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Case report

Platelet-rich plasma combined with intralesional triamcinolone acetonide for the treatment of alopecia areata: A case report

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Abstract

Treatment of long standing alopecia areata can be extremely difficult. Combining more than one treatment modality may be needed. Promising results have been previously reported using platelet-rich plasma. However, combining this treatment modality with other therapies has never been evaluated. We report a patient with long standing alopecia areata treated with a combination of triamcinolone acetonide and platelet-rich plasma intradermal injections. The trial was performed in a half-head design. One half of the scalp was treated with both platelet-rich plasma and intralesional triamcinolone acetonide. The other half received intralesional triamcinolone acetonide only. The half head treated with the combined therapy showed more regrowing hairs and larger hair fiber diameter. Our limited findings suggest that combining platelet-rich plasma with intradermal triamcinolone acetonide may have a positive synergistic effect for treating alopecia areata. Controlled studies with a large number of patients are needed.

Keywords: Alopecia; Alopecia areata; Platelet-rich plasma; Hair; PRP

1. Introduction

Alopecia areata (AA) is a common autoimmune disease that causes non scarring hair loss. It occurs in a patchy, confluent or diffuse pattern (Alkhalifah et al., 2010). Although spontaneous remission is common, long standing disease has a poor prognosis and is less likely to remit spontaneously (Alkhalifah et al., 2010). Platelet-rich plasma (PRP) has been previously used to treat a variety of alopecias including AA with variable success rates (Li et al., 2012). Herein we report, for the first time, on the use of PRP in combination with intralesional triamcinolone acetonide (TrA) for the treatment of long standing AA.

2. Report

A 22 year old healthy female presented to the dermatology clinic complaining of diffuse scalp hair thinning started 5 years ago. The patient experienced patchy hair shedding at the onset. Although, a partial hair regrowth was noted a few months later, the total hair density was never back to normal. Physical examination revealed diffuse scalp hair thinning which was more pronounced on both temporal and occipital areas. A 4 mm punch skin biopsy was performed from the parietal scalp and showed variable inflammatory lymphocytic infiltrate surrounding the miniaturized hair follicles with a marked reduction in the terminal–vellus

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hair ratio to 1.5:1. Thus, a diagnosis of chronic diffuse alopecia areata was made.

Previous treatments included topical clobetasol propionate 0.05% scalp solution, minoxidil 2% solution and anthralin 2% cream. Only partial hair regrowth was noted. However, she had been off all treatments for the last 3 years. A written informed consent was obtained and the trial was performed according to the Declaration of Helsinki.

The right half of the scalp was treated with both TrA (2.5 mg/ml, total of 4 ml) and intradermal injections of PRP (2–3 ml). The left half was only treated with intralesional injections of TrA (2.5 mg/ml, total of 4 ml). Treatments were performed using hypodermic syringes with 30 gauge needles. Multiple intradermal injections in a linear pattern, (1 cm) apart, were given and 0.1 ml was injected at each injection site.

In total, eight treatment sessions were performed during 16 weeks on the right half of the scalp; 4 PRP treatment sessions were alternated with 4 TrA treatment sessions at 2 week intervals. The left half of the scalp received only 4 TrA treatment sessions at 4 week intervals.

For PRP preparation, autologous blood (18 ml) was taken from the patient and put into vacutainers (Pure PRP System, Seoul, Korea) containing ACD-A (trisodium citrate, citric acid and dextrose). The tube was centrifuged at 1500G for 4 min. The PRP fraction was separated and suspended with calcium chloride.

The treatment outcomes were analyzed using global photography and digital trichoscopy. Two square areas, each measuring 1 × 1 cm, were marked over both the right and left parietal scalp, each in mid-pupillary line, 10 cm proximal to the corresponding eyebrow. For each half of the scalp, hair density and mean hair fiber diameter were performed in the corresponding square using digital trichoscopy. The patient was evaluated at two time points: T0; (week 0) and T1; two weeks after the last treatment (week 16).

After completing the trial, both treatment modalities; (TrA and PRP) and (TrA only), resulted in an increase in the number of terminal hairs as compared to the baseline (16% and 12% respectively). On the other hand, only the (TrA and PRP) treated half showed an increase in the mean hair shaft diameter (+35%) as compared to a decline by (−4%) in the (TrA only) treated half of the scalp. Table 1.

Changes in the overall scalp hair coverage was minimal (<25%) in both halves of the scalp as assessed by global photography. However, the right half (TrA and PRP) showed slightly better improvement. Figs. 1 and 2.

3. Discussion

In this case report, we have shown that combining PRP with TrA leads to better improvement, mainly in regard to trichological parameters; hair density and hair fiber diameter, of AA as compared to using TrA only. Although only a minimal difference (4%) in the number of re-growing terminal hairs was noted between the two treatment methods, the mean hair fiber diameter showed a more recognizable difference (39%). Spontaneous remission has been reported in up to 50% of AA patients at year 1 (Alkhalifah et al., 2010). However in this particular case, these figures are believed to be lower as this patient has suffered from AA for 5 years.

This is the first report to describe a possible synergistic effect of PRP when used in combination with TrA for treating long standing AA. The half-head design of this trial helps to possibly eliminate other treatment variables.

PRP is an autologous preparation of growth-factor-rich platelets in concentrated plasma (Li et al., 2012). More than 20 different growth factors, including platelet-derived growth factor (PDGF), transforming growth factor beta (TGFB), vascular endothelial growth factor (VEGF), and fibroblast growth factor (FGF), have been found in PRP (Li et al., 2012; Arshdeep, 2014). These different growth factors are capable of promoting cell proliferation and differentiation (Arshdeep, 2014; Takikawa et al., 2011). Therefore, PRP has found many applications in orthopedics, dentistry, dermatology, esthetics and wound healing.

Mechanisms by which, the growth factors containing PRP promote hair follicle growth and differentiation were studied. In vivo studies have demonstrated the role of PDGF signaling in the development of the hair canal (Khatu et al., 2014). Similarly, FGF was found, in vitro, to promote the proliferation of the dermal papilla cells which play a key role in elongating the hair shafts (Li et al., 2012). FGF-7 and beta-catenin; growth factors known for stimulating the hair follicle growth; were both up-regulated after administrating PRP (Li et al., 2012). Moreover, activated PRP, both in vivo and in vitro, were found to increase Bcl-2 protein levels. The latter has an anti-apoptotic effect on dermal papilla cells (Li et al., 2012).

PRP was also found to have a potent anti-inflammatory effect. It suppresses cytokine release and limits local tissue

Table 1
Changes in the hair count and the hair shaft diameter at baseline; week 0 (T0) and at 2 weeks after the last treatment; week 16 (T1).

	T0	T1	Change%	T0	T1	Change%
	Hair count			Hair shaft diameter		
Right half	19 hairs/cm^2	22 hairs/cm^2	+16%	0.052 mm	0.070 mm	+35%
Left half	25 hairs/cm^2	28 hairs/cm^2	+12%	0.052 mm	0.050 mm	−4%