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Research Article

EVALUATION OF EFFICACY AND SAFETY OF PLATELET RICH PLASMA (PRP) IN THE TREATMENT OF ANDROGENIC ALOPECIA AND BACTERIAL ULCERATIVE LESION

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ABSTRACT

Background: Androgenic alopecia is the most common type of hair loss in both sexes, it is androgen dependent, genetically determined. Many therapies are used in the treatment of androgenic alopecia. Recently platelet rich plasma (PRP) is used as a constructive therapy for the treatment. Objectives: To evaluate the efficacy and safety of PRP in the treatment of androgenic alopecia, and bacterial ulcerative lesions in scalp. Patients and methods: Sixty-four patients with androgenic alopecia were included in this study; they were fully interrogated and examined for sex, age, grad and duration of alopecia and previous therapy. They were treated by injection of 4-5ml of prepared PRP from each patient in the bald area, and the patients followed up for 6-12months after the last secession. Patients with ulcerative lesions developed secondary bacterial infection, and swabs were taken from them, and cultured on different culture media and submitted to a serial of different biochemical tests for diagnosis. Results: A total number of 64 patients with androgenic alopecia were treated by PRP injections, all patients show response with 30% growth of new hair, and negative pull test, increasing of thickness and growth of the hair, the efficacy was variable and directly proportion with the number of secession and inversely proportion with the duration of interval between the successful secession, without adverse side effects. Bacteriological study of those with secondary bacterial infections with *S. aureus* shows responsive for treatment with PRP. Conclusion: It was concluded that PRP therapy was an effective and safe method for the treatment of androgenic alopecia in both sexes, without adverse side effects, and the prevalence was relatively common in both sex, according to antimicrobial activity of PRP against *S. aureus and S. pyogene*s

Keywords: Androgenic alopecia, minoxidil, fen stride, platelet rich plasma.

INTRODUCTION

Androgenic alopecia is by far the most common type of hair loss in sex, (also called male pattern hair loss and male balding) [1]. It is an androgen dependent, genetically determined trait, female pattern hair loss has also been termed androgenic alopecia, in the belief that it is the same entity as in men[1,2]. However in both men and women, hair loss is characterized by progressive decline in the duration of anagen, an increase in the duration of telogen and miniaturization of scalp hair follicles, indicating a final common pathway of follicular regression[1,2]. Almost all Caucasian men develop some recession of the hair line in the front temporal region following puberty [1]. Approximately 80% of men have some degree of balding by the age of 70 years and approximately 50% show Hamilton-Norwood-7 balding[1,3]. In women by the age of 30years 2-5% of Caucasian women show some thinning of their scalp hair rising to nearly 40% at age 70 years[1,4]. The age of onset is teens, 20s or early 30s in men and 20s or early 30s in women[1,2,5]. Etiology in men shows genetic predisposition with high affinity and avidity of testosterone to androgen receptors, in women hyperandrogenism is the major etiology, particularly when accompanied by other signs of androgen excess such as hirsutism and amenorrhea, and raised circulating testosterone level, should promote a search for an androgen-secreting tumor[1,6-8]. Clinically in men the two major features of male pattern hair loss are recession of the frontal hair line and balding of the scalp vertex, eventually, hair loss may coalesce leaving a rim of normal hair growth at the sides and back of the scalp (parietal and occipital areas), which is classified by Hamilton and modified by Norwood. In small proportion of Caucasian men (less than 5%), balding assumes a more diffuse distribution over the crown and frontal scalp, with retention of the frontal hair line, resembling female pattern hair loss[1,2,3,5]. In women, female pattern hair loss is usually a more diffuse process than male, throughout the apical scalp with part wider anteriorly, sparing the frontal hair line, although a small proportion subset of women exhibits a male pattern of temporal recession. The midline part is an important clinical clue, revealing a "Christmas tree pattern" of hair loss with the part tapering from the anterior to the posterior scalp[1,2,4]. Diagnosis of androgenic alopecia is made clinically, investigation is probably unnecessary in both sex with typical pattern hair loss. However, if the hair loss is diffuse and not localized to typical pattern, it is appropriate to check thyroid stimulating hormone, iron and serum androgen[1-4,6,9,10]. Management, patients fall into three groups, those who wish to be reassured, that their hair loss is not a manifestation of serious underling disease, those who are concerned by it and wish to be treated and those with a body dysmorphic disorder[1,2,11]. Treatment in both men and women, include topical minoxidil solution [12-15]. Oral fenistrid 1mg daily[16-18]. Or combination of both[19], used for at least 6months, and lastly surgical hair transplant, particularly in men [20-22]. Recently platelet rich plasma (PRP) is used in the treatment of androgenic alopecia in both men and women [23]. What is PRP: It is a volume of autologous plasma that has a platelet concentration above baseline, the average normal platelet count in blood is 200000/ul, the scientific proof of bone and soft tissue healing enhancement has been shown using PRP with 1000000/ul, it is the concentration of platelet in a 5ml volume of plasma, which is the working definition of PRP today[24,25]. PRP used in the treatment of the following dermatological disorders[26,28].

1. Androgenic alopecia.
2. Alopecia aerates.

3. Skin rejuvenation.
4. Acne scars and contour defects.
5. Wounds, ulcers and connective tissue diseases associated ulcers.
6. Striae distensae.
7. Lipodermatosclerosus.
8. Lichen sclerosus.

The mode of action of PRP is by activation of alpha granules of platelet to release numerous proteins, including platelet-derived growth factor (PDGF), transforming growth factor (TGF), vascular endothelial growth factor (VEGF), insulin-like growth factor (IGF) epidermal growth factor (EGF) and interleukin (IL)[29,30].These growth factors may act on stem cells in the bulge area of the hair follicles, stimulating the development of new follicles and enhance new blood vessels formation[31]. The aim of the present study is to evaluate the efficacy and safety of PRP in the treatment of androgenic alopecia and bacterial lesions in scalp in Kalar City, Al- Sulaymania Provence, Iraq.

PATIENTS AND METHODS

Sixty-four patients with androgenic alopecia were seen in a private clinic in Kalar City, Al-Sulaymania Provence, for the period from January 2016 to December 2017, their ages ranged from (18-48) years, with a mean age (29.17±8years). They were (64) patient with androgenic alopecia, (12) have ulcerative lesions, (32) males and (32) females**.** Some of the patients were treated by topical minoxidil or finasteride or both for a different period, but without significant improvement. The patients were fully interrogated regarding sex, age, grad of alopecia, previous therapy, any contraindication to PRP preparation and therapy, like human immune deficiency virus (HIV), hepatitis-B surface antigen (HBSAg), hepatitis-C virus (HCV), hematological and endocrinological disorders. A written informed consent was obtained from all patients. They were tested for HIV, HBSAg, and HCV by ELISA and complete blood picture. Patients with hair loss disorders other than androgenic alopecia, blood disorders and endocrinological disorders were excluded from the study. The patients were examined before treatment and assessed for grad of androgenic alopecia according to Hamilton-Norwood classification, pull test, diameter of hair, thickness, fullness and pictures were taken before and after therapy. PRP was prepared by aspiration of 9ml fresh blood from each patient under good aseptic procedures and collected in test tube containing sodium citrate. The blood samples were centrifuged at 3500 revolutions/minute for 10 minutes. The intermediate layer, which represent the PRP were obtained and loaded in an insulin syringe containing sodium chloride as activator (1part sodium chloride and 9parts of PRP) and used for treatment of patients by injections. A topical anesthetic cream (EMILA) was applied on the area to be treated, for one hour before treatment, and the treated areas were cleaned by using antiseptic agents, then 4-5ml of prepared PRP was injected in bald area. The patients were treated by 3-6 PRP sessions, with an interval of 2-4weeks between successful sessions. The response to PRP therapy was evaluated clinically, for subjective improvement in hair growth, number, and diameter of hair, hair loss, thickness and pull test, at the end of therapy and the patients followed up for 6-12 months after the last PRP therapy. Some patients with ulcerative lesions developed secondary bacterial infection, and swabs were taken from them, and cultured on different culture media and submitted to a serial of different biochemical tests for diagnosis of type of bacteria which cause infection[32].

The Scientific Ethical Committee in the College of Medicine, University of Diyala and Baquba Teaching Hospital was approved that the research proposal submitted by Assistant prof. Burooj Mohammed Razooqi Al-aajem, prof. Khudhair Khalaf Al-Kayalli and Dr. Watheic Mohammad Husain, entitled (Evaluation of efficacy and safety of platelet rich plasma (PRP) in the treatment of androgenic alopecia and bacterial ulcerative lesion). Under the scientific research with the necessary rules and regulations governing the ethics of scientific research, scientific ethical committee decided to approve the research project and give the ethical number (MD40 January 2016BMR).

RESULTS

A total number of (64) patient with androgenic alopecia, (12) have ulcerative lesions, was treated by platelet rich plasma (PRP) as described in the methods. An equal number (33) of males and females' patients was treated, with a mean age of (29.17±8years). All female patients (100%) had a female pattern androgenic alopecia, which consisted of generalized thinning of fronto-ventral area and maintenance of frontal hair line. Regarding male patients and according to Hamilton-Norwood classification of male androgenic alopecia (male pattern baldness), 10patients (31.2% of male patients) had grad 2, 5 patients (15.6%) had grad 3, 7 patients (21.8%) had grad 4 and 10 patients (31.2%) had female pattern androgenic alopecia. The response to PRP therapy was variable which directly proportion with the number of secessions, 27 patients 3 secessions, 12 patients 4 secessions, 13 patients 5secessions and 12patients received 6 secessions, which means increase number of hair thickness, diameter and growth of the hair, and the response was better with decrease of the interval between the successful secessions. Pull test was positive in all patients before treatment (i.e. more than 3 hairs were pulled), which decreased with successful secessions till become negative (100%) between the third and fifth secessions. In all patients there was a significant reduction in hair loss, increasing diameter, thickness and the number of hairs/surface area. There was a good satisfaction by all patients and clinical improvement as assessed by the treating stuff (pictures below). The gain of hair was variable according to the number of secessions and grad of alopecia . Before treatment the number of hair was ranging from (50-60) hair/cm^2, which increased to (80-90) hair/cm^2, after the last secession, with a new hair growth of (30%). Bacteriological study of those with secondary bacterial infections with *Staphylococus aureus* shows responsive for treatment with PRP in rate (45%).

Before

After 1 month

Before

After 3 month

Before

After 3 month

Before

After 5 month

DISCUSSION

Although many therapeutic options (topical minoxidil, antiandrogen and plastic surgery) were used in the treatment of androgenic alopecia in both sexes, but the response was not satisfactory to the patients and their managers except the hair transplant[12-21]. Platelet rich plasma (PRP) was tried in different medical disorders (plastic surgery, orthopedic surgery, cardiac surgery[33,34]. Recently PRP used in the treatment of different skin disorders including androgenic alopecia in both ssexes and many studies were inducted in different centers all over the world[26-28]. In comparison with other studies[12,14,15,19], this study shows that PRP give a good to excellent results than minoxidil, and without side effects as in minoxidil, and[13,16,18], in which the PRP was better and more effective than antiandrogen therapy and also without side effects. With surgical therapy of hair transplant[20,21], the studies of using PRP was less effective than surgical procedures, but with privilege of absence of side effects in PRP therapy. Our study revealed a result comparable with that done by Besti *et al* [28] using PRP in the treatment of androgenic alopecia, and more effective than that done by Uebel *et al* [31] using platelet-plasma factors. In this study the prevalence of androgenic alopecia was relatively common in both sex, which was differ from other studies[1,4] in which the disease was commonly seen in men and rarely seen in women.

CONCLUSION

It was concluded that PRP was an effective and safe option for treatment of androgenic alopecia than other therapies, and the prevalence was relatively common in both sexes, according have antimicrobial effect against *S. aureus.*

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