e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 2477-2481

Original Research Article

Use of Platelet Rich Plasma in Type-1 Tympanoplasty – A Case Series Conducted in a Tertiary Care Centre

S. Rakshitha[1], Ima Chandra[2], Prathvi P. Nayak[3]

[1]Senior Resident, Department of ENT, ESIC Medical College and PGIMSR and Model Hospital, Rajajinagar, Bangalore, Karnataka, India

[2]Assistant Professor, Department of ENT, K.V.G. Medical College and Hospital, Sullia, Karnataka, India

[3]Assistant Professor, Department of ENT, Haveri Institute of Medical Sciences, Haveri, Karnataka, India

Received: 10-04-2026 / Revised: 04-05-2026 / Accepted: 15-06-2026

Corresponding Author: Dr. Prathvi P. Nayak

Conflict of interest: Nil

Abstract

Background: Platelet-rich plasma (PRP) is an autologous blood derivative containing a high concentration of platelets and growth factors that promote rapid wound healing, haemostasis, and reduced scar formation. Although PRP has been widely used as a therapeutic modality in various medical specialties, its application in otorhinolaryngology has not been extensively investigated. This case series aimed to evaluate the role of PRP in Type I tympanoplasty and its effect on graft healing and hearing improvement.

Methodology: A total of 15 patients with inactive chronic otitis media and mild-to-moderate conductive hearing loss were included in this study. Following a comprehensive preoperative evaluation, all patients underwent Type I tympanoplasty using a temporalis fascia graft performed by a single surgeon. After graft placement, PRP was applied over the graft, followed by placement of Gelfoam soaked in PRP. Patients were followed for 3 months postoperatively, and pure-tone audiometry (PTA) was repeated at the end of the follow-up period.

Results: The mean age of the patients was 32.6 ± 9.22 years, with a female predominance. Four patients had small central perforations, nine had medium-sized perforations, and two had large central perforations. No patient developed postoperative otorrhoea during the follow-up period. Graft uptake was assessed at 6 weeks and again at 3 months, demonstrating complete graft uptake in all patients. The mean hearing gain was 11.47 ± 2.69 dB.

Conclusion: The application of PRP in Type I tympanoplasty appears to facilitate faster and more effective graft healing, resulting in excellent graft uptake and significant hearing improvement. Additionally, the immunomodulatory and antimicrobial properties of PRP may contribute to reducing postoperative infections. Larger controlled studies are warranted to further validate these findings.

Keywords: Tympanic membrane perforation; Platelet-rich plasma; Myringoplasty; Ear; Otology.

DOI: 10.25258/ijcpr.18.6.384

Introduction

Chronic otitis media (COM) is a chronic inflammatory condition of the middle ear cleft involving the middle ear cavity and mastoid air cell system. It is commonly associated with tympanic membrane perforation, which often results in conductive hearing loss.[1] The global prevalence of COM ranges from 1% to 46%, with the highest burden reported in Southeast Asia, Africa, and the Pacific regions.[2] Furthermore, COM is one of the leading causes of conductive hearing loss, accounting for approximately 60.27% of all cases of conductive deafness.[4] Therefore, timely surgical management aimed at restoring the integrity of the tympanic membrane is essential for preventing recurrent infections and improving hearing outcomes.

Type I tympanoplasty (myringoplasty) is the standard surgical procedure performed to repair tympanic membrane perforations in patients with an intact and functioning ossicular chain. Temporalis fascia remains the most widely used graft material because of its excellent biocompatibility and favourable success rates. In recent years, several biological adjuncts, including growth factors, have been investigated to enhance graft healing and improve surgical outcomes.[5-7]

Platelet-rich plasma (PRP) is an autologous blood derivative containing a high concentration of platelets and bioactive growth factors, including platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), transforming growth factor-beta (TGF-β), and epidermal growth factor (EGF). These growth factors promote

angiogenesis, fibroblast proliferation, collagen synthesis, and tissue regeneration, thereby accelerating wound healing while reducing scar formation. PRP has demonstrated favourable outcomes in various surgical specialties, including orthopaedics, plastic surgery, maxillofacial surgery, and dentistry. More recently, its application has expanded to otologic surgeries with encouraging results.[8,7]

The present case series was conducted to evaluate the effectiveness of PRP as an adjunct in Type I tympanoplasty by assessing graft healing and postoperative hearing improvement.

Methods

This prospective cross-sectional case series was conducted at JJM Medical College, Karnataka. A total of 15 patients who fulfilled the inclusion and exclusion criteria and provided written informed consent were enrolled in the study.

All patients underwent a detailed clinical evaluation, including history taking, general physical examination, complete otorhinolaryngological examination, tuning fork tests, and pure-tone audiometry (PTA). Baseline demographic and clinical data were recorded. The collected data were entered into a database and analysed using the SPSS software.

Inclusion Criteria

- Patients aged 16–50 years of either sex.
- Presence of tympanic membrane perforation for at least 3 months.
- Patients with inactive mucosal chronic otitis media, with a dry ear for a minimum of 6 weeks.
- Mild-to-moderate conductive hearing loss with an indication for Type I tympanoplasty.

Exclusion Criteria

Patients with any of the following were excluded from the study:

- Systemic comorbities like uncontrolled diabetes mellitus or hypertension, cardiac disorders, renal disorders etc.
- Active ear discharge.
- Presence of granulation tissue.
- Atticoantral (squamosal) chronic otitis media.
- Marginal tympanic membrane perforation.
- Acute traumatic tympanic membrane perforation.
- Mixed or sensorineural hearing loss.

Platelet-Rich Plasma (PRP) Preparation[9]

- A total of 10 mL of the patient's venous blood was collected under aseptic precautions and distributed equally into four vacutainer tubes containing an anticoagulant. The blood samples were first subjected to a soft-spin centrifugation, resulting in separation into three layers: the upper acellular platelet-poor plasma (PPP), the intermediate buffy coat containing platelet-rich plasma (PRP), and the bottom layer containing red blood cells.
- The platelet-poor plasma along with the buffy coat was carefully aspirated using a sterile syringe and transferred to a sterile tube without an anticoagulant. A second hard-spin centrifugation was then performed to further concentrate the platelets. Following centrifugation, the upper layer of platelet-poor plasma was aspirated and discarded, leaving the platelet-rich plasma concentrated at the bottom of the tube. The PRP was retained in the tube and used immediately during surgery for topical application over the tympanoplasty graft and for soaking the Gelfoam placed over the graft.

Surgical Procedure[9]: All patients underwent Type I tympanoplasty using a temporalis fascia graft under appropriate anaesthesia. After placement of the graft, platelet-rich plasma (PRP) was applied over the graft using a tuberculin syringe. Gelfoam soaked in PRP was then placed circumferentially over the graft, covering the graft–tympanic membrane remnant junction to facilitate graft stabilization and healing. Subsequently, Gelfoam soaked in an antibiotic solution was placed lateral to the tympanic membrane to provide additional support.

Postoperative Follow-up: Patients were followed up at the 1st, 3rd, and 6th postoperative weeks and again at 3 months after surgery. At each follow-up visit, a detailed clinical history was obtained, and otoscopic examination was performed to assess graft uptake, graft integrity, and wound healing.

At the 3-month follow-up visit, pure-tone audiometry (PTA) was repeated to assess postoperative hearing outcomes. Air-conduction thresholds, bone-conduction thresholds, and the air–bone gap were compared with the corresponding preoperative values to evaluate hearing improvement.

Results

A total of 15 patients with inactive mucosal chronic otitis media underwent Type I tympanoplasty with intraoperative application of platelet-rich plasma (PRP). The mean age of the study population was 32.6 ± 9.21 years (range: 18–45 years). There was a female predominance, with 9 (60.0%) females and 6 (40.0%) males.

With respect to the size of tympanic membrane perforation, 4 (26.7%) patients had small central perforations, 9 (60.0%) had medium-sized perforations, and 2 (13.3%) had large central perforations.

No patient developed postoperative otorrhoea during the follow-up period. At the third week, sixth week, and third postoperative month, all patients had dry ears without evidence of infection or persistent discharge.

Graft uptake was assessed at 6 weeks and again at 3 months postoperatively. Complete graft uptake was achieved in all 15 patients (100%) at both follow-up visits, with no cases of residual perforation or graft failure.

Preoperative and postoperative audiological assessment demonstrated a significant improvement in hearing following surgery. The mean hearing gain (difference between preoperative and postoperative pure-tone average) was 11.47 ± 2.69 dB. A reduction in the postoperative air–bone gap (mean 10.8 ± 3.07) was observed in all patients, indicating successful restoration of sound conduction following tympanic membrane repair.

Overall, the use of PRP as an adjunct in Type I tympanoplasty was associated with excellent graft uptake, absence of postoperative infection or otorrhoea, and favourable hearing outcomes in all patients.

Table 1: Demographic and Baseline Clinical Characteristics of the Study Population (n = 15)

Variable	Value
Age (years), Mean ± SD	**32.60 ± 9.21**
Age range (years)	18–45
Sex, n (%)	
Male	6 (40.0)
Female	9 (60.0)
Ear involved, n (%)	
Right	7 (46.7)
Left	8 (53.3)
Size of tympanic membrane perforation, n (%)	
Small	4 (26.7)
Medium	9 (60.0)
Large	2 (13.3)

Table 2: Clinical Characteristics, Surgical Outcomes and Audiological Outcomes Following Type I Tympanoplasty with Platelet-Rich Plasma (n = 15)

Parameter	Preoperative Mean ± SD	Postoperative Mean ± SD	*P* value
Pure-tone average (dB)	31.13 ± 4.31	19.67 ± 3.48	<0.001*
Air–bone gap (dB)	19.60 ± 4.54	8.80 ± 3.05	<0.001*

Outcome	Value
Dry ear at 3 weeks, n (%)	15 (100)
Dry ear at 6 weeks, n (%)	15 (100)
Dry ear at 3 months, n (%)	15 (100)
Complete graft uptake at 6 weeks, n (%)	15 (100)
Complete graft uptake at 3 months, n (%)	15 (100)
Residual perforation, n (%)	0 (0)
Graft failure, n (%)	0 (0)
Postoperative otorrhoea, n (%)	0 (0)
Hearing gain (dB), Mean ± SD	11.47 ± 2.69
Air–bone gap difference (dB), Mean ± SD	10.80 ± 3.07

Discussion

The present case series demonstrated excellent surgical and functional outcomes following the use of platelet-rich plasma (PRP) as an adjunct in Type I tympanoplasty. Complete graft uptake was achieved in all patients (100%), with no cases of postoperative otorrhoea, graft failure, or residual perforation during the three-month follow-up. Audiological assessment revealed a mean hearing gain of 11.47 ± 2.69 dB, supporting the role of PRP in promoting successful graft healing and functional recovery. The favourable outcomes observed in this study are likely attributable to the high concentration of platelet-derived growth factors, including platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), transforming growth factor-beta (TGF-β), and epidermal growth factor (EGF), which stimulate angiogenesis,

fibroblast proliferation, collagen synthesis, and tissue regeneration.

The findings of the present study are comparable with those reported by Taneja et al., who demonstrated significantly higher graft uptake (95.1% vs. 85.3%) and better hearing improvement in patients receiving PRP compared with conventional tympanoplasty. Similarly, Prashanth et al. reported graft uptake rates of 94.1% at six weeks and 97.1% at three months, with a mean hearing improvement of 11.00 ± 2.28 dB and significantly lower postoperative otorrhoea in the PRP group. The hearing gain observed in the present study (11.47 ± 2.69 dB) closely mirrors these findings, while the 100% graft uptake achieved in our series marginally exceeds the success rates reported in both studies. This difference may be explained by the relatively small sample size, inclusion of only patients with inactive mucosal chronic otitis media, meticulous surgical technique by a single experienced surgeon, and standardized postoperative care.[10-11]

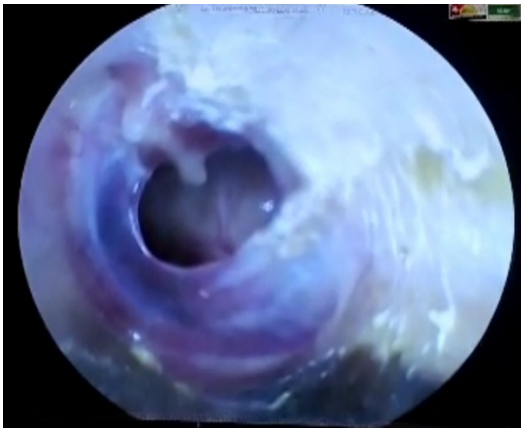

Figure 1: Preop picture of tympanic membrane perforation

Figure 2: Post op picture at 1 month duration

Comparable findings were also reported by Yadav et al., who observed a graft uptake rate of 95% in patients receiving PRP compared with 85% in the control group undergoing conventional underlay myringoplasty. Although Yadav et al. reported a greater mean hearing improvement and air–bone gap closure than the present study, our series demonstrated complete absence of postoperative otorrhoea, infections, and graft rejection, suggesting that PRP not only facilitates graft integration but may also reduce postoperative inflammatory complications. Collectively, these studies reinforce the role of PRP as a safe biological adjunct that enhances graft stability and accelerates tissue healing.[9]

The importance of combining PRP with a structural graft is further highlighted by the randomized clinical trial conducted by Saeedi et al., who utilized PRP-enriched Gelfoam without a temporalis fascia graft. While complete closure was consistently achieved in small perforations, the overall healing rate was only 66.7%, and larger perforations showed poor outcomes. In contrast, complete closure was achieved in all patients in the present study, including those with medium and large perforations. These findings suggest that although PRP promotes tissue regeneration, the addition of a temporalis fascia graft provides essential structural support, particularly for larger tympanic membrane defects.[12]

The present findings are consistent with those of Shiomi and Shiomi, who demonstrated the safety and efficacy of platelet-rich plasma (PRP) in tympanic membrane repair without significant postoperative complications. Although their PRP and atelocollagen sponge technique achieved high closure rates, medium- and large-sized perforations often required repeated applications. In contrast, complete graft uptake (100%) was achieved in all patients in the present study, including those with medium and large perforations, following a single-stage Type I tympanoplasty using a temporalis fascia graft with PRP. The superior outcomes may be attributed to the combined structural support of the fascia graft and the biological effects of PRP, as well as the relatively younger study population (mean age 32.6 ± 9.22 years), since advanced age was identified by Shiomi and Shiomi as a predictor of delayed healing.[13]

Overall, the findings of the present study, together with the available literature, suggest that PRP is a safe, inexpensive, and effective biological adjunct in Type I tympanoplasty. Its ability to promote rapid wound healing, enhance graft integration, improve hearing outcomes, and reduce postoperative complications makes it a promising addition to conventional tympanoplasty techniques. Nevertheless, the present study is limited by its small sample size, absence of a control group, and relatively short follow-up period. Larger

randomized controlled trials with long-term follow-up are required to establish the routine use of PRP in tympanic membrane reconstruction.

Conclusion

Platelet-rich plasma (PRP) is a rich source of growth factors that promote tissue repair and accelerate wound healing. The findings of the present study suggest that the use of PRP as an adjunct to Type I tympanoplasty is associated with excellent graft uptake, improved hearing outcomes, and a low incidence of postoperative complications. Being an autologous product, PRP is safe, biocompatible, and eliminates the risk of immunological reactions or disease transmission. In addition, it is inexpensive, easy to prepare, and can be conveniently incorporated into routine otologic surgical practice. Further large-scale randomized controlled studies are needed to confirm these findings and establish the routine use of PRP in tympanoplasty.

References

1. Kumar PN, Jayagandhi SK, Saravanam PK. Platelet-rich plasma as an adjunct in tympanoplasty: Evaluating graft uptake and healing in large perforations. Indian J Otol 2025;31:199-203.
2. Bellad AS, Kavi A, Mudhol RS. Prevalence of chronic suppurative otitis media among school children residing in rural area of Belagavi, South India. Indian J Otolaryngol Head Neck Surg (November 2019) 71(Suppl 2):S1549–S1552; https://doi.org/10.1007/s12070-019-01627-9
3. Mann SBS, Grewal ES, Nanar MS, Mehra YN, Arora MML (1989) Incidence of chronic suppurative otitis media in general population (a rural survey). Indian J Otolaryngol 28:35–40
4. Gupta S, Harshavardhan R, Samdhani S. To study the association of the size and site of tympanic membrane perforation with the degree of hearing loss. Indian J Otolaryngol Head Neck Surg (November 2019) 71(Suppl 2):S1047–S1052; DOI 10.1007/s12070-017-1102-
5. Sarkar S (2013) A review on the history of tympanoplasty. Indian J Otolaryngol Head Neck Surg 65:S455–S460. https://doi.org/10.1007/s12070-012-0534-5
6. Chauvin K, Bratton C, Parkins C (1999) Healing large tympanic membrane perforations using hyaluronic acid, basic fibroblast growth factor, and epidermal growth factor. Otolaryngol Head Neck Surg 121:43-47
7. Lou Z, Xu L, Yang J, Wu X (2011) Outcome of children with edge-everted traumatic tympanic membrane perforations following spontaneous healing versus fibroblast growth factor-containing gelfoam patching with or without edge repair. International Journal of Pediatric Otorhinolaryngology 75 (2011) 1285–1288. https://doi.org/10.1016/j.ijporl.2011.07.012
8. Stavrakas M, Karkos PD, Markou K, Grigoriadis N. Platelet-rich plasma in otolaryngology. The journal of Laryngology & Otology. 2016;130(2):1098-102.
9. Yadav SP, Malik JS, Malik P, Sehgal PK, Gulia JS, Ranga RK. Studying the result of underlay myringoplasty using platelet-rich plasma. The Journal of Laryngology & Otology. 2018;132(11):990-4.
10. Taneja MK. Role of platelet-rich plasma in tympanoplasty. Indian J Otolaryngol Head Neck Surg (Apr–June 2020) 72(2):247–250; https://doi.org/10.1007/s12070-020-01815-y
11. Prashanth KB, Manjunatha HA, Nayak PP. The efficacy of platelet-rich plasma in the repair of tympanic membrane perforation. Int Arch Otorhinolaryngol. 2025;29(1):s00441791646.
12. Saeedi M, Ajalloueian M, Zare E, Taheri A, Yousefi J, Mirlohi SMJ et al (2017) The effect of PRP-enriched gelfoam on chronic tympanic membrane perforation: a double-blind randomized control trial. The International Tinnitus Journal. 21(2):108-111. https://doi.org/10.5935/0946-5448.20170021
13. Shiomi Y, Shiomi Y (2020) Surgical outcomes of myringoplasty using platelet-rich plasma and evaluation of the outcome-associated factors. Auris Nasus Larynx. 47(2):191-197. https://doi.org/10.1016/j.anl.2019.06.005