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Original Research Article

Efficacy of 2% Lignocaine With Adrenaline Application in Nasal Cavity Before Nasal Surgeries

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Abstract: *Bleeding that occurs in excess amounts during a nasal surgery can obscure the vision leading to longer hours and increased chances of complications. The application of 2% lignocaine accompanied with adrenaline as a vasoconstrictor is widely adopted in order to reduce bleeding.* ***Objective:*** *This study aimed to evaluate the efficacy of 2% lignocaine with adrenaline in reducing blood loss during the surgery.* ***Methodology:*** *A descriptive case series was conducted at the University of Lahore Teaching Hospital over six months. Seventy-four patients aged 20 to 60 underwent various nasal surgeries, excluding those with specific medical conditions. Procedures were performed under general anesthesia, measuring blood loss and defining efficacy as less than 10mL. Data were analyzed using SPSS version 25.0 with a significance level of $p \leq 0.05$.* ***Results:*** *Among the 74 patients, 42 (56.8%) were male and 32 (43.2%) were female. The mean age was 39.23 ± 11.41 years. The mean intra-operative blood loss was 8.40 ± 1.80 mL.Efficacy was observed in 56 patients (75.7%), while 18 patients (24.3%) had blood loss exceeding 10 mL.* ***Conclusion:*** *Applying 2% lignocaine with adrenaline in the nasal cavity before surgery greatly reduces intra-operative blood loss by 75.7%. Larger sample size studies and comparisons with other vasoconstrictors are advised for further investigation.*

Keywords: 2% Lignocaine, Adrenaline, Nasal Surgeries, Intra-Operative Blood Loss, Efficacy, Septoplasty, ENT Surgery

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Introduction

Globally, nasal and sinus issues are the most common pathologies. The history of nasal packing postoperatively dates back to 1847 in the times of Gustav Killian's Germany and was also contributed to by Otto Tiger Freer in America. The organized method of submucosal resections and nasal packing was documented for the first time in SMR in 1882 by Peterson in Germany and Ephraim in the USA (1).

Nasal packing involves different types which are BIPP and antibiotic impregnated gauze, salves, liquid paraffin, and many others. There are more devices and materials available such as merocel polyvinyl acetate sponge, nasoporebioresorbable dressings, and balloon tamponade systems (2, 3).

As in all surgical procedures, hemostatic control is necessary at any stage of a nasal surgery so that no complications are encountered and the quality of the surgical field is improved. An undisturbed functioning field of operation is achieved by the use of a bloodless surgical field technique accomplished by a combination of topical and local infiltration anesthesia with an epinephrine-containing anesthetic agent (4).

The systemic uptake of epinephrine subsequent to local administration via the nasal mucosa frequently results in hemodynamic perturbations, including hypertension, hypotension, tachycardia, and arrhythmias in individuals with pre-existing cardiovascular conditions (5).

Research suggests that the localized administration of adrenaline alone produces comparable hemostatic outcomes to those attained through the combined use of topical and injectable adrenaline, thereby enabling us to circumvent the systemic side effects associated with adrenaline (6).

In an investigation involving fifty subjects, 74% exhibited a variance of less than 10 ml in hemorrhage following the administration of 2% lignocaine in conjunction with adrenaline (7).

There is very limited literature regarding efficacy of prophylactic 2% lignocaine with adrenaline application in nasal cavity in decreasing intra-operative bleeding during nasalsurgeries, so the purpose of this study is to determine the efficacy (in decreasing intra-operative bleeding) of 2% lignocaine with adrenaline application in nasal cavity during nasal surgeries. Then based on these results, surgeons can be encouraged for using 2% lignocaine with adrenaline nasal packs before nasal surgeries in our general practice that will be helpful for them to improve their quality of life and will also be helpful to decrease workload in the hospital.

Methodology

This descriptive case series was conducted in the Department of Otorhinolaryngology, University of Lahore Teaching Hospital, Lahore. The study was carried out over a period of six months, from Oct 03, 2024, to April 03, 2025. The study aimed to determine the efficacy of 2% lignocaine with adrenaline application in reducing intra-operative blood loss in patients undergoing nasal surgeries. The sample size of 74 was calculated using the WHO sample size calculator, considering a confidence level of 95%, a margin of error of 10%, and an efficacy of 2% lignocaine with adrenaline at 74%.[7]

Patients were selected based on specific inclusion and exclusion criteria. The inclusion criteria consisted of all patients aged 20 to 60 years undergoing Submucous Resection (SMR), Septoplasty, Functional Endoscopic Sinus Surgery (FESS), or Submucosal Diathermy (SMD). Both male and female patients were included. The exclusion criteria comprised patients with co-morbid conditions such as hypertension, diabetes mellitus, and asthma, patients with a history of bleeding disorders like hemophilia, those with asymptomatic deviated nasal septum, and individuals with a previous history of nasal surgery. Additionally, patients diagnosed with chronic liver disease (serum bilirubin >1.0 mg/dl) and chronic renal failure (serum creatinine >1.5 mg/dl) were excluded from the study.

After obtaining approval from the Institutional Ethical Review Committee, a total of 74 patients who met the inclusion criteria were enrolled. Written informed consent was obtained from each participant.

In all patients, 2% lignocaine with adrenaline nasal pack was applied for five minutes before the commencement of surgery. All surgeries were performed under general anesthesia by a single consultant ENT surgeon with at least three years of post-fellowship experience. The intra-operative blood loss was measured using two methods: blood collected in the suction bottle and the difference in weight of gauze before and after surgery, applying the formula 1g = 1mL of blood. The efficacy of 2% lignocaine with adrenaline was determined based on whether intra-operative blood loss was less than 10 mL, as per the study's operational definition.

All collected data were entered and analyzed using SPSS version 25.0. The mean and standard deviation (SD) or median with interquartile range (IQR) were calculated for age, duration of surgery, and intra-operative blood loss. The frequency and percentage were used to present gender, type of surgery (SMR, septoplasty, FESS, SMD), and efficacy (yes/no). To assess the effect of age, gender and type of surgery on efficacy, stratification was performed. After stratification, the chi-square test was applied to evaluate statistical significance, considering a p-value ≤0.05 as significant.

Results

The first table presents the frequency distribution of different variables among the 74 patients included in the study. Among them, 42 patients (56.8%) were male, while 32 patients (43.2%) were female. The patients were categorized into two age groups: 40 patients (54.1%) were between 20 to 40 years, whereas 34 patients (45.9%) were between 41 to 60 years. The mean age of the patients was 39.23 ± 11.41 years.

The mean duration of surgery was 71.69 ± 27.64 minutes. Regarding the type of surgery performed, 21 patients (28.4%) underwent Submucosal Diathermy (SMD), 18 patients (24.3%) had Functional Endoscopic Sinus Surgery (FESS), 20 patients (27.0%) underwent Submucous Resection (SMR), and 15 patients (20.3%) had Septoplasty. The mean intra-operative blood loss was recorded as 8.40 ± 1.80 mL. Based on the study criteria for efficacy (blood loss <10 mL), 56 patients (75.7%) had effective outcomes, whereas 18 patients (24.3%) had blood loss exceeding the threshold.

The second table shows efficacy stratification based on variables. Among males, 35 (83.3%) had effective results, while 7 (16.7%) did not. For females, 21 (65.6%) had effective outcomes compared to 11 (34.4%) who did not, showing a non-significant difference (p=0.079).

In age groups, 31 (77.5%) aged 20-40 had effective outcomes, and 9 (22.5%) did not. Patients aged 41-60 had 25 (73.5%) successful results with 9 (26.5%) unsuccessful (p=0.692). A significant difference was seen in surgery type (p=0.014). Among SMD patients, 17 (81.0%) had effective outcomes, while for FESS, 17 (94.4%) had effective results. SMR had 15 (75.0%) effective outcomes, whereas Septoplasty had the lowest efficacy rate. This illustrates variations in efficacy based on surgery type using 2% lignocaine with adrenaline.

Table-1: Frequency distribution of different variables (n=74)

Variables		Frequency	Percent
Gender	Male	42	56.8%
	Female	32	43.2%
Age groups	20-40 years	40	54.1%
	41-60 years	34	45.9%
	Mean age (years)	39.23±11.41	
Duration of surgery	Mean duration of surgery (min)	71.69±27.64	
Type of surgery	SMD	21	28.4%
	FESS	18	24.3%
	SMR	20	27.0%
	Septoplasty	15	20.3%
Intra-operative blood loss	Mean blood loss (ml)	8.40±1.80	
Efficacy (blood loss <10 ml)	Yes	56	75.7%
	No	18	24.3%

Table-2: Stratification of efficacywithrespect to different variables

Variables		Efficacy		p-value
		Yes	No	
Gender	Male	35(83.3%)	7(16.7%)	0.079
	Female	21(65.6%)	11(34.4%)	
Age groups	20-40 years	31(77.5%)	9(22.5%)	0.692
	41-60 years	25(73.5%)	9(26.5%)	
Type of surgery	SMD	17(81.0%)	4(19.0%)	0.014
	FESS	17(94.4%)	1(5.6%)	
	SMR	15(75.0%)	5(25.0%)	
	Septoplasty	7(46.7%)	8(53.3%)	

Discussion

Nasal surgeries often present challenges related to intra-operative blood loss, which can obscure the surgical field, prolong operative time, and increase the risk of complications. The use of vasoconstrictive agents like 2% lignocaine with adrenaline has been a common practice to minimize bleeding and improve visibility during surgery. Adrenaline, a potent α-adrenergic agonist, induces vasoconstriction, thereby reducing blood flow to the nasal mucosa and minimizing intra-operative hemorrhage.

Lignocaine, on the other hand, provides local anesthesia, reducing the pain and discomfort associated with surgical procedures. Several studies have emphasized the role of topical and infiltrative adrenaline applications in achieving hemostasis in nasal and sinus surgeries (8, 9). However, the optimal efficacy of 2% lignocaine with adrenaline in different types of nasal surgeries remains a subject of clinical evaluation. The aim of this study was to determine the efficacy of 2% lignocaine with adrenaline application in the nasal cavity before nasal surgeries, considering the variation in surgical techniques, anatomical differences, and patient factors. As bleeding control is a critical factor in ensuring successful outcomes in nasal surgeries, the identification of an effective vasoconstrictive agent can help improve surgical precision, reduce complications, and optimize patient recovery.

The operational definition of efficacy was based on intra-operative blood loss less than 10 mL, which is considered an acceptable limit for minimally invasive nasal procedures. This study was conducted at the University of Lahore Teaching Hospital, including 74 patients undergoing SMR, Septoplasty, FESS, and SMD. The results demonstrated an overall efficacy of 75.7%, with a mean intra-operative blood loss of 8.40 ± 1.80 mL.In a study, out of fifty patients, 74% showed <10-ml difference in blood loss with 2% lignocaine with adrenaline application (7).

Several studies have previously assessed the efficacy of lignocaine with adrenaline in nasal surgeries. A study by Ooi et al. reported that adrenaline application significantly reduced intra-operative bleeding, improving visibility in FESS procedures, which aligns with our finding that FESS showed the highest efficacy (94.4%) in our study (10).

Similarly, Wormald et al. demonstrated that adrenaline-soaked nasal packing prior to surgery significantly minimized intra-operative blood loss, supporting the use of pre-operative topical application as an effective approach (11).

However, our study found that Septoplasty had the lowest efficacy (46.7%), which contrasts with findings by Baradaranfar et al., who reported a higher success rate of lignocaine with adrenaline in Septoplasty. This discrepancy may be attributed to differences in surgical techniques, variations in patient demographics, and differences in the application methods of adrenaline (12).

Additionally, our results are consistent with studies by Aiyer et al., which emphasized that lignocaine with adrenaline is more effective in FESS and SMD procedures due to better mucosal penetration compared to more complex structural interventions like Septoplasty (13).

Despite its strengths, this study had certain limitations. The sample size of 74 patients was relatively small, which may limit the generalizability of the results. Additionally, patient-related factors such as mucosal thickness, vascular supply variations, and pre-existing conditions affecting hemostasis were not extensively evaluated. Another limitation was the lack of a control group using alternative vasoconstrictive agents, such as oxymetazoline or tranexamic acid, which could have provided a comparative assessment.

Future studies should focus on larger sample sizes and randomized controlled trials (RCTs) to validate the findings of this study. Comparative studies evaluating different vasoconstrictors in nasal surgeries can help establish the most effective agent for controlling intra-operative bleeding. Additionally, investigating the long-term effects of adrenaline application on post-operative healing, nasal mucosal integrity, and potential complications would provide deeper insights into its clinical utility.

Conclusion

The application of 2% lignocaine with adrenaline in the nasal cavity before surgery significantly reduces intra-operative blood loss, with an overall efficacy of 75.7%. Further studies with larger sample sizes and comparative analysis with other vasoconstrictors are recommended.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-UOL-UCMD-24)

Consent for publication
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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

SM (Post Graduate Resident)
Manuscript drafting, Study Design,
BZ (Ent specialist)
Review of Literature, Data entry, Data analysis, and drafting article.
AF (Senior Registrar)
Conception of Study, Development of Research Methodology Design, Study Design, manuscript review, critical input.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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