Cryotherapy is more effective and faster than Q-switched Nd-YAG laser for depigmentation in universal vitiligo patients

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Background: Although cryotherapy has been reported as a technique for depigmenting residual pigmented patches in patients with universal vitiligo, Q-switched Nd-YAG lasers have not yet been used for this purpose. The aim of this study was to compare the efficacy of cryotherapy with that of 532nm Q-switched Nd-YAG laser therapy for depigmentation in patients with universal vitiligo.

Method: Six adult patients (4 male and 2 female) with universal vitiligo and facial residual pigmented patches were treated simultaneously with cryotherapy on the right and the frequency-doubled 532nm Q-switched Nd-YAG laser therapy on the left side. The laser parameters used were spot size 3-5mm, frequency rate 10 hertz, and the fluence was 5J/cm^2. The cryo system was a closed contact CO2 Cryo gun. The patients were scheduled to be treated monthly.

Result: The depigmentation was complete after three successive sessions of cryotherapy and 30-45 days after the last session, in comparison with simultaneous 30-70% depigmentation of the laser side. No scar or permanent sequellae developed on either side.

Conclusion: Cryotherapy is more effective and fast-acting than Q-switched Nd-YAG laser for depigmentation of residual pigmented patches in patients with universal vitiligo.

Keywords: cryotherapy, depigmentation, Q-switched Nd-YAG laser, vitiligo

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INTRODUCTION

Patients with universal vitiligo, who have residual pigmented patches particularly over the face, usually seek for the removal of these patches. The available depigmenting modalities are prolonged topical application of monobenzyl ether of hydroquinone (MBEHQ) [1], Q-switched Alexandrite lasers [2,3] and cryotherapy. In our experience, only a minority of the patients respond to MBEHQ even after 6 months or more. Although the efficacy of cryotherapy has been already reported [4,5], its disadvantages are considerable pain, blistering and the longer downtime. The other option is Q-switched laser therapy. Eight sessions or more may be needed for Q-switched Alexandrite laser to remove the residual pigmented patches [2]. The Q-switched Nd-YAG is not applied yet for this purpose. The relative number of the sessions for the removal of the pigmented patches is not known for lasers and cryotherapy, and their efficacy is not compared. In this study, we decided to compare the efficacy of cryotherapy versus the frequency-doubled 532nm Q-switched

Nd-YAG laser for the depigmentation of the facial residual pigmented patches in the patients with universal vitiligo.

PATIENTS AND METHODS

Six adult patients (four male) with universal vitiligo who suffered from residual pigmented and persistent patches in the facial area were treated simultaneously with cryotherapy on the right and frequency-doubled, Q-switched Nd-YAG laser therapy on the left side. The patients were informed of the possible side effects of the systems and their unpredictable course and number of the sessions. They accepted to sign informed consent forms. They were also informed that their treatments would be free of charge throughout the course of the treatment. The cryo system used was a closed-contact CO2 cryo system with flat and round metallic tips. This cryo system is easier to monitor and apply appropriate amounts of cooling than routinely used spraying N2 cryo-gun. The N2 cryo-gun with closed-contact and flat metallic probes rather than the spraying method can be used as well. After a moderate traction, the round and flat-tipped cryo probe was applied on the pigmented area and the gun was triggered. The liquid CO2 gas was circulated in the metallic tip without spraying directly over the skin. The small skipped areas were treated with smaller probes. The frozen tip transmits the temperature to the pigmented skin and freezes the area. The development of a narrow 1mm frozen rim around the probe is an indication of the termination of the freezing process. This can be obtained by a 20-30 seconds freezing time. The thawing periods may last 30-45 seconds. The frozen area is palpated as a solid plate in the beginning. A wheal and erythema are developed a few minutes after thawing and the patients may experience blistering and oozing within the following hours, and subsequent crust formation during the next few days.

The left side of the patients was treated with the frequency-doubled, 532nm, Q-switched Nd-YAG laser (Quanta laser system, Italy). The parameters chosen were spot size of 3-5mm, frequency of 10 Hertz and the fluence of 5 J/cm^2.

The area was either not anesthetized or anesthetized partially by applying topical lidocaine-prolicane gel. No antibiotics or analgesics were administered. The patients were advised to start using sunscreens outdoors, but no bleaching agent was ordered. The patients were scheduled for monthly follow-ups to repeat the procedures and to treat the remaining non-responded areas.

RESULTS

In the beginning, the patients tolerated the laser therapy well while they were not usually satisfied with cryotherapy for its pain, subsequent blistering, oozing, crust formation, and their longer downtime. Depigmentation was almost complete for the frozen side after 3 subsequent sessions and 30-45 days after the last session. The simultaneous depigmentation in the laser side was 30-70% (Figures 1-4). Both sides could develop temporary post inflammatory

Figure 1. Patient 1, baseline left

Figure 2. Patient1, baseline right

Figure 3. Patient 1, left side, nearly 3 months after 3rd treatment session

Figure 4. Patient 1, right side, nearly 3 months after 3rd treatment session

hyperpigmentation after any session of therapy. A mild erythema persisted for 2 or 3 weeks on the frozen side but shorter on the laser side. The lesions started to bleach one or two weeks later. The depigmentation was gradually increased thereafter, with subsidence of the erythema and post-inflammatory hyperpigmentation. Some punctate purpuric areas developed immediately after laser therapy on the left side (Figure 5).

The hair color in all patients remained intact with no leukotrichia. No scar formation was detected on either side. All patients were satisfied with the results, particularly with the frozen side. No recurrence was detected in one-year follow-up and the laser side of one patient became gradually and completely depigmented without further treatment.

Figure 5. Skin appearance after cryotherapy and laser therapy. Note the purpuric lesions on the left and early edema and wheal formation over the right side

DISCUSSION

Cryotherapy, if done properly, can lead to complete depigmentation after about three sessions. Despite inevitable complications of cryotherapy such as edema, blistering, oozing, crust formation, prolonged erythema, and its longer downtime, no scar or other permanent sequellae was detected. It is an inexpensive and available procedure and can be used for limited depigmentation of the residual pigmented patches in the patients with universal vitiligo. The laser therapy is more tolerable, with a shorter downtime and less inflammatory reaction but it is more expensive, not available everywhere, and needs more therapeutic sessions. The satisfactory depigmentation is reported to be achieved after ten laser sessions [2], while cryotherapy can lead to complete depigmentation even after two sessions. The recurrence rate after laser depigmentation is reported to be 44% [3], while no true recurrence was detected even after 24 months among those patients who were treated earlier with cryotherapy. Darkly pigmented macules or patches are occasionally developed in some patients who undergo cryotherapy in the sun- exposed areas. These pigmented patches are usually darker and more pigmented than their original normal color. They can be removed either by cryotherapy or by less expensive methods such as application of 90% phenol chemical peeling.

Prescription of 20% monobenzone (MBEHQ) cream is very common among dermatologists for the removal of residual pigmented patches in the patients with universal vitiligo. Out of 18

patients studied, only 8 patients responded well with complete depigmentation after 12 months or more of MBEHQ application. Seven other patients responded poorly or showed no depigmentation, and the remaining 3 patients had partial depigmentation [1]. The onset of depigmentation for MBEHQ and other related compounds may be as long as 4-12 months [3]. There is no conclusive evidence to show that the depigmentation seen after prolonged administration of MBEHQ and other related compounds is truly the result of their administration or is the result of spontaneous depigmentation. The prolonged administration of this compound may lead to side effects including the allergic contact dermatitis [6], corneal and conjunctival side effects [7], and dychromatosis [8]. Rapid repigmentation is also reported after a temporary period of depigmentation [9]. Cryotherapy is more effective and fast-acting than frequency-doubled, 532nm, Q-switched Nd:YAG laser therapy, but both methods are more reliable and their efficacy is more predictable than MBEHQ therapy.

REFERENCES

1. Mosher DB, Parish JA, Fitzpatrick TB. Monobenzyl ether of hydroquinone: a retrospective study of treatment of 18 vitiligo patients and a review of the literature. Br J Dermatol 1977;97: 669-79.
2. Rao J, Fitzpatrick RE. Use of Q-switched 755-nm alexandrite laser to treat recalcitrant pigment after depigmentation therapy for vitiligo. Dermatol Surg 2004; 30:1043-5.
3. Njoo MD, Vodegel RM, Westerhof W. Depigmentation therapy in vitiligo universalis with topical 4-methoxyphenol and the Q-switched ruby laser. J Am Acad Dermatol 2000;42:760-9.
4. Di Nuzzo S, Masotti A. Depigmentation therapy in vitiligo universalis with cryotherapy and 4-hydroxyanisole. Clin Exp Dermatol 2010;35:215-6.
5. Radmanesh M. Depigmentation of the normally pigmented patches in universal vitiligo patients by Cryotherapy. J Eur Acad Dermatol Venereol 2000;14:149-52.
6. Lyon CC, Beck MH. Contact hypersensitivity to monobenzyl ether of hydroquinone used to treat vitiligo. Contact Dermatitis 1998;39:132-3.
7. Hedges TR, Kenyon KR, Hanninen LA, Mosher DB. Corneal and conjunctival effects of monobenzone in patients with vitiligo. Arch of Ophtalmol 1983;101:64-8.
8. Urabe K, Hori Y. Dyschromatosis. Semin Cutan Med Surg 1997;16:81-5.
9. Oakley AM. Rapid repigmentation after depigmentation therapy: vitiligo treated with monobenzyl ether of hydroquinone. Australas J Dermatol 1996;37:96-7.