Abstract

Background: Different modes of therapy for scars are currently being used and are limited by their efficacy and side effects. Newer modes of therapy including laser, are thus being studied for their efficacy.

Aim: Assessment of patients' satisfaction following fractional CO\textsubscript{2} laser sessions on their scars.

Methods: Scars were treated by fractional CO\textsubscript{2} laser in thirty patients for a total of 4 sessions 6 weeks apart. Vancouver scar score (VSS) was done before, one, three and 6 months after the last laser session by a blinded observer. Patients' satisfaction at the end of the study was graded as excellent (more than 75\% improvement), good (50-75\% improvement), moderate (25-50\% improvement) and poor (less than 25\% improvement).

Results: Nineteen patients completed the six month follow-up period (12K, 7HTS). VSS score was significantly lower in the treated compared to untreated areas after 3 and 6 months in both K and HTS. Patients were poorly satisfied, 50\% of keloid patients, 28.6\% of hypertrophic scar patients.

Key Words: Patients' satisfaction – Fractional CO\textsubscript{2} laser.

Introduction

EVEN with the advances regarding wound healing, prevention and treatment of hypertrophic scars are still very challenging [1]. Side effects of various treatment modalities such as dyspigmentation and atrophy are considered a significant limitation [2]. Since the introduction of laser treatment for keloids in the mid-1980s, the therapeutic use of lasers with different wavelengths has been investigated. The neodymium: YAG laser (1064nm), flashlamp pumped pulsed dye laser (PDL) (585-595nm); CO\textsubscript{2} laser (wave-length 10,600nm) and argon laser (488nm) were frequently used in the treatment of keloids [3]. Fractional photothermolysis has already demonstrated its effectiveness in the treatment of atrophic and hypopigmented scars [2]. An emerging evidence is suggesting that treatment with a 10,600nm carbon dioxide fractional laser can significantly reduce burn scarring without notable side effects [4].

Patients and Methods

Patients were recruited from the Dermatology Outpatient Clinic, Cairo University from April 2012-April 2013.

In each of the 30 patients, four laser sessions, 6 weeks apart were performed by Fractional Co\textsubscript{2} laser on one side and the other was left untreated serving as a control. Scars were graded clinically using the Vancouver Scar Scale. Patients' satisfaction at the end of the study was graded as excellent (more than 75\% improvement), good (50-75\% improvement), moderate (25-50\% improvement) and poor (less than 25\% improvement). Data was analyzed using IBM SPSS Advanced Statistics version 20.0 (SPSS Inc., Chicago, IL). Chi-square test (Fisher's exact test) was used to examine the relation between qualitative variables. Comparison of more than 2 repeated measures was done using ANOVA for repeated measures or Friedman test, then Bonferroni test for pairwise comparison. A p-value <0.05 was considered significant.

Results

In Keloid group, 3 patients dropped after the 3rd laser session, 2 did not come for the third month follow-up and one did not come for the sixth month follow-up visit). In Hypertrophic scar group, 3 dropped after the 2\textsuperscript{nd} and 2 after the 3\textsuperscript{rd} laser session.

Both the keloid and hypertrophic scar groups showed significant drop in the Vancouver Scar Scale that started to appear after 3 months of therapy.
Half of the twelve keloid patients who completed the study were poorly satisfied, 3 expressed good and 3 moderate satisfaction with therapy. In the hypertrophic scar group 2/7 (28.6%) patients thought the outcome of therapy was excellent, 1 good, 2 moderate and 2 were poorly satisfied.

Table (2): If we considered that any grade whether excellent, good or moderate satisfaction is satisfactory while only the poorly satisfied is considered as unsatisfactory, we could divide patients into 2 groups, satisfied and unsatisfied and this showed no significant difference between both groups.

Patient satisfaction *group crosstabulation:

<table>
<thead>
<tr>
<th>Patient satisfaction</th>
<th>Keloid group (n=12)</th>
<th>Hypertrophic scar group (n=7)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent n (%)</td>
<td>0 (0.0%)</td>
<td>2 (28.6%)</td>
<td></td>
</tr>
<tr>
<td>Good n (%)</td>
<td>3 (25.0%)</td>
<td>1 (14.3%)</td>
<td></td>
</tr>
<tr>
<td>Moderate n (%)</td>
<td>3 (25.0%)</td>
<td>2 (28.6%)</td>
<td></td>
</tr>
<tr>
<td>Poor n (%)</td>
<td>6 (50.0%)</td>
<td>2 (28.6%)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square tests:

<table>
<thead>
<tr>
<th>p-value</th>
<th>Fisher's exact test</th>
</tr>
</thead>
<tbody>
<tr>
<td>.222</td>
<td></td>
</tr>
</tbody>
</table>

The difference is not significant.

**Discussion**

This study was performed on keloid and hypertrophic scar patients. Objective clinical assessment was done using the Vancouver scar score, also used by Nouri et al., 2003, who examined the efficacy of 585-nm PDL in the treatment of surgical scars [5]. Significant drop in the Vancouver Scar Scale of the patients in this study was detected. Despite this patients were poorly satisfied (50% of keloid patients, 28.6% of hypertrophic scar patients) and this can be attributed to the higher patients expectations. Fractional CO2 laser is an efficient modality for hypertrophic scars and keloids. However, to improve our results and reach better patients’ satisfaction, it is recommended to choose good combination therapy and increase the number of the sessions, but the optimal number of sessions is yet to be determined. It is suggested that in managing these scars, the protocol should be individually ameliorated. Greater scar heights should be treated
by intralesional steroids which will cause suppression of the inflammatory process in the wound [6] and secondarily inhibit nitric oxide synthase (NOS)-transcription with subsequent inhibition of collagen synthesis in fibroblasts [3].

Further studies are needed to optimize laser parameters. In addition, positive clinical results may stimulate a new era of studying the molecular mechanisms that underlie this improvement thus paving the way to better treatment options of various scar types [7].

References