

Cutaneous Laser Surgery Update

reported by Dr. Y. P. Fung

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Cutaneous Laser Surgery: An Overall Review

Speaker: Dr. M. Goldman

Selective photothermolysis is the principle mode of action of all laser systems. The wavelength of the laser is important not only for chromophore absorption but also for the depth of penetration. The pulse duration has to match the diameter or the size of the target and the fluence refers to the necessary energy required to destroy the target. The threshold incident laser dosage for epidermal injury can be very close to the threshold for removal of the target chromophore thus sometimes precluding the use of higher laser dosages. This can be overcome by epidermal cooling using gel, contact, dynamic or air cooling systems. Cooling also protects the skin and minimizes pain.

Intense pulse light is a technique sensitive procedure. Being a non-coherent light source of various wavelengths, treatment causes non-specific damage. It is best for treating telangiectasia for skin types I and II, and its success depends on the thickness of gel used, the temperature of the gel reached during the procedure and the different type of cut-off filters and pulse duration. Hypopigmentation may occur after treatment especially in pigmented skin but most resolve with time.

Port wine stain can be treated with pulse dye lasers and recurrence is rare. As the cognitive phase of self-consciousness begins at one and half to two years, The speaker believed that port wine stains should be treated in childhood. Up to 75% of adults with port wine stain felt that it had a negative impact on their lives and 52% thought that their lives improved radically with its eradication. Unresponsive lesions can be dealt with by increasing the spot size, fluence and the wavelength of the laser. Complications include purpura, hyper-

pigmentation, hypopigmentation and scarring. Cooling device allows higher energy to be used.

Strawberry haemangioma can be superficial or deep and composed of vessels of 100 μm in size. Though the literature reported 50% of patients had complete resolution by five years, 15% to 25% of lesions do not completely involute and 8% have a significant cosmetic deformity. Treatment with pulse dye laser is effective and 34% has excellent response while 39% has a response in the superficial part.

Use of Cutaneous Laser in the Treatment of Pigmentary Conditions

Speaker: Dr. H. H. L. Chan

Photodamage often causes lentigines rather than wrinkling in Asians. Laser has been used for the treatment of lentigines but Asians are more likely to develop hyperpigmentation due to higher epidermal melanin. In an in vivo trial comparing the use of different types of 532 nm neodymium:yttrium-aluminum-garnet (Nd:YAG) lasers in the treatment of facial lentigines in Oriental patients, the results showed that the Versapulse long-pulsed 532 nm laser is more effective and should be used instead of the Versapulse Q-switched (QS) Nd:YAG 532 nm laser for the treatment of lentigines in dark-skinned patients. Post-operative hyperpigmentation was common and could occur regardless of the type of laser used. Hyperpigmentation was seen in 24% of patients that did not usually tan after sunbathing. This is important as a small test area is recommended for all dark-skinned patients regardless of their skin response to ultraviolet light exposure. Other studies looking at the use of QS ruby laser for the treatment of cutaneous pigmented lesion in Chinese have reported a similar rate of hyperpigmentation. The role of QS Alexandrite (Alex) for the treatment of lentigines is much less certain.

Different types of QS lasers have been found to be effective in the treatment of naevus of Ota including the QS Ruby, QS Alex and QS Nd-YAG. A study was performed to compare the patient tolerance of QS Alex and QS Nd:YAG lasers in the treatment of naevus of

Ota. Patients' tolerance to QS Alex was better than QS Nd:YAG. However, QS 1064 Nd-YAG laser appeared to be more effective than QS Alex in the lightening of naevus of Ota after three or more laser treatments. Long term complications of QS lasers in the treatment of naevus of Ota include hypopigmentation especially among those treated with QS ruby. The condition also recur in patients with complete clearing after laser treatment and this is an important issue especially when children are treated. Patients with periorbital pigmentation that received Q-switched laser treatment often had periorbital under-response (panda's sign). Taking this and other factors into consideration, a new classification for naevus of Ota was proposed by the speaker allowing for the prediction of the clinical outcome of laser treatment.

Unlike naevus of Ota, acquired bilateral naevus of Ota like macules (ABNOM or Hori's macules) is an acquired conditions that often develops after 20 years of age, involves both sides of the face and mucosal involvement is not seen. Previous treatments involving the use of topical depigmentary agents and chemical peels resulted in partial but incomplete clearing. QS Nd-YAG 1064 nm laser has been reported to be effective in the clearing of this condition, but the results vary greatly. A recent local study found the use of QS Alex laser, in conjunction with topical depigmentary preparation, to be particularly useful, although hypopigmentation was common.

Melanocytic naevi are common and often removed for cosmetic reasons. Different pigmented lasers have been used in their removal and among them ruby laser is particularly well studied. Both the normal mode ruby laser (NMRL) and the QS ruby laser have been used either on their own or in combination for the removal of these lesions. NMRL has been suggested to be particularly effective as the long pulse duration allows thermal destruction of a heavily pigmented zone of melanocytic cells clustered into a nest formation. One of the most controversial areas in laser surgery is the treatment of congenital melanocytic nevi and the risk of melanoma development. There is so far no documented case of melanoma developing from benign melanocytic naevi after laser surgery. Even for the Asian race, the use of laser in the treatment of melanocytic naevi should be avoided if the lesion is located in acral areas, or if there is any other risk of melanoma.

Long Term Clinical Result of Hair Removal in Asian Skin using 800 nm Diode Laser

Speaker: Dr. W. K. K. Fung

An ideal laser system for permanent hair reduction should meet the following criteria:

1. Appropriate wavelength to achieve deep dermal penetration and adequate melanin absorption;
2. Pulse duration below the thermal relaxation time of hair follicle;
3. Cooling device to protect the epidermis;
4. A large spot size and a fast working speed; and
5. Intra-operative discomfort should be minimal with little or no postoperative adverse effects.

Asian patients with hair on the axillae, perioral areas, neck, face, legs and thighs were recruited. After shaving, a trial area was selected to obtain an optimal parameter setting. The whole area was then treated with the laser for one pass with minimal overlap of adjacent pulses. The same area was treated again at four to eight weeks intervals, depending in the rate of hair growth, until 80-90% of visible dark hairs were removed. On completion of treatment, patients were followed up for at least one year.

All patients experienced hair loss of 20-40% after a single treatment session, and more hair loss was noted with further sessions. After three sessions, a 60-90% hair loss was noted in all areas, with the axillae having the best results. Most patients experienced mild stinging pain during treatment, with more pain noted in the axillary and beard areas. Postoperative erythema and perifollicular oedema were transient. About 20% of patients had perifollicular pigmentation, which faded in four to eight weeks. None of the patients had scarring or permanent pigmentary changes. Patients who were followed up for over one year were assessed for any increase in hair growth in treated areas. Most did not have noticeable regrowth of dark hairs, and all were satisfied with the treatment results.

It was concluded that the new pulsed diode laser was both effective and efficient in removing hairs from different body areas in Asians, and was clinically safe and free from side effects. Long term follow-up of patients for over one year indicated the long lasting effects of hair reduction with this diode laser system.