

Patient experience of nasal obstruction and its clinical assessment

L Nip BSc¹, M Tan^{1,3}, K L Whitcroft MBChB (Hons) BSc MRCS DOHNS^{1,2}, R Gupta BSc¹, T S Leung PhD³, P Andrews FRCS^{1,2}

1. Department of Rhinology and Facial Plastic Surgery, Royal National Throat Nose and Ear Hospital, London, UK
2. UCL Ear Institute, London, UK
3. Department of Medical Physics and Biomedical Engineering, University College London, UK

Corresponding author: KL Whitcroft, Department of Rhinology and Facial Plastic Surgery, Royal National Throat Nose and Ear Hospital, 330 Gray's Inn Road, London, WC1X 8DA, UK

k.whitcroft@gmail.com

07985985132

Category: main article

Reference no. JLO17444

Electronic reference no. 100009239

Accepted for publication: 28 June 2017

Accepted for publication: 28.6.17

Competing interests: none declared

Mr L Nip responsibility for the integrity of the content of the paper

Abstract

Background:

Correlation between objective and subjective nasal obstruction is poor and dissatisfaction rates after surgery for nasal obstruction are high. Accordingly, novel assessment techniques may be required. The aim of this survey was to determine patient experience and preferences for the measurement of nasal obstruction.

Materials and Methods:

Prospective survey of rhinology patients.

Results:

Seventy-two questionnaires were distributed (response rate of 83%). Duration of obstruction (>1 year) ($\chi^2=13.5$, $p=0.00024$), but not severity of obstruction affected willingness to spend more time being assessed. Questionnaires (48%) and nasal inspiratory peak flow (53%) are most commonly used assessment techniques. 49% of participants found their assessment unhelpful in understanding their obstruction. 82% agreed/strongly agreed that a visual/numerical aid would help them understand their blockage.

Conclusions:

We found that: many patients are dissatisfied with current assessment techniques: a novel device with visual/numerical results may help: duration of obstruction determines willingness to undergo longer assessment.

Key Words: Nasal Obstruction, Clinical Assessment

Introduction

In the UK, the prevalence of nasal blockage is estimated to be just over 30% with the majority of cases being inflammatory: allergic rhinitis accounts for two thirds of cases¹, chronic rhinosinusitis one third² and structural abnormalities (e.g. deviated nasal septum) a small minority.

There is currently no clear consensus amongst otolaryngologists as to standard assessment methods for nasal blockage. Moreover, 30% of patients are dissatisfied following surgery for obstruction³. This highlights the need to improve evaluation of nasal patency and in particular, to better address patient concerns and education regarding their condition and potential treatment.

The primary aim of this patient survey (end-user questionnaire) was to determine the experience and preferences of patients in the assessment of their nasal blockage in clinic. We attempt to explore what methods were used to investigate their nasal blockage, their satisfaction with current methods, and how to improve understanding of their obstruction. The secondary aims of the study were to determine how long patients suffer with nasal obstruction and whether or not they would be willing to spend more time in clinic for its assessment.

Materials and Methods

Seventy-two questionnaires were distributed to patients with nasal obstruction under the care of the senior author between January and August 2016. The questionnaire was distributed at the same time as the SNOT22, the Nasal Obstruction Symptom Evaluation score and VAS, and was completed before consultation with the clinician.

The questionnaire contained closed format questions of multiple choice, Likert, dichotomous or visual analogue scale form. Ethical approval was submitted at the time of the study. Verbal consent was obtained from all patients. No financial incentives were offered for participating in the study.

The revised end-user questionnaire attempted to explore three domains:

1. Components of the patients' history
 - a) How long they have had nasal blockage for
 - b) The side their blockage feels worse on
 - c) Severity of their nasal blockage
 - d) Any previous nasal surgery
 - e) Whether or not nasal blockage had been assessed previously

2. Investigations undertaken to assess their nasal blockage
 - a) Which subjective and objective measures were performed
 - b) How long it took to perform these measures
 - c) Whether or not these investigations helped them understand their blockage
 - d) How much extra time they would be willing to spend in clinic to have their blockage further assessed

3. What would help the patient understand their blockage
 - a) A number representing their blockage

- b) A visual aid to represent their blockage
- c) Both number and visual aid

All data collected were anonymised and analysed using Microsoft excel. Chi-square tests were performed on the data using the chi-squared function on a 'Casio fx-85GT PLUS' model calculator, with a p-value of <0.05 taken as statistically significant.

Results and Analysis

Out of 72 questionnaires distributed, 60 were completed (response rate of 83%). However, for those questionnaires completed, some questions were either left unanswered or were illegible or unable to interpret. The mean completion rate for the questions was 87% with a standard deviation of 11.8%.

[Figure 1: Results from the first domain of questions enquiring about the patients' nasal blockage history]

78% of respondents had experienced nasal blockage for over 1 year. Two thirds of patients had previously sought help for their blockage and with 51% having had previous surgery.

Where duration of nasal obstruction was more than 1 year, patients are more willing to spend time (defined as at least 10 minutes) on an assessment (χ^2 -value = 13.5, p-value = 0.000243). Interestingly, we found that severity of nasal blockage (defined as greater than 5.0 on the VAS), has no effect on the willingness of patients to more spend time in clinic (χ^2 -value = 0.076, p-value = 0.783). The data is shown in figures II and III.

[Figure 2: Duration of nasal blockage and willingness to spend time on assessment]

[Figure 3: Severity score of nasal blockage (out of 10) and willingness to spend time on assessment]

Table 1 depicts the different methods of assessment that patients have undertaken. Out of 58 respondents for this question, 20 had never undergone any form of assessment for their nasal blockage. The remaining 38 respondents had undergone assessment with at least one of the current available methods. We found that questionnaires and nasal inspiratory peak flow are the methods most commonly used to assess nasal blockage. Conversely, spatula misting is infrequently used and acoustic rhinometry/rhinomanometry is rare. When asked whether or not these measurements were useful in understanding their blockage, 51% reported that they were useful and 49% not useful.

[Table 1: Methods of assessment undergone by patients]

Using a Likert scale to investigate the third domain – what would help the patient understand their blockage – the following data were produced. 69% of patients agreed or strongly agreed a number aid would help. 73% agreed or strongly agreed a visual representation would help and 82% for both a number and visual aid. This is shown in table 2.

[Table 2: Helpfulness of assessment techniques in understanding obstruction}

Discussion

Key findings

The primary aim of this study was to determine patient experience and preferences for the measurement of nasal obstruction.

There has been a general under-utilisation of objective methods across the UK in the assessment of nasal patency predominately due to lack of availability, time consumption and weak correlation with symptom scores⁴. From this survey of our tertiary referral centre, we have shown there is good uptake of subjective questionnaires and objective methods such as the nasal inspiratory peak flow, perhaps in part due to better availability of the latter resource. However, only 51% of participants found these methods useful in understanding their blockage. Spatula misting which often helps patients understand blockage was used only in 42% of cases. Although when done, it was done in conjunction with other methods, suggesting that it was done as a supplementary test to help patients understand other results. We have found that a large group of patients are dissatisfied with current methods.

When asked whether having both a numerical and visual aid together would help in understanding their blockage, the vast majority (82%) either agreed or strongly agreed. A large majority also agreed or strongly agreed for a visual representation and for a numerical representation separately (73% and 69% respectively). Of the methods commonly used during consultation, only the spatula misting provides a visual representation and only the nasal inspiratory peak flow provides a numerical representation of patency. Acoustic rhinometry and rhinomanometry were rarely used. Thus a tool to help educate patients would ideally provide both a visual and a numerical representation of the obstruction.

We found 78% of patients have experienced nasal blockage for over 1 year with two thirds of cases previously seeking help for their problem and a half having had prior surgery. This highlights the chronic burden nasal blockage has on patients. We have also shown that patients with longer durations of nasal obstruction (over 1 year) are more willing to undergo longer assessment (more than 10 minutes), as compared to those with a higher degree of obstruction

Comparison with other studies

To our knowledge, this is the first study to specifically address patient experience and preferences for measurement of nasal obstruction.

Study limitations

Data was only collected from one centre, potentially introducing selection bias regarding patient demographics and conditions assessed. The voluntary nature of the questionnaire could also have introduced a selection bias, targeting more motivated individuals; however given that the questionnaires were completed on different days, at different times by a variety of patients arriving at clinic, this helps to mitigate the effect and attempts to ensure a more random process. In addition, a response rate of 83% and a completion rate of 87% were reasonable. Patients involved included a mix of both follow-up as well as new patients. This may have caused significant bias regarding which techniques were used and also the patient response towards less/more familiar techniques in the question stem. For the referral centre where the study took place, it was a standard measure to give patients subjective symptom scores and perform the nasal inspiratory peak flow.

Clinical applicability of the study

This study has provided an overview of the patient experience during their initial assessment of nasal obstruction. It gives insight into the various methods used in assessing nasal blockage and relative lack of educational value they offer the patient. Consequent lack of patient understanding both at the level of their own pathology, and also at the investigative and treatment level may contribute towards weak correlations observed between subjective and objective measures of nasal patency. It may also potentially contribute towards high patient dissatisfaction rates following surgery for nasal obstruction. There could therefore be an argument to improve satisfaction rates by educating the patient during their rhinological journey.

In particular, there is a need to reassure a subset of patients who feel subjectively blocked (and comment so on subjective symptom scores) but have patent airways on examination and on objective measures.

Acoustic rhinometry, rhinomanometry and nasal inspiratory peak flow⁵⁻⁷ are used for both clinical and research purposes. However, none of these techniques are able to simultaneously assess resting breathing, without being user-dependent, expensive or time-consuming.

The results of this study may therefore support development of a novel assessment device. Such a novel assessment device must be capable of providing an objective evaluation of nasal airflow, which correlates with the patients' subjective experience of blockage and allows the patient and clinician to understand (both visually and numerically) their pathology during resting nasal breathing. In addition, it should be a quick and easy test to perform and should allow measurement of non-forced resting breathing, capable of assessing both nostrils

independently. Direct real-time comparison of unilateral nasal aerodynamics would be of great use in planning surgery for septoplasty or functional septorhinoplasty, and also for assessing post-operative outcomes in clinical practice and research.

Given our results, further development of a patency assessment tool could also potentially aid the general practitioner. A cheap and accurate diagnostic tool looking at normal resting breathing which correlates with subjective sensation would be invaluable in terms of reducing the time to referral in complex cases as well as providing an accurate and definitive test for simpler cases. In both scenarios, a device such as this would give confidence to the physician that the patient has been set on the right path. We are currently conducting a further study to investigate the requirements of such a device if it were to be used in general practice, aiming to explore what features would appeal to general practitioners given the different timescales and resources available to them.

Conclusion

We have found that 1) a large group of patients are dissatisfied with current clinical objective measures, 2) a novel device with visual and numerical results can serve to better explain nasal blockage in simple terms and 3) duration of nasal blockage is the driver behind a patient's willingness to spend more time in clinic, not the severity of blockage.

References

1. Pawanker R, Canonica G, Holgate S, Lockey R. World Allergy Organization (WAO) white book on allergy, 1st ed. United Kingdom. 2011
2. Fokkens WJ, Lund VJ, Mullol J, Bachert C. EPOS 2012: European position paper on rhinosinusitis and nasal polyps 2012. A summary for otorhinolaryngologists. *Rhinology* 2012;50:1-12
3. Konstantinidis I, Triaridis S, Triaridis A, Karagiannidis K, Kontzoglou G. Long term results following nasal septal surgery. *Auris Nasus Larynx* 2005;32:369-374
4. Andrews PJ, Jacques T, Nip L, Li CH, Leung T. A UK survey of current ENT practice in the assessment of nasal patency. *J Laryngol Otol* 2016 Manuscript accepted for publication
5. Hilberg O. Objective measurement of nasal airway dimensions using acoustic rhinometry: methodological and clinical aspects. *Allergy* 2002;57:5-39
6. Clement PA, Halewyck S, Gordts F, Michel O. Critical evaluation of different objective techniques of nasal airway assessment: a clinical review. *Eur Arch Otorhinolaryngol* 2014;271:2617-25
7. Chaves C, de Andrade CR, Ibiapina C. Objective measures for functional diagnostic of the upper airways: practical aspects. *Rhinology* 2014;52:99-103

Summary

- Objective and subjective measures of nasal obstruction often correlate poorly, and novel assessment techniques may be of benefit.
- To our knowledge, no other studies have investigated patient experience or preferences for the clinical assessment of nasal obstruction - this is needed to guide future innovation.
- Patients are dissatisfied with current assessment techniques.
- Duration of obstruction, rather than severity, affects patients' willingness to undergo more in-depth clinical assessment.
- A novel device with visual/numerical results would help patients to understand their nasal obstruction.

Figures and Tables

Figure 1: Results from the first domain of questions enquiring about the patients' nasal blockage history

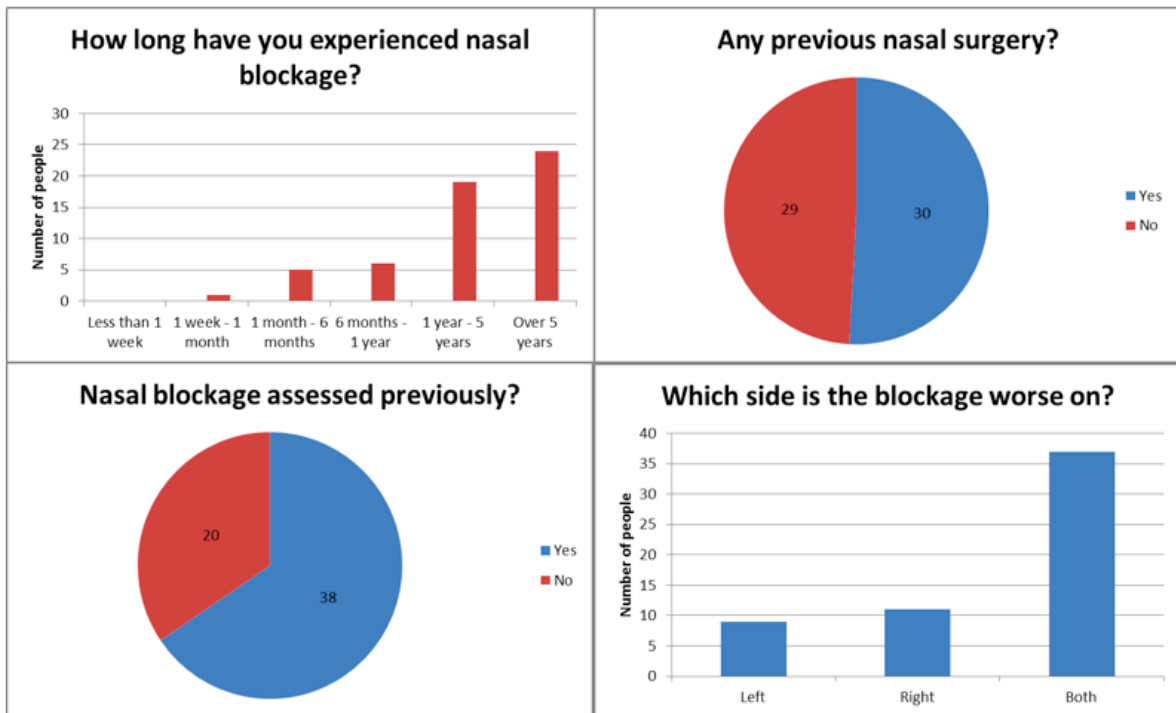
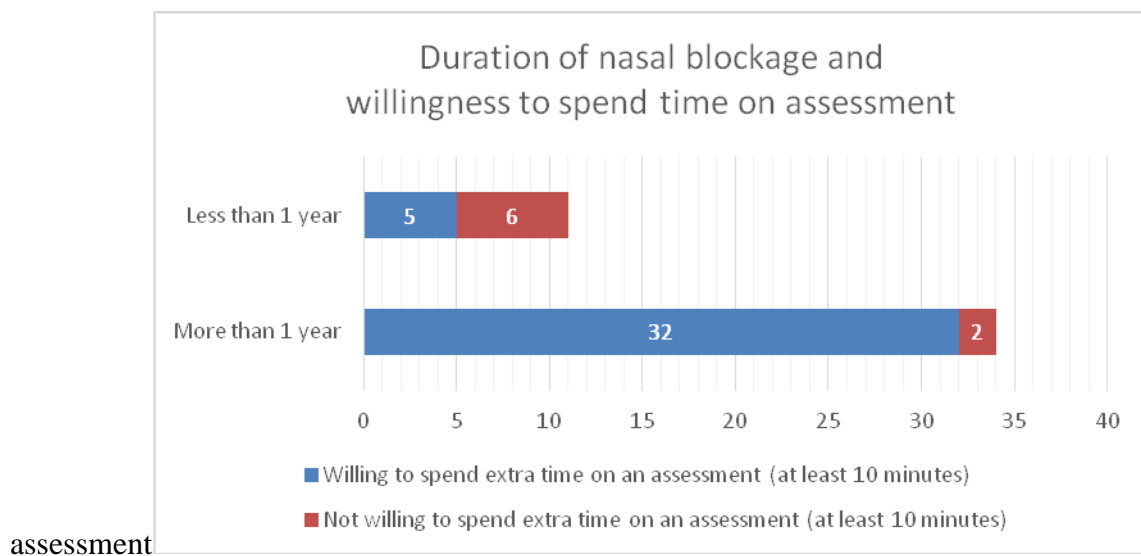


Figure 2: Duration of nasal blockage and willingness to spend time on



assessment

Figure 3: Severity score of nasal blockage (out of 10) and willingness to spend time on assessment

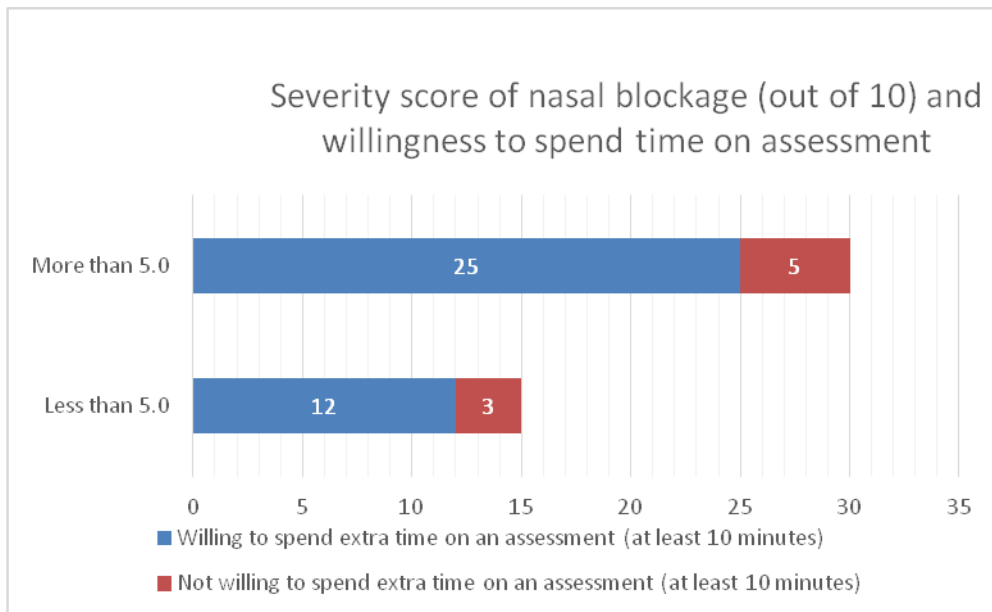


Table 1: Methods of assessment undergone by patients

Method of assessment of nasal blockage	Number of respondents who have had their nasal blockage assessed by this method
Questionnaires	28
Nasal Inspiratory Peak Flowmeter	31
Spatula Misting	16
Acoustic Rhinometry	3
Rhinomanometry	3

Table 2: Visual, numerical or visual and numerical aid as beneficial for understanding

Is this method of assessment useful in understanding the extent of the nasal blockage?	Method of Assessment		
	<i>Number Aid</i>	<i>Visual Aid</i>	<i>Number and Visual Aid</i>
Agree/Strongly Agree	33	35	36
Neutral	13	9	7
Disagree/Strongly Disagree	2	4	1
Total Respondents	48	48	44