CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.2539356

Available online at: http://www.iajps.com *Research Article*

RHINOMANOMETRIC ASSESSMENT OF NASAL AIRFLOW IN DEVIATED NASAL SEPTOPLASTY AND COBLATION TURBINATE REDUCTION

[1]Thuy Phan Chung Tran, [2]Nhung Hoang Hanh Thai

[1]Ear-Nose-Throat Hospital, Ho Chi Minh City 700000, Vietnam., [2]School of Medicine, Vietnam National University Ho Chi Minh City, Ho Chi Minh City 700000, Vietnam.

Abstarct:

Introduction: *The Nasal airflow resistance had 3 components: nasal vestibules, valves and turbinates. Nasal valves composed of a part of nasal septum. The turbinates, especially inferior turbinate, covered by mucous surface with an expansive capacity can increase or reduce the volume, this comprise of the nasal resistance. Therefore, nasal septum and inferior turbinate hypertrophy affect the nasal patency and increase nasal resistance of patients with nasal congestion.*

Objective: *The present study was carried out to study rhinomanometrically the nasal air flow in cases of deviated nasal septum belong with inferior turbinate hypertrophy and to compare rhinomanometric improvement following surgery of nasal septoplasty and coblation inferior turbinate reduction.*

Methods: *Descriptive cross-sectional study from January 2017 to September 2017 at ENT Hospital of HCM City. The study included 42 patients who were performed nasal septoplasty and coblation inferior turbinate reduction. The patientswere interviewed and noted down for SNOT-22 questionnaire. Preoperative and postoperative assessment of nasal air flow were also performed by rhinomanometry.*

Results: *42 patients including 31males and 11 females, mean age was 33,56±11,59.*

Preoperative assessment: TheSNOT-22meanscorewas 6,38± 3,10. Nasal air flow value was 461,17± 110,84cm3/s. Nasal air flow resistance value was 0,35± 0,07Pa/cm3/s.

Post-operative assessment: The SNOT-22 mean score was 1,78±1,66 Nasal air flow value was 977,26± 155,84cm3/s. Nasal air flow resistance value 0,16± 0,03Pa/cm3/s.

Nasal air flow and nasal resistance improve 2,12 and 2,18 times, respectively.

Conclusion: *Rhinomanometry is a objective, reliable and useful method to evaluate preoperative and post-operative nasal obstruction condition of patients. It should be used as a routine assessment in patients who are selected for operation.*

Keywords: *Rhinomanometric, Assessment, Nasal Airflow, Deviated Nasal Septoplasty, Coblation Turbinate Reduction.*

Corresponding author:

Thuy Phan Chung Tran,

Ear-Nose-Throat Hospital, Ho Chi Minh City 700000, Vietnam.

QR code

Please cite this article in press Thuy Phan Chung Tran et al., ***Rhinomanometric Assessment of Nasal Airflow In Deviated Nasal Septoplasty And Coblation Turbinate Reduction.,*** *Indo Am. J. P. Sci, 2019; 06(01).*

INTRODUCTION:

The Nasal septum may has the deviation of bone: cartilage or both. Because of the unbalanced development of nasal septal cartilages and bones, the palatine crest and nasal septum did not merged together [1, 2]. Trauma can be happened when children were born. The nose which is the most prominent structure of the face is easily deformed. Other causes are falling, accidents. Inferior turbinate hypertrophy: Bone and mucous membrane hypertrophy [3]. Local cause: Contacting polluted air, chemicals, wet cold weather and nasal septum deviation. Systemic cause: Allergy, Endocrine disruption [4, 5]. The Nasal airflow resistance had 3 components: nasal vestibules, valves and turbinates. Nasal valves composed of a part of nasal septum. The turbinates, especially inferior turbinate, covered by mucous surface with an expansive capacity can increase or reduce the volume , this comprise of the nasal resistance.Therefore, nasal septum and inferior turbinate hypertrophy affect the nasal patency and increase nasal resistance of patients with nasal congestion [6, 7].

Rhinomanometry may be performed by active or passive techniques. In active Rhinomanometry, the air flow and pressure are measured during spontaneous breathing. In passive Rhinomanometry, a fixed amount of air is blown through one or both nostrils via an external nozzle, while the subject is holding his/her breath and the amount of pressure needed is measured. Passive Rhinomanometry is rarely used because it caused the hypertrophy of nasal mucous membrane [8, 9]. Active Rhinomanometry may be performed with anterior or posterior approaches depending on the position of the sensor.

PURPOSE:

The purpose of our study is to assessing subjectively and objectively (rhinomanometry) the outcome of nasal septoplasty with inferior turbinate reduction. The results of this study will help in assessing the improvement of patients and provide information on further studies.

AIMS AND OBJECTIVES:

To evaluate rhinomanometry improvement following surgery nasal septoplasty and coblation inferior turbinate reduction.

To study whether rhinomanometry is useful in better case selection in the decision concerning operation.

STUDY DESIGN:

It was descriptive cross-sectional study. The study was carried out to study the nasal airflow by rhinomanometrically in cases of deviated nasal septum and Inferior turbinate hypertrophy to compare rhinomanometric improvement following surgery. This study was carried out in ENT Hospital of HCM City from January 2017 to September 2017. The study included all patients who were performed nasal septoplasty and coblation inferior turbinate reduction. The patientswere interviewed and noted down for SNOT-22 questionnaire. Preoperative and postoperative assessment of nasal air flow were also performedby rhinomanometry. Research population: ≥ 16 years old patients with diagnosis of nasal septal deviation and inferior turbinate hypertrophy were surgically treated at ENT Hospital HCMC from January 2017 to July 2017.

Sample size: $n = 1.96^2 \times \frac{0.87\times(1-0.87)}{0.1^2} \approx 43$

Based on the ratio of patients who improved nasal congestion after nasal septoplasty and turbinal reduction in the study of Buckland J.R et al in Sampling method.

Selection criteria

Age ≥ 16. Complaint of persistent nasal obstruction which is not responding to medical treatment.

Nasal septal deviation and inferior turbinate hypertrophy

No other lesion which can cause nasal obstruction.

Had nasal septalplasty and coblation turbinate reduction

Exclusion criteria

Comorbid local lesions: acute and chronic rhinosinusitis, nasal polyposis, nasal tumors, nasal valve diseases.

Data collection and analysis

Sources: Patient records, Patient information form

Data analysis: using software SPSS 23

Results are displayed as mean ± standard deviation (quantiative variables), or frequency and percent (quality variables)

Research progress

Taking history

Assessing symptoms before and 1-month after surgery with questionaire SNOT-22 .

Evaluation with rigid nasal endoscopy

Evaluating types of nasal deviation and inferior turbinate hypertrophy.

Rhinomanometry before and 1-montn after surgery, with 2 times before and after applying local decongestant Naphazoline 0.05% in 5 minutes.

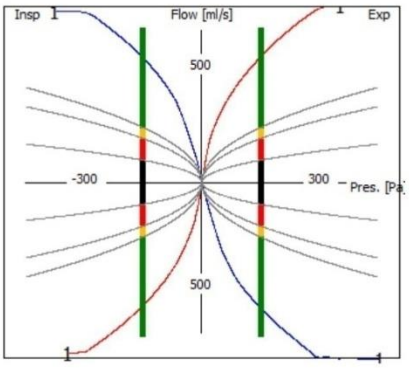
+Step by step of measuring

Explaining the measurement and instructing the patient to sit comfortably in a straight-backed office chair because the patient's cooperation will affect the success of this measurement .In sitting position, one of patient's nostril is sealed with nasal Olive connecting with the pressure tube, the other nostril

sealed off with a tube connecting to the machine. Try not to press the nose which may causes nose deformity. This can be prevented by choosing Olive sizes fitting well with patients' noses.

RESULTS – DISCUSSION:

Name NGUYEN THI TIEN,
d.o.B. 1/1/1965
Pat.Nr. 16051701
Examiner : AB Date : 5/16/2017 3:35:00 PM (Olive)



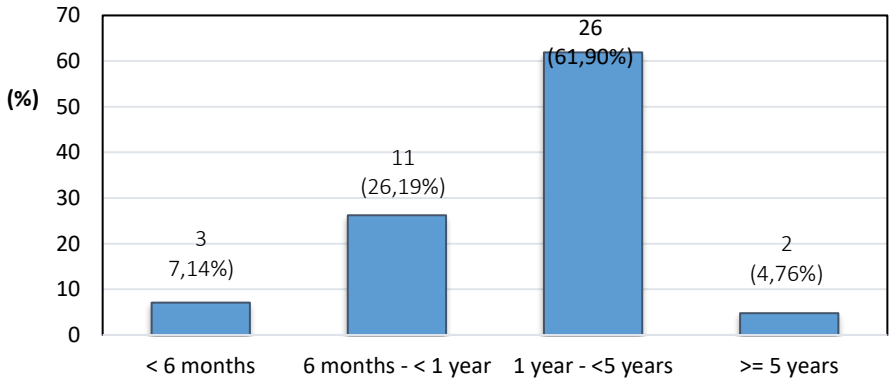
	Inspiration			Expiration			Unit
Pres.	75	150	300	75	150	300	Pa
Fl. L	398	570	774	400	576	800	ml/s
Fl. R	400	564	771	405	573	792	ml/s
Fl. L+R	798	1134	1545	805	1149	1592	ml/s
Fl. L/R	1.00	1.01	1.00	0.99	1.01	1.01	
Fl. L-R	-2.0	6.0	3.0	-5.0	3.0	8.0	ml/s
Fl. inc L	43	36		44	39		%
Fl. inc R	41	37		41	38		%
Fl.L/(R+L)	50	50	50	50	50	50	%
Fl.R/(R+L)	50	50	50	50	50	50	%
Res L	0.64	0.89	1.31	0.63	0.88	1.26	
Res R	0.63	0.90	1.31	0.62	0.88	1.28	

Total Obst. 1 :

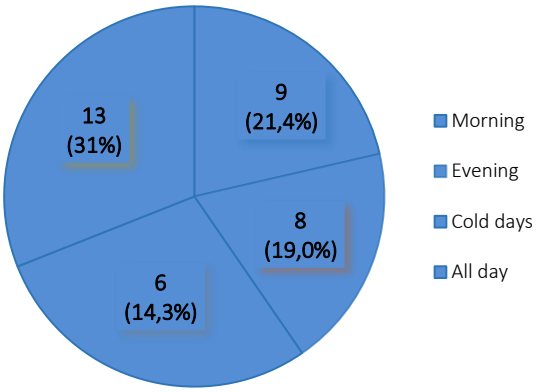
Preoperative assessment

42 patients including 31males and 11 females, mean age was 33,56±11,59.

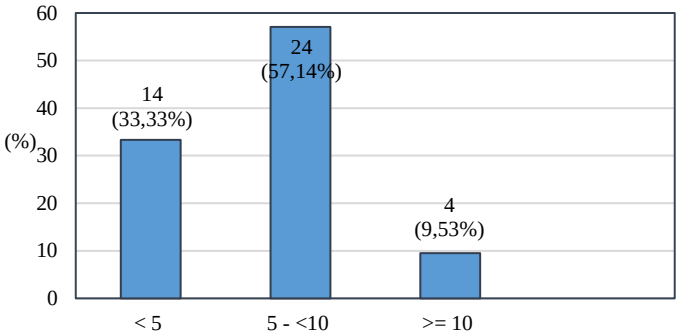
Time of nasal congestion



Mean: 24 months
Range: 2 – 60 months
Preoperative assessment
Time of nasal congestion

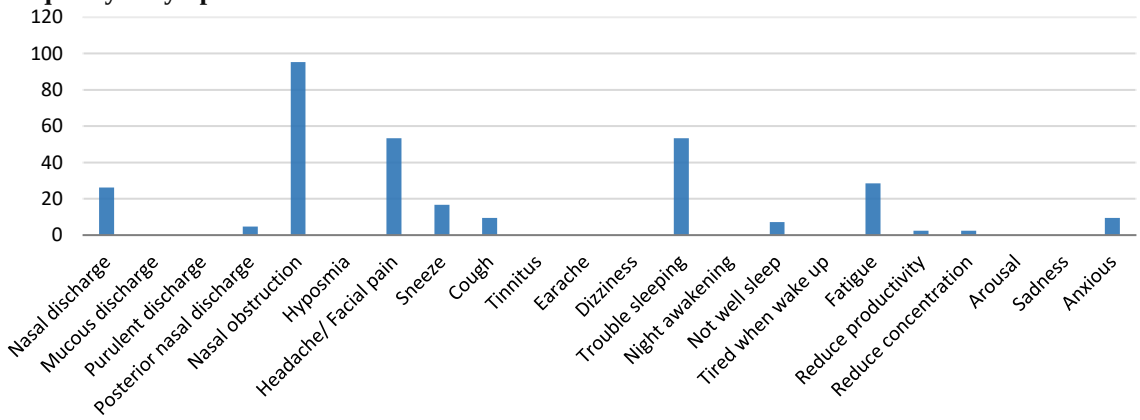


SNOT-22 score



Mean score: 6,38
Range of scores : 2 – 15

Frequency of symptoms



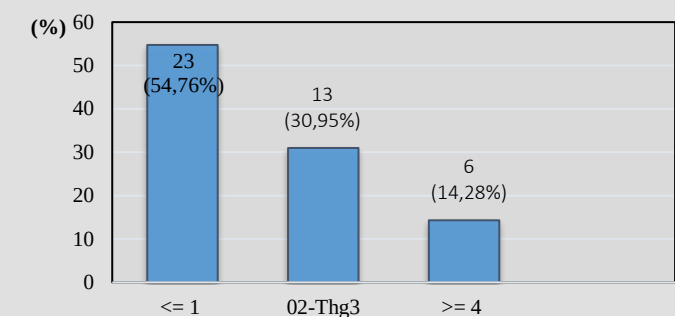
The 3 most common symptoms

Study	**Symptoms**		
	Nasal obstruction	**Headache/ Facial pain**	**Nasal discharge**
J.R. Buckland (2003)	72,5%	7,5%	20%
K.K. Pannu (2009)	80%	12,5%	32,5%
N.N Ha (2017)	88,10%	30,95%	35,71%
Our study	**95,24%**	**53,38%**	**26,19%**

Types of nasal septum deviation

Side	Types of nasal septum deviation				
	C shape	S shape	Spur	Crest	Total (n=42)
Right	7 28%	1 50%	2 100%	6 46,2%	**16** **38,1%**
Left	18 72%	1 50%	0 0%	7 53,8%	**26** **61,9%**

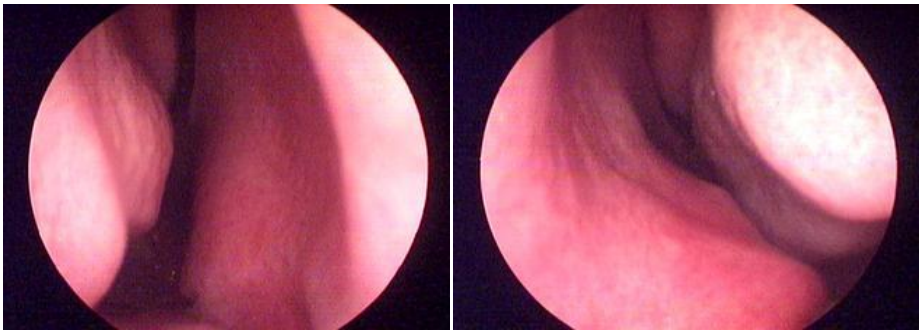
Postoperative assessment
SNOT-22 scores



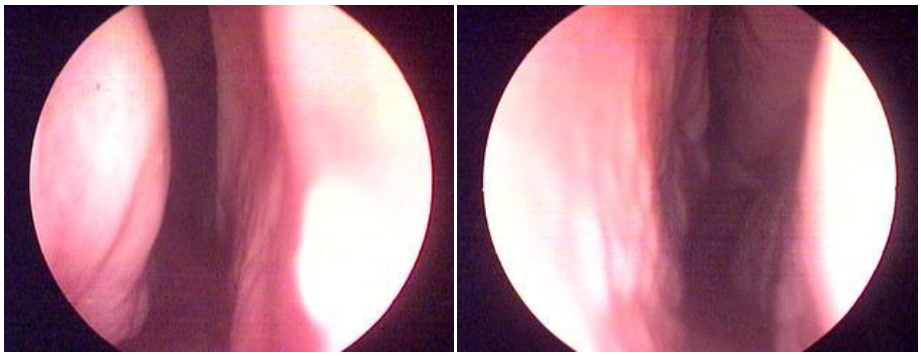
Mean score : 1,78
Range of score: 0 – 6
27 patients (64,29%) has SNOT-22 score decreased postoperatively.
11 patients (26,19%) has postoperative SNOT-22 score 0.
1 patient (2,38%) has SNOT-22 score unchanged postoperatively.
patient increases SNOT-22 score postoperatively.

Compere SNOT-22 scores

Study	n	Preoperative	Postoperative
J.R. Buckland (2003)	40	3,9	1,2
K.K. Pannu (2009)	60	3,42	1,3
H.S. Statish (2013)	70	3,3	1,1
Our study	42	3,25	1,25



Pre-operative nasal endoscopy



Post-operative nasal endoscopy

Characteristics of rhinomanometry

	Preoperative	**Postoperative**	**P**	**% Improve**
FL.150L	221,93 ± 40,62	482,71 ± 76,67	<0,001	54%
FL.150R	240,12 ± 43,30	494,55 ± 82,45	<0,001	51,47%
Total FL.150	**461,17 ± 110,84**	**977,26 ± 155,84**	<0,05	52,81%
RES.150L	0,70 ± 0,14	0,32 ± 0,06	<0,001	54,26%
RES.150F	0,69 ± 0,15	0,31 ± 0,06	<0,001	55,07%
Total RES.150	**0,35 ± 0,07**	**0,16 ± 0,03**	<0,001	54,29%

CONCLUSION:

Nasal air flow and nasal resistance improve 2, 12 and 2, 18 times, respectively. Rhinomanometry is an objective, reliable and useful method to evaluate preoperative and post-operative nasal obstruction condition of patients. It should be used as a routine assessment in patients who are selected for operation. 42 patients including 31males and 11 females, mean age was 33, 56±11, 59. Preoperative assessment: TheSNOT-22meanscorewas 6,38± 3,10.Nasal air flow value was 461,17± 110,84cm3/s. Nasal air flow resistance value was 0,35± 0,07Pa/cm3/s. Post-operative assessment: The SNOT-22 mean score was 1,78±1,66 Nasal air flow value was 977,26± 155,84cm3/s. Nasal air flow resistance value 0,16± 0,03Pa/cm3/s.

PREOPERATIVE:

SNOT-22: 6, 38 ± 3,10.
Nasal airflow: 461,17 ± 110,84 cm^3/second
Nasal air resistance: 0, 35 ± 0, 07 Pa/cm^3/second

Postoperative:

SNOT-22: 1, 78 ± 1, 66
Nasal airflow: 977, 26 ± 155, 84 cm^3/second
Nasal air resistance: 0, 16 ± 0,03Pa/cm^3/second
Nasal airflow increases 2, 12 times
Nasal air resistance decreases 2, 18 times.
Total result: Nasal patency of patients nearly return normal.

Usual methods of nasal examination, Rhinomanometry in association with clinical evaluation, is an important tool in proper selection of patients for surgery and evaluate the post-operative result.

REFERENCE:

1. Buckland J. R., Thomas S., Harries P. G. (2003), "Can the Sino-nasal Outcome Test (SNOT-22) be used as a reliable outcome measure for successful septal surgery?", Clin Otolaryngol Allied Sci, 28 (1), pp. 43-7.
2. H.S.Satish, K.T.Sreedhar (2013), "Septoplasty Outcome Using Snot-22 Questionnaire study".
3. Merkle J., Kohlhas L., Zadoyan G., et al.

(2014), "Rhinomanometric reference intervals for normal total nasal airflow resistance", Rhinology, 52 (4), pp. 292-9.

4. Pannu K. K., Chadha S., Kaur I. P. (2009), "Evaluation of benefits of nasal septal surgery on nasal symptoms and general health", Indian J Otolaryngol Head Neck Surg, 61 (1), pp. 59-65.
5. Shah, Saeeda. "'We are equals'; datum or delusion: perceptions of Muslim women academics in three Malaysian universities." *British Journal of Sociology of Education* 39.3 (2018): 299-315.
6. Wang, T., et al. "Association between subjective nasal patency and airflow characteristics of nasal cavity on nasal septum deviation." *Lin chuang er bi yan hou tou jing wai ke za zhi= Journal of clinical otorhinolaryngology, head, and neck surgery*32.20 (2018): 1557-1562.
7. Tran, Thuy Phan Chung. "Rhinomanometric Assessment of Nasal Airflow in Deviated Nasal Septoplasty and Coblation Turbinate Reduction." *International Journal of Medical Research & Health Sciences* 7.11 (2018): 160-165.
8. Sudheer, C. P., and T. Dinesh Singh. "Evaluation of rhinomanometrical and clinicoradiological differences of nasal airflow in deviated nasal septum." *International Journal of Medical Science and Public Health* 7.1 (2018): 15-19.
9. Nomura, Tsutomu, et al. "Effects of nasal septum perforation repair on nasal airflow: An analysis using computational fluid dynamics on preoperative and postoperative three-dimensional models." *Auris Nasus Larynx* 45.5 (2018): 1020-1026.