Evaluation of the effect of fractional CO2 laser on histopathological picture and TGF-β1 expression in hypertrophic scar.

Makboul M1, Makboul R, Abdelhafez AH, Hassan SS, Youssif SM.

Abstract:

BACKGROUND AND AIMS: Hypertrophic scar is a form of abnormal wound healing process in which tissue repair regulating mechanism is disrupted. Transforming growth factor β1 has a particular importance in the fibrotic scarring response. Treatment of hypertrophic scar included many chemical, physical, and surgical options. Fractional CO2 laser devices have gained acceptance as a way for managing hypertrophic scar. Aims of this study are: (a) to determine the clinical and histopathological effects of fractional CO2 laser on hypertrophic scar, (b) to evaluate the expression pattern of transforming growth factor-β1 (TGF-β1) as an important fibrogenic factor before and 6 months after fractional CO2 laser treatment.

PATIENTS AND METHODS: Forty patients of hypertrophic scar were selected, each patient was treated by four sessions with 1 month apart with fractional CO2 laser. Vancouver Scar Scale (VSS) was used to assess the patients before and after laser treatment. Skin biopsy was taken from eight cases before and 3 months after four fractional CO2 laser sessions and four normal skin control biopsies. All were assessed by hematoxylin-eosin (H&E), Masson's trichrome, Van Gieson and immunohistochemical (IHC) staining with TGF-β1. The epidermal thickness was assessed before and after treatment by image analyzing system software. RESULTS: There was statistically significant difference in VSS before and after fractional CO2 laser (P > 0.001). The epidermal thickness showed significant increase after laser treatment (P > 0.001), and there was also thinning in stratum corneum and replacement of the irregular collagen bands with organized new collagen fibrils as demonstrated by H&E and the other special stains. The study also showed significant decrease in TGF-β1 expression after laser therapy (P = 0.008). CONCLUSION: Fractional CO2 laser could be considered as a good way for hypertrophic scar management. It normalizes dermal collagen as imaged by histopathological picture and the change in TGF-β1 expression.

Keywords:

TGF-β1; fractional CO2 laser; histopathological picture; hypertrophic scar

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