

RADIOFREQUENCY TURBINATE REDUCTION IMPROVE QUALITY OF LIFE TURBINATE HYPERTROPHY PATIENTS

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Abstract

Turbinate Hypertrophy decreases quality of life due to nasal obstructions symptom. Radiofrequency turbinate reduction is minimal invasive surgical that expected to maintain nasal function. The surgical procedure compromises the improvement of patients' quality of life. There is no current consensus the difference quality of life before and after the procedure. Cross-sectional design was done in 31 turbinate hypertrophy patients with radiofrequency turbinate reduction. Before and after the procedure, patient's quality of life was assessed using a sinonasal outcome test-22 (SNOT-22) questionnaire parameters. Questionnaire SNOT-22 scores before and after the procedure was analyzed by t-dependent test. Patients characteristic was 20-39 years old age, employed, has past allergic rhinitis. Mean of SNOT-22 total score before procedure was $60.35 \pm 7,264$ and the mean postoperative total score was $10.19 \pm 3,103$. There were significant differences between quality of life before and after radiofrequency turbinate reduction ($p < 0.0001$). The better improvement symptom are nasal-throat symptom (4-79 %), head, ear and face symptom (2,6-6,4%), diminish sleep disturbance (58,6-71,6%), disturbance activity reduce 57,4-72,8%, and physiological stress reduce 2-25,8%. Radiofrequency turbinate reduction improve the quality of life turbinate hypertrophy patients

Keywords : Turbinate hypertrophy, Turbinate reduction radiofrequency, SNOT-22

INTRODUCTION

Turbinate hypertrophy is an enlargement of nasal turbinate mucosa. Most of hypertrophy which caused nasal blockage symptom located at inferior turbinate. Research in Brazil, from the sample, 65,2% men and 34,8 % women have turbinate hypertrophy. Turbinate hypertrophy is a high concentration at age 10-40 years. The most Etiologic factors is rhinitis allergy (79,6%). Turbinate hypertrophy also associated with the air quality. Approximately about 50 % population have persistent turbinate dysfunction and 20 % because of turbinate hypertrophy. About 5,6 % outpatient in the Adhiatma Semarang Hospital have turbinate hypertrophy. Predisposing factor of turbinate hypertrophy are history of rhinitis allergy, vasomotor rhinitis, anatomic abnormality of nasal structure like septal deviation. Factor which aggravates hypertrophy are air pollution, high humidity and temperature, and other nasal irritant. Some case because of nasal decongestant overuses. The chief complaint of turbinate hypertrophy is nasal obstruction. Chronic nasal obstruction will decrease the quality of life due to local symptom like chronic obstruction, headache, thick mucous, a decrease of smelling and sleep disturbance. All that complaint could disrupt daily activity and decrease occupational productivity.6

Treatment of this complaints are removing possible irritant factors, give some steroid spray if there is any inflammatory condition. However if the enlargement because of bony structure or anatomical abnormality, surgery or reconstruction will be required. Turbinoplasty or turbinate reduction procedure could be performed with rhinoplasty and septoplasty. Another common procedure is Radiofrequency turbinate reduction. Radiofrequency procedure is heating the mucosal turbinate with special electrical device. Heating the mucosa will make scarred of mucousal tissue and reduce the size of turbinate. Radiofrequency technique are less invasive and has good outcome.

One of success parameters of procedure is the increasing of patient quality of life after surgery. SNOT-22 is one of questionnaire to assess quality of life after sinonasal procedure.

SNOT-22 will assess the nose-throat symptom, ear-face, head symptom, sleep disturbance, activity disturbance, and psychological disturbance.

There is no current consensus about the different quality of life before and after the procedure. This research will assess the difference of quality of life before and after radiofrequency turbinate reduction among the turbinate hypertrophy patients

RESEARCH METHODS

Cross-sectional design was done to patient who had undergone radiofrequency turbinate reduction . Sampling technique was total sampling, patients who met inclusion criteria (age > 18 years old, has turbinate hypertrophy and had undergone radiofrequency turbinate reduction at least 2 month ago). Patients with other procedure which combined with radiofrequency has been excluded from the sample. Patient with nasal anatomic abnormality, had systemic disease, had a history of antipsychotic, antihypertensive usage also had been excluded from the sample.

About 31 respondents were given questionnaire about quality of life related to nasal symptom, according the SNOT-22. Patients have been assessed all symptom suitable with questionnaire SNOT-22 before and after the radiofrequency procedure at one time examination. Sampling was done at least 2 months after the procedure , patients Quality of life scores based on SNOT-22 before and after the radiofrequency procedure was analyzed by t-dependent test.

RESULTS

Most of the patients are at age 20-29 and 30-39 years old (58 %). Female more frequently than male patients (54,8%). Most of respondents are employed (51%). Most of the respondents have past rhinitis allergy history (64,5%) and no respondent has past vasomotor rhinitis. Several symptoms, according SNOT-22 are nasal, ear throat symptom, face symptom, sleep disturbance symptom, activity disturbance symptom and psychological symptom.

Table 1. Patients Characteristic

Characteristic	n	(%)
Age(years)		
<20	6	19,4
20-29	9	29,0
30-39	9	29,0
40-49	6	19,0
50-59	1	3,2
Sex		
Male	14	45,2
Female	17	54,8
Occupations		
Dentist	1	3,2
Teacher	1	3,2
Housewife	4	12,9
Employee	16	51,6
Student	5	16,1
Police	1	3,2
Entrepreneur	3	9,7
Rhinitis allergy history		
Yes	11	35,5
No	20	64,5

Vasomotor rhinitis history

No 31 100,0

The most symptom complaint by patients is nose - throat symptoms. Before the procedure patients need to blow up the nose (score : 3,77) and complain some nasal obstruction (score : 5). Other symptom are sneezing (4,65), runny nose (4,48) and decrease of smelling (4,42). After the radiofrequency procedure there are better improvement on nose and throat symptom. Sneezing symptom scores become 2,26 and runny nose scores become 1,26. The best improvement is nasal obstruction which score become 1,03. Need to blow up the nose score decrease 1,16. Dizziness score from 4,42 become 1,16. The procedure also improves the quality of sleep. Difficulty of falling sleep, wake at sleep, wake up tired reduce 58,6 % until 71,8 %. Better sleep increase productivity 72 %, increase

concentration 63 %. Patient also not feel fatigued all the day 54,7%. The psychological impact outcome of the procedure is decreasing the psychological stress like sadness, stress and embarrassment. Total difference score before and after radiofrequency was 82,99%. The total difference score was proven the improvement quality of life. Hence the Minimal clinically important difference (MCID) is 50,16%, so the difference 82.99 % have more important significance at clinical outcome.

In conclusion, Radiofrequency turbinate reduction significantly increases quality of life turbinate hypertrophy patients based on SNOT-22 questionnaire (p:0,0001).

Table 2. Parameter Symptoms According SNOT-22

Variable	Mean Pre operative score	Mean Post operative score	Diference of score (%)	Significance	
Nose and throat symptom					
(1) Need to blow nose	3,77 ± 0,762	1,16 ± 0,523	52,2	P<0,0001*	
(2) Sneezing	4,65 ± 0,798	2,06 ± 0,629	51,8		
(3) Runy nose	4,48 ± 0,677	1,32 ± 0,541	63,2		
(4) Cough	2,26 ± 1,123	0,55 ± 0,506	34,2		
(5) Post nasal discharge	2,81 ± 1,276	0,45 ± 0,624	47,2		
(6) Thick nasal discharge	0,29 ± 1,039	0,03 ± 0,180	5,2		
(21) decrease sense of smeelings	4,42 ± 0,923	0,50 ± 0,624	78,4		
	5,00 ± 0,000		79,4		
(22) nasal blockage	0,000	1,03± 0,752			
Head, face, ear symptom					
(7) Full of ear sensation	0,48 ± 1,208	0,10 ± 0,539	7,6		
(8) Dizziness	4,42 ± 0,765	1,19 ± 0,749	64,6		
(9) Ear pains	0,26 ± 1,032	0,13 ± 0,499	2,6		
(10) Face pains	0,42 ± 1,177	0,00 ± 0,000	8,4		
Sleep disturbances					
(11) Dificulty falling a sleep	3,77 ± 1,055	0,19 ± 0,402	71,6		
(12) Wake up at night	3,55 ± 0,925	0,19± 0,402	67,2		
	3,48 ± 0,890		67		
(13) Lack of night sleep	0,890	0,13 ± 0,341			
(14) Wake up tired	3,03 ± 1,303	0,10 ± 0,301	58,6		
Disruption of activity					
(15) fatigue	3,13 ± 0,922	0,26 ± 0,445	57,4		
(16) Decrease of productivity	4,19 ± 1,046	0,55 ± 0,624	72,8		
(17) Reduce concentration	3,42 ± 0,672	0,26± 0,445	63,2		

Psicological Disturbance

(18) Frustrated/restless/irritable	1,23 ± 1,586	0,06± 0,250	23,4
(19) Sad	1,32 ± 1,536	0,03± 0,180	25,8
(20) Embarrassed	0,10 ± 0,539	0,00± 0,000	2
	60,35 ±		82,99
Total score difference	7,264	10,19 ± 3,103	

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DISCUSSION

Based on the result, women more subseptible to turbinate hypertrophy because of hormonal effect. Progesterone tends to enlarge and congest the turbinate mucosa. Pregnancy and menstrual cycle also make turbinate mucosal hypertrophy.⁹

Adult 20-29 and 30-39 years more vulnerable to turbinate hypertrophy because this segment are productive age and more exposed with irritant or polutant.¹⁰ Most of patients are factory employee. Some industrial pollutant can affect the turbinate mucosal and make some mucosal inflammation. Most patients has past rhinitis allergy.

Rhinitis allergy makes chronic inflammation to nose mucosal especially at turbinate area.¹¹

This result suitable with recent studies that inferior turbinate hypertrophy were affected from daily habits and daily activity at home or at work environment. Other research mentioned that rhinitis allergy increase recurrence of turbinate hypertrophy higher than normal people.²

Before the procedure, five symptom according SNOT-22 questionnaire are nasal obstruction, need to blow up, sneezing, runny nose, decrease sensation of smelling. After procedure there are better improvement in sneezing, runny nose, need to blow nose, dizziness, and nasal obstruction. Other research resulted that radiofrequency turbinate reduction gives long term good satisfaction, less pain and low complication regarding this procedure.¹² After operative procedure they feel better improvement in nasal stuffiness, nasal obstruction and mouth breathing.¹³ In two years some patients has relapsed experience especially rhinitis allergic patient. According NOSE scoring, there were no significantly different between radiofrequency turbinate reduction and septoplasty or turbinectomy in efficacy or post operative outcome. The radiofrequency turbinate reduction has less complication, less of cost and hospitalization. Based on this fact, radiofrequency turbinate reduction should be considered as initial therapy for inferior turbinate hypertrophy.¹⁴ Radiofrequency turbinate reduction appeared long term improvement in olfaction, nasal resistance and subjective benefit in allergic and non allergic patient.^{12, 15}

Objective outcome of the procedure could be evaluated with acoustic manometri, rhinomanometry, and mucous ciliary transport time.

Radiofrequency turbinate reduction on chronic rhinitis and inferior turbinate hypertrophy patient will increase peak flow nasal inspiration, inferior turbinate grading and nasal symptom according visual analog scale, although result of smell ability test after procedure could vary.¹⁶ This procedure significantly improves the role limitations, overall health, sleep, emotions, physical function and social function of patients.¹⁷

The mechanism of radiofrequency treatment is creating scar at inferior submucosa, obliterate small vessels under the mucosa, partially destroy the goblet which provides the mucous, and inhibit local immune response. This process can reduce the hypertrophy of turbinate. Reduction of turbinate could decrease nasal, ear, face throat symptoms so it can increase quality of sleep and daily activity. The improvement of sleep quality can reduce the psychological and physical stress. Better sleep quality also can reduce the fatigue, so it will increase the productivity of employees. Reducing of nose, ear, face, throat symptoms also can reduce stress and embarrassing among the patients.¹⁹

The limitations of this research, because of cross-sectional design, pre and post operative questionnaire was examined at the same time so it can make recall bias among the subject. Subject only compare their subjective complaints before and after the procedure, without measuring the objective sign and symptom based on SNOT-22 parameters.

For further research, Quasi experimental design more suitable for this research. Quasi experimental procedure can control the standard of treatment and control the other variable. Quasi experimental design also can avoid the recall bias. Parameter based on SNOT-22 should be crossed

check with objective measurements. For example, nasal obstructions could be examined with specific device like rhinomanometry. The grade of the reduction of turbinate before and after the procedure should be evaluated with Visual analog scale (VAS). After grading the turbinate, we should do the acoustic rhinometry, rhinomanometry to determine the grade of nasal and ear obstruction. Mucousal ciliary testing also should be performed to examine the mucousal activity due to turbinate hypertrophy. 20

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REFERENCE

1. Former SEJ, Eccles R. Chronic inferior turbinate enlargement and implications for surgical intervention. *rhinology*, 2006. 44 (4): 234-8
2. Cury SE, Cury MD, Adrale E, Giosefi C, Cury R. The incidence of inferior turbinate hypertrophy in Brazilian population. *webmedcentral rhinology* 2013;4(6):1-10
3. Meyers AD, Archer SM. Turbinate dysfunction. *medscape*. 2016. available at <http://emedicine.medscape.com>
4. Medical Records Divisions of Adhiatma Hospital Semarang. Prevalence of inferior turbinate hypertrophy in Adhiatma Hospital in 2015 . Semarang, 2015
5. Jourdy D. Inferior turbinate reduction. *j otol*, 2014. 25 (2): 160-70
6. Lippert B, Wener T. Treatment of the hypertrophic inferior turbinate. *Rhinology*. 1997 Mar;35(1):33-6.
7. Saulescu M, Sarafoleanu D. Surgery for nasal obstruction in inferior turbinate hypertrophy. *romanian j rhinology*. 2015; 5(17): 25-30
8. Satish HS, Sreedhar KT. Septoplasty outcome using snot-22 questionnaire study. *iosr-jdms*, 2013. 6(5): 34-8
9. Naclerio RM, Bachert C, Baraniuk JN. Pathophysiology of nasal congestion. *international j general medicine*. 2010;(3): 47-57
10. Alhelo S and Shanoon A. The effectiveness and safety of radiofrequency in the management of nasal obstruction secondary to inferior turbinate hypertrophy. *int j multidiscip and curr*. 2016; (4):897-901
11. Morales M, Osuna A, Navarrete F, Lopez H, Medina G. Morphological features of the nasal mucosa in healthy children exposed to different concentrations of atmospheric pollution. *Revista allergia*. 1998, 45(1):22-6
12. Banhiran W, Tantilipikorn P, Methetrairut C, Assanasen P, Bunnag C. Quality of life in patients with chronic rhinitis after radiofrequency inferior turbinate reduction. *j med assoc thai*. 2010; 93 (8):950-65
13. Harril WCL, Pillsbury HC, Mcguirt FW, Stewart M . Radiofrequency turbinate reduction: a nose evaluation. *laryngoscope*. 2007 ;(117): .1912-19
14. Cavaliere M, Mottola G, Iemma M. Comparison of the effectiveness and safety of radiofrequency turbinoplasty and traditional surgical technique in treatment of inferior turbinate hypertrophy. *otolaryngol head neck surg*, 2005. 133(6): 972-8
15. Bhandarkar ND, Smith TL. Outcomes of surgery for inferior turbinate hypertrophy. *curr opin otolaryngol head neck surg*. 2010. 18 (1): 49-53
16. Passalli GC, Poscia A, De- waure C, Paludetti G, Galli J. Radiofrequency volumetric inferior turbinate reduction: long-term clinical results. *acta otorhinolaryngologica italica* 2016;36:199-205
17. Haries PG, Thomas S, Buckland JS. Can the sino-nasal outcome test (snot-22) be used as a reliable outcome measure for successful septal surgery? *clin otolaryngol*. 2003; 28(1):1-7
18. Garzaro M, Landolfo V, Pezzoli M, Defilippi S, Campisi P, Giordano C, Pecorari G. Radiofrequency volume turbinate reduction versus partial turbinectomy: clinical and histological features. *am j rhinol allergy*, 2012. 26(4): 321-5
19. Hopskin C, Gillett S, Slack R. Psychometric validity of the 22-items sinonasal outcome test. *otolaryngol*, 2009. 34: 447-54
20. National Institute for Health and Care Excellence. interventional procedure overview of radiofrequency tissue reduction for turbinate hypertrophy. *Ipg495*. 2013; 201(2): 1-3