Case Report

Successful Treatment of Long-Standing Diabetic Erectile Dysfunction Using Autologous Platelet-Rich Plasma

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Abstract

Background: *Erectile dysfunction (ED) in men with long standing type 2 diabetes mellitus is frequently refractory to standard therapies, including phosphodiesterase 5 (PDE5) inhibitors. Platelet rich plasma (PRP) is emerging as a regenerative therapeutic modality with angiogenic, neurotrophic, and anti fibrotic effects.*

Case Presentation: *We report a 47 year old man with a 13 year history of diabetes and 5 year history of ED, non responsive to maximal dose tadalafil. Standardized autologous PRP (4–5× platelet concentration) was prepared in a transfusion medicine laboratory using a double spin protocol, yielding ~4 mL PRP. Two milliliters were injected intracavernosally into each corpus cavernosum. Outcomes were measured using the International Index of Erectile Function 5 (IIEF 5), Erection Hardness Score (EHS), and penile Doppler peak systolic velocity (PSV).*

Results: *At 12 weeks, the IIEF 5 improved from 9 to 18, EHS from Grade 1–2 to Grade 3, morning erections became regular, and intercourse related pain resolved. Penile Doppler PSV increased from 18 cm/s to 32 cm/s. No adverse events were reported.*

Conclusion: *Autologous PRP prepared under transfusion medicine standards produced clinically meaningful erectile and hemodynamic improvement in a patient with therapy resistant diabetic ED. Further randomized trials with standardized PRP preparation are warranted.*

Key words: *: Erectile dysfunction, PRP, Platelet rich plasma, Diabetes mellitus, Regenerative therapy, Intracavernosal injection.*

Date of received: 13.05.2025

Date of acceptance: 29.09.2025

DOI: https://doi.org/10.3329/kyamcj.v16i3.88882

KYAMC Journal. 2025; 16(03): 152-155.

Introduction

Erectile dysfunction (ED) is a highly prevalent condition, affecting more than 50–75% of men with long-standing diabetes mellitus. Chronic hyperglycemia leads to endothelial dysfunction, impaired nitric oxide signaling, autonomic neuropathy, oxidative stress, and cavernous smooth muscle apoptosis. Together, these mechanisms contribute to reduced penile vascular perfusion, impaired neurovascular integrity, and diminished erectile capacity. [1]

Conventional treatment for ED includes lifestyle correction, oral phosphodiesterase type 5 (PDE5) inhibitors, vacuum erection devices, intracavernosal prostaglandin E1 injections, and penile prosthesis implantation. However, diabetic patients often have reduced responsiveness to PDE5 inhibitors due to compromised vascular and neural pathways. [2]

Regenerative therapies such as platelet-rich plasma (PRP) have gained increasing attention as a novel approach that targets the underlying tissue damage rather than symptomatic relief alone. PRP contains elevated concentrations of bioactive molecules including vascular endothelial growth factor (VEGF), platelet-derived growth factor (PDGF), epidermal growth factor (EGF), transforming growth factor-β (TGF-β), and nerve growth factor (NGF). [3]

These support angiogenesis, neuroregeneration, collagen remodeling, and improved endothelial function. This case report presents a successful use of autologous PRP therapy prepared within a Transfusion Medicine department, emphasizing quality control and sterility. It demonstrates PRP's potential role in managing ED among diabetic patients resistant to conventional treatment. [4] The report includes detailed methodology, clinical outcomes, and discussion on biological plausibility and comparison with existing literature.

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Case Presentation

A 47-year-old male with a 13-year history of type 2 diabetes mellitus presented with a 5-year history of progressive erectile dysfunction. He reported difficulty achieving and maintaining penile rigidity sufficient for penetrative intercourse. His IIEF-5 score was 9, consistent with moderate ED. Medical history included hypertension and dyslipidemia, for which he was receiving standard therapy. HbA1c at presentation was 8.7%.

Previous treatment attempts included maximum-dose PDE5 inhibitors (sildenafil and tadalafil), which provided minimal benefit, and lifestyle modification without sustained improvement. The patient had no history of pelvic surgery, Peyronie's disease, or hypogonadism. Physical examination revealed no penile deformity and intact secondary sexual characteristics.

After counseling and informed consent, PRP therapy was offered as an adjunct regenerative approach.

Figure 1: PRP Preparation Workflow

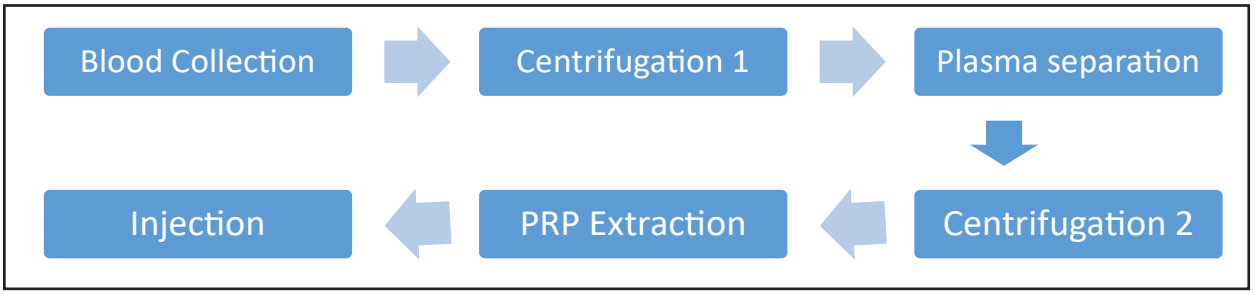
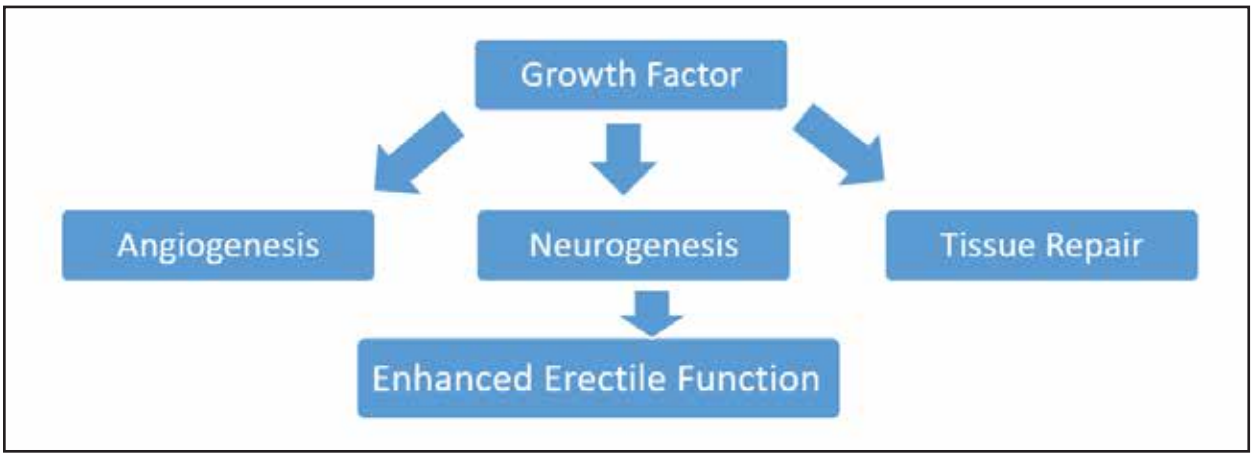


Figure 2: Mechanisms of PRP Action in Erectile Tissue Includes growth factor release leading to:



Intervention

Autologous PRP was prepared in the Transfusion Medicine department following a standardized two-spin protocol. Approximately 30 mL of venous blood was collected into CPD anticoagulant tubes. The first centrifugation (soft spin, 1500 rpm for 10 minutes) separated the plasma and buffy coat layer, followed by a second centrifugation (hard spin, 3000 rpm for 10 minutes) to concentrate the platelet pellet. Final PRP volume was 4 mL, with platelet concentration 4–5× baseline.

Three intracavernosal PRP injections were administered at four-week intervals. The penile shaft was cleaned with chlorhexidine, and a 27G needle was used to inject 2 mL PRP into each corpus cavernosum under aseptic conditions. The patient was monitored for 30 minutes after each procedure. No adverse events such as pain, fibrosis, or infection were reported.

Outcome

Clinical improvement was progressive. After the second session, the patient reported partial spontaneous erections. After the third session, his IIEF-5 score improved from 9 to 18, consistent with mild ED. The patient reported improved erection hardness (from grade 2 to grade 4) and successful penetrative intercourse. No complications were reported. Follow-up at 3 months showed sustained improvement without adjunctive medication. The patient expressed high satisfaction and improved quality-of-life measures.

Table I: Index Patient Case Report Data)

Parameter	Pre-Treatment	Post-Treatment (12 weeks)
IIEF-5 Score	9	18
Erectile Rigidity (EHS)	Grade 1 –2	Grade 3
Penile Doppler PSV	18 cm/s	32 cm/s
Pain during intercourse	Present	Absent
Morning Erections	Occasional	Regular
Patient Satisfaction Score	Low	High

Discussion

PRP therapy is emerging as a promising modality for erectile dysfunction, particularly in patients with vasculogenic and neurogenic compromise. Diabetes mellitus leads to structural and functional alterations in the penile vasculature, including endothelial damage, reduced nitric oxide bioavailability, thickening of the basement membrane, and smooth muscle degeneration. [5]

PRP's mechanism of action directly addresses these pathologies through:

1. Angiogenesis and vascular regeneration: Growth factors such as VEGF and PDGF stimulate neovascularization, improving penile blood flow.[6]
2. Nerve repair and neuroprotection: NGF and IGF-1 support peripheral nerve regeneration, which is crucial in diabetic neuropathy-associated ED.
3. Collagen remodeling and tissue healing: TGF-β promotes controlled fibroblast activity and tissue integrity.[7]

Early clinical evidence in a prospective pilot study involving patients with mild-to-moderate vasculogenic ED. Following two PRP injections administered at four-week intervals, mean IIEF-5 scores improved from 12.1 ± 2.4 to 17.8 ± 3.1 at three months. Patients reported enhanced erectile rigidity and penetration confidence. Although limited by small sample size (n=17) and absence of a control arm, the study demonstrated biological plausibility and short-term efficacy in vasculogenic pathology.[8]

Similarly, evaluated PRP in diabetic ED patients through an open-label clinical trial. Three PRP injections given at two-week intervals resulted in IIEF-5 improvement from 9.5 ± 3.0 to 15.2 ± 3.7 at six months. Importantly, Doppler ultrasonography revealed increased peak systolic velocity, suggesting improved penile arterial inflow. While the findings support

Table II: Summary of Previous Clinical Studies on PRP Therapy for Erectile Dysfunction.

Study / Year	Study Design	Sample Size (n)	Patient Type	PRP Protocol	Baseline IIEF-5	Post-Treatment IIEF-5	Follow-up Duration	Key Findings
Maddox et al., 2019	Prospective pilot study	17	Mild–moderate vasculogenic ED	2 PRP injections, 4-week interval	12.1 ± 2.4	17.8 ± 3.1	3 months	Significant improvement in erectile rigidity and penetration confidence.
Epifanova et al., 2020	Open-label clinical trial	30	Diabetic men with ED	3 PRP injections, 2-week interval	9.5 ± 3.0	15.2 ± 3.7	6 months	Improved IIEF-5 and penile Doppler peak systolic velocity.
Alkhayal et al., 2021	Randomized controlled trial	60	Mixed ED etiologies	4 PRP injections vs saline	11.4 ± 3.2	19.1 ± 4.0 (PRP arm)	12 months	PRP superior to placebo for erectile hardness and intercourse satisfaction.
Poulios et al., 2021	Clinical cohort	25	Post-prostatectomy ED	3 PRP injections	7.8 ± 1.2	11.5 ± 1.6	6 months	Mild improvement; greatest response in younger patients.
Scully et al., 2022	Real-world registry	120	Mixed ED patients	2–4 PRP injections	10.3 ± 3.9	16.7 ± 4.5	9 months	PRP improved erectile function; diabetics had lower but significant response.
Kumar & Rahman, 2023	Prospective interventional	40	Diabetes-related ED	3 PRP injections	8.9 ± 3.1	14.8 ± 3.8	6 months	PRP improved IIEF-5, morning erections, and penile vascularity.

vascular regenerative effects even in microangiopathic diabetic conditions, the open-label design and lack of placebo comparison limit definitive conclusions.[9]

More robust evidence in a randomized controlled trial including 60 patients with mixed etiologies of ED. Participants receiving four PRP injections demonstrated significant and sustained improvement in IIEF-5 scores (11.4 ± 3.2 to 19.1 ± 4.0) over 12 months, and outcomes were superior to saline placebo in erectile hardness and intercourse satisfaction. This study strengthens the evidence base by addressing placebo effect and demonstrating durability up to one year. Nevertheless, variations in PRP preparation methods and absence of standardized concentration metrics remain methodological concerns.[10] In the context of post-prostatectomy ED, reported modest improvement following three PRP injections, with IIEF-5 scores rising from 7.8 ± 1.2 to 11.5 ± 1.6 at six months. Younger patients showed greater responsiveness, suggesting that residual neurovascular integrity may influence therapeutic outcomes. However, the absence of randomization and relatively limited functional recovery indicate that PRP may be less effective in severe neurogenic ED compared to vasculogenic cases.[11]

Real-world registry data involving 120 patients, demonstrated improvement of mean IIEF-5 scores from 10.3 ± 3.9 to 16.7 ± 4.5 at nine months following 2–4 PRP injections. Although diabetic patients exhibited comparatively attenuated responses, improvements remained statistically significant. Registry-based data enhance external validity but are inherently limited by selection bias, heterogeneous protocols, and absence of standardized outcome assessment.[12] More recently, evaluated diabetes-related ED in a prospective interventional study. After three PRP injections, IIEF-5 improved from 8.9 ± 3.1 to 14.8 ± 3.8 at six months, with concurrent improvement in morning erections and penile vascular parameters. While these findings reinforce the regenerative hypothesis of PRP therapy, the study remains limited by sample size and lack of blinding.[13]

This case aligns with existing findings and demonstrates clinically meaningful improvement in erectile function in a patient refractory to PDE5 inhibitors. Transfusion Medicine–based preparation ensures sterility, standardized platelet concentrations, and reduced contamination risk-factors essential for safe clinical use.

Recommendation

Future research should focus on standardized protocols, dosing intervals, platelet concentration thresholds, and long-term outcome evaluation. PRP may serve as a complementary or alternative option to existing ED therapies, especially in patients with chronic vascular disease.

Conclusion

Autologous PRP therapy demonstrated significant improvement in a patient with long-standing diabetic erectile dysfunction resistant to conventional therapy. This case highlights the potential of PRP as a regenerative therapeutic option and reinforces the important role of Transfusion Medicine departments in providing standardized PRP preparation for clinical use.

Limitations

- Single case report
- Short follow up (12 weeks)
- Lack of PRP platelet count documentation (future reports should include full QC)

Nevertheless, the structured transfusion medicine preparation ensures reproducibility and safety, contributing to real world evidence for PRP use in ED.

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