

## Treatment of Verrucous Epidermal Nevus with Combination of Shave Removal and CO<sub>2</sub> Laser

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**Key Words:** Verrucous epidermal nevi, shave removal, CO<sub>2</sub> laser, dermabrasion, curette

### Abstract

**Background:** Verrucous epidermal nevi are hamartomatous lesions of epidermis that induce aesthetic problems especially in face and neck. Many treatments are suggested for this disorder but most of them are disappointing.

**Material and Methods:** This was a follow-up study done on 14 patients (7 male, 7 female) aged 16-34 years. Initially shave removal was done by dermabrasion or curette to papillary dermis and later 3 passes of CO<sub>2</sub> laser were made in abrasive area.

**Results:** From 14 patients, 2 and 12 patients had systemized and localized types respectively; 10 patients (71.4%), and 2 patients (8.3%) responded well from excellent to moderate respectively, but 2 patients (8.3%) showed poor response, although no complication was ever seen on any patients.

**Conclusion:** This treatment is appropriate for extensive, thickened, non-pigmented lesions, resistant to other treatments of verrucous epidermal nevi.

### Introduction

Verrucous epidermal nevi (VEN) are non-inflammatory epidermal hamartomas usually present at birth. Prevalence of VEN in adult is about 0.1%-0.5% [1].

Clinically VEN are characterized by verrucous skin-colored to brown confluent papule which present apparent papillomatous plaque often with linear configuration. VEN may be localized, systemized, nevus unius lateralis, ichthyosis hystrix and inflammatory linear verrucous epidermal nevus [2].

Histological findings are significant hyperkeratosis, papillomatosis, and acanthosis with elongation of the rete ridges similar to seborrheic keratosis as well in systematized variant frequently degeneration of granular layers have been found [3].

Intertriginous lesions may be macerated and induce malodor and secondary infection [1, 2].

In rare cases, squamous cell carcinoma or basal cell carcinoma can develop within the nevus especially in those over 40 years of age [4, 5].



**Figure 1.** Pretreatment of patient with face involvement



**Figure 2.** Post-dermabrasion



**Figure 3.** Post-laser



**Figure 4.** Post-treatment

When VEN are extensive especially with face involvement, they induce cosmetic problems and patients inquire about recommendations [6].

Many topical treatments are suggested but all of them are disappointing and result in high rate of recurrence [7].

Physical modalities such as dermabrasion [1], cryotherapy [8], electro-cautery [9] are used for treatment for VEN but they are accompanied by variable results.

Multiple laser technologies including argon laser [10], Nd:YAG laser [6], ruby laser [11] Erbium-YAG laser [12, 13] and CO<sub>2</sub> laser [14, 15, 16, 17, 18] are used with variable results.

This study was conducted for treatment of VEN by combination of dermabrasion or curette for shave removal and CO<sub>2</sub> laser.

#### **Materials and Methods**

This was a follow-up study that was done in Hajdaie Dermatology Clinic of Kermanshah University of Medical Sciences over a period of 40 months from 2006 to 2010.

Patients who had histopathologically documented VEN and most of them were resistant to others treatments, enrolled in our study but impaired wound healing, keloid diathesis, history of consumption of oral isotretinoin from 6 months ago excluded them from the study. General information such as sex, age, and clinical findings regarding type and location of VEN were recorded. This

study was performed on 14 patients (7 female and 7 male) aged 16-34 years.

Information was given to the patients about this procedure and with the consent of patients treatment was carried. For evaluation of treatment photography was done before and after treatment on patients.

Initially, involved areas were anesthetized by injection of lidocain. Later depending on the size of lesion shaving was carried on by curette or dermabrasion in small and large lesion, respectively.

For shave removal, curettes of size 2 and 3 or diamond fraise dermabrasion with 15000-20000 rpm were employed until pinpoint bleeding was seen. It indicated that the shaving were done to papillary dermis.

In later step the abrasive area was subjected to treatment with three passes of pulse mode CO<sub>2</sub> laser system (Slim Evolution, Lasering) with 16-18 Watts power and 400-500 microseconds in each session. Remaining debris tissue between passes was wiped away by saline-soaked gauze.

Finally with caution and by use of lope, redundant lesion in treated area was removed by continuous mode of CO<sub>2</sub> laser with 0.5 Watts power.

Postoperative care included washing with rivanol 1/1000 and application of silver sulfadiazine and nonadhesive dressing, oral cephalixin 500 mg four times daily for 7 days and recommended avoidance of sun exposure. Reepithelialization usually

**Table 1.** Treated Area in Patients

|               | Frequency | Per Cent | Valid Per Cent | Cumulative Per Cent |
|---------------|-----------|----------|----------------|---------------------|
| Face          | 7         | 50.0     | 50.0           | 50.0                |
| Arm           | 1         | 7.1      | 7.1            | 57.1                |
| Neck          | 2         | 14.3     | 14.3           | 71.4                |
| Back          | 1         | 7.1      | 7.1            | 78.6                |
| Abdomen       | 1         | 7.1      | 7.1            | 85.7                |
| Scalp         | 1         | 7.1      | 7.1            | 92.9                |
| Face and neck | 1         | 7.1      | 7.1            | 100.0               |
| Total         | 14        | 100.0    | 100.0          |                     |

**Table 2.** Outcome of Treatment in Patients

|                   | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------|-----------|---------|---------------|--------------------|
| Poor              | 2         | 14.3    | 14.3          | 14.3               |
| Intermediate      | 2         | 14.3    | 14.3          | 28.6               |
| Good to excellent | 10        | 71.4    | 71.4          | 100.0              |
| Total             | 14        | 100.0   | 100.0         |                    |

occurred between 10-14 days and erythema improved during 3-4 weeks (Figures 1, 2, 3 and 4).

Patients were followed-up for assessment of improvement and complications at the end of the first and third weeks, second and third months and every three months thereafter.

**Table 3.** Outcome of Treatment Based on Location

|               |          | OUTCOME |              |                   | Total  |
|---------------|----------|---------|--------------|-------------------|--------|
|               |          | Poor    | Intermediate | Good to Excellent |        |
| Face          | Count    | 1       | 2            | 4                 | 7      |
|               | % within | 14.3%   | 28.6%        | 57.1%             | 100.0% |
| Arm           | Count    | 0       | 0            | 1                 | 1      |
|               | % within | .0%     | .0%          | 100.0%            | 100.0% |
| Neck          | Count    | 1       | 0            | 1                 | 2      |
|               | % within | 50.0%   | .0%          | 50.0%             | 100.0% |
| Back          | Count    | 0       | 0            | 1                 | 1      |
|               | % within | .0%     | .0%          | 100.0%            | 100.0% |
| Abdomen       | Count    | 0       | 0            | 1                 | 1      |
|               | % within | .0%     | .0%          | 100.0%            | 100.0% |
| Scalp         | Count    | 0       | 0            | 1                 | 1      |
|               | % within | .0%     | .0%          | 100.0%            | 100.0% |
| Face and neck | Count    | 0       | 0            | 1                 | 1      |
|               | % within | .0%     | .0%          | 100.0%            | 100.0% |
| Total         | Count    | 2       | 2            | 10                | 14     |
|               | % within | 14.3%   | 14.3%        | 71.4%             | 100.0% |

**Table 4.** Outcome of Treatment Based on Clinical Form

|           |          | OUTCOME |              |                   | Total  |
|-----------|----------|---------|--------------|-------------------|--------|
|           |          | Poor    | Intermediate | Good to Excellent |        |
| Localized | Count    | 1       | 2            | 9                 | 12     |
|           | % within | 8.3%    | 16.7%        | 75.0%             | 100.0% |
| Systemic  | Count    | 1       | 0            | 1                 | 2      |
|           | % within | 50.0%   | .0%          | 50.0%             | 100.0% |
| Total     | Count    | 2       | 2            | 10                | 14     |
|           | % within | 14.3%   | 14.3%        | 71.4%             | 100.0% |

If additional session was required especially in extensive VEN and recurrence, it was performed after 1-3 months.

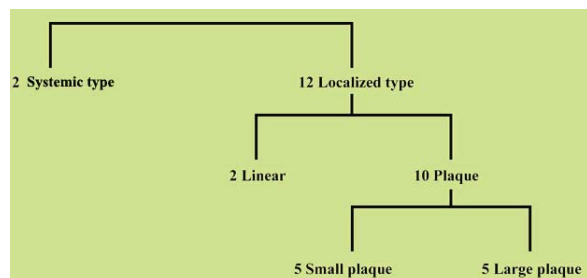
Outcomes of treatment based on satisfaction of patients are classified as: satisfied, moderately satisfied and unsatisfied. Based on our judgment regarding elimination of lesion and induction of scar through pre and post treatment photography in patient, they were classified in three categories: good to excellent response, when total or most of lesion disappeared with minimal or without scar formation, intermediate response with moderate to significant reduction of size and thickening of lesion with minimal scar formation and poor response with minimal or without change in lesions or prominent scar formation.

The proposal of the study was approved by the Ethics Committee of Kermanshah University of Medical Sciences. Analysis of data was carried out using the SPSS software version 16 and *Chi-square test*.

**Results**

From 14 patients, 2 and 12 patients had systemized and localized types respectively. From 12 patients with localized form, 2 patients showed linear array and 10 patients as confluent plaque. Ten patients had plaque form, 5 patients less than 20 cm<sup>2</sup> and 5 patients more 20 cm<sup>2</sup> (**Figure 5**).

The most common site of treatment was face in 7 patients (50%), followed by the neck in 2



**Figure 5.** Clinical characteristic of patients

patients (14.3%) and in 1 patient (7.1%) face and neck (**Table 1**).

The number of sessions was between 1-4 and mean 1.9 which depended on the type of VEN, recurrency and redundancy of lesion compared with the times before treatment. The outcome of treatment based on our observations included: the response of 10 patients (71.4%) and 2 patients (14.3%) was good to excellent and intermediate, respectively (**Table 2**).

The result of treatment in face included: good to excellent in 4 cases (50%), intermediate in 2 cases (28.6%) and poor in 1 case (14.3%). In neck area 1 case (50%) and 1 case (50%) showed good to excellent and poor response, respectively. In 1 case coincidence treatment of face-neck showed good to excellent response (**Table 3**).

In 2 patients with systemized VEN each one responded good to excellent and poor respectively. In 12 patients with localized VEN, 9 patients (75%), 2 patients (16.7%) and 1 patient (8.3%) responded good to excellent, intermediate and poor respectively (**Table 4**).

The outcome of treatment based on patients' judgments included 10 patients (71.4%), 1 patient (7.1%) and 3 patients (21.4%) satisfied, moderately satisfied and unsatisfied. Complications such as moderate to significant scar and persistent postinflammatory hyperpigmentation were not seen on any patients.

Because of the low number of cases, correlation between variables and outcome of treatment was not statically reliable.

**Discussion**

Combination of shave removal and CO<sub>2</sub> laser therapy could be a good optional treatment

for extensive, thickened, non-pigmented and resistant to other treatment of VEN.

Both ablative lasers for example CO<sub>2</sub> and Erbium:YAG lasers and selective photothermolysis, pigment-specific lasers such as argon, Nd:YAG and ruby lasers have been tried for treatment of VEN [6,10, 11, 12, 13, 14, 15, 16, 17, 18].

In a study, long pulse Nd:YAG laser had been used successfully on treatment of 21 patients with VEN where 8 patients (31.8%) showed excellent improvement [6].

Baba et al. [11] suggested ruby laser as an effective modality for treatment of dark-colored epidermal nevus. In 3 patients with epidermal nevus noticeable improvement was achieved by argon laser [10].

We believe that selective thermolytic chromophore specific lasers have a little place in treatment of VEN owing to the fact that most of them show pigment and vascular deficiency. Therefore, these lasers are effective in a few number that are pigmented or rich of blood vessel of VEN.

Ablative Erbium:YAG laser emits invisible near-infrared beam of 2940 nm, that significantly absorbed by water and may be effective for treatment of VEN [12, 13].

We think that less penetration, thermal damage and coagulation effect of Erbium:YAG laser result in limited effect of this laser for treatment of hard, thick and deep seated VEN.

Both continuous and pulsed modes of CO<sub>2</sub> laser have been conducted for treatment of VEN [14, 15, 16, 17, 18].

Thual et al. performed continuous mode of CO<sub>2</sub> laser in patients with VEN and concluded that it was a simple and efficient treatment of VEN but suggested ruling out teenage patients to avoid complications [17].

In a case report one patient with widespread soft variant of epidermal nevus was treated by CO<sub>2</sub> laser at four sessions that showed complete clearance of lesion without complication after 4 years [14].

Michel et al. [15] reported that superpulsed mode of CO<sub>2</sub> laser had more encouraging results but it had high risk of complication than other laser modalities.

In a case series study 3 female patients who were treated by pulsed CO<sub>2</sub> laser showed benefit of this treatment but not always without any complications [16].

In a study including 25 patients, it was concluded that superpulsed CO<sub>2</sub> laser was appropriate modality for elimination of soft and flattened type but no in keratotic of epidermal nevus [18].

In general pulsed mode of CO<sub>2</sub> laser is suitable for treatment of thinner, soft and localized form of VEN but is not sufficient for thick, hard, extensive variant of VEN.

Our reasons for this combined therapy are that many of VEN are thickening, extensive and hard; therefore this type is almost unresponsive to the modality treatment mentioned above. Also in this situation using monotherapy with CO<sub>2</sub> laser required numerous passage of laser therapy that resulted in thermal damage and it was very time consuming. Additionally, the result of shave removal as single therapy depended on the experience of the surgeon so that overtreatment or undertreatment is accompanied by complications and recurrence, respectively.

In our study from 14 patients, 10 patients (71.4%) and in 8 cases in which face area was treated, 5 cases (63.3%) showed good to excellent response.

In conclusion, although many forms of VEN show favorite response to most physical modality, combination therapy with shave removal and CO<sub>2</sub> laser could be an appropriate therapy for extensive, thickened, non-pigmented and unresponsive to other treatments of VEN.

## References

1. Mossi C, Shahidullahz H. Naevi and other developmental defects: In: Rooks Textbook of Dermatology. Burns T, Breathnach S, Cox N, Griffiths C, eds. 8<sup>th</sup> ed. Oxford, Wiley-Blackwell, 2010; 18.4-18.30.
2. Thomas VD, Swanson NA, Lee KK. Benign epithelial tumors, hamartomas and hyperplasias. In: Fitzpatrick's Dermatology in General Medicine. Wolf K, Lowell AG, Goldsmith LA, Katz SL, Gilchrist AS, Leffell DJ, eds. 7<sup>th</sup> ed. New York: McGraw Hill, 2008; 1054-1067.
3. Kirkham N. Tumors and cysts of epidermis: In: Lever's Histopathology of the Skin. Elder DE, Elenitsas R, Johnson BL, Murphy GF, Xu X. eds. 10<sup>th</sup> ed. Philadelphia, Lippincott Williams & Wilkins, 2009; p 235-278.

4. Cramer SF, Mandel MA, Hauler R, Lever WF, Jenson AB. Squamous cell carcinoma arising in a linear epidermal nevus. Arch Dermatol 1981; 117: 222-224. PMID: 7212744
5. Horn MS, Sausker WF, Pierson DL. Basal cell epithelioma arising in a linear epidermal nevus. Arch Dermatol 1981; 117: 247. PMID: 7212753
6. Attia A, Elbasiony MS. Treatment of Verrucous Epidermal Nevus Using Long Pulsed Nd: YAG Laser. Egyptian Dermatol Online J 2010; 6: 2.
7. Fox BJ, Lapins NA. Comparison of treatment modalities for epidermal nevus: a case report and review. J Dermatol Surg Oncol 1983; 9: 879- 885. PMID: 6630702
8. Panagiotopoulos A, Chasapi V, Nikolaou V, Stavropoulos PG, Kafouros K, Athanasios Petridis A, Katsambas A. Assessment of Cryotherapy for the Treatment of Verrucous Epidermal Naevi. Acta Derm Venereol 2009; 89: 292-294. PMID: 19479129
9. James AA, Carruthers L, Carruthers A. review: True Electrocautery in the Treatment of the Syringoma and Other Benign Cutaneous Lesions. J Cut Med Sur 1997; 2; 60-63. PMID: 19479129.
10. Landthaler M, Haina D, Waidelich W, Braun-Falco O. Argon laser therapy of verrucous nevi. Plast Reconstr Surg 1984; 74: 108-113. PMID: 6739584.
11. Baba T, Narumi H, Hanada K, Hashimoto I. Successful treatment of dark-colored epidermal nevus with ruby laser. J Dermatol 1995; 22: 567-570. PMID: 7560453
12. Park JH, Hwang ES, Kim SN, kye YC. Er-YAG laser treatment of verrucous epidermal nevus. Dermatol Surg 2004; 30: 378-381. PMID:15008864
13. Pearson IC, Harland CC. Epidermal naevi treated with pulsed erbium: YAG laser. Clin Exp Dermatol 2004; 29: 494-496. PMID: 15347334
14. Hohenleutner U, Wlotzke U, Konz B, Landthaler M. Carbon dioxide laser therapy of a widespread epidermal nevus. Lasers Surg Med 1995; 16: 288- 291. PMID:7791503
15. Michel JL, Has C, Has V. Resurfacing CO2 laser treatment of linear verrucous epidermal nevus. Eur J Dermatol 2001; 11: 436-439. PMID:11525951
16. Boyce S. CO2 laser treatment of epidermal nevi: Long- term success. Derm Surg 2002; 28: 611. PMID: 12135519
17. Thual Ni, Chevalier JM, Vuillamie M, Tack B, Leroy D, Dompmartin A. CO2 laser therapy of verrucous epidermal nevus. Ann Dermatol Venereol 2006; 133: 131-138. PMID:16508596
18. Parabela S, Pozo J, Jorge B, et al. Epidermal nevi treated by carbon dioxide laser vaporization: A series of 25 patients. J Dermatol Treat 2007; 18: 169-174. PMID: 17538806