PHOTOTHERAPY OF ACNE VULGARIS WITH NARROW BAND, NON COHERENT 660nm LIGHT.

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INTRODUCTION

Since 1970 (1) several clinical and in vitro (2) (3) (4) (5) studies have been carried out, in order to evaluate biological effects of low power laser illumination.

Some clinical research proved with documentary evidence a recovery from ulcus cruris, resistant to conventional therapies (6), after low power laser illumination, and a faster healing of skin diseases (7). Further in vitro studies proved as an irradiation by means of CO_2 laser or other laser type may modify activity of some cellular populations in culture as for example: keraticocites (8) (9), fibroblasts (10) (11) (12), endothelial cells (12), plaques (13) and linfocitos (14).

Biochemical studies proved that as red light or narrow band infra-red light illuminations increase dependent ATP-asic Na-K activity within mouse nervous tissue (15) and increase dependent ATP-asic Ca activity within mouse saphenous vein (16). An action on oxidizing phosphorilation (17) has also been outlined as well as on oxidasis cytochrome (18). One of special features of laser light is its spatial and phase coherence, however Karu (19), in his studies on bio-stimulating of

laser illumination, pointed out as coherence is not a main physical parameter in order to obtain bio-stimulation. In fact Young and others (20) proved as macrophages illumination in culture by means of non coherent light at different wave lengths is able to modify their capacity to stimulate fibroblasts proliferation.

In particular they pointed out that non coherent light illumination at 660 nm wave length, is able to produce the highest fibroblasts proliferation stimulation, probably because of an increased membrane permeability of calcium macrophages (21).

It is well known that U.V. rays exposure may cause, in some cases, a temporary recovery of acne vulgaris. The process in which this ultra-violet illumination or a lower wave length illumination performs its therapeutic effect on acne is not yet well understood. Recent studies (22) show as higher wave length U.V. illumination (366 nm as highest wave length) increases and modifies polyphosphates localization within Propionibacterium acnes and as causes in it production of free radicals (23). Meffert and colleagues (24) explain therapeutic effect of phototherapy with acne, with a photodynamic distruction of Pacnes, which produces usually big quantities of porfirine.

Target of our work has been to evaluate therapeutical efficacy of non coherent narrow band red light illumination (λ=660 nm), with acne vulgaris treatment.

MATERIALS AND METHODS

Our work has been applied to 13 patients (8 females and 5 males) aged 14 to 23, suffering from acne vulgaris with comedos (blackhead) and eritemato-papulo-pustular elements (pimples). Inclusion criteria patients, non suffering from any endocrine, metabolic or immunologic disturbs, have not been submitted to any therapy, neither topic nor systematic, during 20 days preceding study and during the whole study itself. A light

source has been used (Biobeam 660), of small dimensions and easy operation, emitting continuous non coherent red light of 660 nm wave length and 15 mw/cm^2 maximum power density, and 18 mw total power at focus point.

In each case one or more facial zones affected by acne has been chosen, and patients have been trained in order to perform correctly at home two 5 minutes sessions daily, in each chosen area. Light source has been holded at a distance of 2 cm from skin plane by using a proper plastic spacer, ring shaped (4 cm diameter), which is mounted on the emitting device, touching the face. In these conditions focal surface is 2 cm^2. Patients have been checked and photographed at beginning and after 2, 4, 6 weeks of therapy. All patients, with the exception of three, have completed treatment, and in two cases therapy has been extended by further 4 weeks.

RESULTS

7 of 10 patients who accomplished therapy showed major improvement, with reduction in comedos number, damping of eritemato-papulous lesions and progressive pustules healing. In two particular cases improvement has been so clear, to extend treatment 4 further weeks, under patients request. In three cases, in which acne was particularly extensive and complicated by nodules, cysts, microaccesses and cicatricial exits, clinical picture was not modified from beginning of therapy. In ten patients a light worsening has been registered during first illuminations, with increased comedos and eritemato-papulous-pustules lesions, followed by a progressive improvement during subsequent weeks. No appearance of collateral effects local and systematic has been noticed; only three patients related on excess in skin aridity, which disappeared quickly after hydrating cream application.

CONCLUSIONS

In so far as our survey we can assert that narrow band non coherent red light phototherapy may represent an effective alternative to the most traditional therapies applied so far, since it offers major improvements in short time, without carcinogetic hazard as for U.V. rays nor possible side effects related to antibiotic, hormonal or retinoids based systemic therapy. It seems to be interesting to evaluate most of all Biobeam 660 applied therapy, associated with systemic treatments (antibiotic, hormonal, retinoids) in order to obtain a "drug sparing effect" and resulting lower side effects hazard. It is necessary, however, to point out success of treatment depends on a correct use of light source, by irradiating accurate areas, twice a day, at least 5 minutes each time, during one month and a half at least. This may represent a limit in presence of very spreaded wounds (long lasting treatments every day with objective difficulties related to implementation time) and if patient is not well informed and periodically checked in order to verify correct application of light source.

Going by recent studies on acne phototherapy (22) (23) (24), we may assume at the base of Biobeam 660 therapeutic effect there is a change in polyphosphates content and localization and free radical production by side of acnes; these changes may cause lethal effect for micro organism. Only thorough studies of immunohystochemical, biochemical and microbiologic type shall be able to help in better understanding Biobeam 660 operation process in acne vulgaris treatment.

In conclusion, on the base of our limited experience, we believe that narrow band non coherent red light phototherapy (Biobeam 660) should be recommended only in cases of common non conglobate and limited to small face or back areas, as antibiotical, hormonal and retinoidal treatment systemic treatment remains the chosen therapy in serious and wide forms of acne.