The Role of Platelet-Rich Plasma in Enhancing Parotidectomy Outcomes: A Systematic Review and Meta-Analysis

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Abstract

Background: Platelet-rich plasma (PRP), rich in growth factors and cytokines, promotes wound healing and tissue repair. Emerging evidence suggests perioperative PRP in parotid surgery may improve outcomes and reduce complications. However, inconsistent study designs and small sample sizes necessitate a systematic review and meta-analysis to evaluate its efficacy.

Methods: After full-text analysis, three studies were included in the meta-analysis. Five outcomes were included in this meta-analysis, including tube drainage duration, hospital discharge time, salivary fistula formation, and incidence of facial palsy. Meta-analysis was performed on R-studio. An odds ratio (OR) meta-analysis with the mantel-haenszel model was performed on dichotomous variables. Mean difference (MD) meta-analysis was performed for continuous variables. A random-effects model was performed to account for interstudy heterogeneity. ("Parotidectomy" OR "Parotid Gland Surgery" OR "Parotid Tumor Surgery") AND ("Platelet-Rich Plasma" OR "PRP" OR "Platelet Gel" OR "Plasma Rich in Growth Factors")

Results: A total of 133 patients underwent parotidectomy. There were 56 patients in the PRP arm and 77 in the control. There was a decrease in tube drainage duration days in the PRP group, although not statistically significant (MD=-0.16, 95% CI [-1.31, 0.99], p=0.78). Hospital stay was also decreased in the PRP arm by an MD=-0.11 in days, 95% CI [-2.06, 1.84], p=0.91. Salivary fistula formation decreased in the PRP cohorts, although it was not statistically significant (OR=0.30, 95% CI [0.05, 1.89], p=0.19. The incidence of postoperative facial palsy also should be a nonstatistical decrease (OR= 0.62, 95% CI [0.13, 2.83], p=0.53).

Conclusion: Our study indicates that PRP could improve patient satisfaction and postoperative outcomes. However, the current data is not statistically reproducible due to the small number of studies included and patient sample size. More studies are needed to explore upfront PRP application in parotidectomy.

Introduction

- Parotidectomy treats benign and malignant salivary gland tumors but is often complicated by facial nerve palsy, salivary fistula, hematoma, and delayed wound healing.
- Platelet-rich plasma (PRP), containing PDGF, VEGF, and TGF-β, promotes tissue repair, angiogenesis, and reduces inflammation.
- Despite encouraging preliminary data, PRP's impact in parotid surgery remains unclear due to limited, heterogeneous studies.

Objective

To conduct a systematic review and meta-analysis to examine the effect of perioperative PRP application in parotidectomy on drainage duration, hospital stay, salivary fistula formation, and facial nerve palsy.

Methods and Materials

- This study was a systematic review and meta-analysis adhering to PRISMA 2020 guidelines. A comprehensive search was conducted using PubMed, Embase, and the Cochrane Library through April 2025 with a customized Boolean string.
- Included studies evaluated perioperative platelet-rich plasma (PRP) in adult patients undergoing parotidectomy for benign tumors and reported at least one of the following outcomes: drainage duration, hospital stay, salivary fistula formation, or facial nerve palsy.
- Data analysis was performed in RStudio using a random-effects model. Mean differences (MD) were calculated for continuous outcomes and odds ratios (OR) for dichotomous outcomes; heterogeneity was quantified using the I^2 statistic

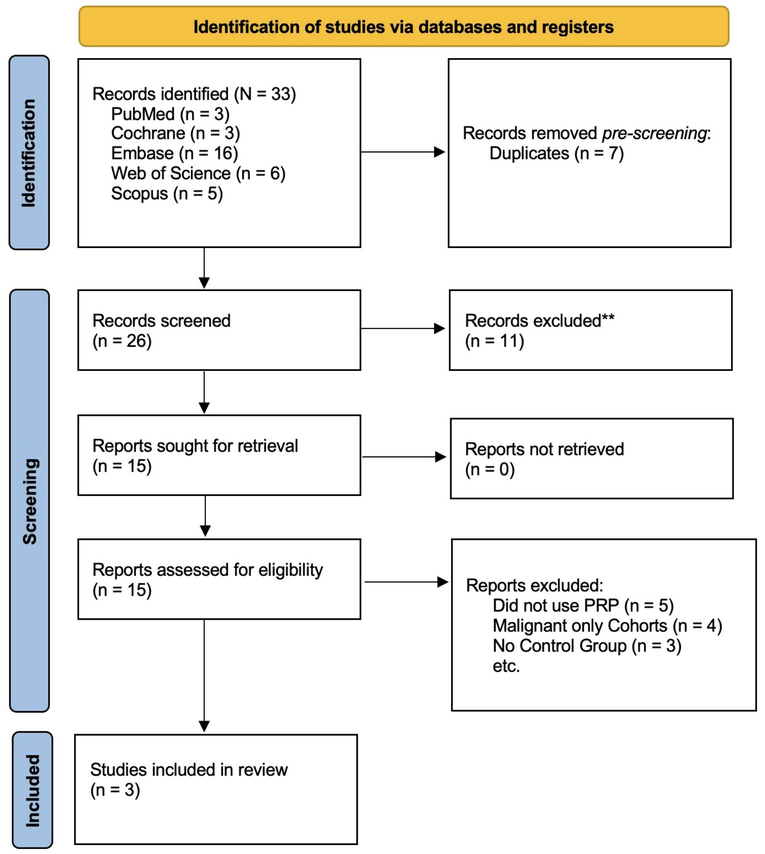

Figure 1. Prisma Flow Chart

Results

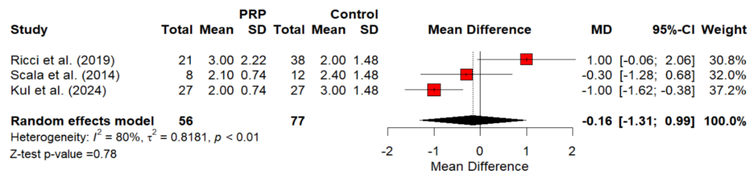

Figure 2. Forest Plot illustrating the impact of PRP versus Control on Tube Drainage Duration Following Superficial Parotidectomy

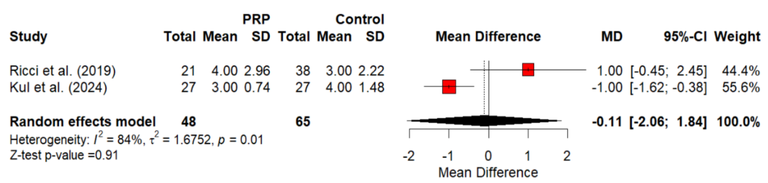

Figure 3. Forest Plot of impact of PRP on Hospital Duration

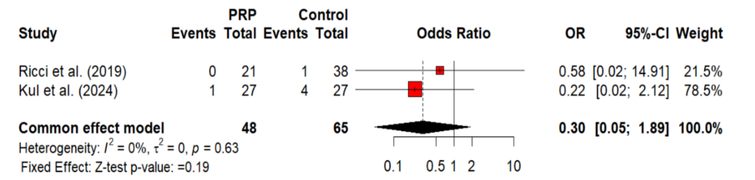

Figure 4. Odds Ratio of Salivary Fistula Formation in PRP Group Versus Control

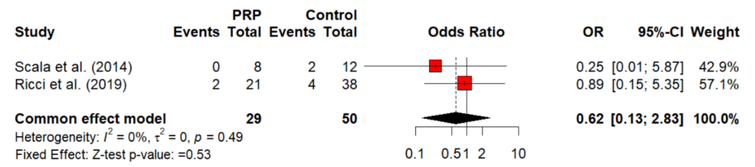

Figure 5. Odds Ratio of Facial Palsy incidence in PRP Group Versus Control Following Superficial Parotidectomy

- A total of 133 patients underwent parotidectomy. There were 56 patients in the PRP arm and 77 in the control.
- There was a decrease in tube drainage duration days in the PRP group, although not statistically significant (MD=-0.16, 95% CI [-1.31, 0.99], p=0.78).
- Hospital stay was also decreased in the PRP arm by an MD=-0.11 in days, 95% CI [-2.06, 1.84], p=0.91. Salivary fistula formation decreased in the PRP cohorts, although it was not statistically significant (OR=0.30, 95% CI [0.05, 1.89], p=0.19.
- The incidence of postoperative facial palsy was lower in intervention group, but was not statistically significant(OR= 0.62, 95% CI [0.13, 2.83], p=0.53).

Conclusions

- PRP did not show any statistically significant improvement in complication rates, tube drain duration, hospital stay or facial palsy incidence.
- Although not statistically significant, all studies were trending towards outcome improvement. However, there is currently insufficient evidence due to lack of studies.
- More studies are needed to explore the application of PRP in superficial parotidectomy.

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References