EVALUATION OF FRACTIONAL CARBON DIOXIDE LASER IN THE TREATMENT OF MACULAR AMYLOIDOSIS

Thesis

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by

Heba Saad Mohammed Ali

(M.B., B.Ch)

Supervised by

DR. Samia Mohammed Essmat

Professor of Dermatology

Faculty of Medicine, Cairo University

DR. Marwa Mohsen Tolba Fawzi

Professor of Dermatology

Faculty of Medicine, Cairo University

DR.Safinaz Salah ElDin Sayed

Professor of Histology

Faculty of Medicine, Cairo University

Faculty of Medicine

Cairo University

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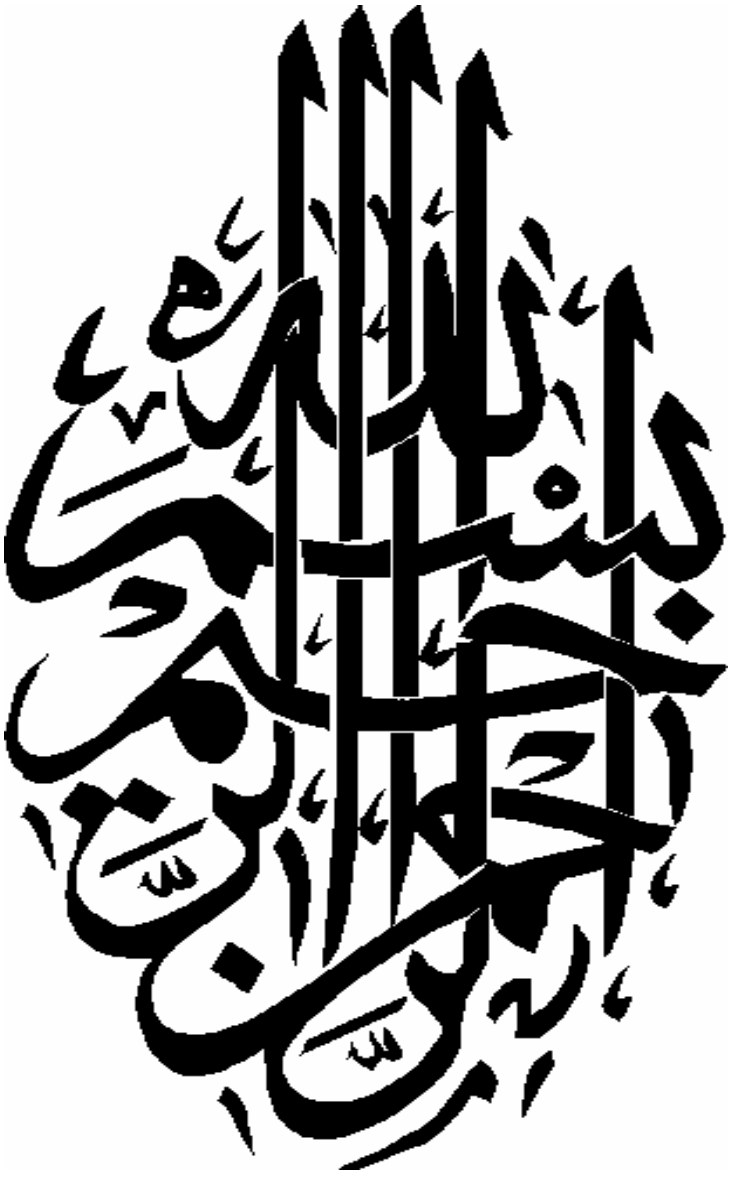

سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنتَ الْعَلِيمُ الْحَكِيمُ

صدق الله العظيم (سورة البقرة آية 32)

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Contents

Abstract

Background:

Primary localized cutaneous amyloidosis is classified into three major forms: macular amyloidosis with rippled hyperpigmentation often on the back and upper arms, papular (lichen) amyloidosis with hyperpigmented papules often in a rippled pattern mainly on the extensor surface of extremities and back and nodular amyloidosis. Various modalities were used in the treatment of cutaneous amyloidosis including various types of lasers, but results were disappointing.

Objective:

To assess the efficacy of fractional CO_2 laser in the treatment of macular and papular amyloidosis both clinically and histologically.

Methods:

A total of 25 patients, 16 with macular amyloidosis and 9 with lichen amyloidosis (seventeen patients were females (68%) and 8 patients (32%) were males) with a mean age of 36.8±8.6 years, ranging from 23 to 50 years were treated by 3-4 sessions of fractional CO_2 laser with two modalities of treatment (superficial ablative mode performed on 2 squares a, b and called area A and rejuvenative mode performed on other 2 squares c, d and called area C. All lesions were examined clinically & histologically before therapy and one month after the end of therapy to assess the degree of improvement. The lesions are evaluated clinically, histologically and by image analysis for detection of the amount of amyloid present, melanin present, thickness of the epidermis and depth of rete ridges.

Results:

All areas of the lesions showed significant decrease of pigmentation scores after treatment, significant drop in the frequency of rippling ($p < 0.001$), improvement of lichenification in macular amyloidosis, flattening of papules in lichen amyloidosis and decrease of itching significantly. As regards the histological improvement, there was a significant decrease of amyloid amount after treatment.

On the other hand, there was no significant change of the amount of melanin after treatment. This applied to the two treatment types.

There was significant decrease of epithelial height in treatment zone A after treatment ($p = 0.032$), while the decrease was apparent, but not statistically significant, in zone C ($p = 0.069$). Also there was significant decrease of depth of rete ridges in the 2 treatment zones after treatment ($p = 0.002$). Treatment was highly satisfactory for 14 patients (56%). Eight patients (32%) reported moderate degree of satisfaction, while only 3 patients (12%) had mild satisfaction with treatment. There was no significant difference between the two treatment modalities regarding clinical and histological improvement. Minimal complications occurred in the form of PIH (2 patients) and pixilation (2 patients). None of the patients suffered pain, ulceration or infection.

Conclusion:

Fractional CO_2 laser effectively improved the appearance of macular and lichen amyloidosis after 3-4 sessions with minimal complications.

Keywords:

Fractional CO2 laser, Macular amyloidosis.

List of Abbreviations

ACD	Amyloidosis cutis dyschromica
AD	Atopic dermatitis
AFP	Ablative fractional photothermolysis
ALA	Aminolevulinic acid
ApoE	Apo lipoprotein E
C3	Complement 3
cA	Organ-limited cutaneous amyloidosis
Cm	Centimeter
CO2	Carbon dioxide
Derma REC	Dermatology Research Ethical Committee
DMSO	Dimethyl sulfoxide
EMLA	Eutectic Mixture of Local Anaesthetics
Er: YAG	Erbium yttrium aluminium garnet
FD	Fluorescein isothiocyanate-labeled dextran
FP	Fractional photothermolysis
FT	Fractional technology
H&E	Hematoxylin and Eosin
h-cA	Hereditary cutaneous amyloidosis
h-Sa	Hereditary systemic amyloidosis
HSV	Herpes simplex virus
IgA	Immunoglobulin A

IgM	Immunoglobulin M
IL	Interleukin
IPL	Intense pulsed light
J/cm	Joule per centimeter
KTP	Potassium titanyl phosphate
LA	Lichen amyloidosis
LP	Lichen planus
LSC	Lichen simplex chronicus
MA	Macular amyloidosis
MAL	Methyl 5-aminolevulinate
MEND	Microscopic epidermal necrotic debris
Mj	Millijoules
Mm	Millimeter
MMPs	Metalloproteinases.
msec	Millisecond
MTZs	Microthermal zones
Nd: YAG	Neodymium yttrium aluminium garnet
nh-cA	Non-hereditary cutaneous amyloidosis
nh-sA	Non-hereditary systemic amyloidosis
Nm	Nanometer
PAS	Periodic acid cheif stain
PC	Poikiloderma of Civatte
PDL	Pulsed dye laser
PDT	Photodynamic therapy

PIH	Postinflammatory hyperpigmentation
PLCA	Primary localized cutaneous amyloidosis
PUVA	Psoralen-Ultraviolet A
Q switched	Quality switched
Sa	Systemic amyloidosis
SP	Selective photothermolysis
TGF	Transforming growth factor
TNF	Tumour necrosis factor
Um	Micrometer
Us	Microsecond
UVB	Ultraviolet B
W	Watt
YSGG	Yttrium-scandium-gallium-garnet

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