International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 05, 2020
ISSN: 1475-7192

The Potential Role of Platelet - rich Plasma in the Treatment of Melasma

Dr. Suhad Jassim abdlkadhim

Abstract--- Objective: *To evaluate the response of patients with melasma to intradermal injection of platelet-rich plasma.* ***Background:*** *Melasma is a frequently acquired disorder of hyperpigmentation, that is characterized by asymptomatic light to dark brown patches on face involving the forehead, cheeks, chin and upper lip. Inspite of several treatments for melasma such as topical agents, chemical based peeling, laser and light sourcestherapies, the treatment results are variable success with complications such as irritation, post-inflammatory hyperpigmentation or hypopigmentation. Nonetheless, platelet-rich plasma (PRP) is gettig attention in aesthetic medicinebecause of its autologous nature and mild side effects compare to other melasma treatments.* ***Methods:*** *the present study included 30 patients with melasma having Fitzpatrick skin type III and IV. The duration of study extended from February to November 2019.The therapeutic course consisted of 5 sessions of Platelet-rich plasma(PRP) injections with an interval of 2 weeks apart. PRP was prepared by using a double-spin method and then activated with calcium chloride. Final evaluation was analysed by percent of reduction in baseline of mMASI score. Its consider mild response when reduction of baseline mMASI was between 0-25%; 25-50% reduction consider fair response; 50-75% reduction consider good response; >75% consider excellent response. The treatment trial was considered effective if there was reduction in mMASI score from the baseline is greater than 50%.* ***Results:*** *Of 30 enrolled patients, 5(16.7%) patients showed good response, 19(63.3%) patients showed fair response, and 6(20%) patients showed poor response. None of patients showed excellent response. The overall efficacy of treatment was 16.7%.* ***Conclusion:*** *PRP appear a promising adjuvant therapy for recalcitrant cases of melasma.*

Keywords--- *Melasma, Platelet-rich Plasma, PRP, Modified Melasma Area and Severity Index, mMASI Score.*

I. INTRODUCTION

Melasma is a frequently acquired disorder of hyperpigmentation, that is characterized by asymptomatic light to dark brown patches on face involving the forehead, cheeks, chin and upper lip[1]. It is commonly seen in women especially those with Fitzpatrick photo types III through VI. Melasma classified into three typesas the epidermal, dermal or a mixed type involving both the epidermal and dermal layersof skin, according to the deposition of the hyperactive melanocytes[2]. The prevalence of melasma varies according to raceand geographical location, affecting up to 30% of child- bearing women in some populations[3].

The exact pathogenesis of melasma is not fully understood, increased melanogenesis, extracellular matrix alterations, inflammation, and angiogenesis all play a role in the development of melasma but there is no increase in the actual number of melanocytes[4].

The etiological factors includes a genetic predisposition, ultra violet (UV) radiation, pregnancy and hormonal influence[5].

Dr. Suhad Jassimabdlkadhim, Department of Medicine, College of Medicine, University of Al-Qadisiyah.

DOI: 10.37200/IJPR/V24I5/PR2020136
Received: 07 Mar 2020 | Revised: 26 Mar 2020 | Accepted: 04 Apr 2020

Treatment of melasma is challenging, First line treatment target melanin production by using a photo protective agents in combination with topical agents such as exfoliants(retinoids), tyrosinase inhibitor (hydroquinone, arbutin, azelaic acid) and antioxidants[6]. Second line treatment are chemical based peeling such as glycolic acid, trichloracetic acid (TCA) and salicylic acid [7]. The third line are Laser and Light Sources, recently the low-fluence Q-switched neodymium-doped yttrium aluminum garnet (QS Nd:YAG) lasertherapy has been widely used alone[8]or with combination of Fractional micro needling radiofrequency (FMR) although it has shown promising results,but this treatment would require multiple sessions at 1-week intervals, which would burden the patients [9].

Erbium: YAG and carbon dioxide lasers can produce significant improvement in the melasmabut there is association of increased risk for post-inflammatory hyper- or hypopigmentation[10][11].

This therapeutic trial may represent the pilot study about the effect of PRP in melasma patient of Iraqi women.

II. METHODS

The present therapeutic trial study was carried out at dermatology Department in Al-Diwaniyah teaching hospital in Iraq. The duration of study extended from February to November 2019. Thirtypatients having mixed type of melasma was established by using Wood's Lamb, their age 20 years and above of either sex (26femaleand 4 male).The patients have baseline mMASI score between (6-20) and Fitzpatrick's skin type III and IV. The therapeutic course consisted of 6 sessions of PRP injections with an interval of 2 weeks apart.

The procedure was discussed with the patients, initially 16 cc of blood was collected by venipuncturein a special tube contain an anticoagulant and a separated gel. The tube centrifuged using a soft spin at 1500 rpm for 10 minutes, the supernatant plasma containing platelets and leucocytes transfer into another tube and centrifuged again at high speed 4000 rpm for 10 minutes.

The platelets accumulate at the bottom, so that the lower 1/3 is PRP while the upper 2/3 is PPP (platelet-poor plasma) which is removed in order to withdraw the pure PRP.

The PRP must activated by using 0.1ml of calcium chloride to each 1cc of plasma to induce exocytosis and release of growth factors fromα-granules. Topical anaesthetic (EMLA) cream which contain 2.5%lidocaine and 2.5% prilocaine was applied on the face for half an hour and subsequently wash off.

The PRP injected to the selected area by using 30G needle for superficial microinjection. Final evaluation was analysed by percent of reduction in baseline of mMASI score which is done 2 weeks after last session.

III. RESULTS

A 30 patients were enrolled in this therapeutic trial, there was 26(86.7%) female and 4(13.3%) male patients with mixed melasma. The age range 20-43 years with average 33.9 ±6.46 year. The Fitzpatrick skin types III 24(80%) patients and skin type IV 6(20%) patients. These demographic data are shown in **table 1**.

The response to the treatments showed no patient (0%) with excellent response, 5(16.7%) patients with good response, 19(63.3%) patients with fair response and 6(20%) patients with poor response. The overall efficacy of treatment was 61.7% these results demonstrated in **table 2.**

DOI: 10.37200/IJPR/V24I5/PR2020136
Received: 07 Mar 2020 | Revised: 26 Mar 2020 | Accepted: 04 Apr 2020

The mean mMASI score was reduced progressively as seen in **Figure 1.** The mean score decreased from 15.41±3.66 at baseline to 8.67±3.07 at the end of study(p=0.0006) as seen in **Table 3.**

The side effects that noticed was mild pain and bruises disappeared after a few days.

Table 1: Demographic Characteristics of Patients

Characteristic	**Value**
Number of cases	30
Age (years)	
Range	20-43
Mean ±SD	33.9 ±6.46
Gender	
Male, *n* (%)	4 (13.3 %)
Female, *n* (%)	26 (86.7 %)
Fitzpatrick skin type	
III	24(80%)
IV	6(20%)

Table 2: Grades of Efficacy based on Reduction in mMASI Score (n=30)

Grades of efficacy	***N(%)***
Poor (0-25% decrease)	6(20%)
Fair (26-50% decrease)	19(63.3%)
Good (51-75% decrease)	5(16.7%)
Excellent (>75% decrease)	0(0%)

Table 3: mMASI Score Results

mMASI score results							
		baseline	2week	4week	1week	8tweek	62week
N	Valid	30	30	30	30	30	30
Mean		15.4167	14.3200	12.9533	11.4067	10.0367	8.6700
Std. Deviation		3.66240	3.36712	3.05216	2.86741	3.00120	3.07438

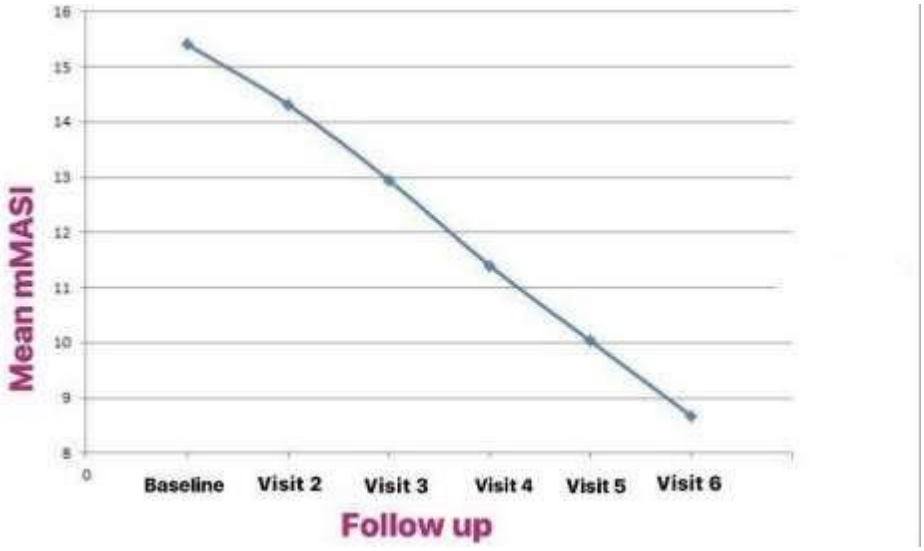

Figure 1: Decrease in Mean mMASI Score During Follow Up

DOI: 10.37200/IJPR/V24I5/PR2020136
Received: 07 Mar 2020 | Revised: 26 Mar 2020 | Accepted: 04 Apr 2020

IV. DISCUSSION

Melasma is acquired disorder of hyperpigmentation commonly found in Iraq. Recently PRP is gaining attention in aesthetic medicine because of its autologous nature and mild side effects compare to other melasma treatments [12].

For instants, PRP application was observed to decrease the incidence of post-inflammatory hyperpigmentation[13][14].

In our therapeutic trial, 30 patients with melasma treated with intradermal PRP injection every 2weeks for 5 sessions. Results were assessed on the basis of percentage of reduction in baseline mMASIscore which showed high rate of fair response19(63.3%) patients and low rate of good response 5(16.7%) patients, with overall efficacy 16.7% so we can say that PRP have a role inmelanogenesis but the efficacy is limited in our people. The improvement of pigmentation may be due to release of TGF-β1and EGF which are known to decrease melanogenesis. The TGF delayed extracellular signal related kinase activation which leads to inhibit melanin synthesis, while EGF lowers melanin production by inhibiting PGE2 expression and tyrosinase enzyme activity[11][14].

In 2014,Turkish case reported by Mutlu Çayırlı *et al,* observed more than 80% reduction in hyperpigmentation after PRP injection for melasma every 2weeks for 3 sessions[15].

Another case from Malaysia reported by Yew Ch*et al* showed variable results in reduction of mean mMASI score in two cases (33.5% and 20%) after monthly intradermal injection of PRP for two sessions in combination of QS ND:YAG laser and topical **α**-arbutin therapy[16].

In 2016 a controlled clinical trial conducted in Thailand by A. Dannarongchai*et al*on ten patients with melasma injected by PRP to one side of the face and intradermal injection of normal saline to another side as control group every 2weeks for 4 sessions, the notable finding was that the mean mMASI score was reduced by 28.9%, but that study was based on small sample size[17].

In 2017, a therapeutic trial study conducted in Pakistan by Faiz *et al* on 20 patients with melasma injected by PRP intradermally for 5 sessions 2weeks apart, showed decrease in MASI score in majority of patients but the efficacy of treatment was low (13.3%)[18].

In our study inspite of decrease in mMASI score in majority of patients but not reached to the point of effective value.

V. CONCLUSION

PRP appear a promising adjuvant therapy for recalcitrant cases of melasma, however larger and longer randomized double blind studies are recommended for long term efficacy.

REFERENCES

[1] P. E. Grimes, S. Ijaz, R. Nashawati, and D. Kwak, "New oral and topical approaches for the treatment of melasma," *Int. J. Women's Dermatology*, vol. 5, no. 1, pp. 30–36, 2019.
[2] K. D. Werlinger *et al.*, "Prevalence of self-diagnosed melasma among premenopausal Latino women in Dallas and Fort Worth, Tex," *Arch. Dermatol.*, vol. 143, no. 3, pp. 423–431, 2007.
[3] T. Passeron and M. Picardo, "Melasma, a photoaging disorder," *Pigment Cell Melanoma Res.*, vol. 31, no. 4, pp. 461–465, 2018.

DOI: 10.37200/IJPR/V24I5/PR2020136
Received: 07 Mar 2020 | Revised: 26 Mar 2020 | Accepted: 04 Apr 2020

[4] P. Date, "Melasma pathogenesis : a review of the latest research, pathological findings, and investigational therapies," pp. 0–6, 2019.
[5] M. Chatterjee and B. Vasudevan, "Recent advances in melasma," *Pigment Int.*, vol. 1, no. 2, p. 70, 2014.
[6] G. S. Jutley, R. Rajaratnam, J. Halpern, A. Salim, and C. Emmett, "Systematic review of randomized controlled trials on interventions for melasma: An abridged Cochrane review," *J. Am. Acad. Dermatol.*, vol. 70, no. 2, pp. 369–373, 2014.
[7] A. Hafeez, S. Shaukat, M. Sanai, T. J. Ahmad, and S. Aman, "Comparison of the efficacy and safety of 40% glycolic acid & 60% lactic acid chemical peel in treatment of epidermal melasma," *J. Pakistan Assoc. Dermatologists*, vol. 29, no. 2, pp. 176–181, 2019.
[8] C. A. P. Hofbauer, M. F. Careta, N. Y. Valente, and L. A. Torezan, "Clinical and Histopathologic Assessment of Facial Melasma After Low-Fluence Q-Switched Neodymium-Doped Yttrium Aluminium Garnet Laser.," *Dermatologic Surg. Off. Publ. Am. Soc. Dermatologic Surg. [et al.]*, vol. 42, no. 4, pp. 507–512, 2016.
[9] H. H. Kwon, S. C. Choi, J. Y. Jung, and G.-H. Park, "Combined treatment of melasma involving low-fluence Q-switched Nd: YAG laser and fractional microneedling radiofrequency," *J. Dermatolog. Treat.*, vol. 30, no. 4, pp. 352–356, 2019.
[10] Z. S. Tannous and S. Astner, "Utilizing fractional resurfacing in the treatment of therapy-resistant melasma," *J. Cosmet. Laser Ther.*, vol. 7, no. 1, pp. 39–43, 2005.
[11] M. K. Trivedi, F. C. Yang, and B. K. Cho, "A review of laser and light therapy in melasma," *Int. J. Women's Dermatology*, vol. 3, no. 1, pp. 11–20, 2017.
[12] C. Langer and V. Mahajan, "Platelet-rich plasma in dermatology," *JK Sci.*, vol. 16, no. 4, pp. 147–150, 2014.
[13] N. L. Lacz, J. Vafaie, N. I. Kihiczak, and R. A. Schwartz, "Postinflammatory hyperpigmentation: a common but troubling condition," *Int. J. Dermatol.*, vol. 43, no. 5, pp. 362–365, 2004.
[14] E. Tamariz-Domínguez, F. Castro-Muñozledo, and W. Kuri-Harcuch, "Growth factors and extracellular matrix proteins during wound healing promoted with frozen cultured sheets of human epidermal keratinocytes," *Cell Tissue Res.*, vol. 307, no. 1, pp. 79–89, 2002.
[15] M. Çayirli, E. Çaliskan, G. Açikgöz, A. H. Erbil, and G. Ertürk, "Regression of melasma with platelet-rich plasma treatment," *Ann. Dermatol.*, vol. 26, no. 3, pp. 401–402, 2014.
[16] C. H. Yew, T. S. Ramasamy, and F. Amini, "Response to intradermal autologous platelet rich plasma injection in refractory dermal melasma: Report of two cases," *J. Heal. Transl. Med.*, vol. 18, no. 2, pp. 6–7, 2015.
[17] A. Dannarongchai, N. Luplertlop, S. Deeanandlarp, and P. Sirithanabadeekul, "The Potential Role of Platelet-Rich Plasma in Melasma Treatment," *TJPS*, vol. 41, no. 2017, 2016.
[18] F. Faiz, A. Shehzad, R. Farooq, S. Mufti, A. Nasir, and T. J. Ahmad, "Efficacy of platelet-rich plasma in the treatment of melasma: A pilot study," *J. Pakistan Assoc. Dermatologists*, vol. 28, no. 3, pp. 348–353, 2018.

DOI: 10.37200/IJPR/V24I5/PR2020136
Received: 07 Mar 2020 | Revised: 26 Mar 2020 | Accepted: 04 Apr 2020