Title: Effects of Septorhinoplasty on Allergic Rhinitis

Abbreviations: AR: allergic rhinitis; DS: septal deviation; VAS: visual analogue scale; RNMa: anterior rhinomanometry; QoL: quality of life; ADL: Basic activities of daily life.

Introduction: Allergic rhinitis (AR) is a chronic inflammatory disease that affects almost 30% of adult population and is associated to other inflammatory disease (1). In AR, upper airway respiratory mucosa is inflamed in response to allergen exposition, mediated by Th2 immunology response. Common symptoms are sneezing, rhinorrhoea, nasal congestion, nasal itching and nasal obstruction. Nasal obstruction is the most refractory symptom to medical treatment (2). AR evolution includes chronic rhinosinusitis, nasal poliposis or chronic rhinitis (3). Despite its prevalence and the variety of medication to treat AR, many patients still feel failure treatment (4). Many studies have demonstrated how AR impairs life quality and work productivity, since it is an important cause of absence from work and school, and generates huge costs in prescription medication (5).

Nasal septum deviation (DS) causes symptoms as nasal obstruction, epistasis, snoring, anxiety, headaches, buccal breathing and sinusitis (6, 7). Septorhinopasty (STP) is the most common treatment for patients with DS with generally satisfactory outcomes (8).

AR treatment include a great variety of medication as antihistamines, anti-leukotrienes, corticoids or specific allergen immunotherapy. This conservative method implies improvement´s symptoms but in some refractory patients' medication alone is not enough. Surgical procedures to treat AR includes cryotherapy, laser cautery, sinus surgery or turbinate resection. AR guides do not include nowadays STP as therapeutic possibility, as its outcomes do not resulted as satisfactory as in patients that only show DS (9).

Some authors as Youn HyoKim et al. (2011) studied in two different AR groups how STP and turbinoplasty or turbionplasty alone affected to patient´s evolution disease (10). In this study they observed a medication reduction in both groups and better scores in VAS (visual analogue scale), although there was no airflow measurement.

Current guides of AR underscore the necessity of research regarding the role of STP in the treatment of AR (11).

Our main objective is to evaluate

Material and methods: **Patients**

Study Design: This will be a prospective quasi experimental non-randomized controlled pre and post-test study. Informed consent (see page 5) will be obtained from all patients in accordance with the Declaration of Helsinki of 1975, revised in 2013. This study has been approved by the Regional Research Ethics Committee of Galicia (Ref: 2015/280).

Patients will be recruited in January 2021 and operated in Allergology and Otorhinolaryngology service in CHUAC (A Coruña University Hospital) in January 2021.

Inclusion criteria: patients aged 18-65, diagnosed with AR and DS, will be recruited. DS will be determined by rhinoscopy findings. AR diagnosis will be stablished clinically (history and physical examination) and testing for specific allergen sensitization (positivity > 3 mm). Studied allergen will be pollen, dust mite and fungi. Symptoms of AR should have at least 1 year evolution. AR Classification will be performed according to Aria 2008 (12), as "Intermittent AR" (less than 4 days per week symptoms) and "Permanent AR" (more than 4 days per week symptoms).

Patients with none of these symptoms will be recorded as mild nasal obstruction: sleeping disorders, daily activity impairment, absence with work or school. If the patient had any of those symptoms were classified as moderate-severe nasal obstruction.

Exclusion criteria: Patients with less than 1-year AR symptoms, patients treated with specific immunotherapy against allergen, patients undergoing simultaneous surgical procedure (e.g. turbinate reduction), smokers, chronic obstructive pulmonary disease, psychiatric disorders, malignant tumours, severe hepatopathy, obstructive sleep apnoea, previous nasal surgery.

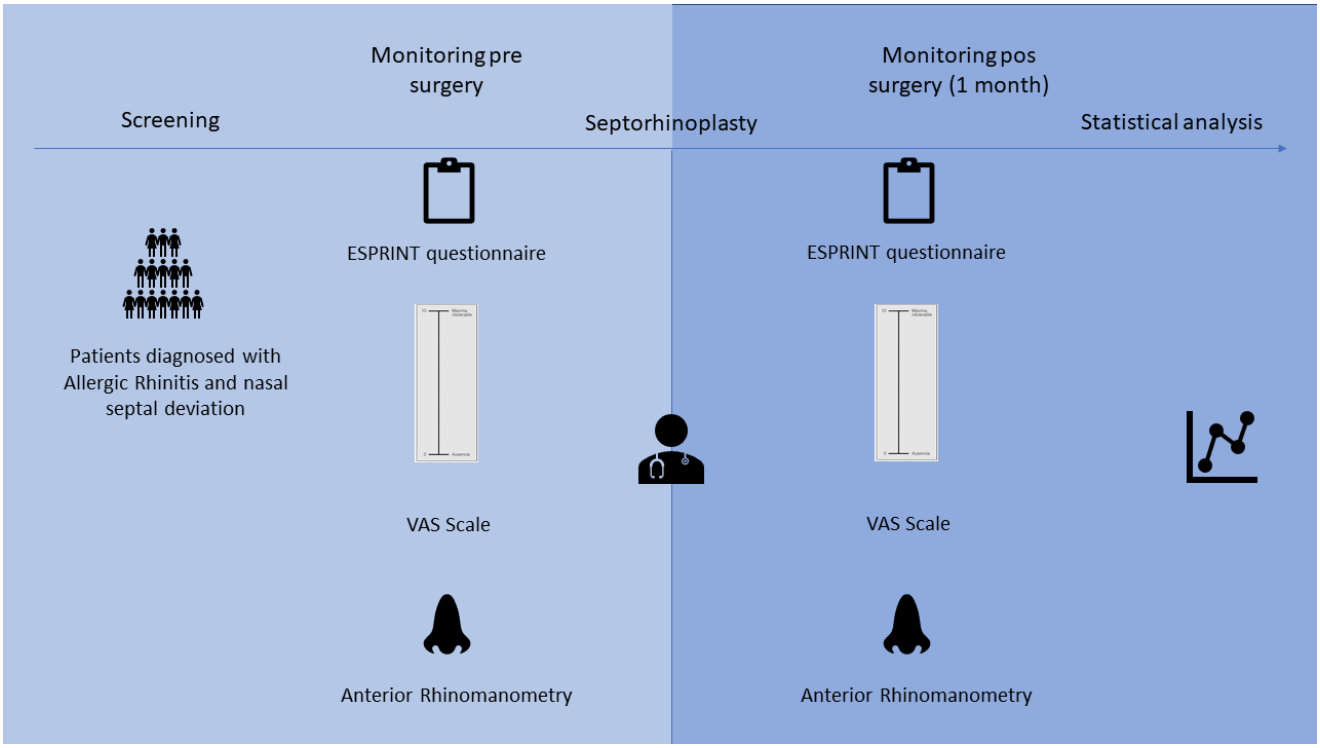
Intervention: patients will be screened and surgical procedure will be performed by the same surgeon. Variables will be collected from clinical history before and one month after surgery.

After screening, patient´s obstruction will be evaluated by anterior rhinomanometry (aRNM) (cm^3/s) with Rhinospir Pro-165 Sibelmed® (Barcelona, Spain). Classification from mild, moderate, severe or very severe will be determined according to Rhinomanometric grading.

Quality of life (QoF) will be scored through ESPRINT scale. ESPRINT is a validated Spanish questionnaire about daily life activity, sleep, psychology and affection´s perception in AR patients (13).

Symptoms like sneezing, itchy nose, ocular symptoms and nasal obstruction will be evaluated with visual analogue scale (VAS) and clinical history. VAS score will be classified as mild (1-3), moderate (4-6) and severe (7-10).

Medication (intranasal corticosteroid, ant leukotrienes, antihistamine eye drops, antihistamine) and its frequency (less than 2 intakes per week or more than 2 intakes per week) will also be registered.



Statistical analysis Plan

Sample size justification: If we estimate in relation to the response variable "severity" that 60% of the patients before the intervention present moderate-severe rhinitis and this percentage is expected to be reduced to 30% after 12 months, 51 patients would be needed to detect this difference as statistically significant with 95% certainty, a statistical power of 80% before a bilateral approach of paired data.

All data will be collected in a data base and analysed with SPSS version 20.0 (SPSS Inc. Chicago, Illinois).
Deviation (SD) or interquartile range will be used to describe quantitative variables. For categorical variables, the frequency and percentage will be used. Sample normality will be assessed using the Kolmogorov-Smirnov test. The univariate analysis will be used for comparing measures, either the Student´s t-distribution or the Mann Whitney U test depending on the application conditions; for comparing proportions, the chi-squared test or Fisher´s exact test will be used. A correlation study will be carried out between quantitative variables using the Fisher or Spearman´s statistical test, according to the application conditions. Significance will be set at $p < 0.05$.

INFORMED CONSENT

STUDY TITLE: IMPACT ON THE CLINICAL COURSE OF ALLERGIC RHINITIS AFTER SEPTOPLASTY.

RESEARCHER: VANESA GARCÍA PAZ

CENTER: CHUAC

The purpose of this document is to provide you with information about a research study in which you are invited to participate. This study was approved by the Research Ethics Committee of the Galician Health Sciences.

If you decide to participate in it, you should receive personalized information from the researcher, read this document first, and ask all the questions you need to understand the details about it. If you wish, you can take the document with you, consult with others, and take the time to decide whether or not to participate.

Participation in this study is completely voluntary. Vd. you may decide not to participate or, if you agree to do so, change your mind by withdrawing consent at any time without obligation to give explanations. We assure you that this decision will not affect the relationship with your doctor or the health care that you. you are entitled.

What is the purpose of the study?

With this study we try to see if the septoplasty surgery you are going to undergo for your septal deviation, modifies the clinical course of your allergic rhinitis. Check if after surgery you will have fewer symptoms of allergic rhinitis, use less medication and ultimately, if you are feeling better, if you have a better quality of life than before surgery. We therefore need the voluntary participation of people like you who have allergic rhinitis and are going to undergo septoplasty surgery for their septal deviation or have already been operated on for it.

Why do they offer to participate in me?

You are invited to participate because you suffer / are diagnosed with allergic rhinitis and you are also waiting to be operated on for septoplasty due to your septal deviation or have already been operated on for septoplasty.

What does my participation consist of?

Your participation in this study does not vary from the usual clinical practice in terms of hospital visits, you will go to the consultation before surgery with the otolaryngologist and in that consultation we will take the opportunity to pass a quality of life questionnaire before surgery, also a test called rhinomanometry it is already usually done to patients who are going to have septoplasty surgery to check what the nasal respiratory flow is like before the operation and they will be asked about the medication they use for allergic rhinitis.

After the surgery you will go for check-ups with your otolaryngologist and on one of these visits, approximately one year after the surgery, you will have the rhinomanometry repeated, we will ask you again about the medication you use for allergic rhinitis and again you will be asked to fill in a quality of life questionnaire for patients with allergic rhinitis.

Your participation will have an estimated total duration of: the time it takes to complete the quality of life questionnaire in patients with allergic rhinitis that only takes a few minutes because the rhinomanometry test and questions about how you are and the medication you use are part of medical history and tests at regular consultation.

What inconveniences or inconveniences does my participation have?

Your participation in the study should not be a nuisance or too much of an inconvenience for you, except in the case of completing a quality of life questionnaire in patients with allergic rhinitis, which consists of 15 questions about how you feel about your rhinitis symptoms..

Will I get any benefit from participating?

You are not expected to get direct benefit by participating in the study. The research aims to uncover unknown or unclear aspects about the changes that septoplasty surgery can produce in the clinical course of allergic rhinitis. This information may be useful in the future for other people.

Will I receive the information obtained from the study?

If desired, a summary of the study results will be provided.

Will the results of this study be published?

The results of this study will be sent to scientific publications for dissemination, but no data will be transmitted that could lead to the identification of participants.

How will the confidentiality of my data be protected?

The processing, communication and transfer of your data will be carried out in accordance with the provisions of Organic Law 15/1999, of 13 December, on the protection of personal data. At all times, you you may access, oppose, correct or cancel your data by requesting it from the researcher. This will not be possible in the event that they are collected anonymously or will be anonymized after collection.

Only the research team, and the health authorities, who have a duty to maintain confidentiality, will have access to all the data collected by the study. Information that cannot be identified may be transmitted to third parties. In the event that any information is transmitted to other countries, it will be carried out with a level of data protection equivalent, at least, to that required by the regulations of our country.

Your data will be collected and stored until the end of the study as follows:

- Anonymized, that is, that any link that could identify the donor of the data has been broken, and cannot be identified even by the research team.

The person in charge of data custody is Vanesa García Paz. At the end of the study the data will be anonymized (will not apply if they have already been collected anonymized).

Are there economic interests in this study?

The researcher will not receive specific remuneration for dedication to the study.

You will not be reimbursed for participating. No commercial products or patents will be derived from the results of the study.

How to contact the research team of this study?

You can contact Vanesa García Paz at the email address vanesa.garcia.paz@sergas.es.

Thank you so much for your collaboration.

References

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