Laser Phototherapy System AL7000 (AccuLase, Inc., a subsidiary of PhotoMedex, formerly Laser Phototonics, Carlsbad, CA) received FDA 510k approval on January 27, 2000 as “substantially equivalent…to devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Devices Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug and Cosmetic Act.” The device is indicated for “UVB phototherapy for psoriasis.”

TA Criterion 1 is met.

TA Criterion 2: The scientific evidence must permit conclusions concerning the effectiveness of the technology regarding health outcomes.

Outcomes assessed in the various clinical trials summarized below include the Psoriasis Area and Severity Index score, measurement of the dimensions of the treated plaque in cm2 and by tracing their outlines, photographic documentation, and test-plaque severity score.

The test plaque severity score is calculated as the total of scores for erythema, scaling, and thickness, using a numerical rating of 0-4 for each of the parameters (with 0 = none, 1 = minimal, 2 = moderate, and 3 = severe) (Katugampola et al, 1995; Ros et al, 1996). In other studies, photographs of plaques have been used for clinical assessment, and biopsy specimens for histological assessment.

In the more recently published studies (Feldman et al 2002; Trehan et al 2002) patients with stable plaque type psoriasis were included (stable is defined as present and unchanged for at least 2 months). Patients were excluded from one study (Feldman et al 2001) if they had failed to respond to UVB phototherapy in the past. Patients were generally excluded if they had a history of keloid or hypertrophic scar formation or known photosensitivity.
TA Criterion 2, continued

The publications concerning use of lasers for treating psoriasis have been uncontrolled case series or clinical trials providing within-lesion comparisons; no randomized controlled trials comparing outcomes with conventional psoriasis therapies have been published.

Level of Evidence: 3, 5

TA Criterion 3: The technology must improve the net health outcomes.

**Argon Laser Therapy**

In a letter, Harrison et al (1985) reported on use of argon laser irradiation at 515 nm to photocoagulate psoriatic plaques in 19 patients. During the 12-month study, no recurrences of psoriasis occurred. However, superficial scar formation was noted.

**Carbon Dioxide (CO\(_2\)) Laser Therapy**

Bekassy (1986) first reported use of a carbon dioxide (CO\(_2\)) laser (emitting 10,600-nm light) as an outpatient procedure for the vaporization of circumscribed psoriatic plaques in 3 patients. The scar tissue which grew over the healed laser vaporized area remained free of psoriasis during a follow-up of more than 3 years. The maximum area that could be treated on a single occasion was ~10 cm\(^2\) since wound infection occurred in 2 patients when the treated area exceeded 30 x 30 mm. The authors noted that the healed areas were slightly depigmented.

Two comparative trials have compared results of CO\(_2\) resurfacing laser treatment to curettage, neither showing long-term benefit for laser treatment.

Alora et al (1998) studied the efficacy and safety of using CO\(_2\) lasers for laser resurfacing of isolated psoriatic plaques in 12 adults with stable, recalcitrant plaque-type psoriasis. In 6 patients, the lesions were divided into quadrants, each of which received different numbers of passes with a 60 microsec pulsed CO\(_2\) (Tru-Pulse) laser. In the remaining 6 patients, one quadrant underwent curettage, the second resurfacing with a scanned continuous wave (Sharplan Silktouch) CO\(_2\) laser, and the last curettage prior to laser resurfacing. Results were disappointing.
TA Criterion 3 (Carbon Dioxide (CO\textsubscript{2}) Laser Therapy), continued

Despite clinical and histological evidence of complete ablation of the epidermis and papillary dermis, in 10 of the 12 patients the psoriatic plaques recurred within 8 weeks. Only 2 patients showed no recurrence after 4 months. No permanent scarring or pigmentation changes were noted. The authors concluded that ablation of the epidermis and papillary dermis with either pulsed or scanned CO\textsubscript{2} lasers was generally ineffective.

Asawanonda et al (2000a) conducted a study to determine the efficacy of the Pendulaser CO\textsubscript{2} resurfacing laser to that of electrodesiccation with curettage in the treatment of recalcitrant psoriatic plaques. In each of 10 patients, a single psoriatic plaque was divided into thirds; one third was treated with CO\textsubscript{2} resurfacing laser, another with electrodesiccation and curettage, and the third left untreated. Results showed that both the CO\textsubscript{2} laser resurfacing and the electrodesiccation with curettage produced similar improvement of psoriasis and were significantly better than the control area at 4 months, but not at 6 months. The authors concluded that for limited recalcitrant psoriatic plaques, CO\textsubscript{2} resurfacing laser and electrodesiccation with curettage could provide an alternative treatment with short-term benefit. However, the authors advised caution in use of these therapies due to the moderately high risk of permanent scarring. The entire published literature reports on only 25 patients treated with a CO\textsubscript{2} resurfacing laser.

Nd:YAG Laser Therapy

Ruiz-Esparza et al (1999) reported a case series of 3 patients with a clinical response of psoriasis to low-energy irradiance with the Nd:YAG laser (1320 nm light). Improvement was noted at a 4-week follow-up visit and continued for 3 months. Partial response occurred in a case of plantar involvement. However, early recurrence was noted at the end of 3 months in 1 case.

The entire published literature of patients treated with the Nd:YAG laser consists of these 3 patients.
TA Criterion 3, continued

**Flashlamp Pulse Dye Laser Therapy**

Five case series have been published concerning flashlamp pulsed dye laser (585 nm) therapy for psoriasis. In a letter, Hacker et al (1992) first reported some clinical improvement in 11 (57%) of 19 psoriasis patients treated with a flashlamp pulsed dye laser, though only those treated with the highest fluences of 9.0 J/cm². However, none of the patients actually achieved complete clearing of their psoriasis. In addition, the authors noted that it would not be practical to treat large plaques with a small, 5-mm laser light diameter.

Kataugampola and colleagues (Kataugampola et al, 1995; Lanigan et al, 1997) reported a case series of 8 patients treated with pulsed dye laser light on three occasions at two-weekly intervals. There was a significant difference in the plaque severity scores between the laser-treated and untreated contralateral plaques (p<.05) from week 6 onwards. The treated plaque severity score at week 16 showed an improvement of >50% from baseline in 5 of the 8 patients, with complete clearing in one patient. Two of the patients showed hemorrhagic scabs on the laser-treated plaques at weeks 4, 6, and 12.

Ros et al (1996) reported a case series of 10 patients treated with the pulsed dye laser on single, stable psoriasis plaques. Treatments involved 1-3 sessions, and the lesional response was graded using a scale for erythema, scaling, and infiltration. Results showed that 6 of the 10 patients experienced an improvement following the laser therapy. The psoriasis severity scale in these patients was reduced to a score of 2.2 ± 1.3 compared with a score of 7.2 ± 1.7 for control plaques. There was a non-significant tendency for multiple treatments to have better efficacy and a single treatment.

Most (8 of 10) of the treated plaques developed black crusts after treatment; one patient’s leg lesion healed with atrophic scarring and hypopigmentation. The authors concluded that pulsed dye laser therapy could improve plaque psoriasis, but cautioned that the adverse effects of pigmentation change and scarring indicated a need for more investigation into its use.

Two comparative trials have compared results of pulsed dye laser treatment to other treatments, only one of which suggested benefit for the laser treatment.
In a comparative study involving 46 patients, Zelickson and colleagues (1996) examined the clinical and histological effects on psoriasis treated with a flashlamp pulsed dye laser. In 13 patients, one half of one plaque was treated with pulsed dye laser at least twice at 3-week intervals. In 23 patients, four plaques were chosen. One plaque was treated with a short (450 microsec) pulse-width laser and one, with a long (1500 microsec) pulse-width laser at 2-week intervals for up to 5 treatments; in addition, one plaque was treated with triamcinolone 0.1% ointment and one, with Polysporin ointment twice daily for 10 weeks. Patients were assessed for plaque erythema, scaling, thickness, pruritus, and overall severity at 1, 2, 3, 6 and 13 months. Results showed significant clinical improvement to the laser treatments, with some patients remaining in remission for up to 13 months. There was no significant difference in benefit between the long and short pulse-width lasers. Mild textural changes of the skin and mild pigmentation changes (both hypo- and hyper-) were noted at sites of laser treatment. The authors concluded that the flashlamp pulsed dye laser could induce prolonged remission in chronic plaque psoriasis. They also stated that the practicality of this treatment must be considered, given inherent problems with the pulsed dye laser such as small spot size and prolonged postoperative healing.

Bjerring et al (1997) treated 11 patients with chronic plaque psoriasis with the flashlamp pulsed dye laser; 6 of the same patients were concurrently treated by dermabrasion. The follow-up period varied between 4 and 9 months. Complete remissions were observed in 3 of 5 patients following laser treatment alone and in 5 of 6 after laser treatment combined with dermabrasion. Partial responses were seen in 6 laser-treated and in 1 patient treated by laser plus dermabrasion. Two patients showed no response to laser treatment.

There were no complications other than slight to moderate skin pigmentation changes.

The authors conjectured that these clinically unsatisfactory results might be explained by the great variability in thickness of plaques and thus of penetration of the laser light.

The entire published literature reports consists of 94 patients treated with the flashlamp pulsed dye laser.
TA Criterion 3, continued

**Xenon Excimer Laser Therapy**

Asawanonda et al (2000b) reported results of a controlled pilot study with a before-after design, conducted to determine the dose-response relationship of excimer laser light in treating psoriasis. The authors studied both the efficacy of clearing and length of remission in 13 consecutive patients with at least 4 large, stable psoriasis plaques. Excimer laser-generated 308-nm UVB light was given to each patient’s 4 plaques, which received 1, 2, 4, and 20 treatments, respectively. Untreated areas within each plaque served as “controls”. Within each plaque, 8 different fluences based on multiples of a predetermined minimal erythema dose (MED) were tested in distinct sites. The multiples were 0.5 and 1 MED (low dose); 2, 3, 4, and 6 MED (medium dose); and 8 and 16 MED (high dose). At every treatment, the dose for each site remained fixed at the same MED multiple. The authors determined a psoriasis severity index score for each area before, every 2 weeks during, and 2 and 4 months after treatment. The authors found that treatment with high fluences produced significantly better results than treatment with medium and low fluences at 4, 6, 8, and 10 weeks (p<.05). At 4 months' follow-up, all sites that received low or medium fluences had recurrences, whereas those that underwent a single treatment at 8 and 16 MED multiples remained in remission. Adverse reactions included transient erythema at moderate fluences and blistering eruptions at high fluences. The authors concluded that 308-nm UVB light irradiation generated by an excimer laser could clear psoriasis with moderately long remission after even a single treatment with high fluences of UVB. However, they also cautioned that the safety of this approach could be questioned since blistering sunburns have been associated with an increased risk of cutaneous melanoma. In addition, they later noted that this was a dose-response investigation, not a treatment trial nor a comparative trial, and recommended further studies to optimize treatment with this novel therapy (Asawanonda et al, 2001).

The one comparative trial in the xenon excimer literature is published in a letter from Bonis et al (1997). They reported on xenon excimer laser treatment of 10 patients with chronic plaque psoriasis. In 6 of the 10 patients, the authors compared the efficacy of narrow band 311 nm UVB light phototherapy with 308-nm UVB laser light treatments on different skin lesions. One 2-3 cm diameter plaque was treated with each type of light.
The narrow band 311-nm UVB phototherapy was administered five times weekly. The 308-nm laser light was administered for 15 ns (20-98 impulses, depending on skin type, with an 11-impulse increase in dose, at a rate of 20 impulses/sec). Treatments were repeated three times weekly until all treated plaques had cleared completely. The number of treatments required for complete clearance with the narrow band 311-nm UVB light was 29-33 (mean 30.1), while that with the 308 nm xenon laser was 8-10 (mean 8.33). The cumulative light doses were 26.31-32.15 J/cm² (mean 31.1) for the narrow band 311-nm UVB light and 2.57-8.11 J/cm² (mean 4.81) for the laser 308-nm UVB light. No side effects were noted except for mild, transient hyperpigmentation. Because the number of treatments was significantly less and the duration of phototherapy was significantly shorter with a xenon laser than with the narrow band UVB therapy, the authors concluded that treatment with laser light was more effective than narrow band 311-nm UVB. However, the comparative portion of this trial involved only 6 patients and it is unclear if lesions were assigned randomly to the different treatments.

The authors later reported that 8 of the original 10 patients were symptom-free in the laser-treated areas after 2 years (Kemeny et al, 2001). They recommended further investigations to improve the therapeutic response to the 308-nm excimer laser treatment by varying the intensity and frequency of the impulses, by establishing the most appropriate starting dose, and by using fixed or increased fluences.

Since the Medical Policy Committee on Quality and Technology last reviewed this topic there have been 3 additional studies published in peer-reviewed journals. None were designed as randomized trials and there is still no published literature that directly compares the excimer laser treatment with existing therapies. This is unfortunate as it would have been relatively simple to add a treatment arm into a study to compare laser with topical steroids.

Feldman et al (2002) report on the results of a multicenter open trial from 5 dermatology practices (one university-based and 4 private practices). This is the largest study of the use of the excimer laser to date. 124 adult patients with stable, mild to moderate plaque type psoriasis involving less than 10% of their body surface area were initially enrolled and treated with a 308-nm XeCl excimer laser connected to a hand piece. (Stable psoriasis was defined as no change in the prior 2 months).
Patients were excluded from the study if they had received recent local or systemic treatment, if they were unresponsive to UVB photo-therapy in the past and if they had a history of koebnerization. Before the first treatment, each patient’s MED (minimal erythema dose) was determined on unexposed, uninvolved skin. The initial UV dose administered was based on the MED and was then adjusted depending on the location, size and thickness of the plaque and the response to treatment. For thick scale, Lac-Hydrin was also administered twice daily and mineral oil was applied to the area prior to laser treatment. Target plaques were then selected for each patient (no information is given on how plaques were selected) and global as well as local Psoriasis Area and Severity Index (PASI) scores were recorded at baseline. Treatments were scheduled twice weekly with a minimum of 48 hours between treatments for a total of 10 treatments if necessary. The main outcome measure was 75% clearing of the target plaque. Time to clearing was analyzed by Kaplan-Meier methods, accounting for truncated observations. One hundred twenty-four patients were enrolled in the study with a mean age of 46; 57% were men. 116 patients completed at least one treatment and 80 (64.5%) patients completed the entire protocol (i.e. 10 treatments or clearing). The most common reason for exiting from the study was “noncompliance” accounting for 45.5 % of the dropouts. Of the patients who met the protocol requirements of 10 treatments or clearing, 72% (66/92) achieved at least 75% clearing in an average of 6.2 treatments. Eighty-four percent of patients (95% confidence interval [CI], 79%-87%) reached improvement of 75% or better after 10 or fewer treatments. The most common reported side effects included erythema (50.8%), blisters (45.2%), hyperpigmentation (37.9%), and erosions (25%). The authors report that side effects were “well tolerated” though no information is presented on the intensity and duration of side effects. The authors conclude that monochromatic 308-nm excimer laser treatment appears to be effective and safe for psoriasis. Long term follow-up was not done so improved long-term remission as well as safety remains unknown. The authors themselves caution that: “there is the potential for unknown risks given the very different dosage schedule that is used with the excimer laser treatment compared with that of standard UVB phototherapy.”
TA Criterion 3 (Xenon Excimer Laser Therapy), continued

Trehan et al (2002) report on the results of a high-dose single treatment with the excimer 308-nm laser in stable plaque-type psoriasis. Eighteen volunteers were enrolled in the study from the dermatology clinics at the Massachusetts General Hospital. For each subject, two plaques were selected and half of each plaque was held as a control while the other half was treated with a single dose of either 8 or 16 times the “first dot of erythema” dose (FDE is similar to but lower dose than the MED). A modified PASI score was assigned to each plaque enrolled in the study. (Score is calculated by adding the scores for scaliness, induraion and erythema for each plaque.) Sixteen subjects completed the study (two patients signed up but never actually participated because of scheduling problems). At the laser treatment sites, “moderately painful” bullae developed within 6-12 hours of the treatment. These areas were crusted within one week and healed within 2 weeks. Eleven of sixteen subjects showed “significant improvement” with reduction of the plaque to a flat red macule and statistically significant decrease in PASI score from 6.31 to 3.56. Five subjects had minimal response to treatment. Plaques that responded tended to be relatively flat at baseline. Six months after treatment psoriasis recurred in all cleared or partially cleared areas.

In a case report, Mafong et al (2002) report on one patient treated with 308 nm excimer laser using a 3.5cm spot, a dosage of 2 minimal erythema doses (MED) and a pulse width of 30ns. The authors report that the patient’s lesions had responded to treatment with topical corticosteroids but had recurred. She had never been treated previously with phototherapy. They report complete clearance of the psoriatic lesions was obtained after 3 weeks of treatment. Remission duration was at least 6 months.

TA Criterion 4: The technology must be as beneficial as any established alternatives.

The established alternatives to laser treatment of psoriasis include: topical agents (corticosteroids, coal tar derivatives, vitamin D analogs, and retinoids), light therapy (UVB phototherapy), combination of light therapy with an oral medication (psoralen-UVA [PUVA] photochemotherapy or acitretin-UVB or acitretin-PUVA), and systemic immunosuppressive chemotherapy (e.g., methotrexate or cyclosporine) (Berger, 2001).
TA Criterion 4, continued

A comparison study of reported psoriasis clearance rates in various published trials reported indicated that initial clearance rates were low, ranging from 1.9% to 44.9% for topical therapies 4.4% to 81% for oral medications. PUVA therapy was associated with the highest proportion of patients with clearance (an average clearance rate of 70% in 193 studies), followed by UVB (averaging 68% in 89 studies), and cyclosporine A (averaging 64% in 127 studies) (Spuls et al, 1997).

The incidence of side effects was highest in those treated with retinoids and lowest in those treated with phototherapy.

It is estimated that about 50% to 80% of patients treated with topical corticosteroids experience a recurrence of psoriasis within 3-6 months, which requires retreatment. Side effects of topical ointments include skin atrophy, tachyphylaxis, and rebound effects. Calcipotriene, the vitamin D derivative, can interfere with normal calcium metabolism. Systemic immunosuppressive therapy can be complicated by infection.

Other destructive treatment modalities used with some effect in the treatment of psoriasis (Ros et al, 1996) include dermabrasion (Zachariae et al, 1995), freezing, and even surgery (Kiil et al, 1985). The use of laser light to treat psoriasis is far less traumatic to and painful for the patient than dermabrasion (Bjerring et al, 1997). Deep dermabrasion is also associated with a potential risk of permanent scarring (Bjerring et al, 1997).

Side effects, and especially the carcinogenicity, of different UV light therapies increase in parallel with the cumulative lifetime UV dose (Lavker et al, 1995). Based upon a 20-year prospective study, Stern R et al found that, 15 years after beginning PUVA therapy, patients exposed to >250 treatments experienced an increased risk of malignant melanoma. Experts presume that the lower cumulative UV dose involved in excimer laser treatment of psoriasis will result in a lower risk of carcinogenesis and other side effects, but this remains to be established by further investigation (Bonis et al, 1997).

There have been no well designed published trials comparing laser treatment of plaque psoriasis to other established treatment modalities. In the absence of such comparative trials, it is impossible to conclude that laser light treatments improve net health outcomes in patients with psoriasis as much as or more than the established alternatives.
TA Criterion 5: The improvement must be attainable outside the investigational settings.

In the recently published trials (Feldman 2002; Trehan 2002) patients were recruited from and treated in University and community-based practices. Should laser treatment prove to be as effective as currently available therapy it would be (and already is) attainable outside investigational settings.

RECOMMENDATIONS OF OTHERS

Blue Cross Blue Shield Association (BCBSA)

The BCBSA reviewed this topic in November 2001. The policy statement is as follows:

“Xenon chloride excimer laser therapy for phototherapeutic treatment is considered investigational as a treatment for psoriasis”.

Centers for Medicare and Medicaid Services

Only one state, South Carolina has a formal policy providing coverage for this technology. There is no formal national coverage policy.

California Dermatology Society

The California Dermatology Society does not endorse specific modalities. Representation at the meeting has been requested.

American Academy of Dermatology

A position statement and representation at the meeting have been requested.

National Psoriasis Foundation

“The National Psoriasis Foundation encourages all health plans to include laser treatment as a covered benefit for their enrollees.”
CONCLUSION

Xenon excimer laser treatment is indicated for the treatment of mild to moderate plaque type psoriasis. By directing high intensity UVB directly to the plaque it offers a theoretical advantage over existing light technology and topical treatments by offering more rapid remission and limiting long term side effects to non-involved skin. Unfortunately, the recent studies still have not answered the question of whether the excimer laser is as effective and safe as existing treatments. As this study would be relatively straightforward to design and execute, such a trial should be forthcoming soon.

The published studies do report impressive improvement rates after single and multiple treatment with the excimer laser. Trehan et al (2002) found that 11 of 16 patients treated with a single high dose treatment with the excimer 308-nm laser had substantial reduction in the psoriasis (and a significant decrease in the modified PASI score) in the half of the plaque that received treatment (as compared to no treatment). The main reported adverse effect of the one treatment were “moderately painful” bullae that developed within 6-12 hours of treatment and healed within 2 weeks. By 6 months all of the treated plaques demonstrated recurrence of disease.

Feldman et al (2002) report on the results of a study in which patients with stable mild to moderate plaque psoriasis involving 10% or less of their body received up to 10 treatments of varying intensity with the 308-nm excimer laser. The target plaque for each patient was selected by the researchers and clinically assessed with a modified PASI score and photographs. One hundred twenty-four patients were enrolled in the study, 116 patients completed at least one treatment and 80 patients (64.5%) completed the entire protocol. 72% (66/92) achieved at least 75% clearing in an average of 6.2 treatments. No comparison to existing treatment was included in the study. The significant drop-out rate (35%) from this study is curious given that one of the purported benefits of laser treatment is patient convenience and improved patient acceptance over established therapies. No patient centered quality of life outcomes were included in the study that might have shed light on this issue.

There have been no published trials comparing laser treatment of plaque psoriasis to other established treatment modalities, such as topical agents (coal tar derivatives, vitamin D analogs, and retinoids), combination of light therapy with an oral medication (psoralen-UVA [PUVA] photochemotherapy or acitretin-UVB or acitretin-PUVA), and systemic immunosuppressive chemotherapy (e.g., methotrexate or cyclosporine).
CONCLUSION, continued

In the absence of level 1 clinical trial evidence, criteria 2 states that the new technology must be safer or more beneficial than existing technologies or treatments. This criteria is not met. In addition, it is impossible to conclude that laser light treatments improve net health outcomes in patients with psoriasis as much as or more than the established alternatives. (TA criteria 4)

It is also difficult to conclude at this time if the beneficial effects outweigh any harmful effects (TA criteria 3) since there are no reported long-term follow-up of patients treated with laser.

Therefore, TA criteria 2-4 are not met.

RECOMMENDATION

It is recommended that laser light treatment of psoriasis does not meet Blue Shield TA criteria.

Committee approval as recommended.

October 16, 2002

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