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Case Report

Dermoscope Guided Carbon Dioxide Laser Ablation-The First Report

Antonio Chuh[1,2*]

[1]Honorary Clinical Associate Professor, Department of Family Medicine and Primary Care, The University of Hong Kong and Queen Mary Hospital, Pokfulam, Hong Kong

[2]Honorary Clinical Professor, Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong and Prince of Wales Hospital, Shatin, Hong Kong

***Corresponding Author:** Antonio Chuh, Honorary Clinical Associate Professor, Department of Family Medicine and Primary Care, The University of Hong Kong and Queen Mary Hospital, Pokfulam, Hong Kong and Honorary Clinical Professor, Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong and Prince of Wales Hospital, Shatin, Hong Kong;
E-mail: antonio.chuh@yahoo.com.hk

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Abstract

We report the first application of dermoscope-guided carbon dioxide laser ablation for a venous lake on the lower lip of an adult patient. The clinical, cosmetic and functional outcomes were excellent after the procedure.

Keywords

Dermatological Surgery; Labial Melanotic Macule; Polarised Dermoscopy; Vascular Lesion; Venous Lake

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Introduction

Favourable results have been reported for a wide range of Dermoscope-Guided Surgical Procedures (DGSP) [1-5]. We report here the first application of Dermoscope-Guided (DG)-laser ablation.

Main Report

A 72-year-old businessman was bothered by a soft mass on the lower lip for the past two years. Functions of the lips including speech and food intake were slightly but appreciably affected. He enjoyed good past health. Examination revealed a soft bluish lesion 9 mm in the largest diameter on the right aspect of the lower lip (Fig. 1). The mass was partially blanchable. Polarised dermoscopy showed a circumscribed mass with red and bluish blood vessels (Fig. 2), compatible with a Venous Lake (VL). No abnormal pigment which would suggest labial melanotic macule was seen.

We discussed the management options with the patient, including no intervention, excisional biopsy with sutures, electrocautery, cryosurgery, and laser ablation. As the diagnosis was virtually certain, the need for a histopathological proof was of a lower priority. The patient opted for carbon dioxide laser ablation as such would be most precise for the complete removal of the lesion but with minimal destruction for the surrounding tissues. As we had much experience in performing and reporting DGSP, we recommended the procedure to be under DG, to which the patient provided informed written consent.

Fig. 3 shows our setup in an out-patient unit attached to a major teaching hospital. A wireless dermoscope was secured vertically by a steel clamp, with the probe of the dermoscope pointing downwards around 3 cm above the lesion. This scope sent signals to a receptor unit connected to a PC, which displayed the surgical field on a monitor.

The dermoscope was adjusted according to several parameters. Firstly, it was switched to optimal polarised view as we would need the underlying parts of the lesion to be visible. Secondly, the magnification was adjusted by altering the distance of the dermoscope above the surgical field. A longer distance results in a lower magnification. Thirdly, the lesion was placed in the centre of the image with tips of the surgical equipments also being visible. The above settings would be finely adjusted during the entire surgical procedure.

The adjacent areas were marked by a skin marker, leaving the lesion with a 1 mm margin. We marked quite a large perilesional area as some of the marking might fade after application of the local anaesthesia and during the procedure.

We elected 1% lignocaine without epinephrine, as epinephrine would lead to vascular constrictions in the lesion. Ultra-fine pulse continuous beams (3W, 100 Hz, wave length: 10.6

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μm) were emitted by the carbon dioxide laser, first to the intended 1 mm margin, then to the periphery of the lesion, then progressing to the centre.

We stopped the bleeding intermittently via applying pressure, and take a quick look in the monitor before the blood seeped out. If the bluish and red vessels pattern still can be seen on the monitor, ablation would be incomplete. Ablation would then be applied again. When we saw no remnant of the lesion on the monitor, we applied bipolar electrocoagulation to achieve haemostasis. Standard dressings were then applied.

Fig. 4 shows the state of the patient two months after the procedure. No remnant of the VL and no scar was seen. The contour and creases of the lower lip were completely restored. Functions of the lower lip including speech and eating were totally attained. We saw the patient one year later. No relapse of the lesion was seen, and the functional aspects remained optimal.

Figure 1: Dark-bluish lesion on the anterior surface of the lower lip. The mass was soft.

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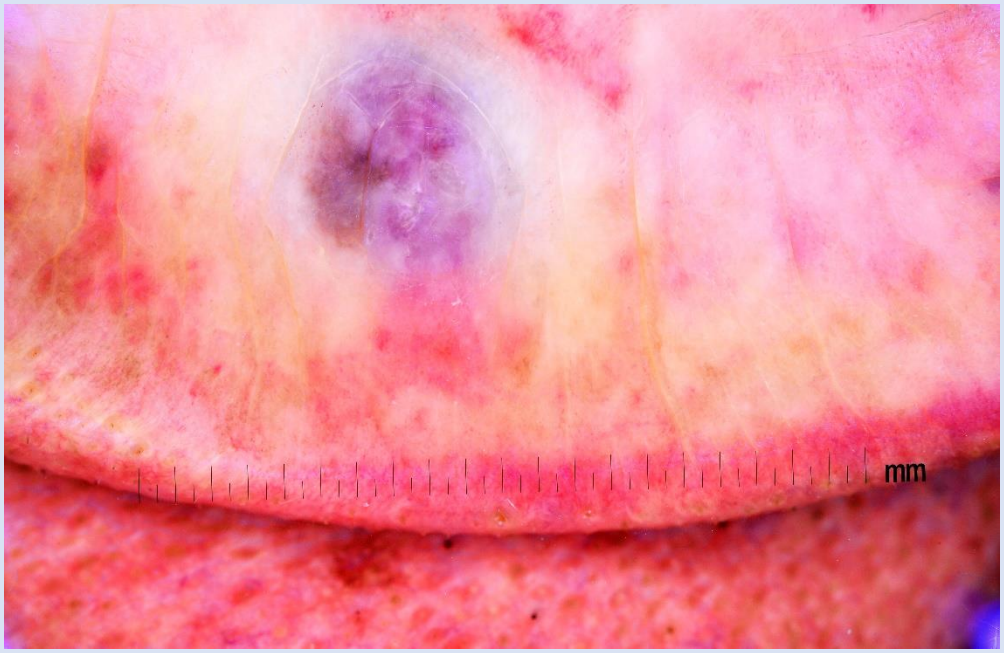

Figure 2: Polarised dermoscopy revealed red and dark blue blood vessels compatible with a venous lake.

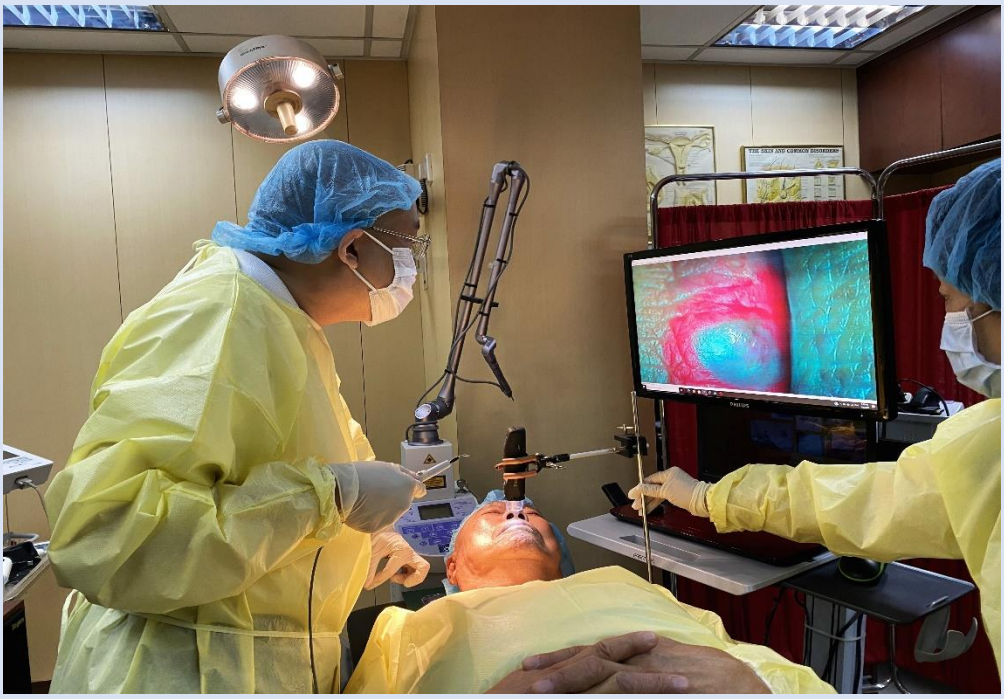

Figure 3: Setup for dermoscope-guided surgical procedures in an out-patient clinic attached to a large teaching hospital. A wireless dermoscope was fixed vertically with probe around 3 cm above the surgical field. The magnification, cross-polarisation, position, and focus were

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being adjusted. Skin dye had already been pencilled around the venous lake with a 1 mm margin.

Figure 4: Appearance two months after the procedure. The creases and contour of the operated site were completely restored.

Discussion

VL, also known as senile haemangiomas, are venous ectasias usually occuring at the lower lips of the middle-aged to the elderlies [6]. They are common and asymptomatic. Solar exposure has been reported to be an associating factor [6]. Reported treatments for VL include sclerotherapy (with polidocanol or ethanolamine oleate), intralesional radiofrequency abrasion (by an intralesional probe to induce lesion destruction), diode laser (to induce dehydration) and electrocautery [7-10].

The major challenge with most treatment modalities is that it depends on experience of the surgeon as to how much tissues have to be removed. This challenge is aggravated by profuse bleeding during the procedures, as the lips are heavily perfused and vessels in VL are usually of particularly large calibres.

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We have reported a range of DG-procedures, including DG-punch biopsy, DG-excisional biopsy, DG-laser excision, DG-suturing in the vicinity of important tissues and DG-electrocautery [2,3]. Similar successful procedures have been reported by other investigators [4,5]. In a case-control study, we compared the outcomes of 39 DGSP with such of 39 pair-matched control procedures with no dermoscopic guidance [2]. We discovered that the risk of clinical relapse at six months was significantly lower for DGSP than for conventional surgery (RR: 0.22, 95% CI: 0.05-0.95). The risk of leaving obvious scars was also found to be significantly lower for DGSP than for conventional surgery (RR: 0.52, 95% CI: 0.32-0.83).

The advantages of DG laser ablation compared to conventional laser ablation are

1. Selectable magnification (around 5-10X for this lesion), thus attaining high precision to aim at parts of the lesion to start and stop the ablation
2. Selectable extent of polarisation (so that different depths of the lesions can be seen). These advantages led to higher sensitivity to secure all parts of the lesion having been destroyed, and higher specificity to minimise damage to the adjacent tissues.

Another general advantage for DGSP is that the continuous flow (usually 30 frames per second) of two-dimensional images resulting in the surgeon perceiving video-like monitoring of the surgical field and heads and probes of the surgical instruments. This would be most pertinent to DG-suturing near important body organs, vessels, and nerves, as we previously reported [3].

However, there are limitations for DG-laser ablation. The clinical, cosmetic, and functional outcomes were optimal owing to the small size and easy accessibility of this lesion. Larger lesions in other body parts might not endorse DG-laser ablation as the treatment of choice. For this patient, the dermoscope was 3 cm above the operational field. The laser tip was thus deviated, not vertically fired onto the skin lesion. This might have casted negative impacts on the efficacy and energy transmission of the laser beam due to oblique penetration of such.

Another limitation of DG-laser ablation is that the procedure can only be applied to lesions with clear clinical diagnoses, sometimes substantiated by dermoscopy. No histopathological and no immunohistochemical reports would be forthcoming. This is just the first report on DG-laser ablation. We hope that other investigators might accumulate more experience for this novel procedure and other DGSP, with the aim of bettering the surgical outcomes for patients with skin diseases and skin lesions.

Conclusion

Dermoscope-guided carbon dioxide laser ablation for a venous lake on the lower lip of one patient led to favourable clinical, cosmetic and functional outcomes.

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