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Original Research Article

Assessment of efficacy of autologous platelet rich plasma in crow's feet wrinkles

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ABSTRACT

Objective: The aim of the study was to evaluate the efficacy of autologous platelet rich plasma in the treatment of crow's feet wrinkles.
Materials and Methods: In a study conducted for 6 months duration, 20 participants were treated with 2 sessions of PRP monthly once. Patients received 1 ml of PRP to each side of crow's feet and infra orbital area. Study was evaluated by comparing pre and post treatment photographs, subjective satisfaction score, objective clinical assessment and side effects.
Results: A definitive improvement was found in most of the patients. Patient satisfaction score showed grade 3 improvement in 5%, grade 2 in 40%, grade 1 in 50% and no improvement in 5%. Objective clinical assessment showed grade 3 improvement in 5%, grade 2 in 60%, grade 1 in 35%. Good results were observed in objective clinical assessment (p value <0.001) as well as patient satisfaction scoring without much side effects.
Conclusion: The present study concludes that PRP therapy is cost effective and safe in treatment of crow's feet wrinkles.

1. Introduction

Facial wrinkles and folds are a result of the ageing process. Pathophysiology of ageing is due to the degeneration of collagen fibres and accumulation of altered elastic fibers in the dermis.[1]

There are many intrinsic and extrinsic factors that trigger facial ageing: sun exposure, hereditary, nutritional, stress, alcoholism, smoking, drug abuse, pollution etc.[2,3]

Age-related changes in the face like dermal dystrophy, dermal thickening, facial soft tissue loss, loss of subcutaneous tissue and redistribution of fat will contribute to facial folds. Crow's feet and nasolabial folds are the first sign of facial ageing.[4] In Aesthetic Dermatology, there are various surgical and nonsurgical modalities that are used for correction of an aged face. Many of the treatments are expensive, effective for short duration and with side effects. One of the therapeutic option to induce collagen is injecting Autologous platelet rich plasma (PRP). PRP contains 4-7 times the baseline concentration of human normal platelet counts. It is prepared from centrifuging patients own blood.[5] The optimal PRP platelet concentration is not clearly known. The current methods by which PRP is prepared reported >1* 10^6platelets / microlitre.[6] Due to the difference in processing of PRP in various studies, the evidence for PRP therapy as an effective treatment is very low. There is no standardized technique to be followed in order to get optimal results. Several factors affect the efficacy of platelets: platelet concentrate, growth factor levels, activation part in vitro and in vivo and time of

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application. PRP in skin rejuvenation acts by increasing dermal collagen and elastic fibers by various molecular mechanisms.[7]

The main purpose of facial rejuvenation is to reverse the aging process either by surgical or non-invasive modalities.[8] In recent years there is decrease in the number of patients who opt for surgical facial rejuvenation procedures. This emphasizes the importance and need of non-invasive and minimally invasive procedures for facial rejuvenation like PRP intradermal injections.[9]

The present study was done to evaluate the efficacy of autologous PRP in the treatment of crow's feet wrinkles.

2. Materials and Methods

The study was carried out in the Department Of Dermatology (Aesthetic Dermatology Clinic). Purposive sampling was done to select 20 healthy volunteers aged between 30 to 60 years attending the Cosmetology OPD with crow's feet wrinkles. The study was done for a period of 6 months from January 2019 to June 2019. All patients were explained about the procedure and possible side effects, after which written informed consent was taken.

2.1. Inclusion criteria

1. Female patients aged between 30-60 years.
2. Patients with mild to severe crow's feet wrinkles on clinical evaluation.
3. Patients who are willing to participate in the study were included.

2.2. Exclusion criteria

1. Pregnancy and lactating females.
2. Treatment taken for facial wrinkles in the past 6 months.
3. Any active infection at the site of treatment.
4. Patients who are not willing for study.
5. Bleeding and coagulation disorders.
6. Who were on antithrombotic and antiplatelet medication were excluded from the study.

2.3. Baseline investigations were done

1. Complete blood count
2. HIV 1 and 2
3. HBsAg , HCV

2.4. Isolation of PRP

Under aseptic precautions, 8.5 ml of venous blood is withdrawn and transferred in to Acid Citrate Dextrose vial. Centifuged at 3000 rpm for 15 minutes. Single spin method was used. Upper $1/3^{rd}$ consisting of platelet poor plasma was discarded. Lower $2/3^{rd}$ consisting of platelet rich plasma was taken in insulin syringes. Buffy coat and RBCs were discarded.

2.5. Patient preparation

Area to be treated is wiped with antiseptic, followed by normal saline. Pre treatment photographs were taken. Informed consent taken prior to the procedure. Topical anaesthesia cream (EMLA: a eutectic mixture of lidocaine 2.5% and prilocaine 2.5%) applied as a thick film under occlusion for one hour, followed by cleaning with sterile saline before the procedure.

Patient was made to sit in an inclined position at 45-degree angle. PRP is filled in insulin syringes with 31 G needle. 0.1 ml of PRP was injected intradermally at a distance of 5mm approximately, in to crow's feet and infra orbital area. Total of 1 ml injected to each side. Slight erythema and edema was noted post procedure associated with mild burning sensation. PRP was injected once a month, 2 sessions. Patients were followed up after 3 months from baseline.

Any side effects, improvement or deterioration was recorded every sitting and photographs were taken after study.

The analysis was done using Patient Satisfaction Score (PSS), Objective Clinical Assessment (OCA) and side effects.

Baseline objective clinical assessment was done as follows:

0: no wrinkles
1: fine wrinkles
2: moderate number of wrinkles, fine to moderate depth
3: numerous lines, fine to deep wrinkles

Patient satisfaction score and objective clinical assessment after 3 months from baseline: scored between 0 to 3

0: No improvement
1: Mild improvement
2: Good improvement (Figure 1)
3: Very good improvement (Figure 2)

3. Results

Study included 20 female participants aged from 30 to 60 years, with mean age of 42.25 years.

1. Patient satisfaction score: 5% had grade 3 improvement, 40% - grade 2, 50% - grade 1 and 5% reported no improvement.(Table 1)
2. Objective clinical assessment: 5% had grade 3, 60% - grade 2, 35% - grade 1 improvement (Table 2) Note: * wilcoxon Signed ranks test
3. Mild and transient adverse effects were seen as follows: 50% - mild erythema, 75% - mild edema, 5% - bruise, 25 % had mild burning sensation lasting for 5 to 10 minutes post procedure.(Table 3)

Table 1: Patient satisfaction score

Score	Number of participants	Percentage (%)
0	01	5
1	10	50
2	08	40
3	01	5

Table 2: Objective clinical assessment

Score	Pre	Post	p- value
0	00	01	Z value – 3.771
1	02	11	
2	13	08	
3	05		<0.001*

Table 3: Mild and transient adverse effects were seen as follows

Adverse effects	Number of participants	Percentage (%)
Burning sensation	05	25
Erythema	10	50
Edema	15	75
Bruise	01	5

Figure 1: Before and after photo showing good improvement on objective clinical assessment (score 2) after 3 months from baseline.

Figure 2: Before and after photo showing very good improvement on objective clinical assessment (score 3) after 3 months from baseline.

4. Discussion

Ageing is characterized by a reduction in the homeostatic and regenerative capacity of all tissues and organs in the body. Biostimulation for new collagen, elastin, extracellular matrix and vascular network formation has the capability to restructure the skin and reduce the signs of ageing.[10]

PRP is autologous concentration of human platelets in a small volume of plasma. Platelets release growth factors upon activation which include: PDGF, TGF-B1, TGF-B2, EGF, VEGF along with fibrin, fibronectin and vitronectin which have a major role in wound healing and cell adhesion. Also PRP acts as a matrix for migration in different tissues including bone, connective tissue and epithelium.[11]

In a study by Redaelli et al, done in 2008, 23 participants received 3 PRP injections spaced at monthly intervals for face and neck rejuvenation. Results showed 30% improvement in crow's feet wrinkles. No serious or persistent side effects were reported.[12]

In a split face randomized, placebo controlled study conducted in Thailand on 20 females, PRP was injected once a week for 4 weeks for crow's feet wrinkles. 75% of the participants were satisfied with PRP.[13]

In a prospective controlled clinical study using PRP for skin rejuvenation in 20 patients showed following side effects: 75% - erythema, 70% - burning sensation, 15% - bruising, 10% - erythema.[14]

In a clinical trial by Banihashemi et al, in 2021, 30 female participants were injected with PRP in two sessions with

3 month intervals. In 3 and 6 months follow up patients reported 73.9% and 78.3% improvement in periorbital wrinkles. 16 (69.6%) developed edema or edema and bruise at the site of injection which lasted for 1 to 7 days. [15]

5. Limitations

1. Small sample size
2. Lack of control group
3. Follow up duration being short

Hence we suggest conducting similar study in larger sample size, with control arms in which participants undergo other commonly used non invasive facial rejuvenation methods like radio frequency, non ablative lasers.

Our study clearly illuminates statistically and clinically significant results, with no serious adverse effects and less expensive.

6. Conclusion

Autologous PRP is a new more natural approach and safe for facial rejuvenation. Our study has shown that the patient satisfaction score and objective clinical assessment score were high. Clinical outcome can be significantly enhanced with concomitant use of lasers, fillers and mesotherapy. Due to less number of studies on clinical efficacy and safety, further studies are required to investigate the mechanism of action behind the therapeutic efficacy of autologous PRP and long term effects in facial rejuvenation.

7. Source of Funding

None.

8. Conflict of Interest

None.

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