

Novel Application of Platelet-Rich Plasma (PRP) Therapy in Treating Atrophic Rhinitis: A Regenerative Perspective for a Challenging Nasal Disease

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ABSTRACT

Atrophic rhinitis (AR) is a chronic debilitating nasal disorder characterized by progressive mucosal atrophy, crust formation, fetor, nasal dryness, and impaired mucociliary clearance. Conventional treatment remains largely palliative and often fails to restore normal nasal physiology. Recently, platelet-rich plasma (PRP), an autologous concentrate rich in growth factors and cytokines, has emerged as a promising regenerative modality in different fields of otorhinolaryngology. Preliminary studies suggest that PRP injection may improve nasal mucosal regeneration, vascularity, mucociliary function, and patient symptoms in atrophic rhinitis. This short communication highlights the possible mechanisms, clinical potential, advantages, limitations, and future directions of PRP therapy in the management of atrophic rhinitis.

Keywords: Atrophic rhinitis; Platelet-rich plasma; PRP; Regenerative therapy; Nasal mucosa; Mucociliary clearance; Rhinology

INTRODUCTION

Atrophic rhinitis (AR) is a chronic nasal disease characterized by progressive atrophy of the nasal mucosa and underlying turbinate bone, resulting in widened nasal cavity, crusting, foul odor, recurrent infection, and paradoxical nasal obstruction. Despite numerous medical and surgical approaches, long-term satisfactory treatment remains difficult because most therapies mainly target symptoms rather than reversal of the underlying mucosal degeneration [1-4].

Platelet-rich plasma (PRP) has recently gained attention as a biological regenerative therapy because of its high concentration of platelets, growth factors, and cytokines capable of promoting tissue repair and angiogenesis. PRP has already shown beneficial effects in wound healing, facial plastic surgery, hair restoration, tympanic membrane healing, and musculoskeletal disorders [7-11]. Its application in atrophic rhinitis may therefore represent a novel regenerative approach rather than a purely symptomatic treatment [1,2].

WHY PRP MAY BE USEFUL IN ATROPHIC RHINITIS

The pathological hallmarks of AR include:

- Loss of ciliated epithelium
- Reduced glandular secretion
- Poor vascularity
- Chronic infection
- Impaired mucociliary clearance
- Progressive tissue atrophy [4]

PRP contains multiple bioactive molecules including:

- Platelet-derived growth factor (PDGF)
- Vascular endothelial growth factor (VEGF)
- Transforming growth factor-beta (TGF- β)
- Epidermal growth factor (EGF)
- Fibroblast growth factor (FGF) [7,9,13]

These factors may stimulate:

- Neoangiogenesis
- Fibroblast proliferation
- Epithelial regeneration
- Collagen synthesis
- Improved tissue hydration
- Mucosal healing [7,8,13,14]

Thus, PRP theoretically addresses the core pathophysiology of AR instead of merely reducing crusting or odor [1,6].

CURRENT CLINICAL EVIDENCE

Recent preliminary clinical studies have shown encouraging outcomes with PRP therapy in patients with primary atrophic rhinitis. Mostafa and Ayad evaluated PRP as a “biogenic stimulator” in primary AR and demonstrated improvement in symptoms, mucociliary clearance, and histopathological findings after PRP application [1].

Similarly, Kim et al. reported significant improvement in Sino-Nasal Outcome Test (SNOT-22), Nasal Obstruction Symptom Evaluation (NOSE) scores, and saccharin transit time following PRP injection into the inferior turbinates [2].

A recent systematic review also concluded that PRP may improve nasal symptoms and mucociliary function with minimal adverse effects, although evidence remains limited by small sample size and methodological heterogeneity [3].

Experimental evidence from regenerative rhinology and animal studies also supports the mucosal healing potential of PRP in chronic nasal mucosal injury [10,15].

POSSIBLE TECHNIQUE

PRP is usually prepared from autologous venous blood using centrifugation [12]. The concentrated platelet-rich fraction may then be injected submucosally into:

- Inferior turbinate remnants
- Nasal septum
- Nasal floor

The procedure may be performed under local anesthesia and repeated at intervals depending on symptom recurrence and clinical response. Endoscopic guidance may improve precision and safety.

POTENTIAL ADVANTAGES

Potential advantages of PRP therapy include:

- Autologous and biocompatible
- Minimally invasive
- Low risk of immunologic reaction
- Office-based procedure
- Regenerative rather than merely symptomatic approach
- Possibility of combination with endoscopic or reconstructive procedures [7,8]

PRP may also reduce the need for more invasive procedures such as Young's operation in selected patients [5].

LIMITATIONS AND CONCERNS

Despite promising early results, several limitations remain:

- Lack of large randomized controlled trials
- Absence of standardized PRP preparation protocols [12,13]
- Unclear optimal dosage and frequency
- Variable duration of benefit
- Limited long-term follow-up data³

Furthermore, advanced cases with severe bony destruction may respond less favorably because PRP primarily targets soft tissue regeneration.

FUTURE PERSPECTIVES

PRP may open a new regenerative dimension in rhinology [10]. Future studies should evaluate:

- Standardized injection protocols
- Histopathological outcomes
- Long-term efficacy
- Combination with stem cell therapy or biomaterials
- Role in secondary atrophic rhinitis

- Comparative efficacy against conventional surgical procedures

The integration of regenerative medicine into rhinology may significantly alter future management strategies for chronic nasal mucosal diseases.

CONCLUSION

PRP therapy appears to be a promising novel adjunctive treatment for atrophic rhinitis. By enhancing mucosal regeneration and vascularity, PRP may address the fundamental pathological changes of the disease rather than merely controlling symptoms. Although current evidence remains preliminary, early clinical outcomes are encouraging. Larger controlled studies are required before PRP can be recommended as a standard treatment modality in atrophic rhinitis.

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