

Quality of Life in Patients with Chronic Rhinitis after Radiofrequency Ablation of Inferior Turbinate

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Background: Radiofrequency ablation of inferior turbinate (RFAIT) to treat chronic rhinitis (CR) is one of the most effective and safe surgical methods. However, there is no study on the quality of life (QOL) of patients with CR after radiofrequency. Therefore, the author conducted the present research.

Objective: To study the QOL in patients with CR after treatment with RFAIT.

Materials and Methods: The present study was a prospective study that enrolled 56 patients between August 2021 and December 2022. RFAIT was applied on both sides. The patients were given Rhinoconjunctivitis quality of life questionnaires (Rcq-36) and Subjective nasal symptoms questionnaires (Snsq) to compare the results before and twelve weeks after treatment.

Results: The QOL after the twelfth weeks of treatment showed significant improvement in all dimensions ($p < 0.001$). Specifically, score for nasal congestion and runny nose decreased from 4.29 ± 0.73 and 3.32 ± 0.64 to 1.88 ± 0.69 and 1.91 ± 0.58 , respectively ($p < 0.001$). There were no complications in all the patients.

Conclusion: RFAIT can improve QOL and nasal symptoms of CR patients. RFAIT is an outpatient procedure with no complication, thus, it will be a good alternative treatment for CR.

Keywords: Chronic rhinitis; Quality of life; Radiofrequency ablation of inferior turbinate

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Chronic rhinitis (CR) is caused by inflammation of the nasal mucosa. The most common presenting symptom of CR is nasal obstruction from inferior turbinate hypertrophy (ITH). Although medical treatments such as intranasal corticosteroid, antihistamines, and decongestants are frequently effective to restore comfortable nasal breathing, nasal obstruction is sometimes only slightly improved. Surgical treatment may play a role when medical treatment fails. The goal of the surgery is to reduce the volume of the turbinate to improve the nasal symptoms without disturbing the nasal functions⁽¹⁾. Various techniques are currently being performed

to reduce the volume of the inferior turbinate such as partial turbinectomy, diathermy coagulation, microdebrider, and radiofrequency.

Radiofrequency ablation of inferior turbinate (RFAIT) is one of the most common techniques currently used for the treatment of ITH⁽²⁾. Radiofrequency causes a thermal lesion that results in submucosal fibrosis and consequently a decrease in the volume of the inferior turbinate. Significant healing of the turbinate samples on a molecular basis has been shown eight weeks after surgery⁽³⁾. Therefore, RFAIT should help to treat nasal obstruction without the disadvantages of the other techniques. The aim of the pilot study was to evaluate the quality of life by Rhinoconjunctivitis quality of life questionnaires (Rcq-36)⁽⁴⁾ and Subjective nasal symptoms questionnaires (Snsq) were administered before and 12 weeks after RFAIT in CR patients.

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Materials and Methods

Participants

Fifty-six patients who reported chronic nasal obstruction and failed to medical treatment between August 2021 and December 2022 at the

Otolaryngology outpatient clinic, Rayong Hospital were prospectively enrolled in the present study. All patients gave their written informed consents before being included in the study, which was approved by the Rayong Hospital Ethics Committee (RYH REC E021/2564) and registered at the Thai Clinical Trials Registry (TCTR20231009001). Inclusion criteria included bilateral nasal obstruction due to turbinate hypertrophy which refractory to medical treatment. Patients with previous nasal surgery, septal deformity, sinusitis with or without nasal polyposis, and a history of systemic diseases were excluded. All patients underwent physical examination by the same surgeon.

Quality of life evaluation

Patients were asked to assess their quality of life before and after RFAIT in a self-administered questionnaire called Rcq-36. It consisted of 36 questions covering six dimensions and two independent items. There were 17 items in the dimension of symptoms with four in rhinitis symptoms (RS), four in eye symptoms (ES), and nine in other symptoms (OS). The other dimensions consisted of three items in physical functioning (PF), three in role limitation (RL), three in sleep problems (Sleep), three in social functioning (SF), and five items in emotions (E) dimension. The last two independent questions included one item about overall health (OH), and one item about absenteeism. Each item had numeric scores ranging from 1 to 5 with the lower score indicating better quality of life, except for absenteeism, which was an open-ended question.

Symptom evaluation

All patients were also given Snsq using standard visual analog scales or VAS (0 to 10) to assess the severity of symptoms including stuffy nose, running nose and itchy nose before and after RFAIT. The patients were also asked about side effects from the treatment by an open-ended question and the severity of postoperative pain by VAS (0 to 10) questionnaires.

Surgical procedure

All surgical procedures were performed under local anesthesia using 10% xylocaine spray with three puffs per nostril and 1 to 3 mL of 1% lidocaine injected into each inferior turbinate by the same surgeon. Radiofrequency energy was delivered by CURIS® (Sutter Medizintechnik, Freiburg, Germany) and used with RaVoR™ bipolar electrode (10 W, Autostop,

total energy ≤ 100 J). The radiofrequency electrode was inserted under endoscopic guidance, and the energy was delivered to three different sites of each turbinate, which were the upper and lower area of the anterior portion and to the middle portion. After treatment, patients returned to work or home with no medication apart from acetaminophen in the case of pain. Patients were not allowed to take any corticosteroids, antihistamines, or decongestants during the follow-up period.

Statistical analysis

The data were analyzed with IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA) using Wilcoxon signed-rank test for data with non-normality and Dependent t-test for data with normality. The Friedman test was used for follow-ups. Spearman's correlation analysis was used for analysis of correlations. A p-value of less than 0.05 was considered statistical significance.

Results

At first, there were 60 patients enrolled in the present study, but only 56 patients completed the protocol. There were 31 men (55.4%) and 25 women (44.6%) with mean ages of 33.4 ± 8.47 years, ranging from 20 to 55 (Table 1). The patient's quality of life in every dimension of the Rcq-36 showed a significant improvement ($p < 0.05$) twelve weeks after treatment (Table 2). Absenteeism decreased the most by 81.8%, followed by nasal symptoms at 70.1%, while ES decreased the least at 18.5% (Figure 1). Rcq-36 found that lower scores in each item compared to before treatment. There was a statistical significance at the 0.05 level ($p < 0.001$), except for phlegm, which was not statistically different ($p = 0.077$) (Table 3). RS were found significant change in all items ($p < 0.05$), particularly on the stuffy nose symptom with 56.2%.

From Snsq, the mean score of all symptoms immediately after treatment, and at 1, 4, 8, and 12 weeks after treatment had a significant reduction (Table 4) particularly on stuffy nose, which decreased from 3.86 ± 0.49 to 0.67 ± 0.37 or 93.4% ($p < 0.001$) (Figure 2).

Table 1. Patients characteristic

	Value (n=56)
Sex; n (%)	
Male	31 (55.4)
Female	25 (44.6)
Age (years); mean \pm SD (min-max)	33.04 \pm 8.47 (20 to 55)

Table 2. Rhinoconjunctivitis quality of life questionnaires (Rcq-36) between baseline and follow up 12 weeks

Rcq-36	Baseline; mean±SD	Follow-up 12 weeks; mean±SD	Mean difference (%change)	p-value
Rhinitis symptoms (RS)	11.84±1.02	6.69±1.10	-4.88 (-70.1%)	<0.001*
Eye symptoms (ES)	7.46±0.85	6.09±1.10	-1.38 (-18.5%)	<0.001*
Other symptoms (OS)	26.02±2.10	17.61±0.98	-8.41 (-32.3%)	<0.001*
Physical functioning (PF)	7.09±0.82	4.07±0.50	-3.01 (-42.5%)	<0.001*
Role Limitation (RL)	7.75±0.96	3.80±0.72	-3.95 (-50.9%)	<0.001*
Sleep	8.30±0.97	5.05±0.59	-3.25 (-39.2%)	<0.001*
Social functioning (SF)	7.07±0.83	3.96±0.69	-3.11 (-43.9%)	<0.001*
Emotions (E)	17.95±1.02	7.96±0.95	-9.98 (-55.6%)	<0.001*
Overall health (OH)	3.32±1.06	1.59±0.50	-1.73 (-52.1%)	<0.001*
Absenteeism	1.48±0.95	0.27±0.45	-1.21 (-81.8%)	<0.001*

Data were analyzed with Paired t-test, * Statistically significant at the 0.05 level

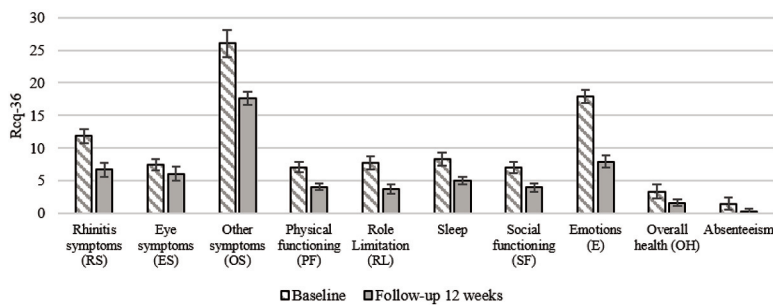


Figure 1. Rcq-36 score between baseline and follow-up 12 weeks.

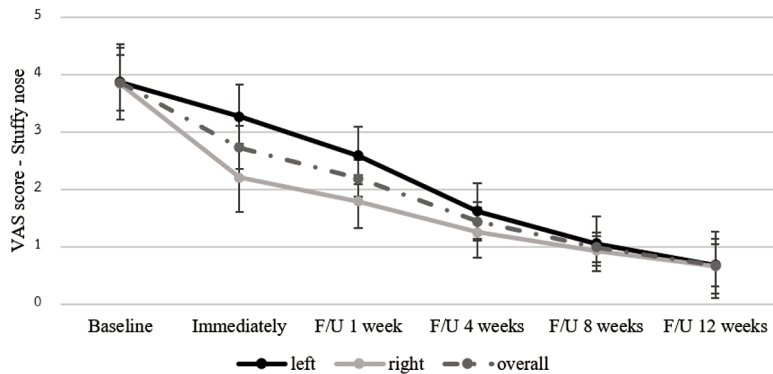


Figure 2. VAS score of stuffy nose in baseline, immediately, follow up 1, 4, 8 and 12 weeks.

Pain score immediately after treatment, and at 1, 4, 8, and 12 weeks had a median value of 2, 2, 1, 0, and 0 points, respectively with a statistically significant decrease ($p<0.001$) (Figure 3). All patients reported no complication just minimal pain, with only one subject required acetaminophen after the operation.

When compared Rcq-36, subjective nasal symptoms, and pain score at follow-up 12 weeks classify by gender and age, the present study found that the mean OH in male patients at 1.71 ± 0.46 was significantly higher than female patients at 1.44 ± 0.51

($p=0.042$), while other dimension, subjective nasal symptoms and pain score were not statistically different ($p>0.05$) in gender. Patient age was not related to Rcq-36, subjective nasal symptom and pain score ($p>0.05$) (Table 5).

Discussion

Patients affected by CR are initially treated with conservative therapy, including antihistamines, intranasal corticosteroid sprays, allergic desensitization, mast cell stabilizers, and systemic decongestants.

Table 3. Rhinoconjunctivitis quality of life questionnaires (Rcq-36) classified by items between baseline and followup 12 weeks

Rcq-36	Baseline mean±SD	Follow-up 12 weeks mean±SD	Mean difference (%change)	p-value
Rhinitis symptoms (RS)				
Runny nose	3.32±0.64	1.91±0.58	-1.41 (-42.5%)	<0.001*
Itchy nose	2.25±0.64	1.68±0.51	-0.57 (-25.3%)	<0.001*
Stuffy nose	4.29±0.73	1.88±0.69	-2.41 (-56.2%)	<0.001*
Sneezing	1.98±0.70	1.50±0.51	-0.48 (-24.2%)	<0.001*
Eye symptoms (ES)				
Itchy eyes	2.14±0.75	1.73±0.62	-0.41 (-19.2%)	<0.001*
Irritated eyes	1.96±0.60	1.55±0.57	-0.41 (-20.9%)	<0.001*
Watery eyes	1.71±0.62	1.43±0.50	-0.29 (-16.9%)	<0.001*
Tired eyes	1.64±0.70	1.38±0.56	-0.27 (-16.5%)	<0.001*
Other symptoms (OS)				
Cough	3.09±0.77	1.91±0.61	-1.18 (-38.2%)	<0.001*
Dry throat/dry mouth	3.05±0.94	1.80±0.40	-1.25 (-40.9%)	<0.001*
Phlegm	2.64±0.99	2.32±0.72	-0.32 (-12.1%)	0.077
Hard to think	2.88±0.72	1.98±0.59	-0.89 (-30.9%)	<0.001*
Fatigue	2.75±0.77	1.52±0.57	-1.23 (-44.7%)	<0.001*
Tired easily	2.96±0.83	2.50±0.57	-0.46 (-15.5%)	<0.001*
Body aches	2.82±0.72	1.41±0.50	-1.41 (-50.0%)	<0.001*
Headaches	3.13±0.92	2.23±0.76	-0.89 (-28.4%)	<0.001*
Sleepy all the time	2.70±0.63	1.93±0.60	-0.77 (-28.5%)	<0.001*
Physical functioning (PF)				
Must stop work or studies	2.25±0.55	1.14±0.35	-1.11 (-50.5%)	<0.001*
Unable to concentrate on work or studies	2.39±0.49	1.48±0.50	-0.91 (-38.1%)	<0.001*
Causes a disturbance in work, such as interrupted working	2.45±0.60	1.45±0.50	-1.00 (-40.8%)	<0.001*
Role limitation (RL)				
When playing sports or doing a heavy work or participating in an activity that requires a lot of strength or energy	2.70±0.63	1.63±0.49	-1.07 (-39.6%)	<0.001*
When playing sports or having a regular work or participate in an activity that requires average strength or energy	2.50±0.51	1.18±0.39	-1.32 (-52.8%)	<0.001*
When walking half a kilometer	2.55±0.50	1.00±0.00	-1.55 (-60.8%)	<0.001*
Sleep				
Sleep and wake up often during the night	2.82±0.66	1.61±0.49	-1.21 (-42.9%)	<0.001*
Difficulty getting to sleep	2.20±0.40	1.61±0.49	-0.59 (-26.8%)	<0.001*
Do not sleep deeply	3.29±0.62	1.84±0.37	-1.45 (-44.1%)	<0.001*
Social functioning (SF)				
Loss of confidence when meeting others	2.46±0.50	1.34±0.48	-1.13 (-45.9%)	<0.001*
Reduce the meetings or activities with others	2.21±0.41	1.30±0.46	-0.91 (-41.2%)	<0.001*
Feel like you do not want to go out	2.39±0.49	1.32±0.47	-1.07 (-44.8%)	<0.001*
Emotions (E)				
Annoyed with self	3.55±0.50	1.88±0.33	-1.68 (-47.3%)	<0.001*
Worried	3.29±0.49	1.48±0.50	-1.80 (-54.7%)	<0.001*
Frustrated	3.68±0.47	1.52±0.50	-2.16 (-58.7%)	<0.001*
Irritated	3.55±0.50	1.55±0.50	-2.00 (-56.3%)	<0.001*
Annoyed to have to carry tissue papers or handkerchief more than usual	3.88±0.33	1.54±0.50	-2.34 (-60.3%)	<0.001*

Data were analyzed with Paired t-test, * Statistically significant at the 0.05 level

When these means do not provide adequate relief, surgical procedures are indicated^(5,6).

Different surgical techniques are currently

available. Submucosal techniques are the most conservative options because they can preserve overall nasal physiology, sparing ciliated epithelium⁽⁷⁾. Since

Table 4. Subjective nasal symptoms

	Baseline mean±SD	Immediately mean±SD	F/U 1 week mean±SD	F/U 4 weeks mean±SD	F/U 8 weeks mean±SD	F/U 12 weeks mean±SD	Partial η ² mean±SD	p-value
Stuffy nose								
Left	3.87±0.66	3.27±0.56	2.59±0.50	1.62±0.49	1.05±0.48	0.68±0.58	0.885	<0.001*
Right	3.84±0.63	2.20±0.59	1.79±0.46	1.25±0.44	0.93±0.26	0.66±0.48	0.886	<0.001*
Overall	3.86±0.49	2.73±0.38	2.19±0.32	1.44±0.33	0.99±0.26	0.67±0.37	0.934	<0.001*
Runny nose								
Left	2.23±0.69	1.98±0.56	1.86±0.40	1.23±0.43	0.96±0.27	0.75±0.44	0.701	<0.001*
Right	2.23±0.76	1.89±0.59	1.79±0.41	1.27±0.45	1.02±0.13	0.93±0.26	0.637	<0.001*
Overall	2.23±0.56	1.94±0.48	1.82±0.35	1.25±0.33	0.99±0.15	0.84±0.27	0.783	<0.001*
Itchy nose								
Left	1.75±0.69	1.86±0.55	1.73±0.45	1.34±0.48	1.13±0.33	0.96±0.27	0.469	<0.001*
Right	1.95±0.59	1.95±0.48	1.86±0.35	1.45±0.50	1.07±0.26	0.93±0.26	0.628	<0.001*
Overall	1.85±0.32	1.90±0.34	1.79±0.27	1.39±0.34	1.10±0.20	0.95±0.18	0.735	<0.001*

Data were analyzed with Repeated measure ANOVA, * Statistically significant at the 0.05 level

Table 5. Compare Rcq-36, Subjective nasal symptoms, and pain score at follow-up 12 weeks classify by sex and age

	Male	Female	p-value	Age (r)	p-value
Rcq-36; mean±SD					
Rhinitis symptoms (RS)	6.74±1.25	7.24±1.56	0.188	0.009	0.946
Eye symptoms (ES)	6.19±1.17	5.96±1.02	0.435	-0.119	0.381
Other symptoms (OS)	17.61±0.99	17.60±1.00	0.962	-0.031	0.821
Physical functioning (PF)	4.13±0.56	4.00±0.41	0.325	0.072	0.596
Role Limitation (RL)	3.68±0.70	3.96±0.73	0.148	0.102	0.455
Sleep	5.10±0.54	5.00±0.65	0.543	-0.195	0.150
Social functioning (SF)	3.84±0.58	4.12±0.78	0.129	-0.009	0.947
Emotions (E)	8.06±0.96	7.84±0.94	0.386	-0.248	0.066
Overall health (OH)	1.71±0.46	1.44±0.51	0.042*	-0.126	0.354
Absenteeism	0.29±0.46	0.24±0.44	0.679	-0.084	0.537
Subjective nasal symptoms; mean±SD					
Stuffy nose	0.68±0.38	0.66±0.37	0.864	-0.028	0.838
Runny nose	0.84±0.27	0.84±0.28	0.986	-0.029	0.832
Itchy nose	0.92±0.23	0.98±0.10	0.220	0.107	0.433
Pain score; meadian (min, max)	0 (0, 0)	0 (0, 0)	0.369	0.084	0.541

Data were analyzed with Independent t-test, Mann-Whitney U test, and Correlation coefficient, * Statistically significant at the 0.05 level

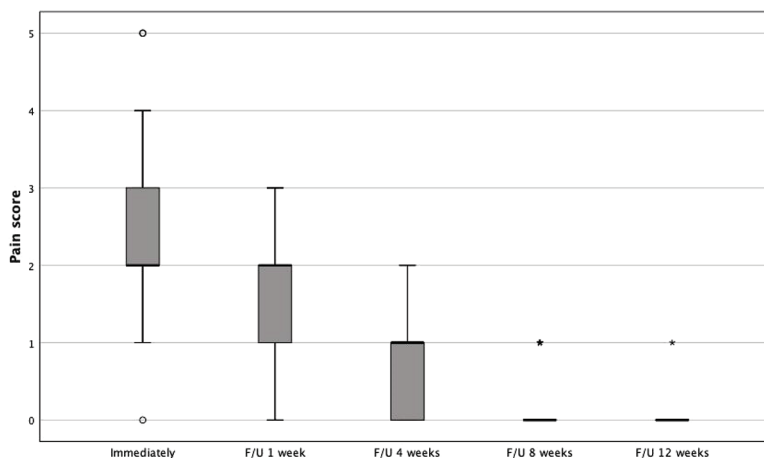


Figure 3. Pain score in immediately, follow up 1, 4, 8 and 12 weeks.

the first report by Li et al.⁽⁸⁾ in 1998, the safety and efficacy of radiofrequency volumetric reduction of the inferior turbinate have been confirmed by studies that show subjective and objective improvement in nasal function. Nease et al.⁽⁹⁾ conducted a prospective, randomized, blinded, placebo-controlled study that found good outcomes on a VAS using scores for frequency and severity of nasal obstruction and ability to breathe two months and six months after radiofrequency treatment. Farmer et al.⁽¹⁰⁾ recently demonstrated improvement in nasal function using posterior rhinomanometry (RMM) and VAS in 20 patients treated with radiofrequency, with a 3-month follow-up. Kizilkaya et al.⁽¹¹⁾ compared the efficacy of microdebrider assisted inferior turbinate (MAIT) and radiofrequency-assisted inferior turbinoplasty for nasal obstruction treatment, evaluating nasal symptoms, airflow resistance, and saccharin transit time at six and twelve months after surgical treatment. They found identical favorable results for both techniques.

The authors used the Rcq-36 to assess the outcomes of the RFAIT. Rcq-36 is the disease-specific quality of life questionnaire in Thai language that has been validated⁽⁴⁾. It has been shown to correlate with SF-36 in assessment of Thai patients with allergic rhinoconjunctivitis, but the Rcq-36 had a better correlation with symptom scores than SF-36⁽¹²⁾. The author also assessed other subjective symptom scores in nasal symptom and pain score with standard VAS using a scale of 0 to 10.

The result showed that the patient's quality of life in every dimension of the Rcq-36 had a significant improvement twelve weeks after treatment ($p < 0.05$). The highest improvement was seen in absenteeism and RS. The lowest improvement was in the ES and OS. RS found a significant change in all items ($p < 0.05$), particularly on the stuffy nose symptom. Regarding the nasal symptom scores, all symptoms immediately after treatment, and at one, four, eight, and twelve weeks after treatment were significantly decreased ($p < 0.05$). The highest response was seen on the stuffy nose at 93.4% and runny nose at 78.3%. When compared the symptom scores from Li et al.⁽⁸⁾, they reported that 21 in 22 patients (95.45%) had an improvement eight weeks after RF treatment similar to the study. In addition, response rates of 90% to 100% were reported in studies⁽¹³⁻¹⁵⁾. Pain score after RFAIT in the present study was only 2, which correlated with the report from Lin et al.⁽¹⁶⁾ that found little pain and good tolerance by the patients. Rcq-36, subjective nasal symptoms and pain score were

not statistically different ($p > 0.05$) in gender and age.

The limitation of the present study was a short-term study with a small sample size and did not have objective finding such as acoustic rhinometry (ARM) and RMM to compare, even for poor correlation between objective findings and patient subjective symptoms of nasal obstruction⁽¹⁷⁾. Future studies are recommended with a larger sample size, longer time to follow-up, and comparative studies among different treatment modalities should be assessed to improve quality of life in patients with CR.

Conclusion

RFAIT can improve the quality of life and nasal symptoms of CR patients. RFAIT is an outpatient procedure and no complication in the present study was found, thus, it will be a good alternative treatment.

What is already known on this topic?

RFAIT for treatments CR patients.

What does this study add?

Quality of life improves after RFAIT in CR patients.

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Conflicts of interest

The author declares no conflict of interest.

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