

SHORT COMMUNICATION

High-energy neodymium laser radiation for the treatment of face cutaneous melanoma

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Summary

This study retrospectively evaluated the curative efficacy of two powerful pulsed Neodymium (Nd) lasers ($\lambda = 1060$ nm, pulse duration 1 and 4.5 msec, maximum pulse energy 700 and 1000 J, respectively) for the treatment of 47 patients with histologically confirmed stage I cutaneous melanoma of the face who were followed-up 5 years and more. The esti-

mated 5-year survival rate was 82.9%. Regional and distant metastases developed in 23.4% of the patients. There were no cases with local recurrences. High-energy pulsed Nd laser radiation is effective in treating flat and / or slightly raised cutaneous stage I facial melanomas, while the therapeutic result is also accompanied by positive cosmetic result.

Key words: facial melanoma, neodymium laser radiation

Introduction

The main treatment method of cutaneous melanoma, that affects the face in 5.5-8.7% of the cases, is surgical excision and Mohs' micrographic surgery. In case of surgery for stage I face cutaneous melanoma, which has a relatively more favorable prognosis (due to the higher frequency of the lentigo maligna melanoma) in comparison with other tumor localizations, 5-year survival rates range between 76.0 and 86.0%, local recurrences develop in 2.4-5.5% of the cases and regional and distant metastases are found in 17.0-31.0% of the patients [1,2].

Development and introduction into clinical practice of new effective methods of treatment for malignant cutaneous tumors is one of the urgent problems of modern oncology. As well-dosed, non-contact, sterile and bloodless method, laser radiation is now successfully applied in oncological-dermatological practice [3-6].

In this study we used high-energy Nd laser radiation to treat patients with stage I facial cutaneous melanoma.

Methods

From February 1997 to December 2003 laser ra-

diation was used for the treatment of 47 patients with facial nonulcerated histologically confirmed stage I melanoma. In 25 (53.2%) patients melanomas did not exceed 1.0 cm in diameter, in 18 (38.3%) patients melanomas were 1.1-2.0 cm and in 4 (8.5%) cases tumors were over 2.0 cm in diameter. Of 47 melanomas 21 (44.7%) were flat and 26 (55.3%) were elevated by 1-2 mm. The average patient age was 53.1 years (range 29-67). Patient population included 8 males and 39 females. Clark level I was seen in 1 (2.1%) patient, level II - in 17 (36.2%), level III - in 19 (40.4%) and level IV - in 10 (21.3%) patients. Level V was not detected. In 16 (34.0%) patients Breslow thickness was 0.5-1.5 mm, in 23 (48.9%) 1.51-3.0 mm and in 8 (17.0%) patients 3.1-4.0 mm.

Two high-energy pulsed Nd ($\lambda = 1060$ nm) lasers applications (Pulsar-1 000 and its modification Pulsar-1 000M, Russia) were used. Nd lasers were solid state lasers on the glass with the Nd addition working in pulsed mode (pulse duration 1 and 4.5 msec, maximum pulse energy 700 and 1000 J, respectively, light spot diameter 0.5-1.5 cm). Depending on tumor size 5-12 impulses with 45-60 sec intervals were given and 3520-7300 J light energy was delivered to tumor lesion. Laser therapy was performed under local anesthesia with 1% solution of lidocaine hydrochloride plus adrenaline and was carried out during one session, paying special attention

to include in the area of irradiation clinically clear skin about 1.0-1.5 cm from the visible rim of the tumor [2].

The patients were treated on outpatient conditions. Laser radiation produced destruction of the tumor and healthy tissues via coagulatory necrosis. All patients were followed-up from 5 to 11 years (median 7.5) after treatment.

Results

The 5-year survival was 82.9% (of 47 patients 39 were alive 5 years or more and 8 died of generalized disease). Three patients developed regional nodal metastases and were alive with no evidence of disease after lymph node dissection for more than 5 years. Regional and distant metastases developed in 11 (23.4%) patients from 5 months to 3.5 years after treatment. Lesions were detected in regional lymph nodes in 8 (17.0%) and synchronous regional and distant metastases in 3 (6.4%) patients. No regional and distant metastases were seen in the unique patient with Clark level I. In case of Clark level II only regional metastases appeared in 3 of 17 (17.6%) patients; in Clark level III (5 of 19 patients/26.3%) 4 (21.0%) developed regional metastases and 1 (53%) developed synchronous regional and distant metastases and in Clark level IV - in 3 of 10 (30.0%) patients 1 (10.0%) developed regional and 2 (20.0%) synchronous regional and distant metastases. In Breslow thickness 0.5-1.5 mm metastases developed in 2 of 16 (12.5%) patients, 1.51-3.0 mm in 6 of 23 (26.1%) patients and 3.1-4.0 mm in 3 of 8 (37.5%) patients. In Breslow thickness 0.5-3.0 mm only regional and distant metastases were detected. No local recurrences were observed.

Discussion

The obtained data showed a rather high 5-year survival of patients after treatment for stage I cutaneous melanoma of the face by high-energy pulsed Nd laser. The frequency of regional and distant metastases after irradiation by Nd laser is practically the same as with surgical treatment. The absence of local recurrences after Nd laser radiation is likely to be due to the fact that pulsed laser coagulation of cutaneous melanoma creates rich lymphoid-histiocytic infiltration in the wound [7], which prevents the development of local recurrences. Pulsed Nd laser radiation produces positive cosmetic outcomes (Figure 1 a, b), which contribute to rapid social rehabilitation of patients. The procedure itself is technically simple, carried out in outpatient conditions and provides good psychological effect.

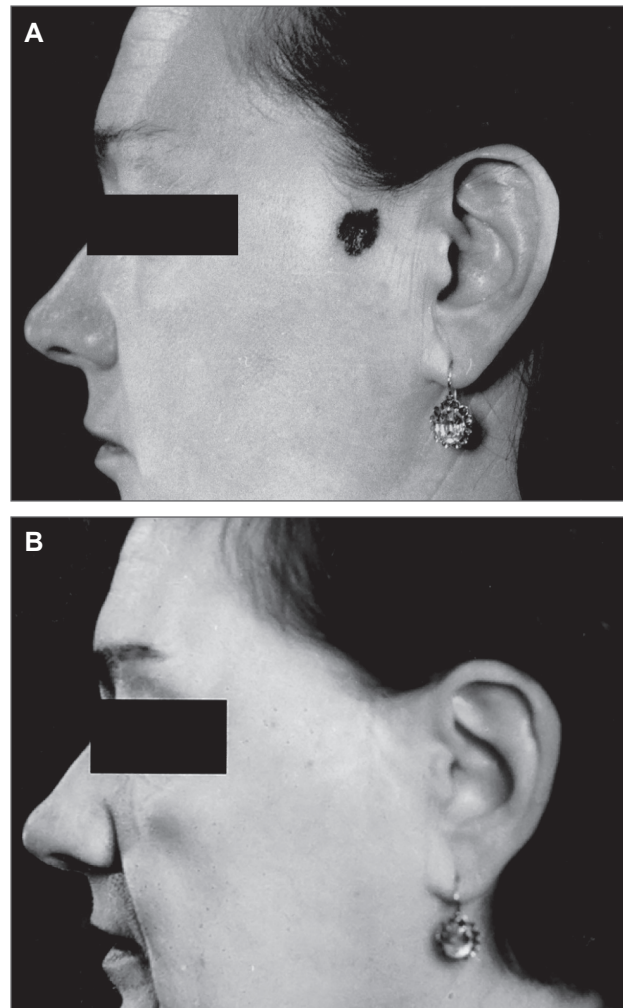


Figure 1. Melanoma (epithelioid-cell, Clark III and Breslow 2.1 mm) near the left ear. **A:** Before treatment. **B:** 10 years after Nd laser treatment.

A small number of authors have reported contradictory results concerning laser therapy in stage I cutaneous melanoma. According to Terentiev and Yakhontov [8] who used CO₂ laser radiation for destruction of histologically confirmed stage I cutaneous melanomas, 5-year survival of patients was 88%. In contrast, Reali et al. [9] reported that CO₂ laser therapy did not improve the results for stage I melanoma patients as compared to traditional surgical treatment. However, Karrer et al. [10] do not recommend laser therapy for primary malignant melanoma of any stage. Yet, the majority of authors consider that laser radiation is an effective curative treatment only for cutaneous metastases of malignant melanoma [11].

High-energy pulsed Nd laser radiation is effective in treating stage I flat and/or raised lesions of 1-2 mm with Breslow thickness up to 4.0 mm and I-IV Clark levels. Careful patient selection for laser treatment is essential to secure positive results.

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