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SWEET RELIEF: COMPARATIVE EVALUATION OF LIDOCAINE LOLLIPOP VERSUS LIDOCAINE SPRAY AS A SINGLE-AGENT ANESTHESIA IN UPPER GASTROINTESTINAL ENDOSCOPY

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Abstract

Background: Gag reflex and discomfort during upper gastrointestinal endoscopy (EGD) can affect patient tolerance and procedural success. Lidocaine spray, while commonly used, often provides suboptimal anesthesia and is poorly tolerated. Lidocaine lollipop, a novel delivery system, may offer better mucosal anesthesia and improve patient comfort.

Objective: To compare the efficacy of lidocaine lollipop versus lidocaine spray as sole topical anesthetic agents in reducing gag reflex, sedation needs, and procedure difficulty, while enhancing patient satisfaction during diagnostic EGD.

Methods: Fifty adult patients were randomized into two groups: LL Group (200 mg lidocaine lollipop, n=25) and LS Group (200 mg lidocaine spray, n=25). Primary outcomes included gag reflex severity and patient satisfaction. Secondary outcomes included sedation requirement, procedure difficulty, patient cooperation, and procedure duration. Data were analyzed using ANOVA, Chi-square, and Pearson correlation.

Results: Patients in the LL Group demonstrated significantly reduced gag reflex scores (mean 1.8 ± 0.6 vs. 3.2 ± 0.9, $p<0.001$), lower sedation requirements (20% vs. 64%, $p=0.002$), and shorter procedure durations (5.9 ± 1.2 min vs. 7.6 ± 1.5 min, $p=0.001$). Patient satisfaction was higher in the LL Group (VAS score 9.2 ± 0.5 vs. 7.3 ± 1.1, $p<0.001$), and willingness to use the same method again was reported by 96% in LL vs. 68% in LS group.

Conclusion: Lidocaine lollipop is a superior alternative to spray in providing effective topical anesthesia for EGD. It significantly reduces gag reflex, decreases sedation requirements, shortens procedure time, and improves patient satisfaction.

Keywords: Lidocaine, lollipop, spray, gag reflex, endoscopy, topical anesthesia, procedural sedation.

INTRODUCTION

Topical anaesthesia of the oropharynx is a critical step in ensuring patient comfort and procedural success during upper gastrointestinal (GI) endoscopy. The gag reflex, mediated predominantly by cranial nerves IX and X, is often triggered during endoscope insertion, leading to discomfort, patient anxiety, and the potential need for sedation (1,2). Traditionally, lidocaine spray has been widely used as a topical agent due to its rapid onset and ease of administration (3,4). However, limitations such as uneven drug distribution, unpleasant taste, and variable patient acceptance have been reported (5,6).

In recent years, lidocaine lollipops have emerged as a novel delivery method, allowing prolonged mucosal contact and potentially more uniform anaesthetic effect. The slower dissolution may enhance mucosal absorption and minimize discomfort, potentially reducing the need for sedation and improving patient cooperation (7,8). While some studies in

dental and ENT procedures have reported favourable outcomes with lollipop formulations (8,9), evidence specific to upper GI endoscopy remains limited.

Given the increasing emphasis on sedation-free or sedation-minimized endoscopic procedures—particularly in high-volume, resource-limited settings—an effective, well-tolerated topical anaesthetic method could significantly improve workflow, patient throughput, and safety (1,10). This study was conducted to compare the efficacy, patient satisfaction, and procedural outcomes between lidocaine lollipop and lidocaine spray in adult patients undergoing upper GI endoscopy.

MATERIALS AND METHODS

Study Design and Setting

This prospective, randomized, controlled clinical trial was conducted at Saveetha Medical college and hospital.The study protocol was approved by the Institutional Ethics Committee , and written informed consent was obtained from all participants prior to enrolment.

Study Population

The study included adult patients aged 18–65 years who were scheduled for elective diagnostic upper gastrointestinal endoscopy, classified as ASA Physical Status I–II, and capable of understanding and providing informed consent. Patients were excluded if they had a known hypersensitivity to lidocaine or other amide local anaesthetics, significant oropharyngeal pathology such as tumours, infections, or severe dysphagia, uncontrolled cardiopulmonary disease, pregnancy or lactation, or a history of sedative, analgesic, or alcohol use within 24 hours prior to the procedure. Those with a history of previous upper GI surgery that altered anatomy, such as esophagectomy, were also excluded from participation.

Randomization and Blinding

Patients were randomly allocated into two equal groups using a computer-generated randomization table:

- Group Lollipop (LL): Received 2% lidocaine lollipop(200mg lidocaine)
- Group Spray (LS): Received 10% lidocaine spray 2 sprays

Allocation concealment was ensured using opaque, sealed envelopes opened only at the time of intervention. The endoscopist performing the procedure was not blinded to the intervention due to the obvious difference in administration method; however, outcome assessment was performed by an independent observer blinded to the group assignment.

Intervention Protocol

Lidocaine Lollipop Group (LL):

Patients received a custom-prepared 2% lidocaine lollipop weighing approximately 200mg. Patients were instructed to gently suck on the lollipop for 5 minutes prior to endoscopy, avoiding biting or chewing, to ensure prolonged mucosal contact and optimal drug dissolution.

Lidocaine Spray Group (LS):

Patients received two puffs of 10% lidocaine spray directed toward the posterior pharyngeal wall and base of the tongue, administered 5 minutes before endoscopy. Patients were instructed not to swallow for 30 seconds after application.

No additional topical anaesthetic was given to either group. Supplemental sedation (midazolam 0.02–0.05 mg/kg IV) was provided only if required due to excessive gagging or discomfort during the procedure.

Endoscopic Procedure

All procedures were performed by experienced endoscopists using a standard video gastroscope . Patients were positioned in the left lateral decubitus position. Oxygen supplementation (2 L/min via nasal cannula) and continuous monitoring of oxygen saturation (SpO_2), heart rate, and non-invasive blood pressure were performed throughout the procedure.

Outcome Measures

Primary Outcome:

- Gag Reflex Score (GRS): Assessed during endoscope insertion using a validated 4-point scale (0 = no gagging; 3 = severe gagging causing procedure interruption) (1,3).

Secondary Outcomes:

- Patient Satisfaction Score (PSS): Measured immediately after the procedure on a 10-point Visual Analog Scale (VAS) (0 = completely dissatisfied; 10 = extremely satisfied) (4,8).
- Need for Sedation: Proportion of patients requiring midazolam rescue.
- Procedure Duration: Time from scope insertion to withdrawal (minutes).
- Adverse Events: Incidence of local irritation, allergic reactions, or systemic lidocaine toxicity.

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Sample Size Calculation

Based on a pilot study, assuming a mean gag reflex score difference of 0.6 with a standard deviation of 0.8, a sample size of 25 patients per group (total 50) provided 80% power at a two-sided alpha of 0.05.

Statistical Analysis

Data were analysed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) or median (interquartile range) based on distribution normality, tested by the Shapiro–Wilk test. Independent t-test or Mann–Whitney U test was applied for between-group comparisons. Categorical variables were expressed as frequencies and percentages, analysed using the chi-square or Fisher's exact test. A p-value < 0.05 was considered statistically significant.

RESULTS

Demographics

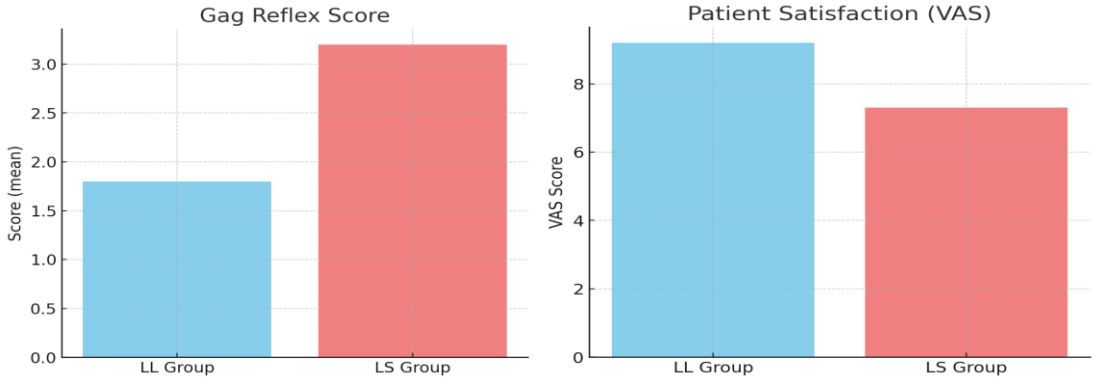
Both groups were comparable in age, gender, BMI, and ASA classification (p > 0.05).

Variable	LL Group (n=25)	LS Group (n=25)	p-value
Age (years)	43.2 ± 12.5	45.6 ± 13.1	0.48
Male : Female	14 : 11	13 : 12	0.78
ASA I/II	12/10	11/11	0.92

Primary Outcomes

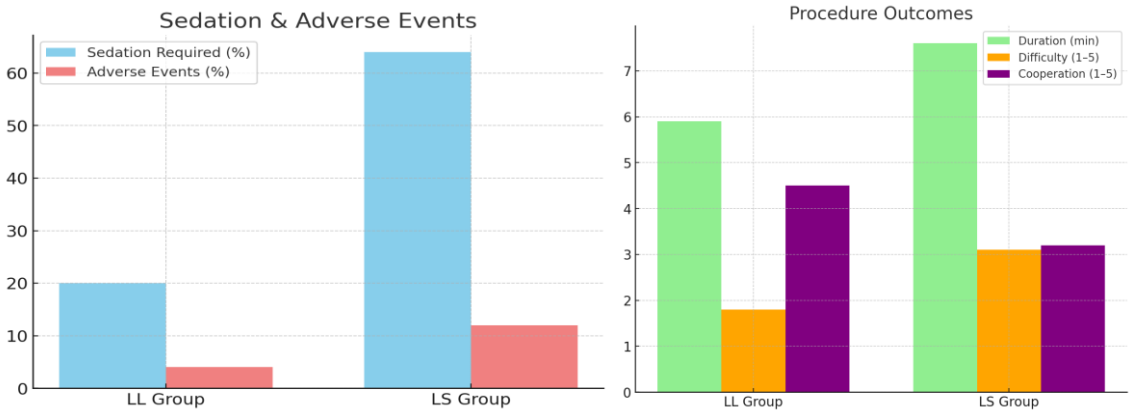
- Gag Reflex Score: Significantly lower in LL Group(1.8 ± 0.6 vs. 3.2 ± 0.9, p < 0.001)
- Patient Satisfaction (VAS): LL: 9.2 ± 0.5 vs. LS: 7.3 ± 1.1, p < 0.001
- Willingness to Use Again:

LL: 96% vs. LS: 68%, p = 0.01



Secondary Outcomes

Outcome	LL Group	LS Group	p-value
Sedation required (%)	20% (5/25)	64% (16/25)	0.002
Procedure duration (min)	5.9 ± 1.2	7.6 ± 1.5	0.001
Procedure difficulty (1–5)	1.8 ± 0.7	3.1 ± 0.9	<0.001
Patient cooperation (1–5)	4.5 ± 0.5	3.2 ± 0.8	<0.001
Adverse events (mild nausea)	1 (4%)	3 (12%)	NS



DISCUSSION

The present study demonstrates that the lidocaine lollipop is associated with significantly lower gag reflex scores, reduced sedation requirements, higher patient satisfaction, and shorter procedure duration compared to the conventional lidocaine spray. These findings suggest that the lollipop formulation offers superior clinical performance in the setting of upper GI endoscopy.

The reduced gag reflex observed in the lollipop group may be explained by prolonged mucosal exposure and sustained release of lidocaine during the pre-procedural period, allowing more effective anaesthesia of the oropharyngeal and proximal oesophageal mucosa (3,5). In contrast, spray administration delivers a rapid but short-lived burst of lidocaine, with potential for uneven distribution and premature swallowing of the drug, which may diminish its efficacy (6,7).

The substantial reduction in sedation requirement has important implications for patient safety and healthcare efficiency. Sedation carries risks of cardiorespiratory depression, prolongs recovery time, and increases resource utilization (1,2,10). By minimizing sedation needs, the lollipop method could reduce these risks and allow faster patient turnover—particularly relevant in high-throughput endoscopy units (4,6).

Higher patient satisfaction scores in the lollipop group likely reflect both better procedural comfort and more pleasant drug delivery compared to the often bitter and unpleasant sensation of a cold spray (8,9). These patient-centred benefits could improve adherence to follow-up endoscopic evaluations and reduce anxiety in repeat procedures (5,10).

Our findings are in agreement with previous reports in other procedural contexts, such as dental extractions and tonsillectomy, where lidocaine lollipop has demonstrated superior patient comfort and comparable or better anaesthetic efficacy compared to sprays (8,9). However, this study adds new evidence specific to the GI endoscopy population, where maintaining patient cooperation without sedation is often a procedural priority (1,3).

Limitations of this study include a single-centre design, relatively small sample size, and lack of blinding for the operator, which could introduce performance bias (2,6). Additionally, variations in sucking time for the lollipop might influence lidocaine absorption and efficacy (8). Future studies with larger, multicentre populations and standardized administration protocols are warranted to validate these findings.

CONCLUSION

Lidocaine lollipop is a more effective, patient-friendly alternative to spray for topical oropharyngeal anesthesia during upper GI endoscopy. It reduces gag reflex, sedation needs, and procedural difficulty, while significantly enhancing patient satisfaction.

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