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Impact Of Combined Antacid And Proton Pump Inhibitor Therapy Versus Proton Pump Inhibitor Alone On Post-Tonsillectomy Recovery In Adults With Laryngopharyngeal Reflux.

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Abstract

Introduction: *Laryngopharyngeal reflux (LPR) is implicated in delayed mucosal healing and increased postoperative morbidity after tonsillectomy. Proton pump inhibitors (PPIs) are standard treatment; however, combined acid suppression using PPIs plus antacid therapy may offer enhanced benefits.*

Objective: *To evaluate the effects of combined pantoprazole and antacid syrup therapy versus pantoprazole alone on postoperative pain, mucosal healing, and swallowing/voice function in adults aged 18–40 years with confirmed LPR undergoing tonsillectomy.*

Methods: *In this prospective observational study, 100 adults with LPR (RSI ≥13, RFS ≥7) undergoing elective tonsillectomy were divided into two groups: Group A (pantoprazole 40 mg once daily + antacid syrup post meals, n=50) and Group B (pantoprazole 40 mg once daily only, n=50). Outcomes were recorded for pain (numeric scale, days 1–7), mucosal healing (slough grading, days 7 and 14), and swallowing/voice function (standardized questionnaire, 2 weeks). Statistical analyses included repeated measures ANOVA and independent t-tests; significance at $p<0.05$.*

Results: *Both groups had comparable demographics and compliance. Group A demonstrated significantly faster pain reduction (mean day 7 pain 1.8 ± 0.6 vs. 2.4 ± 0.8, $p=0.002$), improved mucosal healing (day 7 score 0.9 ± 0.3 vs. 1.3 ± 0.5, $p=0.005$; day 14 score 0.3 ± 0.1 vs. 0.6 ± 0.2, $p=0.003$), and superior swallowing/voice function (9.5 ± 0.3 vs. 9.0 ± 0.4, $p=0.004$).*

Conclusion: *Combined PPI and antacid therapy results in better postoperative recovery than PPI monotherapy in adults with LPR undergoing tonsillectomy. This suggests that dual acid suppression may optimize healing and functional outcomes in this population.*

Keywords:*Tonsillitis, tonsillectomy, laryngopharyngeal reflux, antacid, proton pump inhibitor*

INTRODUCTION

Tonsillectomy remains a common surgical procedure with well-documented postoperative pain, delayed mucosal recovery, and functional impairments such as dysphagia and voice changes [1,2]. Laryngopharyngeal reflux (LPR) involves retrograde flow of gastric contents causing inflammation in the upper aerodigestive tract, potentially exacerbating these complications [3–5]. Although PPIs are standard therapy to reduce acid exposure, residual non-acid reflux and pepsin activity may contribute to persistent mucosal irritation [6,7].

Previous studies in adults suggest that adjunctive antacid or alginate therapies, which buffer gastric contents and reduce refluxate volume, can provide symptom relief and improve mucosal healing [8–10]. However, there is limited evidence assessing their role specifically in the postoperative tonsillectomy setting. This study investigates whether combined pantoprazole and antacid syrup therapy improves pain, healing, and function compared to PPI alone in adults with confirmed LPR undergoing tonsillectomy.

Aims And Objectives

- Compare combined PPI + antacid syrup therapy versus PPI alone in adults (18–40 years) with LPR after tonsillectomy.
- Evaluate postoperative pain reduction over 7 days between the two groups.
- Compare mucosal healing at days 7 and 14 post-surgery.
- Assess swallowing and voice function recovery at 2 weeks.

METHODOLOGY

Study Design and Population

A prospective observational cohort study was conducted at Saveetha Medical College, Chennai from January to June 2025. One hundred adults aged 18–40 years with confirmed LPR (Reflux Symptom Index [RSI] ≥13 and Reflux Finding Score [RFS] ≥7,) with symptoms of tonsillitis scheduled for elective tonsillectomy were recruited.

REFLUX SYMPTOM INDEX (RSI)

Within the last week, how did the following problems affect you?	0 = NO PROBLEM 5 = SEVERE PROBLEM					
Hoarseness or problem with voice	0	1	2	3	4	5
Clearing your throat	0	1	2	3	4	5
Excess throat mucus or post nasal drip	0	1	2	3	4	5
Difficulty swallowing food, liquids, or pills	0	1	2	3	4	5
Coughing after you ate or after lying down	0	1	2	3	4	5
Breathing difficulties or choking episodes	0	1	2	3	4	5
Troublesome or annoying cough	0	1	2	3	4	5
Sensations of something sticking in your throat or a lump in your throat	0	1	2	3	4	5
Heartburn, chest pain, indigestion, or stomach acid coming up	0	1	2	3	4	5

Inclusion Criteria

- Age between 18 and 40 years
- Confirmed diagnosis of LPR via symptom scoring and laryngoscopic findings
- Scheduled for primary tonsillectomy
- Willingness to comply with medication and follow-up

Exclusion Criteria

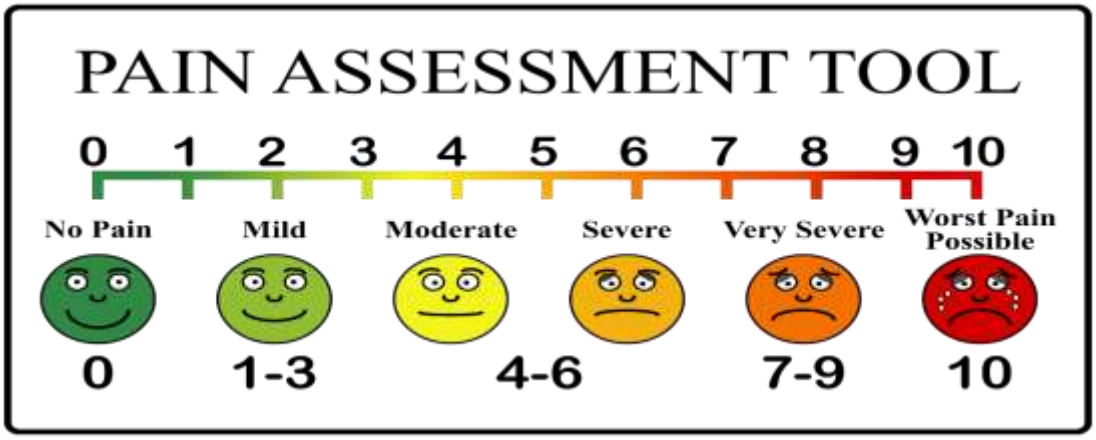
- Concurrent adenoidectomy or other upper airway surgeries, OSA surgeries
- History of gastrointestinal disorders other than LPR (e.g., peptic ulcer disease)
- Prior surgery on tonsils, pharynx or larynx.
- Use of acid suppression therapy within four weeks prior to surgery
- Pregnant or lactating women
- Known allergy to study medications

Interventions

- **Group A (n=50):** Pantoprazole 40 mg once daily + antacid syrup (alginate/magaldrate formulation) taken after meals for 14 days postoperatively
- **Group B (n=50):** Pantoprazole 40 mg once daily alone for 14 days postoperatively

Outcome Measures

- **Pain:** Recorded daily for 7 days using a numeric rating scale (0 = no pain, 10 = worst pain)



- **Mucosal Healing:** Evaluated on postoperative days 7 and 14 via a standardized slough grading scale (0 = fully healed epithelium, 3 = heavy slough presence) assessed by an otolaryngologist blinded to group allocation

Slough Grading Scale (0–3) – Mucosal Healing Assessment

Grade	Description	Clinical Interpretation
0	**Fully healed epithelium**	Mucosa appears completely regenerated, pink, smooth, no visible slough.
1	**Mild slough presence**	Minor areas of whitish slough or fibrin; epithelialization mostly complete.
2	**Moderate slough presence**	More extensive whitish slough; epithelial regeneration still incomplete.
3	**Heavy slough presence**	Large areas of thick, white or yellowish slough; poor healing observed.

- **Swallowing and Voice Function:** Assessed at 2 weeks using a validated questionnaire measuring dysphagia and voice clarity, scored 0–10 (higher scores indicating better function)

Statistical Analysis

Data were analyzed using SPSS v25.0. Pain trajectories over 7 days were assessed using repeated measures ANOVA to examine group × time interactions. Independent t-tests compared mucosal healing and functional scores between groups at each time point. Compliance and adverse event rates were compared using Chi-square tests. A p-value < 0.05 was considered statistically significant.

RESULTS

1. Demographics and Compliance

Both groups were statistically similar in mean age (~29 years), gender distribution, and medication compliance (>95%). No serious adverse events were reported.

Parameter	Group A (PPI + Antacid)	Group B (PPI Only)	p-value
Mean Age (years)	28.7 ± 5.2	29.3 ± 5.6	0.58
Gender (Male:Female)	26:24	25:25	0.84
Compliance (%)	96%	95%	0.77
Serious Adverse Events	0	0	—

2. Pain Trajectory (Days 1–7)

Group A exhibited faster pain reduction across the first postoperative week compared to Group B.

Day	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
1	6.3 ± 1.1	6.4 ± 1.0	0.66
3	4.2 ± 0.8	4.8 ± 1.0	0.01
5	2.9 ± 0.7	3.6 ± 0.9	0.003
7	1.8 ± 0.6	2.4 ± 0.8	0.002

Repeated measures ANOVA demonstrated a significant group × time interaction ($p < 0.01$).

3. Mucosal Healing (Days 7 and 14)

Group A showed superior mucosal healing at both postoperative days.

Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Day 7	0.9 ± 0.3	1.3 ± 0.5	0.005
Day 14	0.3 ± 0.1	0.6 ± 0.2	0.003

4. Swallowing and Voice Function (Day 14)

Group A demonstrated better swallowing and voice outcomes at two weeks.

Parameter	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Swallowing/Voice Score	9.5 ± 0.3	9.0 ± 0.4	0.004

DISCUSSION

The study results indicate that combined PPI and antacid therapy post-tonsillectomy in adults with LPR significantly improves pain relief, accelerates mucosal healing, and enhances swallowing and voice function compared to PPI alone. The demographic similarity and high compliance suggest the differences are attributable to the intervention.

This aligns with prior adult studies showing that PPIs combined with alginate-based antacids effectively reduce acid exposure and neutralize refluxate, minimizing laryngeal irritation and promoting mucosal

repair [8,11,12]. The enhanced functional outcomes suggest reduced inflammation and faster epithelialization. While PPIs reduce gastric acid secretion, antacid alginates form a physical barrier, limiting refluxate contact with the pharyngeal mucosa, which might explain superior clinical outcomes [13–15].

Limitations include the observational design and lack of a placebo control. Future randomized controlled trials with objective reflux measures (e.g., impedance-pH monitoring) and longer follow-up are recommended [16–18].

CONCLUSION

In adults aged 18–40 with LPR undergoing tonsillectomy, adjunctive antacid syrup with PPI therapy improves postoperative pain control, mucosal healing, and swallowing/voice function more than PPI monotherapy. These findings support dual acid suppression as a superior therapeutic strategy in this population.

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