EFFICACY OF BIOTIN MESOTHERAPY IN MANAGEMENT OF TELOGEN EFFLUVIAUM.

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ABSTRACT

Background: Telogen effluvium (TE) is one of the most common forms of diffuse, non-scarring hair loss for which patients present for clinical evaluation. It is usually a reactive and reversible disorder. Therefore, identifying and correcting the underlying cause is the most important component in management. Potential therapeutic options like mesotherapy, botulinum toxin A and laser can be used in the management of different hair falling disorders.

Objective: The study aims to evaluate the efficacy, safety and tolerability of multiple sessions of Biotin mesotherapy in treatment of Telogen effluvium.

Methods: A randomized clinical trial was conducted in the Dermatology, Venereology, and Andrology Department, Faculty of Medicine, Zagazig University Hospitals during the period from October 2019 to November 2020. Twenty-four patients with Telogen effluvium received multiple sessions of biotinmesotherapy injection.

Results: On comparing between hair parameters in all patients before and after treatment, there was improvement in number of total hair count, terminal hair and multiple follicular units and decrease in number of vellus hair. The treatment modality had minimal and well-tolerated side effects.

Conclusion: Biotin mesotherapy is effective in management of telogen effluvium.

Keywords: Telogen effluvium, Biotin, Mesotherapy.

I. INTRODUCTION

Telogen effluvium (TE) is the most frequent cause of diffuse non-scarring hair loss. It can be acute if less than 6 months, duration beyond 6 month is considered as chronic TE (CTE) and occurs most commonly in the 4th or 5th decade of life. It can be primary or secondary. In the primary form, no triggering factors can be identified and the hair pull test is usually strongly positive (1).

In the secondary form the inciting factors of telogen effluvium can be organized into several categories as acute illness such as febrile illness and severe trauma, chronic illness such as malignancy and liver disease, hormonal changes such as pregnancy and delivery, changes in diet like anorexia, low protein intake, and chronic iron deficiency, heavy metals such as selenium, arsenic, and thallium and medications such as beta-blockers, anticoagulants and carbamazepine. In general, it occurs approximately 3 months after the primary insult, affecting <50% of the scalp (2,3,4).

As acute telogen effluvium is a reactive process, which resolves spontaneously, treatment usually is limited to reassurance. Any reversible cause of hair shedding, such as poor diet, iron deficiency, hypothyroidism, or medication use, should be corrected. Chronic telogen effluvium is less likely to resolve rapidly, but reassurance is still appropriate for these patients. Often, the knowledge that the hair loss will not progress to baldness is comforting to the patient (5).
Mesotherapy is a non-surgical medical treatment that employs multiple injections of plant extracts, pharmaceutical medications, multivitamins and other ingredients into the intradermal layer. Biotin mainly acts as a coenzyme and growth factor. The goal of biotin mesotherapy in hair disorders is to restore and increase local microcirculation, provide nutritional input, slow down the programmed process of follicular involution, stimulate the hair's environment through needling and complement other treatments (6,7).

II. SUBJECTS AND METHODS

This clinical trial was conducted in the Dermatology, Venereology, and Andrology Department, Faculty of Medicine, Zagazig University Hospitals during the period from October 2019 to November 2020. The study was approved by scientific and ethical committees, the Faculty of Medicine Zagazig University, and by the Institutional review board. A written consent form was obtained from all patients. 24 patients with telogen effluvium treated by biotinmesotherapy in multiple sessionswere included in the study.

The main inclusion criteria were patients complaining of acute or chronic telogen effluvium, diagnosed clinically and by dermoscopy, of both sex and all ages, with no treatment of hair loss for the last 3 months.

The main exclusion criteria were hair disorders other than telogen effluvium as alopecia areata and androgenetic alopecia or hair loss secondary to systemic diseases as thyroid dysfunction, SLE, renal and hepatic failure, patients on medications associated with hair loss (anticoagulants, retinoids, anticonvulsants, and antidepressants) and pregnancy.

All patients of our study were evaluated clinically before treatment by complete history taking, general examination to exclude systemic causes of hair loss, and tricoscopic examination that included examination of a shed or pulled hairs with the naked eye clarified a depigmented pulp, Scalp examination show loss of less than 50% of scalp hair, positive hair pull test in different scalp regions. Trichoscopic examination was done (8).

Biotin mesotherapy was injected in multiple sessions. In each session, 2ml was injected intradermally in the upper and lateral aspects of the scalp by the nappage technique. Multiple injection points 1cm apart of 0.05 ml at each point were done using an insulin syringe, depth of injection was 2–4 mm at 30–60° angle. Injections were done every two weeks for two months then once monthly as maintenance for 4 months (9).

Patients' assessment:

A. Clinical assessment: Patients were assessed clinically at baseline and every month after that for 6 months. Photographs were taken by a mobile camera (Samsung Galaxy A20, 13MP) at baseline and every session. At baseline, patients showed decreased hair density all over the scalp without marked widening of the central part. The improvement in hair growth and increasing hair density were graded objectively by the dermatologist according to Global Photographic Review (GPR) on seven points scale that include:+3 Significant improvement, +2 Moderate improvement, +1 Minimal improvement, 0 No improvement, -1 Minimal worse, -2 Moderate worse and -3 Significant worse (10).

B. Trichoscopic assessment: Trichoscopy ( Innovative Digital Microscope 1000x) used at baseline to assure the diagnosis of Telogen effluvium showing decreased hair density with the presence of empty follicles and single hair follicular unit, with the absence of hair shaft diameter variation and perihilar halo. To check the same area at all time, we used (v) kandas point which is the point of intersection between mid-sagittal line and the coronal line connecting the tips of the tragus on both sides, by using the plastic headband and tape-line. All patients were evaluated by tricoscope 3 times, at the beginning of the study, after 3 months, and after 6 months (8).

C. Pull test: The hair pull was performed at the vertex, 2 parietal areas, and the occipital area of the scalp. The pulled hair was counted before and after treatment. In telogen effluvium, more than 10 % of pulled hair was removed (11).

D. Patient satisfaction: Patients were asked about their satisfaction on hair growth and graded (0) Unsatisfied patients, (1) Moderately satisfied patients, and (2) Well satisfied patients (10).

E. Safety evaluation: Patients were monitored for any complications and side effects during and after injection as pain, bleeding, hematoma, ecchymosis, and allergic reactions (12).
III. STATISTICAL ANALYSIS

Data were analyzed using IBM SPSS 23.0 for windows (SPSS Inc., Chicago, IL, USA) and NCSS 11 for windows (NCSS LCC., Kaysville, UT, USA). Quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were expressed as frequency and percentage. The following tests were done Independent-samples t-test, Mann Whitney U test, Chi-square (X2) test, and Paired t-test test. Different stages of significance were considered P-value <0.05 was considered significant. P-value <0.001 was considered as highly significant. P-value > 0.05 was considered insignificant.

IV. RESULTS

This study included 24 female patients with TE, their ages ranged from 19-35 years, disease duration ranged from 6-24 months for all patients. There were statistically significant increase in hair parameters included total hair count, terminal hair and multiple follicular units after treatment. There was a statistically significant decrease in vellus hair and single hair follicular units (Tables 1,2) According to patient satisfaction, most of patients were well satisfied (grade 2). According to GPR, most cases showed significant improvement in hair growth. The only side effect of treatment was pain that was recorded in most patients.

*Photo 1(a):* 29 years old female patient with TE, shows decreased hair density and widening of central part before treatment.  
*Figure 1(b):* Shows marked improvement in hair growth and narrowing of central part after mesotherapy injection.

*Photo 2(a):* Trichoscopy for the same patient before treatment, shows decreased hair count with presence of single hair follicular unit.  
*Figure 2(b):* After treatment, shows increased number of total hair count, appearance of new hair and increase number of multible hair follicular unit.
*Photo 3(a)*: 30 years old female patient with TE, shows decreased hair density and widening of central part before treatment.

*Figure 3(b)*: Shows marked increased in hair growth and narrowing of central part after mesotherapy injection.

*Photo 4(a)*: Trichoscopy for the same patient before treatment, shows increased number of single hair follicular unit and presence of empty follicle. *Figure 4(b)*: After treatment, shows increased number of total hair count, appearance of new hair and increased number of multiple hair follicular unit.

**Table (1):** Difference in count of all hair types among all patients.

<table>
<thead>
<tr>
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<th>Before treatment Mean ± SD</th>
<th>After treatment Mean ± SD</th>
<th>P-value</th>
</tr>
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<tbody>
<tr>
<td>Total hair count</td>
<td>50.4 ± 4.5</td>
<td>65.8 ± 7.3**</td>
<td>&lt;0.001  HS</td>
</tr>
<tr>
<td>Terminal hair</td>
<td>34.2 ± 11.4</td>
<td>63.8 ± 9.32**</td>
<td>&lt;0.001  HS</td>
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Intermediate hair   24.2 ± 7.21  30.8 ± 9.96**  <0.001 HS
Vellus hair         41.7 ± 7.8  17.1 ± 3.96**  <0.001 HS

HS: P-value<0.001 is high significant  ** significant difference in hair count after treatment.

Table (2): Difference in count of follicular units among all patients.

<table>
<thead>
<tr>
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<th>Before treatment</th>
<th>After treatment</th>
<th>P-value</th>
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<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Single FU</td>
<td>63.3 ± 7.78</td>
<td>43.3 ± 10.5**</td>
<td>&lt;0.001 HS</td>
</tr>
<tr>
<td>Multiple FU</td>
<td>37.5 ± 8.12</td>
<td>63.8 ± 7.11**</td>
<td>&lt;0.001 HS</td>
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</table>

HS: P-value<0.001 is high significant

V. DISCUSSION

This clinical trial aimed to evaluate the efficacy, safety and tolerability of biotinmesotherapy in multiple sessions in treatment of Telogen effluvium. Twenty-four patients with Telogen effluvium were included in this study and received multiple sessions of biotinmesotherapy injection.

Telogen effluvium (TE) is one of the most common forms of diffuse, non-scarring hair loss. It affects both males and females, with a higher incidence rate in females who take hair shedding problems more seriously than men and are more seeking medical treatment. The association of telogen effluvium with age is unclear, it may occur at both sex and any age including infants and children, but it is more common in middle-aged women between the ages of 20 and 40 years (13,14). In our study all patients were females and their ages ranged from 19-35 years.

In our study, disease duration ranged from 6-24 months for all patients. The onset of TE was gradual in 83.3% and sudden in 16.7%. The course of the disease was progressive in almost all cases. Telogen effluvium has two types of presentation, acute and chronic. Acute TE is defined as hair shedding lasting for less than six months, while chronic TE lasts for more than 6 months. CTE tends to fluctuate for years with alternating periods of spontaneous remissions with episodes of relapses (14).

In this study, trichoscopy was done for all cases before and after treatment to evaluate the response of treatment by detecting total hair count, number of terminal, intermediate, vellus hair, number of single and multiple hair follicular units, all these parameters were taken per cm2. Trichoscopy was used to confirm the diagnosis of hair falling. There were no specific findings in telogen effluvium. However, the presence of upright regrowing hair and predominance of hair follicle openings with only one emerging hair shaft may be indicative of telogen effluvium in absence of features characteristic for other causes of hair loss (8).

There was an improvement in almost all hair parameters. There was an increasing in number of total hair count, terminal hair, and multiple hair follicular units, while the number of vellus hair and single follicular unit decreased after treatment. Out of 24 patients, there was a significant improvement in 16 patients, moderate improvement in 6 patients, and minimal improvement in 2 patient on GPA at the end of 24 weeks. These changes occurred as biotin mesotherapy acts as a coenzyme and growth factor, it is used in the management of telogen effluvium by restoring and increasing local microcirculation, providing nutritional input, slowing down the programmed process of follicular involution and stimulating the hair’s environment through needling and complement other treatments (6,9).

Patient satisfaction for hair growth was evaluated and graded into 3 grades. Grade 0 for unsatisfied patients that was 8.3% of patients, grade 1 for moderately satisfied patients that was 33.3% and grade 2 for well-satisfied patients that was 58.4%.

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Patients were asked about complications of treatment as pain, bleeding, edema, urticaria and allergic reaction. This coincides with our study, pain from injection was recorded in 58.3% and there were no other complications in 41.7%.

VI. CONCLUSION

Biotinmesotherapyis effective in treatment of TE. It had minimal and well-tolerated side effects.

Conflict of Interest

We declared that there is no conflict of interest.

REFERENCES