Skin incision versus laser – the influence of different techniques on scar formation and lymphatic drainage in rats. A preliminary report

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Abstract

Introduction: The constantly rising number of skin malignancies and increasing cancer awareness encourage more people to visit outpatient clinics in order to have various skin lesions removed. Despite the fact that scarring is a physiological response to any excision procedure, minimizing the size of it is a goal of every good practitioner. Therefore the question arises whether different techniques used to remove skin lesions may impact the formation and quality of skin scars.

Aim: To perform an evaluation of skin scars formed by laser and surgical incisions and their influence on lymphatic outflow in rats.

Material and methods: Five male rats were used. Using methylene blue, the migration of dye through lymphatic channels of the lower extremity was measured. Afterwards, transverse incisions were made distally using laser and a surgical blade. Wounds were left to heal by secondary intention. After 4 weeks dye migration assessment was repeated and tissue samples were obtained for microscopic evaluation.

Results: Wounds after surgical incisions healed entirely. Wounds after laser treatment had not healed, with a visible area of granulation tissue and hair loss. Significantly worse dye migration was observed in rat extremities after laser therapy than after surgical incision (p = 0.007).

Conclusions: The results of the study show that the size of the scar can depend on the incision technique used. Larger scars after laser therapy limit the lymphatic flow of the skin, which may have an adverse effect on mapping sentinel lymph nodes. However, this hypothesis requires further research.

Key words: scar, laser, skin cancer, lymphatic drainage.

Introduction

In recent years, increased occurrence of skin malignancies has been observed. The most common include basal-cell carcinoma, squamous-cell carcinoma and melanoma (which makes up 4% of all malignant tumors). Special attention should be paid to malignant melanomas, as even a very small primary lesion with a diameter of a few millimeters can already metastasize severely, reducing the overall survival rate [1, 2].

Increased skin cancer awareness encourages more people to visit outpatient clinics in order to have a skin lesion removed. Some of them present with an already diagnosed skin malignancy, but a large number of patients would like to have skin lesions excised due to aesthetic indications.

In the material of the Department of Plastic, Endocrine and General Surgery of the Pomeranian Medical University, the percentage of incidental skin cancer and melanoma diagnosis after excision based on aesthetic indications is 10%. The basic technique used is a classic surgical excision. Laser or cryotherapy is less common. After each procedure a scar forms as a physiological response to injury. Minimizing the size of the skin scar after any procedure is a goal of every practitioner regardless of...