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Biochemical changes observed after puva versus puva plus methotrexate therapy in mycosis fungoides using synchrotron infrared microspectroscopy

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Introduction and background: Mycosis Fungoides (MF) is the most common type of cutaneous T-cell lymphoma in which the distinction between early stage MF and other inflammatory dermatosis remains difficult. PUVA therapy still remains the first line of treatment for early stage MF.

Objective of the study: In this study, we assessed differences between lymphocytes of MF and inflammatory disorders using Synchrotron IR microspectroscopy. In addition, the efficacy of PUVA therapy versus PUVA plus methotrexate for early stage MF was evaluated.

Patients and methods: Twenty patients of early stage mycosis fungoides (MF) (Ia - Ib - IIa) and nine patients with psoriasis and lichen planus were included in this study. Ten MF patients were treated with PUVA and the other ten MF patients were treated with PUVA plus methotrexate (MTX) until complete clinical remission. Lymphocytic count was done before and after treatment. Formalin-fixed, paraffin-embedded skin biopsies were cut into 10 μm thick sections and placed on infrared-reflective MirrIR glass slides. Synchrotron infrared (IR) microspectroscopy was used to determine the relative amounts of nucleic acids, RNA, DNA, and protein. Statistical differences were assessed using cluster analysis and Student t-test.

Results: When comparing MF with other inflammatory disorders it was found that no significant differences were noted in the ratio of DNA/protein, RNA/DNA and the relative amount of beta sheet protein. Also, after treating MF with either therapeutic modality a non significant difference was noted in the DNA/protein, RNA/DNA ratios and the relative amount of beta sheet protein. Also the lymphocytic count in MF patients decreased significantly (P= 0.000) with both lines of therapy whether within the epidermis or the dermis.

Conclusion: PUVA therapy is an effective treatment for early stage MF, and methotrexate could be reserved for more advanced cases that are not PUVA responsive. We recommend maintenance therapy after clinical remission. Synchrotron Infrared Microspectroscopy is a promising method for diagnosis of suspicious cases or follow-up of patients with MF.