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CLINICAL REPORT

Ruby Laser Treatment of Congenital Melanocytic Naevi – A Pessimistic View

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Congenital melanocytic naevi may be disfiguring and potentially malignant. Treatment with lasers is a relatively new option, and promising results have been published. Most studies include few patients, and describe the effect of different lasers and different techniques. The aim of this report is to evaluate the results of ruby laser treatment on facial congenital naevi in children. Fourteen children (age range 2–16 years) with medium-sized congenital naevi were included. All naevi had a facial distribution, and were considered unsuitable for surgical excision. Ten children (age range 2–5 years) were treated under general anaesthesia and 4 under local anaesthesia. Q-switched and normal mode ruby lasers were used in 12 children and normal mode only in 2. Treatments were performed at intervals of 2–20 months (median 3 months), and the number of treatments varied between 2 and 8 (median 3). The results were monitored by clinical photographs. None of the patients showed a satisfactory result. Based on these results, laser treatment with ruby laser in children with congenital naevi is not recommended outside of clinical studies. Laser treatment may have a malignant potential that in our opinion is not balanced by good clinical results. ***Key words: congenital naevi; ruby laser; children.***

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Congenital naevi are present in 1% of neonates. Most lesions are small- or medium-sized, measuring less than 20 cm in diameter. Histological characteristics of congenital naevi are nests of melanocytes in the lower two-thirds of the dermis, often in the skin adnexal structures and between collagen fibres. These features are, however, not present in all small- or medium-sized congenital lesions (1). The risk of melanoma developing in these lesions if left untreated is controversial (2, 3).

Treatment of congenital naevi with a low malignant potential should not increase melanoma risk. With respect to treatment, surgical excision is still the gold standard. Over the last decade, reports have documented the effectiveness of different laser systems, in particular the ruby laser (4, 5). In initial reports Q-switched lasers were used. Reduction of pigmentation was modest, and partial repigmentation was seen in all patients (6, 7). Repigmentation was believed to originate from deeper dermal levels. Histological studies have confirmed that recurrence is dependent on the depth of naevomelanocytic nests (8).

Later, the technique was changed to include normal mode delivery of energy (9). This mode penetrates deeper parts of the naevus based on higher fluences and larger spot size. Pulsewidths of 1–3 milliseconds result in thermal damage in deeply situated melanocytic nests. More recent reports advocate techniques that combine normal mode ruby laser (NMRL) and Q-switched ruby laser (QSRL) (4, 5). The combined technique was developed because the success of NMRL and QSRL was restricted to partial lightening and incomplete histological clearance. Promising results obtained from small series have encouraged authors to argue that indication for surgical intervention should be re-evaluated (4). Critics state that laser treatment may be both mutagenic and increase metastatic potential (10).

In our department we have treated small- and medium-sized congenital melanocytic naevi located on children's faces. All naevi were considered unsuitable for surgical excision. The indication for treatment was cosmetic.

MATERIAL AND METHODS

Fourteen Caucasian children (age range 2–16 years) with medium-sized congenital naevi were included. All naevi had a facial distribution. Ten children (age range 2–5 years) were treated under general anaesthesia and 4 under local anaesthesia.

Ruby laser (EpiTouch Ruby 5000, Sharplan) in normal mode combined with Q-switching was used in 12 children and normal mode only in 2 (deviation from protocol). Normal mode energy delivery had a pulse duration of 1.2 milliseconds, and maximum fluence reached for each patient was between 25 and 40 J/cm^2. Q-switched mode generates a pulse of 20–40 nanoseconds duration and maximum fluence reached was between 7.5 and 10 J/cm^2. Combined mode was performed as described by Kono et al. (11). Multiple passes of QSRL were applied after one initial pass of NMRL and manual epidermal peeling.

Treatments were performed at intervals of 2–20 months and the children received between 2 and 8 treatments (median 3) (Table I). The result were monitored by clinical photographs. Treatment was stopped if no further lightening was observed.

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Table I. *Overview of number of ruby laser treatment sessions and settings, time period of treatments and follow-up in months. Maximum fluence in J/cm² in parentheses*

Patient	Total number of			Treatment period/ follow-up (months)
	Sessions *n*	QSRL sessions *n* (J/cm²)	NMRL sessions *n* (J/cm²)	
1	3	1 (7.5)	2 (40)	15/–
2	7	5 (10)	6 (40)	20/–
3	2	1 (9.8)	2 (33)	3/6
4	2	1 (10)	2 (40)	7/3
5	2	1 (10)	2 (40)	3/3
6	6	2 (7.5)	6 (33)	36/7
7	1	1 (10)	1 (30)	–/6
8	3	3 (7.5)	3 (25)	5/4
9	5	4 (10)	5 (33)	12/5
10	2	0	2 (40)	3/7
11	8	4 (10)	7 (30)	23/2
12	2	0	2 (35)	11/–
13	5	5 (10)	5 (35)	13/21
14	6	3 (10)	6 (40)	15/9

QSRL: Q-switched ruby laser, NMRL: normal mode ruby laser

RESULTS

All naevi showed a partial, initial response to ruby laser treatment, but re-pigmented after several months (Fig. 1). Some degree of persistent lightening was seen in most patients, but lightening was of minimal clinical relevance. The result was not satisfactory in any patient as judged by the patient or the parent. Two children were referred to plastic surgeons. The other 12 are waiting for treatment with new laser systems if proven effective.

DISCUSSION

This case series is fairly large and there should not be any selection bias. Our department is the only department of dermatology in Norway treating pigmented lesions with lasers. All children considered unsuitable for surgery were offered laser treatment, and are included in our series.

Most congenital melanocytic naevi contain nests of melanocytes deep in the dermis, often related to skin appendages. All studies suggest that these melanocytes are the origin of recurrence. Not all congenital naevi will exhibit these histological features, especially not the small ones (1). Acquired melanocytic naevi do not have these deep nests, and these naevi respond more favourably to ruby laser treatment (12, 13). It is possible that cases without the classical congenital histology are included in the successful case series presented in the literature. Both cases reported by Kono et al. (11) are small naevi. The technique described used whitening of the naevus as a clinical endpoint of QSRL. In our experience, whitening was difficult to obtain, even with maximum fluences after the initial NMRL pass. This indicates that melanocytic nests in our patients were deeper situated. Ethnicity may also be of importance.

It has been argued that cosmetic success of laser treatment is dependent on a microscopic scar masking the underlying residual naevus cells. One report using histological observations estimates that 4–6 laser treatments are required to achieve a subtle scar with masking properties (14). Six children in our study had 5 or more treatments and reached high maximum fluences between 30 and 40 J/cm². Re-pigmentation occurred in all patients. This observation led other parents to stop treatment of their child after only 2 or 3 treatment sessions.

An important issue is the possible potential for malignant transformation. Concern has been raised about the possibility of laser treatment inducing malignant changes in melanocytes (8). Recent studies have confirmed an up-regulation of melanocytic adhesion molecules after laser treatment, indicating increased metastatic potential (10). Recently, a report was published where a malignant melanoma occurred at the periphery of a giant naevus previously treated with laser therapy (15). The

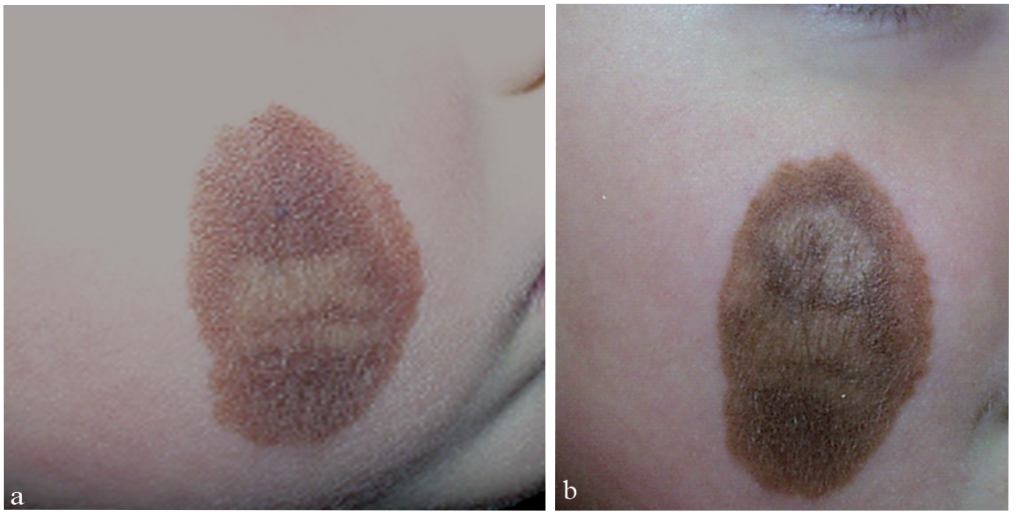

Fig. 1. Naevus 5 months after initial test spots (a) and after 5 treatments (b).

authors conclude that there is no evidence suggesting that melanoma developed as a consequence of laser treatment, but long-term mutagenic risks may exist.

In conclusion, published studies on laser treatment of congenital naevi could encourage dermatologists to believe that ruby laser is a good alternative to surgical excision. Our results do not support this view. Laser treatment may have a malignant potential that in our opinion is not balanced by good clinical results.

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