

Original Research Article

Pediatric turbino­plasty: what is the impact of allergy on long-term outcomes?

Francisco Alves De Sousa*, Sara Raquel Azevedo, Sara Costa, Ana Nóbrega Pinto, Teresa Soares, Miguel Bebiano Coutinho, Luís Meireles

Department of Otorhinolaryngology and Head and Neck Surgery, Centro Hospitalar Universitário do Porto, Porto, Portugal

Received: 04 June 2022

Revised: 16 July 2022

Accepted: 18 July 2022

*Correspondence:

Dr. Francisco Alves De Sousa,

E-mail: franciscoalvesousa@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: The use of inferior turbino­plasty (IT) in pediatric patients is controversial, especially in the presence of allergic rhinitis. The objective of this study was to assess the long-term results of radiofrequency inferior turbino­plasty in allergic versus non-allergic children.

Methods: Children operated between 2017 and 2019 and whose intervention included radiofrequency IT were included. Multiple scores were collected in 2021 through a telephone call to parents. A comparison was made between allergic children (AC) and non-allergic children (NAC).

Results: 41 children were included. Parents of AC reported a higher degree of dissatisfaction with surgery (AC: 0.8 ± 1 versus NAC: 0.2 ± 0.5 , $p=0.026$). AC revealed a greater dependence on medication in order to control nasal obstruction (41% in AC vs 6% in NAC, $p=0.010$). The total Nasal Obstruction Symptom Evaluation (NOSE) score was higher in AC (mean AC 26 ± 25 versus mean NAC 5 ± 12 , $p=0.003$). The sinus and nasal quality of life 5 SN-5 score was higher in AC (mean AC 2.5 ± 1 vs NAC mean 1.4 ± 0.8 , $p<0.001$). AC had a lower score on the SN-5 quality of life scale (mean AC 6.6 ± 2.4 vs NAC mean 8.3 ± 1.8 , $p=0.014$).

Conclusions: Radiofrequency IT alone does not seem effective in the long-term resolution of nasal obstruction in AC.

Keywords: Turbino­plasty, Allergy, Pediatrics, Results, Long-term, Children

INTRODUCTION

Inferior turbinate hypertrophy is a common pathology in pediatric age, implying a remarkable functional impact in the child, by eliciting obstruction of the nasal ventilatory flow.^{1,2} Inferior turbino­plasty (IT) is a widely accepted procedure in adults and is increasingly used in pediatric patients.^{2,3} Some studies suggest that IT will be effective both in the presence and absence of atopy, but others contest its effectiveness in the long-term nasal outcome, especially in patients with allergic rhinitis.^{1,2,4} The aim of our study was to carry out a survey on the status of nasal

symptoms in children who underwent IT, a few years after surgery, comparing allergic children (AC) with non-allergic children (NAC).

METHODS

The study was carried out at a tertiary referral hospital in Portugal. A retrospective selection of children who underwent Radiofrequency (RF) IT on an outpatient basis between January 2017 and December 2019 was performed. Only patients undergoing their first Otorhinolaryngological surgery were included. All

patients underwent general anesthesia and IT was performed under direct visualization rhinoscopy. Data were collected from clinical records: 1) gender, date of surgery, date of birth. 2) evidence of atopy: specific IgE, positive prick test for allergen 3) type of intervention (concomitant adenoidectomy, tonsillectomy, myringotomy). Inclusion criteria were as follows: age between 4-15 years; patients with surgical indication for IT; Exclusion criteria were as follows: age over 15 years old, associated co-morbidities, former Otorhinolaryngological surgery, congenital facial dysmorphisms, concomitant causes of nasal obstruction (severe septum deviation or polyps).

The sample size was based on a pre-defined non-probability convenience sample. After compiling a database with the selected population, taking into account the previously mentioned criteria, children's parents were contacted by telephone from January 2021 to October 2021. Verbal consent was obtained after presentation and explanation of the study's focus and scope. Parents were invited to answer a customized questionnaire. The degree of dissatisfaction with the surgery in improving nasal symptoms (rated from 0 to 4, with 0 being extremely satisfied and 4 being extremely dissatisfied), medication dependence for controlling nasal symptoms (yes or no), the Glasgow Outcome Scale, Nasal obstruction symptom evaluation (NOSE) score and The Sinus and Nasal Quality of Life 5 (SN-5) score were collected.⁵⁻¹⁰ A statistical comparison of the results between AC and NAC was performed.

RESULTS

A total of 41 children were included, 68% male and 38% female. The mean age recorded at the time of surgery was 8.7±2.7 years (minimum 4 and maximum 15 years). 19 of

the included patients were AC (46%) and 22 were NAC (54%). The mean time between the surgical intervention and the response to the questionnaire by the parents' response to the questionnaire was 32.4±8.3 months. Table 1 summarizes the performed procedures.

Parents of AC registered higher dissatisfaction with surgery, compared with parents of NAC (AC: 0.8±1 versus ANC 0.2±0.5, p=0.026). AC revealed a greater dependence on medication to control nasal obstruction in the long term (41% in AC versus 6% in NAC, p=0.010). The long-term total NOSE score was higher in allergic children (AC: 26±25 versus NAC: 5±12, p=0.003). Partial NOSE scores revealed higher NOSE-secretions in AC (AC: 1±1.33 versus NAC: 0.2±0.7, p=0.024); highest NOSE-obstruction in AC (AC: 1.4±1.2 versus NAC: 0.4±0.9, p=0.007); highest NOSE-respiration in AC (AC: 1.2±1.2 versus NAC: 0.1±0.3, p<0.001); higher NOSE-sleep in AC (AC: 0.7±1.1 versus NAC: 0.1±0.5, p=0.04); and higher NOSE-exercise in AC (AC: 0.8±1.1 versus NAC: 0.2±0.5, p=0.031). Likewise, the SN-5 score was higher in the AC (AC: 2.5±1 versus NAC: 1.4±0.8, p<0.001). Regarding the partial scores of SN-5, the AC revealed a higher score of SN-5 infections (AC: 2.7±1.9 versus NAC: 1.4±1.2, p=0.014), a higher score of SN-5 nasal obstruction (AC: 3.6±1.7 versus NAC: 1.6±1.4, p<0.001), higher SN-5 allergy score (AC: 4±1.6 versus NAC: 1.8±1.5, p<0.001), with no significant differences in emotional SN-5 (AC: 1±0.5 versus NAC: 1.2±0.7, p=0.525). The AC also scored significantly lower on the SN-5 quality of life scale for nasal problems (AC: 6.6±2.4 versus NAC: 8.3±1.8, p=0.014). Regarding the Glasgow score, there was no statistically significant difference between the subgroups (AC: 10.8±11.7 versus NAC: 14.2±10.3, p=0.336). Table 2 summarizes the main findings of the study.

Table 1: Procedures performed in the study's COHORT.

Procedure	n	Frequency (%)
Adenoidectomy	25	61
Tonsillectomy	16	39
Miringotomy	8	19.5
Inferior turbinoplasty (by radiofrequency)	41	100

Table 2: Main findings: allergic versus non-allergic children.

Subgroup outcome	Allergic	Non allergic	Statistical significance (p value)
Degree of dissatisfaction with the surgery in improving nasal symptoms (0-4 scale)	0.8±0.4	0.2±0.5	0.026
Medication dependency (Yes or No)	41 %	6 %	0.01
Total Glasgow (-100 to + 100)	10.8±11.7	14.2±10.3	0.336
Nose (0 to 100)	26±25	5±12	0.003
SN-5 (1 to 7)	2.5±1	1.4±0.8	<0.001

Continued.

Subgroup outcome	Allergic	Non allergic	Statistical significance (p value)
QoL SN-5 score (0 to 10 quality of life due to nasal pathology)	6.6±2.4	8.3±1.8	0.014

Taking into consideration that simultaneous adenoidectomy may have interfered with long-term nasal symptoms, an additional analysis was performed in order to compare AC and NAC who underwent turbinoplasty without concomitant adenoidectomy (total of 15 children, 7 AC and 8 NAC). Parents of AC from this subgroup continued to register a lower degree of satisfaction with the surgery compared with parents of NAC, that tended for statistical significance although not reaching it (AC: 1.2±1 versus NAC: 0.4±0.7, $p=0.126$). AC from this subgroup showed a greater dependence on medication to control nasal obstruction in the long term (71% in AC versus 0% in NAC, $p=0.007$). The long-term total NOSE score was higher in AC (AC: 34±28 versus NAC: 7±15, $p=0.034$). Likewise, the SN-5 score was higher in the AC (AC: 3±0.8 versus NAC: 1.4±0.6, $p<0.001$). In children who did not undergo adenoidectomy, AC had a lower mean score on the SN-5 quality of life scale for nasal problems, although not statistically significant (AC: 6±2.3 versus NAC: 7±1.8, $p=0.368$).

DISCUSSION

The use of IT in patients with rhinitis refractory to medical treatment is globally accepted, with a relatively low rate of complications.¹¹ The incidence of postoperative pain in IT by RF appears to be relatively low in pediatric age.¹² However, the potential discomfort related to nasal packing and the risk of bleeding should be taken into account in the surgical decision, especially in the pediatric population, where pharyngeal procedures are commonly associated.¹² Also, the possible lack of long-term efficacy with recurrence of inferior turbinate hypertrophy (especially in AC) should be accounted.² These factors raise discussion about the pertinence of using inferior IT turbinoplasty techniques in Pediatric patients.

The primary objective of our study was met. Using questionnaires, the impact of allergy on the nasal ventilation system years after IT was investigated. It was possible to compare whether the presence of atopy interferes with the post-surgical long-term outcome, when comparing AC and NAC subgroups. The presence of atopy implied worse long-term outcomes, namely from nasal obstruction, nasal secretions, nasal breathing, sleep, physical exercise, medication dependence, satisfaction with the surgery outcomes of nasal symptoms and quality of life. The major exception was the Glasgow Outcome Score, which did not reveal significant differences between subgroups. Thus, our results seem to be in line with the literature regarding the effectiveness of submucosal ablation techniques, whose results seem to be largely affected by the presence of allergy.^{2,13,14} There are several IT techniques, such as RF ablation, plasma

ablation, microdebridement and electrocautery techniques.⁴ In this study, all patients underwent IT by RF.

It is not uncommon for authors to refer to partial turbinectomy with medial flap as “turbinoplasty”.¹⁵ However, the term turbinoplasty may be more appropriately used in pure mucosa or submucosal ablation techniques without conchal osteotomy. It is quite likely that the long-term results of IT largely depend on the technique. When investigating different IT studies, it should be noted that those showing good long-term results are generally the ones where osteotomy techniques were preferred, i.e., true total or partial turbinectomy. This is the case of the study carried out by Ophir et al, which reports 88% improvement in nasal obstruction 10-15 years after intervention.¹⁶ Thus, sometimes the terms “turbinoplasty” and “turbinectomy” are used interchangeably, which makes the interpretation of IT success more difficult. Another example are the works from Hamerschmidt et al and Abdelhak et al, who claim good results from inferior turbinoplasty, but whose technique involved medial flap turbinectomy.^{3,4} Studies that used mucosal or submucosal ablation techniques, such as ours, seem to report significant rates of relapse of nasal hypertrophy and obstruction, especially in allergic patients.^{1,2,13,14} Therefore, the interpretation of efficacy of IT in pediatric age should be cautious, taking into account the surgical technique and the nomenclature used.

The present study has some limitations. On the one hand, it is based on subjective measurements, and not on objective volumetric or nasal patency measurements, which would be more reliable. On the other hand, in most of the enrolled children, procedures other than IT were associated within the same surgery, which may partially compromise interpretation of the results. The fact that the same RF IT technique was used in all patients allows for a clearer comparison of the subgroups, however it would be pertinent to compare other IT techniques, or even turbinectomy.

CONCLUSION

The results of this work point towards the need for a multimodal approach to nasal obstruction in children with inferior turbinate hypertrophy. RF IT does not seem effective in the long term as a single and definitive intervention in the resolution of nasal obstruction, especially in allergic patients. It would be pertinent to carry out studies weighing the risk-benefit of different turbinoplasty and turbinectomy techniques in pediatric age. Conclusive and robust results accounting for the long-term impact of atopy and IT techniques success

could guide the clinician in choosing the most appropriate approach for each case.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the local ethics committee

REFERENCES

1. Arganbright JM, Jensen EL, Mattingly J, Gao D, Chan KH. Utility of inferior turbinoplasty for the treatment of nasal obstruction in children a 10-year review. *JAMA Otolaryngol - Head Neck Surg.* 2015;141(10):901-4.
2. Whelan RL, Shaffer AD, Stapleton AL. Efficacy of inferior turbinate reduction in pediatric patients: a prospective analysis. *Int Forum Allergy Rhinol.* 2021;11(12):1654-62.
3. Abdelhak BH, Sadek AA, Abdel Moneim RA, Saad ZA. The Effectiveness of Inferior Turbinoplasty in Children with Nasal Obstruction. *Otolaryngol - Open J.* 2019;5(2):22-5.
4. Hamerschmidt R, Hamerschmidt R, Moreira ATR, Tenório SB, Timi JRR. Comparison of turbinoplasty surgery efficacy in patients with and without allergic rhinitis. *Braz J Otorhinolaryngol.* 2016;82(2):131-9.
5. Marone SAM, Filho TAL, Ishie RT. Using ERG inquiry to evaluate otoplasty satisfaction in an otorhinolaryngology medical residency training hospital. *Braz J Otorhinolaryngol.* 2012;78(1):113-9.
6. Iana R. The glasgow childrens benefit inventory. *Ann Otol Rhinol Laryngol.* 2004;980-6.
7. Pinto D, António S, Isabel L, Sérgio C, Luis V. Efeito da otoplastia na saúde e qualidade de vida das crianças Otoplasty effect in health and quality of life of children. 2017;55:193-7.
8. Alves S, Lopes I, Ferreira PL, Fonseca L, Malheiro D, Silva A. "NOSE" Validação em Português e aplicação na septoplastia. *Rev Port Otorrinolaringol e Cir Cérvico-Facial.* 2010;48(1):9-14.
9. Kay DJ, Rosenfeld RM. Quality of life for children with persistent sinonasal symptoms. *Otolaryngol - Head Neck Surg.* 2003;128(1):17-26.
10. Uchoa PRCE, Bezerra TFP, Lima ÉD. Cross-cultural adaptation and validation of the Sinus and Nasal Quality of Life Survey (SN-5) into Brazilian Portuguese. *Braz J Otorhinolaryngol.* 2016;82(6):636-42.
11. Serrano E, Percodani J, Woisard V. Efficacy of partial inferior turbinectomy in the treatment of nasal obstruction. Retrospective study apropos of 71 patients. *Ann d'oto-laryngologie Chir cervico faciale Bull la Soc d'oto-laryngologie des Hop Paris.* 1996;113(7-8):379-83.
12. de Sousa FA, Casanova MJ, Pinto AN, Coutinho MB, e Sousa CA. Pediatric otolaryngology: influence of ambulatorial surgical procedures on postoperative pain. *Int J Otorhinolaryngol Head Neck Surgery.* 2021;7:12.
13. De Corso E, Bastanza G, Di Donfrancesco V. Radiofrequency volumetric inferior turbinate reduction: long-term clinical results TT - Riduzione volumetrica dei turbinati inferiori con radiofrequenze: risultati clinici a lungo termine. *Acta Otorhinolaryngol Ital.* 2016;36(3):199-205.
14. Akdag M, Dasdag S, Ozkurt FE. Long-term effect of radiofrequency turbinoplasty in nasal obstruction. *Biotechnol Biotechnol Equip.* 2014;28(2):285-94.
15. Hol MK, Huizing EH. Treatment of inferior turbinate pathology: a review and critical evaluation of the different techniques. *Rhinology.* 2000;38(4):157-66.
16. Ophir D, Schindel D, Halperin D, Marshak G. Long-term follow-up of the effectiveness and safety of inferior turbinectomy. *Plast Reconstr Surg.* 1992;90(6):980-7.

Cite this article as: De Sousa FA, Azevedo SR, Costa S, Pinto AN, Soares T, Coutinho MB, et al. Pediatric turbinoplasty: what is the impact of allergy on long-term outcomes? *Int J Otorhinolaryngol Head Neck Surg* 2022;8:633-6.