Laser Ablation of Xanthelasma Palpebrarum by Using the Pinhole Method

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Background and Objectives

Xanthelasma palpebrarum is a xanthoma arising on the eyelids. When the lesion is large, surgical removal may cause distortion, and total laser ablation or chemoablation can cause scarring and delayed healing. Here, we introduced an adequate method to treat a large xanthelasma palpebrarum lesion.

Materials and Methods

Patients were treated with either carbon dioxide or erbium:yttrium aluminum garnet laser with a beam size of 1.5-2 mm (interbeam distance, 1-2 mm). Three independent plastic surgeons assessed the degree of improvement, scarring, and pigmentation.

Results

A total of 13 patients were treated using the pinhole method (7 women and 6 men). The mean patient age was 50.1 ± 8.72 years. The mean follow-up period was 8.3 months. The mean number of treatments was 3 times. The mean grade of improvement was 3.54. Nonetheless, there were 3 cases of hypopigmentation that occurred with a larger lesion size and darker skin color.

Conclusion

Large xanthelasmas were treated successfully using the pinhole method. The pinhole method appears to be effective for treating large xanthelasma palpebrarum lesions while avoiding scarring or distortion.

Key words

Xanthelasma palpebrarum; Laser therapy; Pinhole method

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INTRODUCTION

Xanthelasma palpebrarum is a cutaneous xanthoma arising around the eyelids. It is the most common form of xanthoma and is histologically composed of foamy histiocytes. It can be accompanied by hyperlipidemia, although not all cases are associated with hyperlipidemia.¹ Surgical excision and laser treatment are the main treatment modalities, and chemoablation can also be performed. Although surgical excision is a certain method for complete removal in a single procedure, it is difficult to apply if the lesion is large or difficult to remove because of its location. Furthermore, both laser and chemoablation treatments have a long healing period, and can cause scar contracture in case of large xanthomas.

At our center, we have treated xanthelasmas with laser

Fig. 1. The size of the beam (blue) was 1.5-2 mm and the interbeam distance was 1-2 mm. Ablation was done until the orbicularis oculi muscle was visible or when bleeding occurred.

ablation with the pinhole method since 2013. In this article, we reviewed prospectively enrolled data and evaluated the efficacy of the pinhole method.

MATERIALS AND METHODS

From June 2014 to December 2017, 13 patients were treated with pinhole laser ablation. We used carbon dioxide (CO₂) laser or erbium:yttrium aluminum garnet (Er:YAG) laser. The patients were required to visit the clinic every month, during which they were photographed for evaluation. If there were remnant or recurring xanthomas, retreatment was done for 1 month until the lesions were successfully treated.

Patients were treated with either CO₂ or Er:YAG laser with a beam size of 1.5-2 mm (interbeam distance, 1-2 mm). Ablation was performed to a depth until the orbicularis oculi muscle was visible or the wound bled (Fig. 1 and 2). The treatment was repeated until the lesion was successfully removed, and the results were assessed 1 month after the last treatment. Three independent plastic surgeons who were not involved in this study assessed the results in terms of grade of improvement and pigmentation. The improvement was graded as follows:

Fig. 2. Photograph taken immediately after treatment. Multiple holes made by the pinhole method on the xanthelasma palpebrarum lesion can be seen. Some holes show bleeding.

Table 1. Quartile grade of improvement

Grade	1	2	3	4
Details	Minimal improvement <25%	Moderate improvement 25-50%	Marked improvement 51-75%	Near-total improvement >75%

Table 2. Patient demographics

Mean age (years)	50.1 ± 8.72
Female/male	7 / 6
Bilaterality	61.50%
Mean follow-up period	8.3
Mean number of treatments	3

Table 3. Results

	N = 13
Mean grade of improvement	3.53
Color matching	
Hypopigmentation	3
Normal	20
Hyperpigmentation	0

1 (minimal improvement), 2 (moderate improvement), 3 (marked improvement), and 4 (near-total improvement). The results of color matching were divided into hypopigmentation, normal, or hyperpigmentation (Table 1). In patients with multiple xanthomas, each individual lesion was assessed and counted separately.

RESULTS

A total of 13 patients (7 women and 6 men) with 23 le-

sions were enrolled and assessed. The mean patient age was 50.1 ± 8.72 years. The mean follow-up period was 8.3 months, and the mean number of treatments was 3 times (Table 2). Of the 13 patients, 8 (61.50%) had bilateral xanthomas.

The mean grade of improvement was 3.54, indicating that the pinhole method caused marked or near-total im-

Fig. 3. A 44-year-old female patient who underwent treatment 4 times. (A) Pre-treatment photograph. (B) Photograph taken after 4 treatments.

Fig. 4. A 49-year-old female patient who underwent treatment 2 times. (A) Pre-treatment. (B) Post-treatment.

Fig. 5. A 41-year-old male patient with bilateral large xanthelasmas on the upper and lower eyelids. He underwent treatment 2 times. (A) Pre-treatment photograph. (B) Photograph taken after 2 treatments.

Fig. 6. A 30-year-old male patient with bilateral large xanthelasmas on the upper eyelids. He underwent treatment 4 times and was very satisfied with the results. (A) Pre-treatment photograph. (B) Photograph taken after 4 treatments.

provement of the xanthelasmas (Table 3). However, there were 3 cases of hypopigmentation, which tended to occur when the lesion was larger and broader.

DISCUSSION

Xanthelasma palpebrarum is the most common type of xanthoma and commonly observed in middle-aged female patients.² It histologically consists of lipid-foamy histiocytes, and up to 50% of patients show high levels of lipid profile. In their cross-sectional study, Pandhi et al. observed that patients with xanthelasma palpebrarum have a high risk of atherosclerotic disease.³ Therefore, it is important to suspect and identify xanthelasma palpebrarum when patients visit for evaluation.¹

Because of the location of the xanthelasma, many patients visit the clinic seeking for its removal. Various treatment modalities are available, including surgical excision, chemical peeling, cryotherapy, and laser therapy (CO₂ or Er:YAG).⁴⁻⁷ For small xanthelasmas, surgical excision is a simple and definitive treatment. However, if the lesion is huge, it is impossible to close directly without extensive scarring or distortion such as an ectropion; le Roux removed large xanthelasmas by including them in excised skin during blepharoplasty.⁸ Elabjer et al. excised large xanthelasmas and covered the defects with ipsilateral and/or contralateral eyelid skin grafts harvested using blepharoplasty.⁴ This method, however, is only available when blepharoplasty was originally scheduled or when the patient has redundant skin on the eyelids. A method of excising the lesion and allowing the wound to heal secondarily was also reported.⁹

In addition to surgery, cryotherapy, chemical cauterization, and laser ablation are simple methods for both patients and physicians, and have shown satisfactory results.^{7,10,11} However, these methods also have limitations when the lesion is small or medium in size. Healing with secondary intention of large xanthelasmas may result in scar contracture and delayed healing. The pinhole method with laser can overcome these problems. Ahn et al. reported a case treated using the pinhole method in 2013.¹² The patient was successfully treated without scarring or distortion. In our study, we prospectively enrolled 13 patients and followed them for a relatively long period. Healing was faster because the small holes made by the pinhole method were each surrounded by intact epithelium (Fig. 2). Furthermore, because small defects rarely cause scar contracture, scarring or distortion is rare even after several treatments.

Unlike in the report by Ahn et al.¹², there were 3 cases

of hypopigmentation in our study. Hypopigmentation was more frequent as the size of the lesion was larger and the skin color was darker. As shown in Fig. 3 and 6, large and broad xanthelasmas tend to become dyschromic. Therefore, physicians should inform the patient in advance about this possibility.

In conclusion, we propose the pinhole method with CO₂ or Er:YAG laser as a safe and effective treatment modality in patients with xanthelasma palpebrarum, especially when the lesion is large. As CO₂ lasers are widely available, the pinhole method can be easily performed.

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