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Title: "Photodynamic therapy and evaluation of its effectiveness using non-invasive diagnostic methods in selected dermatological conditions"

Introduction

This dissertation is based on five thematically related full-text publications on photodynamic therapy in the treatment of selected dermatological conditions.

Actinic keratosis (AK) is considered the most prevalent precancerous skin condition. Due to the high prevalence of AK, as well as the possibility of progression to invasive squamous cell carcinoma (SCC), its diagnosis requires treatment regardless of clinical stage. Photodynamic therapy (PDT) is used to treat this condition, with high efficacy and good cosmetic results. The available literature has suggested that PDT may be of limited value in the treatment of pigmented lesions. However, no studies conducted to date have analyzed the efficacy of PDT in various AK subtypes, including the pigmented subtype. There is also no work on the improvement of dermoscopic features or abnormalities in reflectance confocal microscopy (RCM) images after treatment with PDT in the different AK subtypes.

PDT, in addition to AK, can also be used to treat low-risk basal cell carcinoma (BCC) and also, for example, extramammary Paget's disease (EMPD).

Aims

The aim of the first stage of the work was to analyze the current state of knowledge about new therapeutic options for AK, the place of PDT in this indication and also the use of PDT in the treatment of the pigmented subtype of BCC of the skin. The second part of the PhD thesis evaluated the effectiveness of photodynamic therapy in the treatment of the pigmented subtype of solar keratosis. The final stage evaluated the use of (video)dermoscopy and reflectance confocal microscopy in assessing the efficacy of guided PDT in classic and pigmented AK (pAK) subtypes.

Material and methods

The first study included 20 lesions of the pAK in 16 patients treated with PDT. All skin lesions were evaluated clinically and dermoscopically for typical pAK features. RCM was also used to confirm the diagnosis of pAK, and exclude other diseases, as well as to evaluate keratinocyte atypia.

Then, in the second stage of work, patients with AKs on the face of grade II (25 pigmented, 275 non-pigmented) were included in the study. Skin lesions were evaluated by (video)dermoscopy and RCM at the beginning of the study and three months after PDT.

Results

In the first stage of work, after three sessions of PDT, complete resolution of all clinical features of pAK was observed in 80% of the lesions studied. Dermoscopically, 65% of the lesions achieved a total (100%) response, and no cellular atypia was observed in control RCM images in 85% of the lesions.

In the second stage of the work, it was observed that in classic AK the most common dermoscopic signs were small wavy vessels (96%), scaling (92%), microerosions (48%) and the so-called “strawberry” pattern (36%), while pAK was mainly characterized by a rhomboid pattern (80%), scaling (60%), white globules (48%), the superficial pigmentation and the so-called “jelly sign” (40% each). For the classic AK, the most characteristic RCM features were as follows: abnormal “honeycomb” pattern in the stratum spinosum, inflammatory infiltration of the epidermis, and solar elastosis, which were present in 96% of lesions. In pAK, the most common features observed in RCM were dark central areas of parakeratosis (72%), so-called “mottled pigmentation” (72%), inflammatory infiltration of the dermis (64%), solar elastosis (60%), and an abnormal “honeycomb” pattern in the spinous layer (56%). Dermoscopically, PDT resulted in complete resolution of the rhomboid pattern in both classic AK and pAK subtypes, the starburst pattern and so-called “jelly sign” in classic AK, and the inner gray halo, so-called “rosette sign” and crust in pAK. Three months after one PDT session, RCM evaluation showed mainly solar elastosis in both classic AK and pAK, inflammatory infiltration of the epidermis in classic AK, and inflammatory infiltration of the dermis in pAK - representing a response to the ongoing treatment.

Conclusions

Photodynamic therapy appears to be an effective treatment for the pigmented subtype of solar keratosis on the face in fair-skinned individuals. The use of new non-invasive imaging techniques, such as RCM and videodermoscopy, can better visualize the efficacy of ongoing treatment of AK in both its pigmented and classic subtypes.