

Brief communication (Original)

The efficacy of 4% lidocaine with 3% ephedrine used on nasal packs or as a nasal spray for pain relief in nasal endoscopy

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Background: Before nasal endoscopy, topical intranasal anesthetics and decongestant are usually used to relieve patients' pain and discomfort. Two methods of drug administration are usually performed, nasal packing vs. nasal spray.

Objective: We compared the efficacy of nasal packing vs. nasal spray with 4% lidocaine and 3% ephedrine in patients undergoing rigid nasal endoscopy in terms of pain, discomfort, clarity of view of lateral nasal anatomy and overall patient and examiner preference.

Methods: A single-blinded randomized controlled clinical trial was conducted in 86 adult patients undergoing rigid nasal endoscopy at the Outpatient Department of Otorhinolaryngology, Faculty of Medicine, Khon Kaen University, Thailand. Nasal cavities were randomly selected to receive nasal packing or nasal spraying before nasal endoscopic procedure. Outcomes were assessed for differences in pain, discomfort, clarity of nasal anatomy during nasal endoscopic procedures as well as patient and examiner preference.

Results: There were statistically and clinically significant differences between the nasal spray groups and nasal packing groups during drug administration in the number of patients who had less pain, 46 (56.1%) vs. 17 (20.7%), patients' pain score 2.36 vs. 3.20 and patient preference, 63.4% vs. 30.5%, respectively. During nasal endoscopic procedure, there were no clinically and statistically significant difference in the number of patients who had less pain, less discomfort, pain score and discomfort score. There was also no statistically and clinically significant difference for the choice of method of drug administrations for nasal endoscopic examination in the future. During nasal endoscopy, the endoscopist could see the middle meatus and superior meatus more clearly when nasal packing group had been performed and the endoscopist expressed a clear preference for nasal packing.

Conclusions: Nasal packing provided a clearer view of lateral nasal wall anatomy. This method of drug administration was preferred by the endoscopist. There were no clinically and statistically significance differences between both methods in terms of patients' overall preference.

Keywords: Ephedrine, lidocaine, nasal endoscopy, nasal packing, nasal spray

The examination of a nasal cavity and nasopharynx by a nasal endoscopy is an important and common procedure for diagnosis in otolaryngology. Currently, two methods of topical anesthetic/decongestant administration are used prior to nasal endoscopy in conscious patients. These are nasal packing and nasal sprays. Of the two methods, nasal spray is less time-consuming, easier to do and

more convenient. However, it might not relieve pain adequately because of the uncertainty of the duration of the contact of the nasal mucosa with the solution. In addition, patients might experience discomfort from the spray jet and nasal packing may relieve pain and congestion better. However, nasal packing consumes more time, needs more equipment, and might cause pain from the packing process.

There have been many studies comparing different local anesthetic drugs with or without topical decongestants [1-6]. However, there have been no studies comparing the two methods of nasal preparation. In this study, we compared the efficacy

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of nasal packing vs. nasal spray with 4% lidocaine and 3% ephedrine in patients underwent rigid nasal endoscopy in terms of pain, discomfort, the clarity of the view of the lateral nasal anatomy and overall preference.

Materials and methods

This was a randomized single-blinded controlled trial conducted at ENT Outpatient Department, Srinagarind Hospital, Faculty of Medicine, Khon Kaen University between February 2006 and September 2007. Fully conscious and cooperative adult patients (aged 15-65 years) with nasal, paranasal sinus or nasopharyngeal diseases who needed to be examined by rigid nasal endoscopy were studied. Patients were excluded if they had asymmetric nasal cavities, pain in paranasal sinuses or facial pain, if they had experienced heart diseases or hypertension, if they had received any analgesic medications in the previous six hours, or if they were allergic to lidocaine and/or ephedrine. Eligible patients, enrolled with written informed consent, had nasal preparation with 4% lidocaine mixed with 3% ephedrine by a doctor (ST) who would not carry out the nasal endoscopy. Patients were randomized using a computer program to decide which nasal cavity would be prepared by which method, and the codes of allocation were concealed in sealed opaque envelopes. This study was approved by the Khon Kaen University Ethics Committee for Human Research.

In each patient, one nasal cavity would be packed by cotton sized 1x1 cm which was soaked with mixed solution of 4% lidocaine and 3% ephedrine (1:1). To guide the nasal packing, we used a 4-mm 30-degree rigid nasal endoscope and placed at the nasal vestibule to visualize the nasal cavity. Then, the packing was introduced from posterior choana to the anterior nares. The other nasal cavity was sprayed at the upper and lower parts with a solution of 4% lidocaine and 3% ephedrine (1:1) via an atomizer (three puffs per each surface). After 10 minutes, nasal endoscopy was done by another doctor (PJ) who was blinded to the methods of drug administration. For the diagnostic nasal endoscopy process, we used a 4-mm 30-degree rigid nasal endoscope using a standard method of examining the nasal cavity including inspection of inferior meatus, nasopharynx, sphenoethmoidal recess, superior meatus and middle meatus.

Outcomes were assessed by the patients and the doctor who performed nasal endoscopy. The

patients were asked to choose the local anesthetic administration method they preferred both before and after doing the nasal endoscopy. In addition, they assessed pain and discomfort they experienced during the endoscopy using a visual analogue scale from 0 to 10 immediately after the examination of each nasal cavity. The patients were asked to choose which nasal cavity was more uncomfortable during the endoscopy. The examining doctor was asked to compare the quality of the view obtained in each nasal cavity and the anatomical structures they were able to identify, including middle meatus, superior meatus and sphenoethmoidal recess and nasopharynx more clearly. They were also asked to decide which the nasal cavity was easier to examine in clarity of view and patient comfort and cooperation.

The sample size was estimated based on a pilot study of 10 patients undergoing rigid nasal endoscopy. It was estimated to detect mean pain scores and standard errors of nasal packing and spray groups of 3.2 vs. 4.9, and 2.78 vs. 3.44, respectively, setting a type I error of 0.05 and type II error of 0.80.

Statistical analysis

The data were analyzed using descriptive statistics. Discrete data were interpreted into percentage and analyzed using McNemar's chi square test. Continuous data, such as visual analogue score, were assessed for normal distributed using the Shapiro-Wilk W test. If they were distributed normally, a t-test was used for paired data. If they were not distributed normally but the distribution between groups was similar, the Wilcoxon signed-rank test was used for the analysis.

Results

Eighty-six patients (32 males and 54 females, 45 in nasal packing group and 41 in nasal spray group) were enrolled in the study. The diseases or conditions of the patients that needed to be examined by endoscopy were rhinosinusitis with nasal polyps, rhinosinusitis without nasal polyps, nasopharyngeal cancer, epistaxis and other conditions as shown in **Table 1**. Four patients were removed from the study because they incorrectly filled in the questionnaires.

When we assessed pain during drug administration, the use of a nasal spray produced less subjective pain, a lower pain score. More patients expressed a preference for the use of the nasal spray rather than nasal packing (**Table 2**).

Table 1. Diagnoses of patients in the study.

Diseases	Number (%)
Sinusitis with nasal polyp	9 (10.5)
Sinusitis without nasal polyp	53 (61.6)
Nasopharyngeal cancer	12 (13.9)
Epistaxis	3 (3.5)
Others (dacryostenosis and allergic rhinitis)	9 (10.5)
Total	86 (100)

Table 2. Comparison of clinical variables between nasal packing and nasal spray preparation during drug administration.

	Number of method that patients felt less painful (%)	Patient pain score		Number of fondness of patients (%)
		Average	Standard deviation	
Packing	17 (20.7)	3.20	2.39	25 (30.5)
Spray	46 (56.1)	2.36	2.15	52 (63.4)
Same	19 (23.2)	NA	NA	5 (6.1)
Comparison of statistics between two methods				
95%CI	-53.94, -16.79	0.28, 1.40		-53.87, -11.98
P-value	0.0003	0.0036		0.0028

NA = not available

When we assessed pain during the nasal endoscopy procedure, there was no different evidence between the two methods (**Table 3**).

Clarify of view during nasal endoscopy in each area of nasal cavity between nasal packing and nasal spray preparation is compared in **Table 4**. Interestingly, the doctor who did nasal endoscopy procedure could see the anatomy of the middle meatus and superior meatus more clearly during the procedure

when the nasal cavity had been packed rather than sprayed. The area of sphenoethmoidal recess and nasopharynx was also seen more clearly by the examiner if the nasal cavity had been packed, but this difference was not statistically significance. The overall assessment showed that the examiner preferred nasal packing method compared with nasal spray method without statistically significance.

Table 3. Comparison of clinical variables between the use of nasal packing and nasal spray preparation during nasal endoscopy

	Pain			Discomfort		
	Less pain	Pain score		Less discomfort	Discomfort score	
	Number (%)	Average	SD	Number (%)	Average	SD
Packing	37 (45.1)	2.80	2.11	30 (36.6)	2.99	2.37
Spray	30 (36.6)	3.06	2.39	32 (39.0)	2.88	2.35
Same	15 (18.3)	NA	NA	20 (24.4)	NA	NA
Statistical comparison between methods						
95%CI	-12.16, 29.23	-0.86, 0.34		-0.22, 1.54	-0.45, 0.68	
P-value	0.464	0.391		0.899	0.688	

NA = not available

Table 4. Comparison of clarify of view during nasal endoscopy in each area of nasal cavity between nasal packing and nasal spray preparation

	Area of nasal cavity with clearer view			
	Middle meatus N (%)	Superior meatus N (%)	Sphenoethmoidal recess N (%)	Nasopharynx N (%)
Pack	49 (59.8)	35 (42.7)	29 (35.4)	34 (41.5)
Spray	23 (28.0)	17 (20.7)	21 (25.6)	21 (25.6)
Same	10 (12.2)	30 (36.6)	32 (39.0)	27 (32.90)
Comparison of statistics between two methods				
95%CI	11.40, 52.01	4.16, 39.74	-8.23, 27.74	-2.76, 34.46
P-value	0.0029	0.0175	0.322	0.105

Discussion

Nasal preparation before nasal endoscopy, with nasal packing or a nasal spray, is a common procedure. This study demonstrated that, from patients' view point, there was a slight preference for nasal spraying (45.1%) to nasal packing (42.7%) but this difference is not statistically significant. From the examiner's viewpoint, nasal packing was preferable, but this difference was not statistically significant. Nasal packing provided a clearer view of middle meatus, superior meatus, sphenoethmoidal recess and nasopharynx.

Local drugs widely used are cocaine and lidocaine. Since cocaine is a recreational drug, it is rarely used in Thailand. Currently, doctors usually use topical nasal anesthesia with decongestant by using either nasal packing or nasal spray. The common decongestants used are phenylephrine, adrenaline and ephedrine. Ephedrine helps decongest nasal mucosa significantly and help increase inspiratory flow through the nasal cavity. Lidocaine is a commonly used local anesthesia and doctors usually use 4% and 5% concentration of lidocaine. In our study, we used 4% lidocaine with 3% ephedrine for nasal preparation. Previously, there have been no studies comparing these two methods. The previous studies compared the medications that were used in nasal preparation prior to flexible nasal endoscopy [2-5, 7-10]. There has been only one study of nasal preparation prior to rigid nasal endoscopy by Douglas et al. [1]. They compared the effectiveness of co-phenylcaine to 5% lignocaine. The study showed that with co-phenylcaine the doctor could see the anatomy of nasal cavities more clearly.

Nasal spray for local anesthetics with or without decongestant has been widely used in ENT clinical practice [11-15]. Our study showed that during nasal endoscopy, nasal packing could prevent pain and

discomfort slightly more effectively than the use of a nasal spray. However, although there was no statistically significant difference between each method, the examiner preferred nasal packing.

It has been shown that multi-use of Venturi nasal atomizer can transmit bacteria from nasal vestibules to the tip of atomizer, nozzle and into the reservoir of the atomizer by the effect of back-flow of fluid into atomizer [12-15]. Previous studies did not recommend the use of multi-use of Venturi nasal atomizer [15].

In conclusion, nasal packing with cottonoids soaked in topical anesthetic with decongestant should be performed before endoscopy compared with nasal spray using atomizer.

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