EFFICACY OF PLATELET RICH PLASMA VERSUS AUTOLOGOUS EMULSIFIED FAT IN THE TREATMENT OF INFRAORBITAL DARK CIRCLES

By

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ABSTRACT

Background: Periorbital hyperpigmentation, generally called dark circles, is a condition characterized by relatively dark coloration of the periorbital eyelids. It is a common worldwide problem which makes a person appear tired, sad, and aged. Although this condition does not cause physical morbidity, it can pose a substantial cosmetic problem and, eventually, affect the quality of the effected individual.

Objective: To evaluate the efficacy of platelet rich plasma versus autologous emulsified fat in the treatment of infraorbital dark circle.

Patients and methods: Our study was carried out on 30 patients presenting with infraorbital dark circles of different etiological factors divided into A and B from December 2019 to July 2020. All patients were recruited from the Dermatology outpatient clinic of Al-Azhar University Hospitals. Patients were divided into two equal groups: Group A treated with platelet rich plasma (PRP) and Group B treated by autologous fat injection.

Results: The present study showed excellent response of 3 patients (20%) in group A, and 7 patients (46.7%) in group B. Moderate response occurred in 2 patients (13.3%) in group A, and 4 patients (26.7%) in group B. Mild response occurred in 2 patients (13.3%) in group A, and 3 patients (20%) in group B. No response occurred in 8 patients (53.3%) in group A and 1 patient (6.7%) in group B.

Conclusion: Both PRP and emulsified fat were effective in treatment of infraorbital dark circles with statistically significant difference as regard the improvement, patient satisfaction and postoperative complications at the end of treatment period and follow up for six months.

Keywords: Platelet Rich Plasma, Autologous Fat, Infraorbital Dark Circles.

INTRODUCTION

Periorbital hyperpigmentation seems to have multifactorial causes that involve intrinsic factors (determined by the individual's genetics), and extrinsic factors (sun exposure, smoking, alcoholism and sleep disturbance. However, the presence of melanin pigment and hemosiderin pigment in the affected sites is a distinctive feature in its aetiopathogenesis (Taskin, 2015). The extent of the problem is reflected in many products advertised to either lighten or cover the pigmentation (Alsaad and Mikhail, 2013).

Another common cause of infraorbital dark circles can be thin, translucent lower
eyelid skin overlying the orbicularis oculi muscle. The orbicularis oculi muscle lies right beneath the skin, with little or no subcutaneous fat, and the darkness may be due to the visible prominence of the subcutaneous vascular plexus or vasculature contained within the muscle. This condition usually involves the entire lower eyelids, with a violaceous appearance consistent with prominent blood vessels covered by a thin layer of skin. The violaceous appearance is more prominent in the inner aspect of the lower eyelids and is usually accentuated during menstruation (Ranu et al., 2011). Possible causative factors of the dark circles include genetic or hereditary, excessive pigmentation, periorbital edema, excessive vascularity, and shadowing due to skin laxity and tear trough (Robers, 2014).

The initial popularity of PRP grew from its promise as a safe and natural alternative to surgery. PRP advocates promoted the procedure as an organically based therapy that enabled healing through the use of one’s own natural growth factors. In recent years, scientific research and technology has provided a new perspective on platelets. Studies suggest that platelets contain an abundance of growth factors and cytokines that can affect inflammation, postoperative blood loss, infection, osteogenesis, wound, muscle tear and soft tissue healing (Anitua et al., 2012).

Autologous fat grafting has become quite popular in tissue reconstruction and augmentation over the past decade. Its regenerative properties and beneficial effects with respect to skin texture have been observed in several studies. Hyperpigmentation, skin texture, and scar quality may equally play an important role in determining a suitable treatment and resulting outcome. Consequently, described a new technique introducing Nano fat and hypothesized that it could be applied in various other skin conditions such as wrinkles and discolorations. Wrinkles and skin discolorations are usually addressed with expensive dermatological treatments such as “fillers” and erosive chemical peelings that require numerous sessions. Such treatments often have no permanent effect. Therefore, wrinkles and discolorations might also benefit from the long-term regenerative properties of Nano fat (Uyulmaz et al., 2018).

The present work aimed to evaluate the efficacy of platelet rich plasma versus autologous emulsified fat in the treatment of infraorbital dark circle.

PATIENTS AND METHODS

This study was carried out on 30 patients presenting with infraorbital dark circles of different etiological factors from December 2019 to July 2020. Patients were randomized into two equal groups: **Group A** treated with platelet rich plasma, and **Group B** treated with autologous fat injection. All patients were recruited from the Dermatology outpatient clinic of Al-Azhar University Hospitals.

Response to treatment:

i. Excellent response: Complete resolution of dark halos like the surrounding skin.

ii. Moderate response: Improved color but still not like the surrounding skin.
iii. Mild response: improved color but still close to the preoperative picture.

iv. No response: same color of the dark halos as preoperative picture.

Follow-up of patients was done every one month for six months to detect improvement. The side effects of treatment were recorded such as ecchymosis and bruising.

All patients were subjected to complete medical history, dermatological examination and documented digital photography.

**RESULTS**

Regarding demographic data, there was no statistically significant difference between both groups regarding age, sex, skin type and family history (Table 1).

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Groups</th>
<th>Group A (N = 15)</th>
<th>Group B (N = 15)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Mean ±SD</td>
<td>31.6±6.7</td>
<td>32.3±10.6</td>
<td>0.823</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>2 (13.3%)</td>
<td>2 (13.3%)</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>13 (86.7%)</td>
<td>13 (86.7%)</td>
<td></td>
</tr>
<tr>
<td>Skin type</td>
<td>III</td>
<td>12 (80%)</td>
<td>7 (46.7%)</td>
<td>0.058</td>
</tr>
<tr>
<td></td>
<td>IV</td>
<td>3 (20%)</td>
<td>8 (53.3%)</td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td>Negative</td>
<td>9 (60%)</td>
<td>8 (53.3%)</td>
<td>0.713</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>6 (40%)</td>
<td>7 (46.7%)</td>
<td></td>
</tr>
</tbody>
</table>

There was a statistically significant difference (p-value < 0.05) between studied groups as regard improvement as the present study showed excellent response of 3 patients (20%) in group A and 7 patients (46.7%) in group B. Moderate response occurred in 2 patients (13.3%) in group A and 4 patients (26.7%) in group B. Mild response of 2 patients (13.3%) in group A and 3 patients (20%) in group B. No response occurred in 8 patients (53.3%) in group A and 1 patient (6.7%) in group B. There was a statistically significant difference (p-value < 0.05) between studied groups as regard patient satisfaction. There was a highly satisfaction of 3 patients (20%) in group A and 10 patients (66.7%) in group B. Satisfaction occurred in 8 patients (53.3%) in group A and 4 patients (26.7%) in group B, no satisfaction in 4 patients (26.7%) in group A and one patient (6.7%) in group B (Table 2).
Table (2): Comparison between studied groups as regard improvement and patient satisfaction

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
<th>Group A (N = 15)</th>
<th>Group B (N = 15)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement</td>
<td>No</td>
<td>8</td>
<td>1</td>
<td>0.048</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excellent</td>
<td>3</td>
<td>7</td>
<td>0.048</td>
</tr>
<tr>
<td>Patients satisfaction</td>
<td>Not satisfied</td>
<td>4</td>
<td>1</td>
<td>0.032</td>
</tr>
<tr>
<td></td>
<td>Satisfied</td>
<td>8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly satisfied</td>
<td>3</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

There was a statistically significant difference (p-value < 0.05) between studied groups as regard postoperative ecchymosis and bruises (Table 3).

Table (3): Comparison between studied groups as regard postoperative ecchymosis and bruises

<table>
<thead>
<tr>
<th>Side effects</th>
<th>Groups</th>
<th>Group A (N = 15)</th>
<th>Group B (N = 15)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postoperative ecchymosis and bruises</td>
<td>Minimal</td>
<td>6</td>
<td>12</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>9</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Figure (1): A 42 years old female with dark halos before and after treatment with emulsified fat showing excellent improvement

Figure (2): A 25 years old male with dark halos before and after treatment with PRP showing excellent improvement
DISCUSSION

In this study, there were no significant difference between both groups regarding age, sex, family history, and skin type. The present study showed excellent response of 3 patients (20%) in group A and 7 patients (46.7%) in group B. Moderate response occurred in 2 patients (13.3%) in group A and 4 patients (26.7%) in group B. Mild response of 2 patients (13.3%) in group A and 3 patients (20%) in group B. No response occurred in 8 patients (53.3%) in group A and 1 patient (6.7%) in group B. The reported side effects were mild ecchymosis and bruises which is less likely to occur in fat injection.

In agreement with this study, Zzam et al. (2020) concluded that autologous fat transplantation is an effective method for the treatment of infraorbital dark circles due to thin and translucent lower eyelid skin overlying the orbicularis oculi muscle. Also, there was significant clinical improvement of the periorcular dark halos in 50%, moderate improvement was encountered in 20%, mild improvement was encountered in 20%, and no change in the color was noted in 10%. There was good agreement about the clinical outcome between the two evaluating surgeons who were blind to the used technique. In this study, despite the wide range of objective improvement (no improvement, mild, moderate and significant), 80% were satisfied with the final result and 20% were not satisfied and that was agreement with our study.

Oh et al. (2014) reported that patients who were unhappy with soft tissue filler injection to the periorbital area tended to have thinner skin, which is more vulnerable to developing increased vascularity, bruising, or contour irregularities. This is why fat grafting, which is readily available, safe, and completely biocompatible, is preferred to soft tissue fillers for dark circles accompanying thin eyelid skin.

Al Shami (2014), Mehryan et al. (2014) and Nofal et al. (2018) investigated the effects of PRP as a possible rejuvenating agent for reduction in infraorbital dark circles. The study was conducted as a single session of 1.5 mL PRP injected intradermal into the tear trough area and wrinkles of crow’s feet.

CONCLUSION

Both PRP and emulsified fat were effective in treatment of infraorbital dark circles with higher rate of improvement in case of emulsified fat injection with statistically significant difference as regard the improvement, patient satisfaction and postoperative complications at end of treatment period and follow up for six months.

Conflicts of interest: No conflicts of interest were encountered.

REFERENCES


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تقييم فاعلية حقن البلازما الغنية بالصفائح الدموية مقارنة بالدهون الذاتية متناهية الصغر في علاج الهالات السوداء تحت العين

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الخلفية: تعتبر الهالات السوداء واحدة من المشاكل الشائعة والمنتشرة على مستوى العالم، وعلى الرغم من عدم تأثيرها على الخصائص الفيزيائية الا انه تؤثر على الصحة النفسية للشخص المصاب بها. ويعزى ظهور الهالات السوداء إلى عدة عوامل مختلفة من أهمها العوامل الوراثية، والزيادة الموضعية في عدد الخلايا الصبغية، والمنخفض الدهني، والالتهابات الجلدية للجفن السفلي.

الهدف من البحث: تقييم فعالية وسلامة البلازما الغنية بالصفائح الدموية مقابل الدهون الذاتية متناهية الصغر في علاج الهالات السوداء. السفلي.

المريضي وطرق البحث: هذه الدراسة تم تنفيذها على 30 من المرضى الذين حضروا إلى العيادة الخارجية للأمراض الجلدية بمستشفيات جامعة الأزهر خلال الفترة من ديسمبر 2019 حتى يوليو 2020. وتتم إخضاع جميع المشاركين أو ذويهم إلى أخذ التاريخ الشخصي والمرضي كاملا وفحص جلدي يتضمن الهالات السوداء وأسبابها والتقاط الصور قبل وبعد العلاج.

وقد تم تقسيم المرضى والتساوي إلى مجموعتين: في المجموعة الأولى تم التعامل مع المرضى من خلال حقن البلازما الغنية بالصفائح الدموية، وفي المجموعة الثانية تم التعامل مع المرضى من خلال حقن الدهون الذاتية متناهية الصغر.
نتيجة البحث: لم يكن هناك فرقًا إحصائيًا بين المجموعتين فيما يتعلق بالعمر، الجنس، وجود البشارة، والتأريخ المرضي السوراني، ومدة العلاج والاستجابة للعلاج.

وعلى الجانب الآخر من الدراسة كان هناك فرقًا إحصائيًا فيما يتعلق بنسبة التحسن، والأعراض الجانبية الناتجة عن الحقن ومرضى المرضى بنسبة التحسن، وكانت النتائج كالتالي: المجموعة الأولى تم التحسن الكامل في 3 مرضى (13.3%)، والتحسن الخفيف في 2 مرضى (13.3%)، ولا تحسن في عدد 8 مرضى (53.3%). وفي المجموعة الثانية تم التحسن الكامل في 7 مرضى (46.7%), والتحسن المعتدل في 4 مرضى (26.7%), والتحسين الخفيف في 3 مرضى (20%), ولا تحسن في 1 مريض (6.7%).

وبالإشارة إلى الأعراض الجانبية فلا توجد أعراض جانبية تتذكر سوياً ببعض الأساليب البسيطة في أماكن الحقن والتي كانت أكثر في مرضى المجموعة الأولي.

الأستنتاج: كلا الطرقتين تمثلان علاجاً واعداً في علاج الهالات السوداء نظراً لتوفيرهما وسرعة عملهما وقلة الأثار الجانبية الناتجة عن استخدامهما وسهولة الحصول عليهما، إلا أن البلازما الغنية بالصفائح الدموية في علاج الهالات السوداء نظراً لما تحتويه من كميات هائلة من الخلايا الجذعية ولامكانيتها استخدامها في جميع أنواع وأسباب الهالات السوداء.