CLINICAL TRIAL PROTOCOL

Prepared for registration on ClinicalTrials.gov

Official Title: A Prospective, Randomized, Comparative Study of the Effectiveness of Lateralization versus Radiofrequency Ablation for Patients with Bilateral Inferior Turbinate Hypertrophy

NCT Number: Not yet assigned (to be inserted once the PRS record is created and ClinicalTrials.gov generates the number)

Brief Title: Radiofrequency Ablation versus Lateralization for Inferior Turbinate Hypertrophy

Local/Ethics Protocol Number (MREC/NMRR): NMRR-20-1334-55391 (IIR)

Date of this Document: *13th August 2026*

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1. BACKGROUND AND RATIONALE

Inferior turbinate hypertrophy is one of the commonest causes of chronic nasal obstruction. Medical therapy is first-line treatment for bilateral inferior turbinate hypertrophy (BITH), with surgery reserved for patients in whom pharmacological treatment fails or is contraindicated. A range of turbinate-reduction techniques have been described, aiming to maximise volumetric reduction while preserving normal nasal function and minimising complications; these differ in long-term efficacy and complication profile.

Most turbinate surgery is performed under general anaesthesia. Patients who decline general anaesthesia, or for whom its risks outweigh the benefits of surgery, may be offered office-based alternatives under local anaesthesia. Radiofrequency ablation of the inferior turbinates (RFIT) is a well-established office-based option: prior studies report it to be safe and effective for up to 36 months, with improvement in nasal airflow and obstruction symptoms. Lateralization (outfracture) of the inferior turbinates is a further office-based alternative reported to be safe and effective using only simple instruments, with a low complication rate.

Both procedures can be performed in the clinic setting, but at the time this study was designed they had not been directly compared. This study therefore compared RFIT and lateralization in patients with BITH, to determine which offers a more effective office-based alternative for patients opting for a surgical procedure outside the operating theatre.

2. OBJECTIVES AND HYPOTHESES

2.1 General Objective

To compare the effectiveness of lateralization versus radiofrequency ablation (RFIT) for patients with bilateral inferior turbinate hypertrophy.

2.2 Primary Objective

To compare the effectiveness of both procedures in improving patients' nasal symptoms, measured using the Nasal Obstruction Symptom Evaluation (NOSE) questionnaire.

2.3 Secondary Objectives

- To compare reduction in the size of the inferior turbinates between groups, using the 25% Inferior Turbinate Classification System.
- To compare complications between the two procedures, including crusting of the nasal cavity (assessed endoscopically), pain score (Visual Analogue Scale), and anxiety level during the procedure (Visual Analogue Scale).

2.4 Hypotheses

Research hypothesis: Lateralization is more effective than radiofrequency ablation for patients with bilateral inferior turbinate hypertrophy.

Null hypothesis: Lateralization is not more effective than radiofrequency ablation for patients with bilateral inferior turbinate hypertrophy.

Note: the study was designed and powered to test the hypothesis above; the as-conducted results (reported in the accompanying manuscript) in fact found greater and more durable improvement in NOSE scores with RFIT, while lateralization caused fewer early complications. This protocol describes the original research question and design, not a re-stated post-hoc hypothesis.

3. TRIAL DESIGN

- Study type: Interventional (clinical trial)
- Primary purpose: Treatment
- Allocation: Randomized
- Interventional model: Parallel assignment, two arms
- Masking: Outcomes-assessor blinded. Endoscopic photographs/videos of the inferior turbinates were scored by three independent assessors who were not informed whether each image was taken pre- or post-procedure. Participants, the treating investigators, and care providers could not be masked, because the two procedures are physically distinguishable to perform.
- Study phase: Not applicable (procedural/device comparison, not a drug trial)
- Number of arms: 2 (RFIT; Lateralization)

4. STUDY SETTING

Single centre: Department of Otorhinolaryngology – Head and Neck Surgery, Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia.

5. ELIGIBILITY CRITERIA

5.1 Study Population

Patients with bilateral inferior turbinate hypertrophy attending Hospital Tengku Ampuan Rahimah, who declined turbinate surgery under general anaesthesia, and who fulfilled the inclusion and exclusion criteria below, were recruited into the study.

5.2 Inclusion Criteria

- Bilateral inferior turbinate hypertrophy, Grade 3 or 4 (25% Inferior Turbinate Classification System)
- Age more than 18 years
- NOSE score more than 30
- On conventional pharmacological therapy for more than 3 months

5.3 Exclusion Criteria

- Severe deviated nasal septum or caudal dislocation
- Nasal polyposis
- Nasal valve disorder
- Allergy or contraindication to Marcaine (bupivacaine) with adrenaline, or to Co-Phenylcaine

5.4 Sex/Gender and Age

- Sex: All
- Minimum age: 18 Years
- Maximum age: N/A (no upper age limit specified by protocol; enrolled participants ranged from 18 to 67 years, mean 36.59 years)
- Accepts healthy volunteers: No

6. SAMPLE SIZE

Sample size was calculated using the ClinCalc Sample Size Calculator. Prior data indicated expected success rates of approximately 50% for lateralization and 85.5% for radiofrequency ablation. To reject the null hypothesis with a power of 0.8 and a type I error probability of 0.05, a total of 26 patients per group (52 patients overall) was required. Inflating this by 20% to account for missing data and loss to follow-up gave a target sample size of 60 patients.

7. RECRUITMENT

Eligible patients were identified during routine ENT clinic assessment (rigid nasendoscopy) by the principal investigator and co-investigator. Patients who had been on pharmacological therapy for more than 3 months, had Grade 3-4 inferior turbinate hypertrophy with a NOSE score greater than 30, remained symptomatic, and were not keen for surgery under general anaesthesia were counselled about the study. Patients were given a Patient Information Sheet in English or Malay, allowed sufficient time to consider participation, and scheduled for a subsequent appointment. All recruited patients were seen at dedicated clinic slots under the principal investigator and co-investigator.

8. ARMS AND INTERVENTIONS

8.1 Arm 1: Lateralization (Active Comparator)

Procedure/Surgery -- Lateralization (outfracture) of the inferior turbinates:

- Local anaesthesia administered prior to the procedure.
- Nose sprayed with 2 puffs of Co-Phenylcaine Forte in each nostril for decongestion.
- Marcaine (bupivacaine) with adrenaline 0.5% infiltrated into bilateral inferior turbinates.
- Nose packed bilaterally with Co-Phenylcaine-soaked neuropatties for 5 minutes.
- Using a Freer elevator, the inferior turbinate is moved medially and superiorly until a crunching sound is heard, then moved laterally and inferiorly (outfractured).
- Patient monitored in clinic for 15 minutes post-procedure.

8.2 Arm 2: Radiofrequency Ablation of the Inferior Turbinates (RFIT) (Experimental)

Device/Procedure -- Radiofrequency ablation:

- Local anaesthesia administered prior to the procedure (as above: Co-Phenylcaine Forte spray, then Marcaine with adrenaline 0.5% infiltration, then Co-Phenylcaine neuropattie packing for 5 minutes).
- Radiofrequency ablation performed using a radiofrequency generator with a bipolar needle electrode, inserted into the inferior turbinate at one or more points, delivering energy for a set duration.
- Patient monitored in clinic for 15 minutes post-procedure.

8.3 Common Procedural Safeguards (Both Arms)

An emergency trolley was available in clinic for both procedures. Patients developing an allergic reaction were given intramuscular hydrocortisone 100 mg and monitored, referred to a

pharmacist, issued an allergy card, and rescheduled. Patients unable to tolerate the procedure under local anaesthesia due to pain or anxiety had the procedure abandoned. Post-procedure, patients were observed for 15 minutes, reported pain/anxiety on a Visual Analogue Scale, and were given paracetamol 1 g three times daily and advised to use alkaline nasal douching every 6 hours for 1 week. Intranasal steroid sprays and decongestants were stopped post-procedure through 6 months; restarting was documented if requested for recurrent symptoms.

9. OUTCOME MEASURES

9.1 Primary Outcome Measure

Description: 1. Change in Nasal Obstruction Symptom Evaluation (NOSE)

Score Description: The total NOSE score ranges from a minimum of 0 to a maximum of 100 points on a scale, where higher scores indicate worse nasal obstruction (a more severe symptom burden). A successful outcome is defined as a reduction in score from a moderate/extreme level to a mild level. Measure Type: Mean Unit of Measure: score on a scale (0-100)

Time Frame: Baseline, 1 week, 1 month, 3 months and 6 months post-procedure

9.2 Secondary Outcome Measures

Change in Inferior Turbinate Size

Description: Inferior turbinate size will be assessed using the 25% Classification System, graded on a scale of 1 to 4, where higher grades indicate worse (larger) turbinate size. Measure Type: Mean Unit of Measure: grade on a scale (1-4)

Time Frame: Baseline, 1 week, 1 month, 3 months, 6 months post-procedure

10. PARTICIPANT TIMELINE

Baseline (pre-procedure): informed consent, rigid nasendoscopy with turbinate grading (mean of three independent scorers), NOSE questionnaire, randomisation to study arm. Follow-up visits at 1 week, 1 month, 3 months and 6 months post-procedure: repeat NOSE questionnaire, endoscopic turbinate grading, and assessment for complications and nasal spray resumption at each visit.

11. ASSIGNMENT OF INTERVENTIONS

11.1 Sequence Generation and Allocation

Patients were allocated a sequential registration number on enrolment. A computer-generated random sequence (online research randomizer) was used to assign participants 1:1 to the lateralization or RFIT group.

11.2 Blinding of Outcome Assessment

Photographs and videos of the inferior turbinates were taken before and after each procedure at every visit. Three independent surgeons scored turbinate grade from these images without being informed whether each image was taken pre- or post-procedure, to reduce assessment bias. There was no unmasking of the allocation sequence itself, as the endpoint assessment relied on blinded image review rather than on the treating clinician's own assessment.

12. STATISTICAL METHODS

Descriptive data are expressed as mean +/- standard deviation unless otherwise stated. Repeated Measures ANOVA was used to determine the difference in mean NOSE score and turbinate grade within and between groups over time, with Bonferroni-adjusted pairwise comparisons. Fisher's Exact test and Pearson Chi-square test were used for categorical outcomes (complications, nasal spray resumption). The Mann-Whitney test was used to compare pain/anxiety scores between groups. A p-value less than 0.05 was considered statistically significant. Analysis followed an intention-to-treat approach.

Testing for multiple time-point comparisons was adjusted using the Bonferroni correction to control the family-wise error rate. The assumption of sphericity required for Repeated Measures ANOVA was verified using Mauchly's test for each outcome; where this assumption was met, the Sphericity Assumed statistic is reported, and where it was violated, the Greenhouse-Geisser correction was applied instead. No interim analyses were conducted; all participants who completed the study were included in the intention-to-treat analysis, and no imputation was performed for the single participant lost to follow-up (excluded from time points after withdrawal only).

13. DATA MONITORING AND HARMS

No formal independent Data Monitoring Committee was appointed for this single-centre, low-risk, office-based procedural comparison.

Adverse events (bleeding, crusting, adhesions, allergic reactions) were monitored clinically at the time of the procedure and at each follow-up visit, and managed per the safeguards described in Section 8.3. One participant (RFIT group) developed epistaxis one week post-procedure requiring anterior nasal packing and overnight admission for observation; the participant was discharged well after two days.

14. ETHICS AND DISSEMINATION

14.1 Research Ethics Approval

This study was registered with and approved by the Medical Research & Ethics Committee (MREC), Ministry of Health Malaysia (registration number NMRR-20-1334-55391 (IIR)). All procedures complied with the Declaration of Helsinki (1975, revised 2008) and Malaysian Good Clinical Practice Guidelines.

This study was conducted at a single facility location (Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia), so this amendment history applies to the study's only Facility Location.

14.2 Informed Consent

Written informed consent was obtained from all participants prior to enrolment, using a Patient Information Sheet and Informed Consent Form available in English and Malay. Participation was voluntary; participants could withdraw at any time without effect on their ongoing clinical care, and data collected up to withdrawal were retained for analysis. Withdrawn participants were not replaced.

14.3 Confidentiality

Patient anonymity was maintained on the data collection form; data were identified only by sequential study number.

14.4 Sponsorship and Funding

This is a self-sponsored, investigator-initiated study. It received no specific grant from any funding agency, commercial or not-for-profit sector.

14.5 Conflicts of Interest

The authors declare none.

14.6 Dissemination Policy

Results are intended for publication in a peer-reviewed otolaryngology journal. Individual participant data are available from the corresponding author on reasonable request.

15. TRIAL REGISTRATION STATEMENT

This trial is being registered at www.clinicaltrial.gov

16. REFERENCES

1. T Harju, J Numminen, et al,A Prospective, Randomized, Placebo-Controlled Study of Inferior Turbinate Surgery. Laryngoscope 00: Month 2018
2. N D. Bhandarkar ,T L. Smith. Outcomes of surgery for inferior turbinate hypertrophy. Current Opinion in Otolaryngology & Head and Neck Surgery 2010, 18:49–53
3. E.De Corso,et al. Radiofrequency volumetric inferior turbinate reduction: long-term clinical results. Acta Otorhinolaryngol Ital 2016;36:199-205
4. S. Sinno,K Mehta,Z H Lee.Inferior Turbinate Hypertrophy in Rhinoplasty:Systematic Review of Surgical Techniques. Plastic and Reconstructive Surgery Journal, September 2016;419e-429e
5. N Tanna, D D. Im, T H Azhar,et al. Inferior Turbinoplasty During Cosmetic Rhinoplasty Techniques and Trends. Annals of Plastic Surgery & Volume 72, Number 1, January 2014;5-8
6. F Aksoy,et al. Midterm outcomes of outfracture of the inferior turbinate. Otolaryngology–Head and Neck Surgery (2010) 143, 579-584
7. DC Lee, SG Jin, et al. Does the Effect of Inferior Turbinate Outfracture Persist?. Plastic Reconstructive Surgery 2017 Feb;139(2):386e-391e
8. F Akagun, M Imamoglu, et al. Comparison of Radiofrequency Thermal Ablation and Microdebrider-Assisted Turbinoplasty in Inferior Turbinate Hypertrophy: A Prospective, Randomized, and Clinical Study. Turk Arch Otorhinolaryngol 2016; 54: 118-23
9. Bozan A, Eris¸ HN, Dizdar D, Göde S, Tas¸delen B, Alpay HC. Effects of turbinoplastyversus outfracture and bipolar cautery on the compensatory inferior turbinate hypertrophy in septoplasty patients. Braz J Otorhinolaryngol. 2019;85:565---70.
10. M Camacho, S Zaghi, V Certal,et al. Inferior Turbinate Classification System, Grades 1 to 4: Development and Validation Study. Laryngoscope 125: February

2015;296-302

11. M J. Lipan, S P. Most, Development of a Severity Classification System for Subjective Nasal Obstruction. JAMA Facial Plastic Surgery September/October 2013 Volume 15, Number 5;358-361
12. M.G Stewart, D. L. Witsell, et al. Development and validation of the Nasal Obstruction Symptom Evaluation (NOSE) Scale. Otolaryngology– Head and Neck Surgery Volume 130 Number 2;157-163
13. Li KK, Powell NB, Riley RW, Troell RJ, Guilleminault C. Radiofrequency volumetric tissue reduction for treatment of turbinate hypertrophy: a pilot study. Otolaryngol Head Neck Surg 1998; 119: 569-73.
14. Buyuklu F, Cakmak O, Hizal E, Donmez FY. Outfracture of the inferior turbinate: a computed tomography study. Plast Reconstr Surg. 2009;123:1704---79.
15. Zhang QX, Zhou WG, Zhang HD, Ke YF, Wang QP. Relationship between inferior turbinate outfracture and the improvement of nasal ventilatory function. Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi. 2013;48:422---5