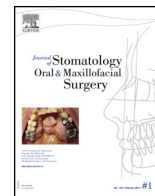




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Review

Injections of platelet-rich plasma for androgenic alopecia: A systematic review

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ABSTRACT

The aim of this literature review was to evaluate the effects of PRP injections into the scalp of patients with androgenic alopecia. A literature review was conducted using the Pubmed and Google Scholar databases with the search terms “platelet-rich plasma” or “platelet-rich fibrin” and “hair” or “alopecia” or “androgenic alopecia”. The publications included had to clinically assess the efficacy of PRP injections in patients with androgenic alopecia. Out of the 32 publications retrieved, 14 publications were included, of which 3 randomized, 4 prospective controlled, 4 prospective uncontrolled and 3 retrospective studies. Seven out of 9 studies reported a significant increase of hair density ranging between 12.3 and 45.9 hairs/cm², (i.e. 19–31% hairs/cm²). Four studies assessed hair loss with the traction test and found a negative result after treatment in more than 95% of patients. Regarding hair thickness, 1 study reported an increase in hair diameter of 46.4% and 1 reported an increase of 106.4% of the “Hair mass index”. Overall, the use of PRP injections in patients with androgenic alopecia seems effective with respect to promoting lost hair regrowth, decreasing hair loss and increasing hair thickness. The effects appear to be progressive from the first injection session, to peak after 3 to 5 sessions and to be attenuated in the absence of further injections. No major adverse effect was reported in the 14 clinical studies.

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1. Introduction

Androgenic alopecia, which is explained by abnormally elevated activity of the enzyme 5 α -reductase type 2 at the level of the hair follicles in the temporal, frontal and vertex areas [1], induces an esthetic prejudice. Injections of platelet-rich plasma (PRP) into the scalp are one of the new therapies used to slow down the onset of androgenic alopecia and to treat it. PRP is an increasingly widely used biomaterial prepared by recovering, separating and concentrating patient platelets from a blood draw [2]. The preparation methods are increasingly well mastered and abundantly described in the literature, including methods employing commercial kits [3]. Platelets are cells of interest with respect to cell proliferation and differentiation since they can release numerous growth factors and cytokines [4], which attract and stimulate endothelial and stem cells [5].

Hair growth, known as the anagen phase, consists of the proliferation and maturation of progenitor cells derived from the bulge stem cells [6,7]. The cells giving rise to hair growth are of at least 3 types [8]: slow-multiplying stem cells present in the hair

follicle bulge, fast-multiplying progenitor cells which derive from stem cells and mesenchymal cells which are present in the dermal papilla.

Certain growth factors, of which EGF, FGF and TGF, contribute to hair growth regulation and control as shown in several studies [7,9–11]. Those growth factors are present in PRP [4] and thus available, from a blood sample, in an autologous manner, i.e. they are derived from the patient himself.

PRP injections may stimulate the growth of hair affected by locally increased activity of the enzyme 5 α -reductase. Currently, the reference treatment is hair transplantation, which is an onerous surgical procedure requiring a donor site. This makes PRP injections attractive if they are effective.

The aim of this literature review was to evaluate the efficacy of PRP injections into the scalp of patients with androgenic alopecia, to determine the methods of use and to identify any adverse effects.

2. Material and methods

A literature review was conducted in February 2017 after searching the Pubmed and the Google Scholar databases with the

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search terms “platelet-rich plasma” or “platelet-rich fibrin” and “hair” or “alopecia” or “androgenic alopecia”.

In order to be included, the publication had to clinically assess the efficacy of PRP injections in patients with androgenic alopecia. There was no publication date deadline. The publications could be written in English, French, Spanish, Italian or German.

The exclusion criteria consisted of the following: case reports, letters or reviews without any clinical trial, studies assessing PRP injections in association with another procedure or treatment, studies in patients with alopecia of a non-androgenic etiology, and in vitro and animal in vivo studies.

The primary endpoint was the hair regrowth as assessed by hair density, i.e. the number of hairs/unit area. The validated methods of measurement of hair density are phototrichograms [12], phototrichoscans [13] (which is a modified computerized Phototrichogram), and validated scores like the “Hair density Index” [14], which is the product of hair density and hair thickness assessed at the same time.

The secondary endpoint was hair loss, which can be assessed by the traction test [12]. This validated and well described method is the number of extracted hairs when a clinician grasps between his

thumb, index and middle finger a bundle of approximately 50–60 hairs and tug them away firmly.

The others endpoints were hair thickness, which can be assessed by the hair diameter, the injections protocol and the side effects.

3. Results

The search retrieved 32 publications of which 18 were excluded for the following reasons: 5 publications consisted of letters without any clinical trial [15–19]; 2 publication were literature reviews which did not focus on the use of PRP for androgenic alopecia [20,21]; 1 publication was only an abstract [22]; 1 publication was a case report [23]; 2 publications evaluated PRP injections as adjunctive therapy with polydeoxyribonucleotide injections [24], or with deltaparine and protamine micro particles [25]; 1 publication evaluated hair transplants soaked with PRP before transplantation [26]; 3 publications evaluated PRP injections in patients with alopecia areata [27–29] and 3 publications were in vitro or animal in vivo studies [30–32].

The flowchart is presented in Fig. 1. The results are presented in Table 1.

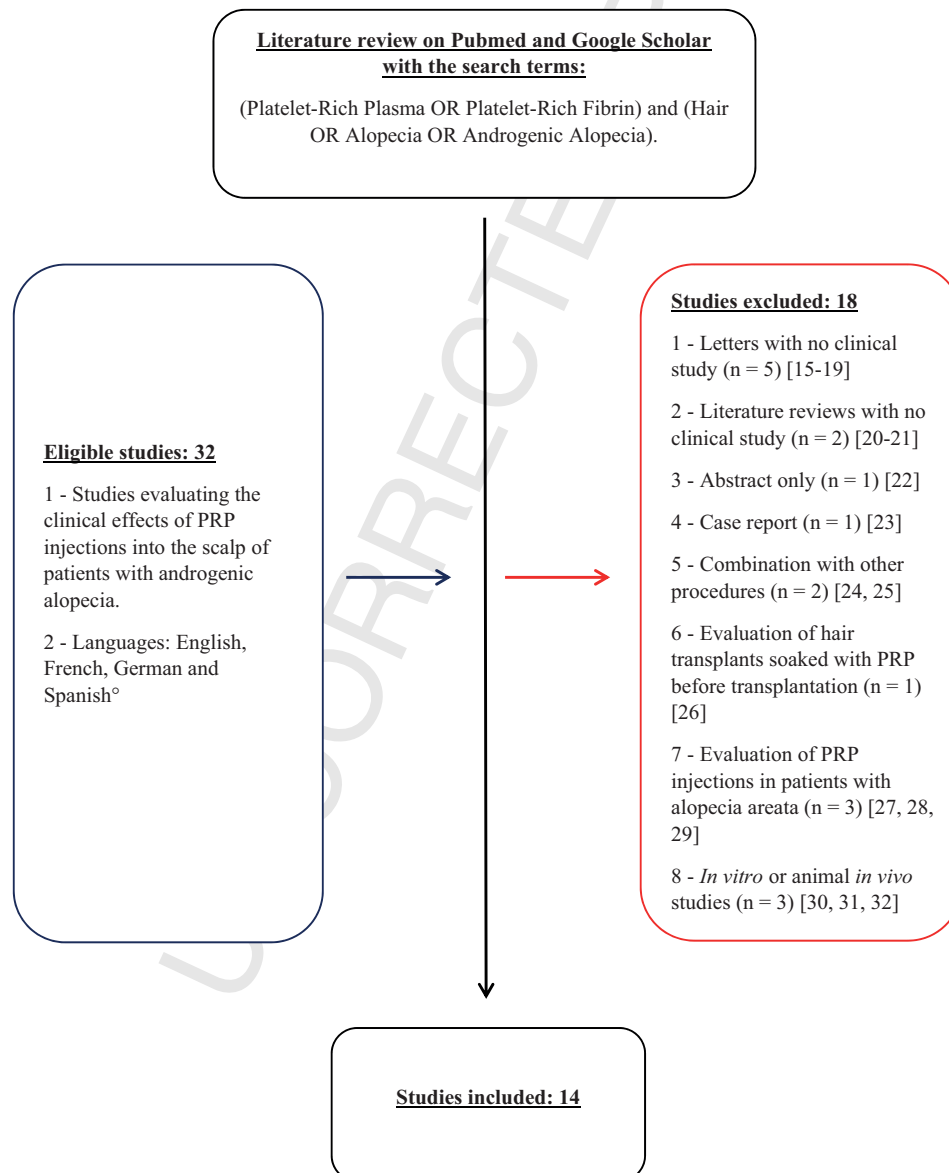


Fig. 1. Flowchart.

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