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Platelet-Rich Plasma in Androgenetic Alopecia

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Abstract

The goal of these recommendations is to provide a framework to practitioners for implementing useful, evidence-based recommendations for the preparation of platelet-rich plasma (PRP) and its use in androgenetic alopecia (AGA). The Indian Association of Dermatologists, Venereologists and Leprologists (IADVL) assigned the task of preparing these recommendations to its taskforce on PRP. A comprehensive literature search was done in the English language on the PRP across multiple databases. The grade of evidence and strength of recommendation were evaluated on the GRADE (Grading of Recommendation, Assessment, Development, and Evaluation) framework. A draft of clinical recommendations was developed on the best available evidence, which was also scrutinized and critically evaluated by the IADVL Academy of Dermatology. Based on the inputs received, the final consensus statement was prepared. A total of 30 articles (meta-analyses, prospective and retrospective studies, reviews [including chapters in books], and case series) were critically evaluated, and the evidence thus gathered was used in the preparation of these recommendations. This expert group recommends use of manual double-spin method for the preparation of PRP for AGA. Minimum three to five sessions of PRP are recommended for AGA with a gap of 1 month between the two sessions. Patients with Grade II to V Norwood Hamilton classification of AGA are the ideal subset for PRP. A total of 5 to 7 mL of PRP and 0.05 to 0.1 mL/cm^2 is the recommended dose of PRP for AGA. Activation of PRP is not required when it is used for AGA. About 1 to 1.5 million platelets/μL of platelets in PRP is the recommended platelet concentration in PRP for the treatment of AGA. I-PRF (injectable platelet-rich fibrin) has also been found to be useful in AGA, although further studies are required to establish its role. PRP can also have an adjunctive role in hair transplantation procedures.

Keywords: *Androgenetic alopecia, hair transplant, male pattern baldness, PDO, platelet-rich plasma, platelet-rich plasma guidelines, preparation, RCF, recommendations, regenerative medicine, RPM, threads*

Introduction

Platelet-rich plasma, abbreviated as PRP, has come a long, long way in the past three decades. What began as a humble platelet concentrate for correcting thrombocytopenia in the 1970s has now forayed into the field of aesthetic medicine and therein has created quite a stir. And while the indications range from clinical to functional to cosmetic, PRP has faced quite some opposition.[1]

From the inception of the first platelet concentrate in the 1950s to being used as an adjunct to make bony particles sticky in oral maxillofacial surgeries, PRP has been riddled with controversy.[1] There are clearly defined schools of thought when it comes to PRP, and this dichotomy stems from the fact that the methodology is variable, and not standardized. In fact, as of date, we are yet to have a clear set of guidelines on how to make PRP.[2] What ensues from improper methodology is "inadequate" PRP, and hence a negative skewing of opinion and data. Simply put, it leads operators to believe that PRP does not work, even when their own preparation has not been controlled, tested, and quantified, in terms of platelet concentration. Very limited literature remarks on the final preinjection yield of PRP, and how it was calculated, and whether the yield actually achieved an angiogenic potential.

By definition, PRP, as a fraction of whole blood, must contain more than fourfold

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of the baseline platelet count, or an absolute count of 1,000,000/mL in 5 mL PRP.[3] A study by Dhurat *et al.*[4] in 2014 standardized these guidelines, via the method of repetitive hit, trial, and error. Various factors discussed in this landmark article were shown to affect the final outcome of PRP and how to go about it. Factors ranged from, but not limited to, the volume of whole blood drawn to the volume of PRP injected, temperature control, centrifugation settings and calibration, the method of PRP, whether commercial kit was used or not, the type of anticoagulant used, and whether or not exogenous activation was performed. But since most studies follow alternative methods and materials to prepare PRP, the results show a very high variance. And this interindividual variability and operator dependency is what holds back PRP – not PRP itself, which poses the greatest challenge in this field.

PRP has often been touted as an elixir, not only in nonvalidated literature and on the internet but also in PubMed-indexed articles.[5-7] Its indications range from aesthetic indications such as alopecias (androgenetic alopecia [AGA], alopecia areata, telogen effluvium, cicatricial), facial rejuvenation, acne scars, antiaging to clinical indications such as wound healing, lipodermatosclerosis, morphea, and lichen sclerosus. All the aforesaid indications are off-label, meaning that the treating physician can use this at his or her own discretion for a said indication as it is U.S. Food and Drug Administration (FDA) approved for another indication. Off-label usage is not new for us, dermatologists, both clinically and in the field of aesthetic medicine.

The earliest attempt to classify PRP was made by Anitua[8] in 1999, which was only dependent on the crude platelet

With regard to efficiency, there is enough evidence to support the use of PRP in the fields of hair restoration and facial rejuvenation, with the limiting factor being an inefficient methodology for preparing and delivering PRP. The author reviewed the literature on Medline pertaining to the indications, as mentioned, and included only the highest levels of evidence, in this write-up.

Current concepts in AGA

PRP is used in AGA, as it possesses a plethora of GFs, and is mitogenic, angiogenic, and chemotactic for keratinocytes, melanocytes, and fibroblasts. Therefore, it acts on various pathways of the "Golden Anchorage" model of the hair follicle as proposed by Garg and Manchanda[5] – the bulge, dermal papilla (DP), vasculature, and neural/signaling cells, thus stimulating hair growth, and regrowth of a total of 16 randomized controlled trials (RCTs) were meta-analyzed by Giordano *et al.*,[11] wherein the pooled data showed an increase in hair diameter and hair count from the baseline. The results were not statistically significant. They also mentioned that there was a "high diversity in the method used in pooled studies." Another meta-analysis by Dervishi *et al.*[12] identified 13 relevant RCTs with 356 pooled patients with AGA, wherein a half-head study was done on PRP and found an increase in hair diameter as compared with placebo. Yet another randomized, double-blinded, active-controlled, split-scalp study by Gentile *et al.*[13] recruited 23 patients and showed significant hair regrowth in AGA using PRP. A study by Qu *et al.*[14] recruited patients with male and female pattern hair loss (FPHL) and concluded that PRP was effective in treating both conditions, while also improving hair texture, reducing seborrhoea and inflammation, other pathomechanisms for progression of