

A new paradigm in vascular treatment: Cellec-V

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Background

Approximately 25 years ago, intense pulsed light (IPL) was first developed and introduced to the market. Early-stage IPL technology was only capable of providing skin pigmentation treatment – however, the development of IPL technology introduced the cut-off filter which allowed the clinicians to choose the wavelength. As a result, the clinicians could apply the appropriate filter according to different indications such as vascular lesions, skin rejuvenation, and acne. More specifically, vascular lesions which could only be treated with laser therapy can now be treated with IPL. When the excessive amount of laser is used for irradiation, there are risks of burns, skin necrosis, and scarring. IPL does not utilize a single wavelength as laser therapy does, but instead uses the cut-off filter to select higher wavelengths which show relatively higher vascular absorption. This allows more efficient treatment of vascular lesions and a relatively lower risk of side effects than the laser therapy.

This study aims to validate the effectiveness and safety of the cut-off filter of IPL by performing IPL-based treatment on 10 patients with vascular lesions using the cut-off filter.

Materials

The use of Intense Pulsed Light (IPL) for vascular lesions may not be the most effective choice but surely no one can deny that it is certainly one of the most widely used option in clinical practice. There have been numerous studies and trials to determine which filter range would be the most effective for different vascular applications and the debate still goes on.

Recently, Jeisys Medical Inc. upgraded their cellec line to cellec-v which has upgraded spectrum 500(S), 550(S) options for more effective vascular treatments and 530(D) filter is also forthcoming shortly. The past versions of cellec offered vascular filter of 530(S)nm which was still effective for many vascular lesions but a pleasant upgrade has been made in developing new filters 500(S), 550(S)& 530D to maximize the effects of vascular treatments.

500(S) filter range (500-600nm) is effective due to the high absorption spectrum (542, 570nm) for oxyhemoglobin which is effective toward small superficial vascular lesions (within penetration depth 0.5~1.0mm). The 500(S) filter has a high absorption level not only for the vessels but also for melanin, and therefore should be used for patients with Skin Types I and II.

550(S) filter range (550-650nm) is effective due to the high absorption spectrum(570nm) for oxyhemoglobin. 550(S) wavelengths have relatively lower melanin absorption than 500(S), and therefore can be used on vascular lesions of the patients with Skin Types III~IV.

The 530(D) filter simultaneously emits short wavelengths (530-650nm) and long wavelengths

(900-1200nm). Short wavelengths are extremely efficient for superficial vascular lesions since they have high absorption of oxyhemoglobin and deoxyhemoglobin with shallow penetration depth.

Long wavelengths (900-1200nm) have low absorption in vascular lesions, but provide thermodynamic heating to deep vessels and destroys the vessels.

Compared to normal IPL filters for vascular treatment, 530D blocks the range between 670-870nm to decrease the absorption into melanin and also protect the epidermis with contact cooling for a much safer treatment.

Patients and Methods

Patients

This clinical study was performed on the total of 10 patients (7 females and 3 males). The patients' skin types ranged between II~IV, and patients had vascular lesions including telangiectasia (2 patients), facial flush (7 patients), and acne vulgaris (1 patient). Telangiectasia patients and the patient treated with 530(D) were only given one-time treatment, while the others were given 3 treatments with the 2-week period between each treatment. A follow-up was performed 1 month after the completion of treatment.

Methods

Telangiectasia

Two male patients had highly developed blood vessels around their nose. One-time treatment with the 500(S) filter was administered onto the lesion with the following conditions: 16J/cm²; double pulse; pulse duration 2.5 and 5.0ms; and pulse delay 20ms. After the first shot of irradiation, changes in the vessels were monitored. If the vessels disappeared or turned dark in color, thermal damage was inflicted onto the vessel, and the treatment was completed. On average, 2 shots were needed for immediate disappearance of the vessel. Even if there are no changes observed to the blood vessel, heat can be accumulated on the skin surface and cause burns. Therefore, maximum of 3 shots should be used for irradiation of the same lesion.

Facial flush

Facial flush often occurs in females. Among the female patients, all but one had facial flush, and the facial flush treatment market around the globe is quite large. Females with lighter skin tones are more likely to have facial flush.

Facial flush is spread throughout the entire cheek, and often requires IPL treatment. Different filters were used for the treatment depending on the skin type, vascular depth, and skin conditions of the patients.

	Superficial vessels	Deep vessels
Skin Type I-II	500(S)	530(D)
Skin Type III	550(S), localized 500(S)	530(D)
Skin Type IV	550(S)	530(D)

The treatment conditions for each filter were as following: 500(S) filter with 14~18J/cm², Dual pulse, pulse duration 2.4~3.0ms 4.4~6.0ms, pulse delay 20ms; 550(S) filter with 13~17J/cm², Dual pulse, pulse duration 2.4~3.0ms 4.4~6.0ms, pulse delay 20ms; and 530(D) filter with 17-18J/cm², single pulse, pulse duration 8.8ms. When performing one-time treatment using 500(S) and 550(S) filters, we used the following conditions and the effect was minimal: double pulse, 4.0/6.0 pulse duration, and 20ms pulse delay. Exceeding 18J/cm² can cause an excessive response, and can leave tire marks on the skin. Therefore, we have maintained the energy level low and shortened the pulse duration and completed the planned 3 treatments.

Acne vulgaris

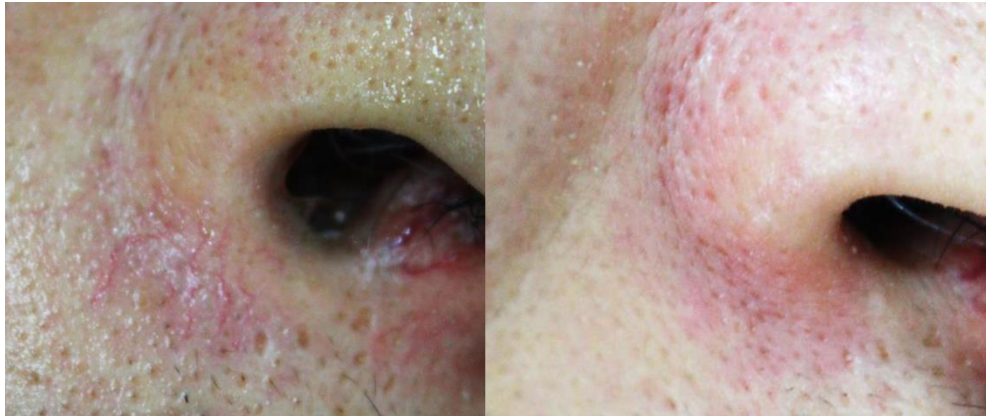
The effects of IPL on treating acne vulgaris have been previously mentioned multiple times in different studies, and this proven effect was confirmed again using the cellec v 500(S) filter. The acne patient had skin type II. First treatment (1pass) was performed using the 500(S) filter with the following conditions: 13J/cm², double pulse, 2.2ms/4.6ms pulse duration, and 15ms pulse delay. Additional 1pass treatment was given using the 550(S) filter with the following conditions: 13J/cm², double pulse, 4ms / 7ms pulse duration, and 20ms pulse delay.

For each treatment, pictures of the patients were taken using an identical camera for all pictures. Comparison of pre-treatment and post-treatment pictures assessed the effects of the treatment. After completion of treatment(s) in all patients, a survey was provided to assess satisfaction of the patients, with scores of 1 (unsatisfied), 2 (somewhat satisfied), or 3 (highly satisfied). Any instances of adverse effects throughout the study period were recorded.

Results

All 10 patients who received the treatment had clinical improvements. Comparison of the pictures pre-treatment and post-treatment (3 treatments) demonstrated the effectiveness of the treatment. All patients exhibited improved skin texture and clearer skin.

Fig. 1 compares the pre-treatment and post-treatment pictures of the telangiectasia patient. Telangiectasia immediately disappeared and has improved by >90%. From the follow-up 1-month post-treatment, we observed rejuvenation of the vessels that were not completely damaged. Nevertheless, compared to the baseline, the patient was improved by >70%. All patients with facial flush demonstrated effectiveness after 3 treatments, as shown in Figs. 2 – 4. There was only one patient (out of 10 patients) suffering from acne vulgaris. After treatment using both 500S and 550S filters, not only acne vulgaris but also acne itself was improved.



Baseline

Immediately

FIGURE 1: Telangiectasia patient (skin type III) given one-time treatment using the 500(S) filter, 16J/cm², double pulse, pulse duration 2.5 and 5.0ms, and pulse delay 20ms. Immediately after the treatment, the patient exhibited >90% improvement.



Baseline

after 3rd treatment

FIGURE 2: Facial flush patient (skin type II) given 3 treatments (with a 2-week increment between each treatment) using the 500(S) filter, 14-16J/cm², double pulse, pulse duration 2.4ms / 4.4ms, and pulse delay 20ms. The comparison is made between the baseline (pre-treatment) and 1-month after the 3rd treatment. Not only flush but also skin texture was largely improved.



FIGURE 3: Facial flush patient (skin type III) given 3 treatments (with 2-week increment between each treatment) using 550S Filter, 12~15J/cm², double pulse, pulse duration 3.0ms / 6.0ms, and pulse delay 20ms. The comparison is made between the baseline (pre-treatment) and 1-month after the 3rd treatment. Not only flush but also skin texture was largely improved.



FIGURE 4: The patient exhibited facial flush on the entire cheek. The patient (skin type III) was given 1 pass treatment using the 560 filter, double pulse, pulse duration 3.0 / 6.0ms, 16 J/cm², and another 1 pass treatment (2shot) using the 530D Filter, 17J/cm², single pulse, and pulse duration 8.8ms. The post-treatment picture is taken after 1 treatment, demonstrating improvements made to both superficial and deep vessels and consequently improved facial flush.

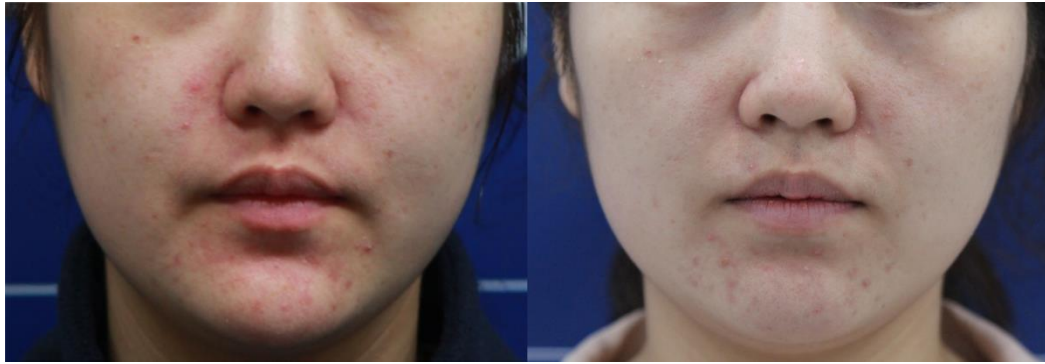


FIGURE 5: This patient exhibited acne vulgaris to the sides of the nose and chin. The patient (skin type II) was given 3 treatments (with a 2-week increment between each treatment) using the 500(S) filter, double pulse, pulse duration 2.4ms / 4.4ms, and pulse delay. Both acne and acne vulgaris improved, and skin tone has turned lighter.

Satisfaction survey results indicated high levels of satisfaction with 8 patients responding as "highly satisfied", 1 patient responding "satisfied", and 1 patient responding "unsatisfied". The patient who responded "unsatisfied" had a localized stretch mark after the 2nd treatment. This patient had no symptoms immediately after the treatment, but exhibited an IPL sapphire-shaped black scab on treated area the day after treatment. This patient did not exhibit blister formation, and therefore we monitored the condition until 48 hours after the treatment. From the 3rd day post-treatment, we administered duoderm extra thin CGF dressing and removed it on the 7th day. The scab naturally fell off a week after with no PIH being observed.

Discussion

Despite the small sample size, we confirmed that 3 new filters from cellec v are effective against vascular lesions. However, the range of wavelengths is not within the safe zone and therefore the technology must be used with caution. Localized lesions such as telangiectasia can be removed with aggressive treatment. However, using a large amount of energy to treat larger vascular lesions such as facial flush has a higher risk of burns, and therefore the treatment must be performed over the course of 3 – 5 sessions. The new filter allows for high absorption not only in the vessels but also in melanin, and therefore is likely to be effective for skin pigmentation treatment as well. Using this study as a foundational study, we expect more studies to be completed on the new filter of cellec v in order to maximize its utility.