Selected Aspects of Improving the Management of Skin Cancer

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John Paoli, MD, PhD, defended his PhD thesis on 3 June 2009 in Gothenburg, Sweden. The thesis was supervised by Associate Professor Ann-Marie Wennberg from the Department of Dermatology and Venereology, Sahlgrenska University Hospital, Göteborg and co-supervised by Marica B. Ericson, MSc, PhD, from the Department of Physics, University of Gothenburg. The opponent was Professor Bernt Lindelöf from Karolinska University Hospital, Stockholm. Professor Cecilia Björkelund, Associate Professor Mats Bjellerup, and Associate Professor Ingrid Synnerstad were members of the assessment committee.

Skin cancer incidence rates are constantly rising in Sweden. Therefore, improved techniques for prevention, early detection and effective treatment are required in order to deal with this growing problem. The thesis comprised four studies covering selected aspects of diagnostic, therapeutic and preventive methods, which aimed to improve the management of skin cancer.

Skin cancer diagnosis is currently based mainly on visual examination, dermoscopy and histopathology, but several new imaging techniques are under development. One of these is multiphoton laser scanning microscopy (MPLSM). We used MPLSM to study non-melanoma skin cancers (NMSCs) in comparison with healthy skin *ex vivo*. This technique allowed for visualization of typical histopathological criteria of superficial basal cell carcinomas and squamous cell carcinoma *in situ* lesions on a subcellular level. However, thicker nodular basal cell carcinomas were more difficult to study with MPLSM due to the limited imaging depth of approximately 100 µm.

Photodynamic therapy (PDT) is an effective therapeutic option for superficial NMSCs and it is considered a first-line therapy for extensive areas of actinic keratoses (AKs). New indications are constantly being evaluated. Penile intraepithelial neoplasia (PIN) is a diagnosis that lacks effective treatments with low recurrence rates; therefore the effectiveness of PDT was studied in the treatment of PIN. Seven out of ten patients responded to PDT in the study. Four of these seven patients showed no signs of recurrence after a mean follow-up time of 35 months.

The main drawback of treating patients with PDT is the pain caused during the irradiative phase. This is an adverse effect with which physicians have been struggling for years. We performed a split-face study on 16 patients with extensive AKs in the facial area. Supraorbital, infraorbital and mental nerve blocks were performed on half of the treatment area, while the other half was left untreated as in routine clinical practice. The study showed that nerve blocks provided excellent pain relief during PDT.

When it comes to primary and secondary prevention of skin cancer, different campaigns are regularly carried out to encourage sensible sun-exposure behaviours and promote skin self-examinations for early detection. One of these campaigns is the "Euromelanoma Day" screening campaign. The results of the Swedish campaign of 2008 were compiled. In one day in early May, dermatologists from 34 different clinics and hospitals screened 2659 patients. Compared with similar campaigns in other European countries, the Swedish campaign obtained up to 2–3 times higher detection rates of NMSC and malignant melanoma (MM). Twenty-four patients were diagnosed with MM. Of these, 10 MMs were *in situ* and the invasive ones had a predominantly favourable prognosis. One or more NMSCs were clinically suspected in 456 patients (17.1%).

In conclusion, today's diagnostic, therapeutic and preventive measures can be further developed. Bed-side histopathological confirmation of a skin cancer diagnosis may be possible with new non-invasive imaging techniques such as MPLSM. Furthermore, PDT may become another therapeutic alternative for PIN, and nerve blocks can be used for effective pain relief during PDT in the facial area. Finally, screening campaigns, such as the "Euromelanoma Day" can result in high detection rates of skin cancer when directed towards a risk population.