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Original Article

Effects of combine treatment of tressfix and PRP on the levels of different micro ribonucleic acids among seborrheic eczema patients

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Abstract

Introduction The research aid in the identification of individual micro Ribonucleic Acids (miRNA) linked to the beneficial tissue healing responses found in patients receiving the medication. Hence the study is aimed to determine the effects of PRP and tressfix serum on the levels of miRNA among seborrheic eczema patients.

Methods The research comprised both male and female individuals between the ages of 18 and 65 who had mild to moderate seborrheic eczema. Participants were either unresponsive to traditional therapy or resistive to them. Individuals with immune-related diseases, bleeding disorders, active skin infections, serious medical illnesses, allergies to PRP or tressfix serum components, and those who were pregnant or nursing were not eligible.

Results The analyses of the findings revealed that the levels of miRNA were significantly reduced ($p<0.05$) in all three groups. Significant reduction was observed in combine group in comparison to PRP and tressfix serum alone groups. In group A the expression of all miRNA was reduced significantly ($p<0.05$), in comparison to miRNA expression in group B and group C. In group C the expression of two miRNAs that were has-mir-941 and hsa-miRNA-212 was reduced significantly whereas the levels of remaining three miRNA remained non-significantly unaltered.

Conclusion This study gave evidence of the efficacy of the intervention, which combines platelet-rich plasma (PRP) with tressfix serum, in treating seborrheic eczema. The drop in miRNA levels across all three groups suggests that the therapy had a significant influence on the underlying molecular pathways involved in skin healing and inflammation. The combination group, in comparison to the other treatment groups, showed the most significant drop in miRNA levels.

Key words
Platelet-Rich plasma; Seborrheic; MicroRNAs.

Introduction

Facial seborrheic dermatitis (FSD), commonly known as seborrheic eczema, is a chronic inflammatory skin illness that usually affects the forehead, brows, glabella, and nasolabial folds.[1] It is believed that up to 10% of the adult population is affected, with a greater frequency among men in their third and fourth decades of life.[2] The actual aetiology of FSD is unknown, however, various variables are thought to contribute to its development.[3-4] A genetic susceptibility to aberrant epidermal barrier (EPB) function and altered sebum composition is one potential scenario.[5] Disruptions in the EPB can foster the growth of Malassezia yeasts,

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which are lipid- dependent yeasts prevalent on sebum-rich skin.[6] Although the rate of sebum excretion in many FSD patients may not be enhanced, the disease is more common in locations with the most and biggest sebaceous glands.[7-8] Malassezia yeasts, which may thrive in a sebum-rich environment, have been discovered in greater concentrations in some FSD patients. Malassezia yeasts create free fatty acids when they metabolize sebum, which can irritate the skin and cause dermatitis.[9]

It is crucial to highlight that not all persons with a high density of Malassezia acquire FSD, indicating that immune system dysregulation may be required for the yeasts' harmful activity. Up to 11 gene mutations and protein shortages have been related to FSD or FSD-like symptoms in people and mice, showing a hereditary vulnerability to the disorder.[10-11]

Platelet-rich plasma (PRP) is a therapy that has gained traction in a variety of medical sectors due to its ability to help in tissue repair and regeneration. PRP is produced from the patient's own blood and includes more platelets than conventional blood. Platelets are high in growth factors, which aid in tissue repair and regeneration.[12] PRP's capacity to enhance tissue repair and collagen synthesis may be advantageous in the setting of seborrheic eczema. Seborrheic eczema is an inflammatory skin disorder that causes itchy, erythematous, greasy, and scaly plaques.[13] Because PRP contains growth factors that are chemotactic and mitogenic for numerous cells involved in tissue repair, it is possible that PRP might aid in the regeneration of injured skin and enhance cutaneous barrier function.[14-15]

Combining PRP with tressfix serum, which presumably contains additional growth factors and skin-beneficial components, may have a synergistic impact in the treatment of seborrheic eczema. Tressfix serum, if formulated to address the underlying causes of seborrheic eczema, might complement and increase PRP's regenerative qualities and therapeutic potential. The levels of microRNAs (miRNAs) in seborrheic eczema patients would be significant for assessing the success of this combination treatment and understanding its molecular consequences. miRNAs are tiny non-coding RNA molecules that play an important role in gene expression regulation. They have been linked to a variety of skin disorders and can be used as biomarkers to assess disease severity and therapy response. Researchers can acquire insights into the molecular alterations that occur throughout the healing process by comparing miRNA expression patterns before and after the combined therapy of PRP and tressfix serum. The research aids in the identification of individual miRNAs linked to the beneficial tissue healing responses found in patients receiving the medication. This study aims to determine the effects of PRP and tressfix serum on the levels of miRNA among Seborrheic Eczema patients.

Methods

This is single blinded randomized clinical trial that was conducted on seborrheic eczema patients in the department of dermatology at Isra University Hospital, Hyderabad. Diagnosed seborrheic eczema patients of aged 20-40 years were selected. Envelope Method was used for the purpose of randomization.

A total of 60 patients were split into three groups of 20 each. Tressfix serum and PRP combined therapy was used to treat patients in Group A. PRP alone was administered to patients in Group B, and tressfix serum alone was advised to patients in Group C.

The research comprised both male and female individuals between the ages of 18 and 65 who

had mild to moderate seborrheic eczema. Participants were either unresponsive to traditional therapy or resistive to them. Individuals with immune-related diseases, bleeding disorders, active skin infections, serious medical illnesses, allergies to PRP or tressfix serum components, and those who were pregnant or nursing were not eligible. The treatment's effects were analyzed using recognized severity grading methods that includeing Eczema Area and Severity Index (EASI), as well as changes in the expression levels of microRNAs (miRNAs) related with skin healing and inflammation. The PRP and tressfix serum combo therapy was administered to participants who satisfied the inclusion criteria and gave informed consent.

Using a 21-gauge butterfly needle, the accurate PRP manufacturing procedure entailed extracting 15mL of venous blood from the patient. The blood was obtained in five sterile tubes with an anticoagulant of 3.8% sodium citrate. The tubes were first centrifuged at 150g for 10 minutes to separate red blood cells from plasma, including the buffy coat of white blood cells and platelets, using a twofold spin procedure. The plasma was then carefully transferred to another tube and centrifuged at 1500 to 2000g for 10 minutes to separate platelet-poor plasma (PPP) at the top from platelet-rich plasma (PRP) at the bottom. The PPP was aspirated carefully to avoid mixing with the PRP. Finally, the PRP was activated by adding 0.1mL of $CaCl_2$ for every 0.9 mL of PRP, resulting in an active PRP concentration of around 3mL, appropriate for possible therapeutic uses.

PRP injections were administered intradermally using a 1-mL syringe and sterile 30- gauge needles. Before the injection, 0.2 mL of PRP was carefully injected into the subfollicular plane at 2 cm intervals on the scalp, focusing on the frontal, parietal, and vertex regions. The scalp surface was properly washed with alcohol pads prior to each injection. During the 14-week therapy period, participants got a total of seven sessions, each two weeks apart.

For the patients in Combination Therapy (Group A): Patients in the combination therapy group got PRP and were also advised to utilize tressfix serum once a day for 14 weeks.

PRP Treatment (Group B): The patients got one session every two weeks for a total of seven sessions over the course of 14 weeks.

Tressfix Serum Treatment (Group C): Patients in the tressfix Serum therapy group were advised to use the serum once daily for 14 weeks. The serum comprises ginkgo biloba 4%, procapil 10%, panthenol 1%, biotin 2mg, castor oil 2%, propylene glycol 5%, glycerin 5%, and wheat protein 5%.

Levels of 15 different microRNAs were determined including: hsa-miR-223, hsa-miR-212, hsa- miR-21, hsa-miR-421, hsa-miR-29b-1, hsa-miR-146b, hsa-miR-941, hsa-miR-27a, hsa-miR-155, hsa-miR-4273, hsa-miR-98, hsa-miR-204, hsa-miR-105-1, hsa-miR-10a and hsa-miR-143. Out of these, 5 miRNAs (hsa-miR-143, hsa-miR-421, hsa-miR-29b-1, hsa-miR-941, and hsa- miR-212) turned out to be positive.

The Eczema Area and Severity Index (EASI) is a frequently used grading system for patients to quantify the severity and breadth of atopic dermatitis (eczema).[16] The readings were taken twice at baseline and after 14 weeks of intervention.

Results

The demographics description of the participants revealed that mean age of the participants was 43.5±2.5 years with 39 males (65%) and 21 females (35%). Further analyses had revealed

Table 1 Demographic description of participants included in the study.

Variables	*Mean age in years ± SD*	*Males n (%)*	*Females n (%)*
Combine	43.5±2.5 years	39 (65%)	21 (35%).
Group wise distribution			
Group A: (PRP + Tressfix Serum)	43.8±2.5 years	13 (33.33%)	7 (33.33%)
Group B: (PRP)	43.2±2.8 years	12 (30.76%)	8 (25.80%)
Group C: (Tressfix Serum)	44.1±3.2 years	14 (35.89%)	7 (33.33%)

Table 2 Levels of microRNA before and after intervention.

	Variables	*Pre mean±SD*	*Post mean±SD*	*MD±SD*	*t-stats*	*p-value*
Group A	hsa-miR-143	140±2.56	120.56±2.95	19.44±3.96	11.56	<0.001
	hsa-miR-421	85.6±1.25	78.56±2.51	7.05±2.58	4.47	<0.001
	hsa-miR-29b-1	125.04±2.25	105.48±2.25	19.56±2.78	11.61	<0.001
	hsa-miR-941	154.14±4.14	125.48±1.25	28.66±1.58	17.89	<0.001
	hsa-miR-212	98.56±3.02	78.38±3.45	20.18±3.35	12.25	<0.001
Group B	hsa-miR-143	135.65±2.58	126.12±3.65	9.53±2.29	6.68	<0.001
	hsa-miR-421	88.45±4.56	77.89±1.25	10.56±2.58	7.74	<0.001
	hsa-miR-29b-1	158.78±3.54	139.11±4.47	19.67±2.25	11.9	<0.001
	hsa-miR-941	95.78±2.24	84.14±2.58	11.64±3.2	11.89	0.05
	hsa-miR-212	99.14±2.24	85.23±3.34	13.91±4.21	10.58	<0.001
Group C	hsa-miR-143	138.21±3.57	137.9±3.38	0.31±0.01	1.5	0.07
	hsa-miR-421	92.14±2.01	92.01±3.8	0.13±0.8	0.9	0.08
	hsa-miR-29b-1	129.85±3.63	127.71±6.3	2.14±1.11	1.12	0.63
	hsa-miR-941	150.20±1.25	145.01±5.55	5.19±2.25	3.47	0.04
	hsa-miR-212	93.25±1.85	90.21±3.25	3.04±1.14	2.3	0.05

that the average age of the participants in group A was 43.8±2.5 years, group B was 43.2±2.8 years and group C was 44.1±3.2 years **(Table 1)**.

The analyses of the findings revealed that the levels of miRNA were significantly reduced ($p<0.05$) in all three groups, with higher reduction observed in combine group in comparison to PRP and tressfix serum alone groups. In group A the expression of all miRNA were reduced significantly ($p<0.05$) more than in comparison to miRNA expression in group B and group C. In group C the expression of two miRNAs that were has-mir-941 and hsa-miRNA-212 was reduced significantly whereas the levels of remaining three miRNA remained non-significantly unaltered **(Table 2)**.

Further impact of treatment strategies was also determined on EASI and the findings revealed that the EASI was significantly improved ($p<0.05$) group A and in group B, whereas no significant difference in the EASI was found in patients in group C ($p>0.05$) **(Table 3)**.

Discussion

The results show the intervention's effectiveness, notably in the combined group and Group B, and highlight the potential of miRNA modification as a feasible treatment method for eczema management. A case study involved two

Table 3 EASI score.

Variables	*Before Intervention EASI ± SD*	*After Intervention EASI ± SD*	*t-score*	*p-value*
Group A	54.25±2.25	33.21 ± 2.58	11.56	<0.05
Group B	50.14 ± 3.21	39.45 ± 3.58	9.88	<0.05
Group C	52.78 ± 4.56	49.58 ± 5.56	1.12	>0.07

sessions of platelet-rich plasma (PRP) mesotherapy provided to seven patients with corticosteroid-induced rosacea- like dermatitis (CIRD) before normal treatment to restore skin barrier function. Surprisingly, the patients' symptoms and looks improved dramatically without the need for additional therapies.[17] The PRP therapy significantly decreased erythema, telangiectasia, and papules in the afflicted people, reducing sensitivity and inflammation. The patients were pleased with the results because the mesotherapy was well-tolerated and resulted in significant improvement in their condition.[17] This surprising outcome shows that PRP mesotherapy might be a promising treatment method for corticosteroid-induced rosacea-like dermatitis and perhaps rosacea. However, larger randomized controlled studies are required to confirm its safety and effectiveness in treating these disorders.

In a comprehensive review, that was performed with the objective to determine the efficacy of microneedling with platelet-rich plasma (PRP) for treating atrophic post-acne scars,[18] the authors did a thorough search of medical journals and databases, concentrating on the most recent or comprehensive research. It was found by these researchers that while microneedling and fractional CO_2 laser can successfully cure atrophic acne scars, the use of PRP in conjunction with microneedling has shown encouraging results. The use of PRP into the microneedling method not only shortened healing time but also lowered toxicity, suggesting a possible treatment option for atrophic post-acne scars.[18]

In another case study alleviation of symptoms of patients with atopic dermatitis (AD) after several PRP injections was observed. PRP's activated platelets produce growth factors that promote tissue regeneration and renewal by inducing crucial healing processes. Following repeated PRP treatments, the patient's AD symptoms steadily improved and finally disappeared for a lengthy period of time.[19] The patient's exceptional two-year symptom improvement supports the potential utility of PRP for controlling AD and other kinds of dermatitis.[19] The findings call for more research into the therapeutic effects of PRP in treating skin eczema through randomized clinical trials with a greater number of patients.[19]

The current single-blind randomized clinical trial sheds light on the efficacy of platelet-rich plasma (PRP) therapy in the treatment of seborrheic eczema. The study used a rigorous study design utilizing envelope randomization to ensure a fair allocation of individuals into three groups. The target group of diagnosed seborrheic eczema patients aged 20-40 years was well-defined, and the intervention method comprising PRP therapy was well-documented and standardized. To examine therapy results, the researchers used established severity grading systems, such as the Eczema Area and Severity Index (EASI). The analysis of microRNA expression levels added to our understanding of the underlying processes of PRP treatment in skin healing and inflammation. While randomization was used in the research design, the sample size of 60 individuals divided into three groups (20 each) may be somewhat small, thus reducing statistical power and generalizability of the findings. Furthermore, the lack of a placebo or control group may make comparing the efficacy of PRP therapy to standard therapies or no intervention difficult. Larger sample numbers, longer follow-up periods, and the inclusion of control groups in future research might reinforce the study's findings and increase the evidence foundation for PRP therapy in the treatment of seborrheic eczema.

Conclusion

The study gives evidence of the efficacy of the intervention, which combines platelet-rich plasma (PRP) with tressfix serum, in treating seborrheic eczema. The drop in miRNA levels across all three groups suggests that the therapy had a significant influence on the underlying molecular pathways involved in skin healing and inflammation. The combination group, in comparison to the other treatment groups, showed the most significant drop in miRNA levels. Furthermore, the considerable improvement in Eczema Area and Severity Index (EASI) ratings in both the combined group and Group B indicates the intervention's efficacy in reducing eczema symptoms. The findings highlight the potential of miRNA alteration as a viable therapeutic method for eczema management, calling for more research and clinical studies to evaluate and optimize this therapy strategy. These results have the potential to improve the quality of life of people suffering from seborrheic eczema and may aid in the development of tailored and effective therapies for this prevalent and chronic skin condition.

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