



# TREATMENT OF BENIGN VASCULAR SKIN LESIONS WITH CARBON DIOXIDE LASER

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Fifteen patients, 10 males and 5 females, between 10-27 years age with different benign vascular skin lesions i.e. haemangioma (3) and lymphangioma circumscriptum (2) were taken up for this study. The lesions in all the patients were vaporized/excised with the indigenously developed carbon dioxide laser. The patients were evaluated at 1,2,4,8 and 12 weekly visits to assess the overall response to the treatment and the side effects. All the patients responded to the treatment. The patients with granuloma pyogenicum showed excellent response with complete disappearance of the lesions while the patients with haemangiomas, lymphangio-haemangiomas and lymphangioma circumscriptum improved by 70-90%. Transient hypopigmentation and mild scarring were seen in all the patients except in patients with granuloma pyogenicum. There were no other significant side effects in any of the patients.

*Key Words : CO<sub>2</sub> laser, Vascular skin lesions*

## Introduction

Laser is an optical device generating coherent, collimated and monochromatic light energy which can be used to destroy the unwanted tissue. The first working laser was developed in 1960.<sup>1</sup> Subsequently many laser systems using solid, liquid and gas as the lasing medium have been developed. But carbon dioxide (CO<sub>2</sub>) laser still remains the most versatile and useful laser in clinical practice.<sup>2</sup> It emits laser energy of this wavelength, hence it is non-specifically absorbed by water, therefore it causes non-specific destruction of the tissue. CO<sub>2</sub> laser can coagulate, vaporize or excise the tissue, therefore it can be successfully used to treat many lesions which were considered untreatable.<sup>2</sup> In a preliminary study we evaluated the therapeutic role of CO<sub>2</sub> laser in various benign vascular skin lesions.

## Materials and Methods

In this study 15 patients with various benign vascular skin lesions were taken up. A thorough clinical examination of the lesions including the examination of old injury scar, BCG scar etc, to look for keloids/hypertrophic scars was performed. The diagnosis in each patient was made purely on the basis of clinical features. The patients having tendency to develop hypertrophic scars/keloids and patients with history of bleeding disorders were excluded from the study. The lesion cleaned with diluted savlon and normal saline and anaesthetized with 2% lignocaine. Gauze pads soaked in normal saline or sterile water were kept around the lesion

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to absorb the laser radiant energy and to prevent accidental fire. The eyes of the patients were covered with soaked gauze pads to protect them from any accidental injury due to laser beam reflections. The surgeons and the attendants used protective goggles for eye protection. The surgical laser system used was model c-40 unit, an indigenous carbon dioxide laser apparatus developed by centre for Advanced Technology, Department of Atomic Energy, Indore, India. It employs carbon dioxide, nitrogen and helium (1: 2.5: 12) gases to produce 106000 nm wave length beam energy. The lesions were vaporized using the power settings of 10-20 watts delivered in continuous defocussed mode. Soft, fleshy and pedunculated lesions were excised by using the laser in focussed mode. The charred surface after ablation was cleaned with 3% hydrogen peroxide or sterile saline after laser ablation. Topical antibiotic cream was used in all the patients till the laser induced ulcers healed. The patients were evaluated at the end of 1st, 2nd, 4th, 8th and 12th weeks to assess the therapeutic response. Post treatment effects like colour changes, itching, pain, infection, scarring, atrophy and recurrence etc. if any, were also recorded. If there was no satisfactory improvement after the initial treatment, subsequent exposures were given. The final assessment was done at the end of 12 weeks and the overall response was graded as: excellent if the lesion regressed by 75%-100%, good if it was 50%-75% and poor if the improvement was less than 50%.

## Results

The present study had 15 patients, 10 males and 5 females between 10-27 years of age. Out of these 15



patients, 6 had haemangiomas, 3 each lymphangioma-haemangiomas and granuloma pyogenicum whereas 2 patients had lymphangioma circumscriptum. Patients with haemangiomas had asymptomatic lesions over the right arm, trunk, thighs, knees, forearm, and the dorsum of right hand present since birth or very early childhood. After laser therapy 4 patients had excellent improvement while 2 showed good regression. Three patients had lymphangioma-haemangiomas on the vulva, upper back and abdomen. Two of them showed good improvement while 1 patient had poor response. None of these patients reported for follow-up after 2 weeks. Three patients with granuloma pyogenicum lesions on the scalp and upper lip for 1-3 months had complete clearance of their lesions without any side effects. Two patients had lymphangioma circumscriptum on the trunk since birth and both of them had good response to treatment. Transient hypopigmentation and mild cosmetically acceptable scarring was seen in all the patients with haemangioma and lymphangioma lesions.

### Discussion

Many diseases which were considered impossible or difficult to treat are now being effectively managed with the carbon dioxide laser.<sup>2,3</sup> CO<sub>2</sub> laser has the ability to coagulate, vaporize or excise. However its main advantage in vascular lesions is that it can seal the smaller blood vessels during the procedure and hence provide a cleaner bloodless operating field. The healing of the tissue is also good after the procedure. In this study 17 patients with different benign vascular skin disorders were treated on an outpatient basis with continuous wave defocussed mode laser using an irradiance of 320 watts/cm<sup>2</sup> to 63, 700 watts/cm<sup>2</sup>. The degree of response in patients with haemangioma, varied from excellent to good (70-90%). Four of our patients had excellent (90%) improvement and two showed good (70%) improvement. Better results were obtained in younger patients and in those with smaller lesions. Similar results have been reported by the other workers as well with CO<sub>2</sub> laser.<sup>4-6</sup> Two patients with lymphangioma circumscriptum showed good (70%) regression while out of 3 patients with lymphangioma-haemangioma, 2 had good (50-75%) improvement. One patient had a large lesion over the vulva which had moderately profuse bleeding warranting discontinuation of procedure and had poor response. Other workers

have also reported good results with CO<sub>2</sub> laser and they have advocated its safety and usefulness in lymphangiomas.<sup>7-9</sup> Three patients with solitary pedunculated granuloma pyogenicum had excellent results after laser excision of the lesions from the pedicle. All these patients had complete hair growth and normal skin texture by 8th week postoperatively. Raulin et al, Sencer et al and Goldman et al have also reported excellent results with CO<sub>2</sub> laser in these patients with no side effects and they have advocated its use and superiority in patients with pyogenic granuloma.<sup>10-12</sup> However Lee et al, have reported failure of CO<sub>2</sub> laser in their 2 patients with granuloma pyogenicum.<sup>13</sup>

Therefore in conclusion, CO<sub>2</sub> laser seems to be a good therapeutic tool with excellent results for treatment of various benign vascular skin lesions in our patients. The side effects have been transient, minimal and well acceptable except in 1 patient. It can be considered a good therapeutic choice in these patients. However with more experience the results can be further improved and side effects minimized.

### References

1. Mianman TH. Stimulated optical radiation in ruby. *Nature* 1960; 187: 493-494.
2. McBurney ET. Carbon dioxide laser treatment of dermatologic lesions. *South Med J* 1978; 71: 795-797.
3. Nelson SJ. Lasers: state of art in dermatology. *Dermatol Clin* 1993; 11: 15-26.
4. Ohshiro T. The carbon dioxide laser treatment of cavernous haemangioma of the lower lip. *Laser Surg Med* 1981; 1: 337-345.
5. Barak S, Katz J, Kalpan I. The carbon dioxide laser in surgery of vascular tumors of the oral cavity in children. *ASDC J Dent child* 1991; 54: 293-296.
6. Lanigan SW, Cotterill JA. The treatment of port wine stains with carbon dioxide laser. *Brit J Dermatol* 1990; 123: 229-235.
7. Baillian PL, Kantor GR, Wheeland GR. Carbon dioxide laser vaporization of lymphangioma circumscriptum. *J Am Acad Dermatol* 1986; 14: 257-262.
8. White B, Adkins WY. The use of carbon dioxide laser in head and neck lymphangioma. *Lasers Surg Med* 1986; 6: 293-295.
9. Hass Af, Narurkar VA. Recalcitrant breast lymphangioma circumscriptum treated by ultra pulse carbon dioxide laser. *Dermatol Surg* 1998; 24: 893-895.
10. Raulin C, Petzoldt D, Werner S. Granuloma pyogenicum-removal with CO<sub>2</sub> laser. *Hautarzt* 1997; 48: 402-405.
11. Sencer M, Derancourt C, Blanc D, et al. Recurrent pyogenic granuloma or Warner and Wilson-Jones syndrome. *Arch Pediatr* 1997; 4: 653-655.
12. Goldman I, Perry E, Stefanovsky D. A flexible sealed tube transverse radio frequency excited carbon dioxide laser for dermatologic surgery. *Lasers Surg Med* 1983; 2: 317-322.
13. Lee CT, Tham SN, Tan, T. Initial experience with carbon dioxide laser in treating dermatological conditions. *Ann Acad Med Singapore* 1987; 16: 713-715.