

Case report - "Change in vascularization of cutaneous melanoma metastases under local immunotherapy, visualized by line-field confocal optical coherence tomography"

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Introduction

There is an increasing incidence of melanoma worldwide, as well as the occurrence of systemic and locoregional metastases in advanced stages of disease. Although imaging studies have been performed, there are few studies and case reports addressing line-field confocal optical coherence tomography (LC-OCT) imaging of vascular morphology under local immunotherapy in melanoma and its skin metastases. The present case report used LC-OCT to visualize and analyze the changes in vascular morphology and blood flow of melanoma skin metastases under local immunotherapy with interleukin-2 (IL-2).

Objectives

The aim is to show that the vascular morphology and blood flow of the metastases approximate the structure of healthy skin, which could make it possible to predict the response to therapy in the future.

Methodology

Initially, targeted measurable skin metastases were selected on the patient's right inner thigh. The metastases were assessed macroscopically, microscopically using reflected light microscopy, and both the blood flow and the morphology of the blood vessels were qualitatively recorded using LC-OCT in horizontal sections and the video function. Regular control examinations were carried out over a period of two months under immunotherapy with IL-2 in order to document possible changes.

Results and conclusion

Dermoscopic imaging

The quantitative acquisition and evaluation of the dermoscopic images showed a clear change from disseminated erythematous, concentrically arranged standing nodules with polymorphic vessels (blobs, coils, lines, curves, serpigios, branching, arborising) of different diameters distributed over the right inner thigh to ulcerated necrotic and crusty plaques under local immunotherapy with IL-2.

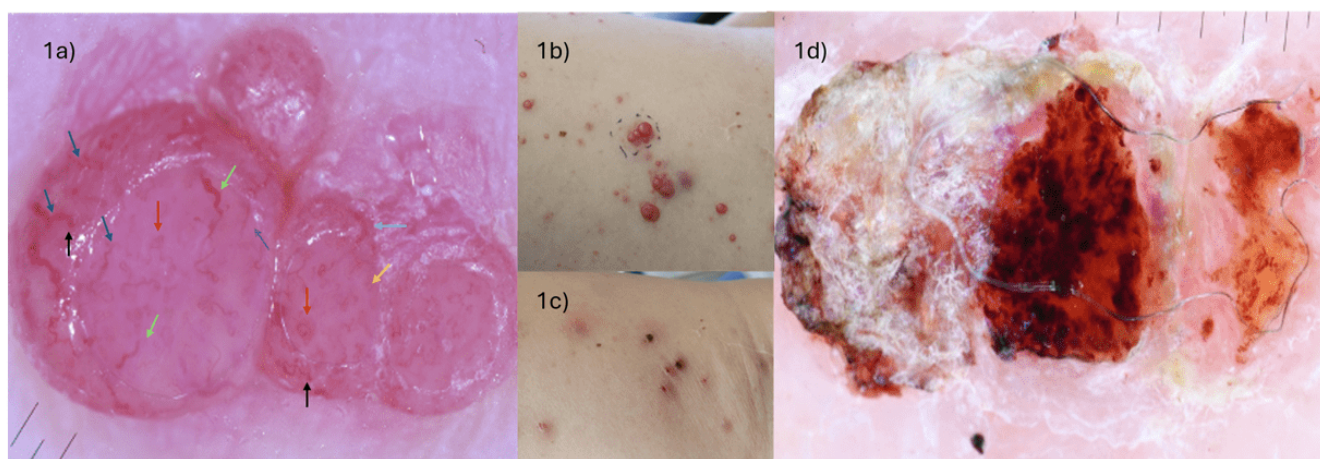


Fig. 1. Clinical images (1b, 1c) and dermoscopic images (1a, 1d) of melanoma skin metastases on the inner thigh before (1a, 1b) and after (1c, 1d) local immunotherapy with interleukin-2. Dermoscopic images showed a clear change from disseminated erythematous, concentrically arranged standing nodules with polymorphic vessels (blobs (yellow arrow), coils (red arrows), lines (purple arrow), curves (sky blue arrow), serpigios (green arrows), branching (blue arrows), arborising (black arrows) of different diameters distributed over the right inner thigh to ulcerated necrotic and crusty plaques.

LC-OCT imaging

The evaluation of the LC-OCT images showed that the blood flow decreased over the two-month treatment period and the vessel morphology changed. Originally polymorphic, serpigios vessels with a diameter of 87 μm and moderate blood flow developed into monomorphic, linear vessels with slow blood flow and a smaller vessel diameter of 44 μm . In addition, a surrounding inflammatory reaction was recognizable.

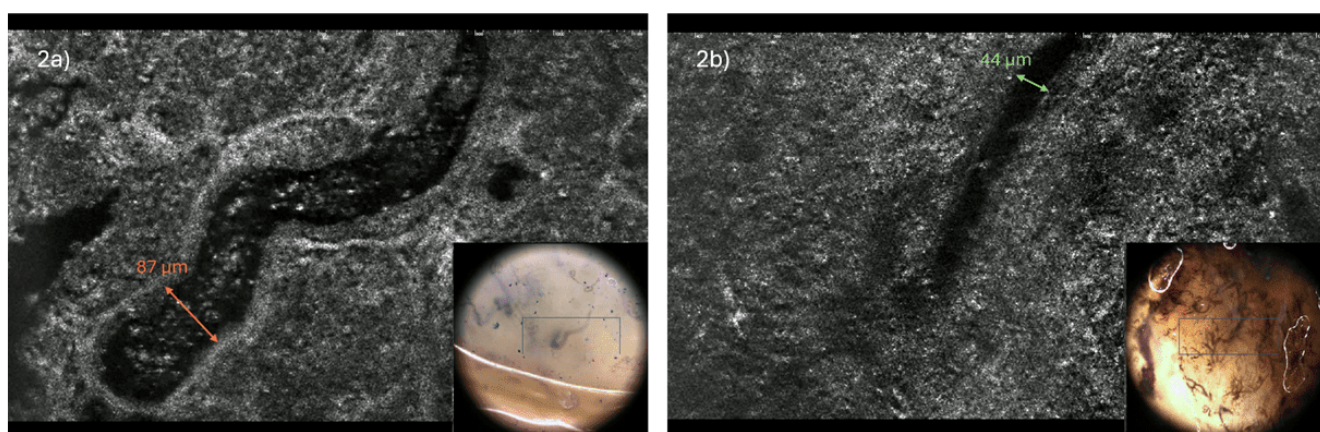


Fig. 2. Line-field confocal optical coherence tomography (LC-OCT) from a blood vessel of a melanoma skin metastasis on the inner thigh before (2a) and after (2b) local immunotherapy with interleukin-2. LC-OCT images showed that the blood flow decreased over the two-month treatment period and the vessel morphology changed. Originally polymorphic, serpigios vessels with a diameter of 87 μm (orange double arrow) and moderate blood flow developed into monomorphic, linear vessels with slow blood flow and a smaller vessel diameter of 44 μm (green double arrow). In addition, a surrounding inflammatory reaction was recognizable.

This case report aims to show how local immunotherapy with interleukin-2 alters the blood flow and vascular morphology of skin metastases from malignant melanoma to resemble healthy skin, potentially indicating therapeutic response.