

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 (*Uyulmazet 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.

Statistical analysis:

Results of the present study were statistically analyzed using SPSS 25 (IBM, USA). Data were represented as median ±SD or number and percentage. Numerical data were compared using Mann-Whitney U test, while categorical data were compared using Chi-square test as appropriate. P value < 0.05 was considered significant.

RESULTS

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

Table (1): Comparison between studied groups as regard demographic data

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

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

Parameters		Groups		Group A (N = 15)		Group B (N = 15)		P-value
		No						
Improvement	No	8	53.3%	1	6.7%	0.048		
	Mild	2	13.3%	3	20%			
	Moderate	2	13.3%	4	26.7%			
	Excellent	3	20%	7	46.7%			
Patients satisfaction	Not satisfied	4	26.7%	1	6.7%	0.032		
	Satisfied	8	53.3%	4	26.7%			
	Highly satisfied	3	20%	10	66.7%			

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

Side effects		Groups		Group A (N = 15)		Group B (N = 15)		P-value
		Minimal						
Postoperative ecchymosis and bruises	Minimal	6	40%	12	80%	0.025		
	Mild	9	60%	3	20%			

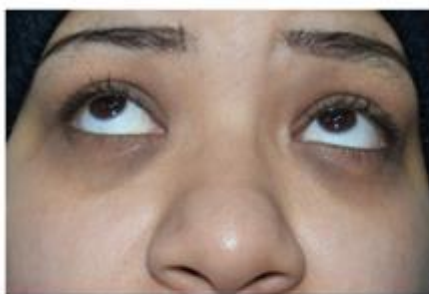


Figure (1): A 42 years old female with dark halos before and after treatment with emulsified fat showing excellent improvement

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.

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

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خلفية البحث: تعتبر الهالات السوداء واحدة من المشاكل الشائعة والمنتشرة علي مستوي العالم، وعلي الرغم من عدم تأثيرها علي الخصائص الفيزيائية الا انها تؤثر على الصحة النفسية للشخص المصاب بها. ويعزى ظهور الهالات السوداء إلى عدة عوامل مختلفة من أهمها العوامل الوراثية، والزيادة الموضعية فى عدد الخلايا الصبغية، والمنخفض الدمعى، والاحتقان الوريدي للجفون، والترهلات الجلدية للجفن السفلى.

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

المرضى 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. وتم إخضاع جميع المشاركين أو ذويهم إلى أخذ التاريخ الشخصي والمرضى كاملا، وفحص جلدي يتضمن الهالات السوداء وأسبابها والنقاط الصور قبل وبعد العلاج.

وقد تم تقسيم المرضى بالتساوي إلى مجموعتين: فى المجموعة الاولى تم التعامل مع المرضى من خلال حقن البلازما الغنية بالصفائح الدموية، وفى المجموعة الثانية تم التعامل مع المرضى من خلال حقن الدهون الذاتية متناهية الصغر.

نتائج البحث: لم يكن هناك فرقا إحصائيا بين المجموعتين فيما يتعلق بالعمر، والجنس، ولون البشرة، والتاريخ المرضي الوراثي، ومدة العلاج والاستجابة للعلاج.

وعلى الجانب الاخر من الدراسة كان هناك فرقا احصائيا فيما يتعلق بنسبة التحسن، والاعراض الجانبية الناتجة عن الحقن ورضى المرضى بنسبة التحسن، وكانت النتائج كالتالى: المجموعة الأولى تم التحسن الكامل في 3 من المرضى (20%)، والتحسن المعتدل في 2 من المرضى (13.3%)، والتحسن الخفيف في 2 من المرضى (13.3%)، ولا تحسن في عدد 8 من المرضى (53.3%). وفي المجموعة الثانية تم التحسن الكامل في 7 من المرضى (46.7%)، والتحسن المعتدل في 4 من المرضى (26.7%)، والتحسن الخفيف في 3 من المرضى (20%)، ولا تحسن في 1 من المرضى (6.7%).

وبالإشارة إلي الأعراض الجانبية فلا توجد اعراض جانبية تذكر سوى بعض الكدمات البسيطة في أماكن الحقن والتي كانت أكثر في مرضى المجموعة الأولى.

الاستنتاج: كلا الطريقتين تمثلان علاجاً واعداً في علاج الهالات السوداء نظراً لتوفرهما ولسرعة عملهما وقلّة الآثار الجانبية الناتجة عن استخدامهما وسهولة الحصول عليهما، إلا أن الدهون الذاتية متناهية الصغر تعد أفضل من البلازما الغنية بالصفائح الدموية في علاج الهالات السوداء نظراً لما تحتويه من كميات هائلة من الخلايا الجذعية ولإمكانية استخدامها في جميع أنواع وأسباب الهالات السوداء.

الكلمات الدالة: البلازما الغنية بالصفائح الدموية – الدهون الذاتية – متناهية الصغر – الهالات السوداء تحت العين .