The Journal of Laryngology and Otology
December 1995, Vol. **109,** pp. 1163–1165

Sleep nasendoscopy: what benefit to the management of snorers?

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Abstract

It has been proposed that sleep nasendoscopy (SN) will improve the success rate of the uvulopalatopharyngoplasty operation by identifying those patients with palatal snoring. The aim of this study was to test the efficacy of SN in the management of snorers who do not have obstructive sleep apnoea. This study compared a group of 26 snorers managed without SN (group A) to a group of 27 snorers managed with SN (group B). The post-operative results of group A were 61 per cent cured, 27 per cent better and 8 per cent unchanged. Group B results were 76 per cent cured, 19 per cent better and 5 per cent unchanged. However, if patients with only palatal snoring had surgery, the results for group B would have been 94 per cent cured, 6 per cent better and 0 per cent unchanged (95 per cent C.I. of difference $+0.14, +0.54$, $p = 0.017$). The results confirm the predictive power of SN in identifying success following uvulopalatopharyngoplasty. A simple grading system is suggested to aid in treatment planning. Patients are divided into three categories on SN: palatal snorers, mixed snorers and non-palatal (tongue base) snorers. It is proposed that uvulopalatopharyngoplasty may cure palatal snorers but mixed snorers will need additional therapies to eliminate their snoring although uvulopalatopharyngoplasty may improve the symptoms.

Key words: Snoring, diagnosis, surgery

Introduction

Sleep nasendoscopy was first developed by Croft and Pringle (1991). It allows direct visualization of the upper respiratory tract during snoring. Since then the same authors have developed a grading system which they feel may be useful in the selection of patients for uvulopalatopharyngoplasty (Pringle and Croft, 1993). The technique itself involves the services of an anaesthetist and not a sedationist (according to Royal College of Surgeons guidelines, 1993), cardio-pulmonary resuscitation facilities and a recovery area. The patient requires to be in hospital for approximately four hours and to be taken home by a responsible adult. The aim of this study was therefore to assess the efficacy of the technique in a controlled manner.

Method

We performed a retrospective analysis of all uvulopalatopharyngoplasty patients treated at the Christie Hospital NHS Trust, Manchester between 1991 and 1993. The technique used was similar to that described by Sharp *et al.* (1990) which is a variation of the original procedure by Fujita *et al.* (1981) where the tonsils and a rim of palate (including the uvula) are excised, in our case, with the CO_2 laser and the defect closed with catgut sutures. All operations were carried out by the same surgeon, who had previously trained in the technique, or under the direct supervision of the same surgeon by the same method.

Overnight pulse oximetry was carried out on all patients prior to listing for surgery. The oximetry trace was scored by an experienced physician, for recurrent oxygen desaturation associated with cyclical variation in heart rate. Only patients with entirely normal overnight oxygen saturation studies were classified as 'simple snorers' and included in the study.

Sleep nasendoscopy was introduced in August 1992 and became a standard pre-operative investigation. Therefore all patients seen before this date were listed for uvulopalatopharyngoplasty without sleep nasendoscopy and all those listed after August

TABLE I
PRINGLE/CROFT GRADING SYSTEM FOR SNORERS

Grade	Description
Grade 1	Simple palatal snoring
Grade 2	Single level palatal obstruction
Grade 3	Multisegment involvement
Grade 4	Sustained multisegment collapse
Grade 5	Tongue base level obstruction

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Accepted for publication: 3 September 1995.

TABLE II
COMPARISON OF NON-SLEEP NASENDOSCOPY (GROUP A) TO SLEEP NASENDOSCOPY (GROUP B)

Result	Group A	Group B
Cured	61% (16)	76% (16)
Better	27% (7)	19% (4)
Unchanged	8% (2)	5% (1)

For cured category, 95% C.I. of the difference: −0.11,+0.41 $p = 0.28$.

1992 had sleep nasendoscopy prior to listing for surgery. At sleep nasendoscopy, record was made of the anatomical structure responsible for the snoring and the degree of obstruction. Later, these results were re-analysed according to the grading system recommended by Pringle and Croft (1993). All patients were reviewed at six weeks and six months after surgery and it was possible to divide the results into three groups: cured, better or unchanged.

Results

Fifty-three patients were included in the study. Twenty-six patients (group A) were seen prior to the introduction of sleep nasendoscopy and all had uvulopalatopharyngoplasty. Twenty-seven patients (Group B) had sleep nasendoscopy as part of their pre-operative investigations and 21 of these had uvulopalatophayngoplasty. Of the other six patients, one did not attend for surgery, one did not snore under sedation despite 65 mg of intravenous midazolam and the rest were found to have predominantly tongue base snoring and were therefore offered conservative measures.

Table II displays the snoring results of the two groups. When the cure rates are compared the 95% confidence interval of the difference is not significant ($-0.11, +0.41, p = 0.28$). The snoring results of group B are tabulated against the Pringle/Croft grading system (Table III). Four of the nine patients in group A who were not cured by uvulopalatopharyngoplasty had post-operative sleep nasendoscopy which revealed tongue base snoring in two, epiglottic snoring in one and micrognathia with tongue base collapse in one.

Discussion

The results in this study demonstrate an improvement in cure rate when sleep nasendoscopy is included in the pre-operative work-up. However, the results do not achieve statistical significance. If the patients with only (Pringle/Croft) grade one or two sleep nasendoscopy had been treated with uvulopalatopharyngoplasty, the results would have been much improved (Table IV). When the cure rates are now compared the 95% confidence interval of the difference is significant ($+0.14, +0.54, p = 0.017$). This supports the Pringle/Croft grading system as a predictor of cure following uvulopalatopharyngoplasty for simple snorers.

TABLE III
UVULOPALATOPHARYNGOPLASTY RESULTS COMPARED TO SLEEP NASENDOSCOPY (PRINGLE/CROFT) GRADE

Result	Grade One	Two	Three	Four	Five
Cured	14	2			
Better	1		3		
Unchanged			1		
No Surgical treatment			1	3	

TABLE IV
COMPARISON OF NON-SLEEP NASENDOSCOPY (GROUP A) TO SLEEP NASENDOSCOPY (GROUP B) GRADE 1 AND 2 (PRINGLE/CROFT)

Result	Group A	Group B (selected)
Cured	61% (16)	94% (16)
Better	27% (7)	6% (1)
Unchanged	8% (2)	0% (0)

For cured category, 95% C.I. of the difference: +0.14,+0.54 $p = 0.017$.

Our results confirm the feeling first put forward by Pringle and Croft that uvulopalatopharyngoplasty alone will not cure the patients who have grade three, or greater, sleep nasendoscopy results. However, the same authors suggest that these patients have more severe snoring as fewer declined to attend for uvulopalatopharyngoplasty. Grade Three and Four patients therefore provide a therapeutic challenge. They may well be improved by surgery but is this better performed before other therapy, e.g. weight loss, when the result will not be a cure? Or should they be given a trial of the various medical therapies available prior to surgery? There is no evidence to support either of these two strategies at present. If patients accept the practice, it would be more economical to perform sleep nasendoscopy and immediately proceed to uvulopalatopharyngoplasty if appropriate.

Aided by the findings in this study, the grading system of Pringle and Croft could be simplified into three grades for patients with simple snoring: Grade One: palatal snoring; Grade Two: mixed snoring; Grade Three: non-palatal (tongue base) snoring. The management of each grade could be: Grade One: uvulopalatopharyngoplasty alone; Grade Two: medical treatment combined with uvulopalatopharyngoplasty; Grade Three: contraindication to uvulopalatopharyngoplasty. Medical treatment, e.g. weight loss, mandibular advancement prosthesis or nasal continuous positive airway pressure (CPAP). Various surgical therapies as used in obstructive sleep apnoea, may be considered, e.g. nasal surgery, tonsillectomy, laser to tongue base, maxillary or mandibular osteotomy, hyoid advancement and tracheotomy.

Sleep nasendoscopy is a good predictor of cure following uvulopalatopharyngoplasty for snoring. Adding it to the pre-operative work-up will reduce the total number of operations performed which will probably pay for the extra expense of carrying out the investigation.

Acknowledgements

The authors wish to thank Dr Patricia Stone and Dr Ashley Woodcock of the Sleep Laboratory, Wythenshawe Hospital for their assistance with the

snoring programme and this paper. We also appreciate the help of Karen Worrall in collecting the data.

References

Croft, C. B., Pringle, M. B. (1991) Sleep nasendoscopy: a technique of assessment in snoring and obstructive sleep apnoea. *Clinical Otolaryngology* **16:** 504–509.

Fujita, S., Conway, W., Zorich, F., Roth, T. (1981) Surgical correction of anatomic abnormalities in obstructive sleep apnoea syndrome: uvulopalatopharyngoplasty. *Otolaryngology–Head Neck Surgery* **89:** 923–934.

Pringle, M. B., Croft, C. B. (1993) A grading system for patients with obstructive sleep apnoea—based on sleep nasendoscopy. *Clinical Otolaryngology* **18:** 480–484.

Royal College of Surgeons of England (1993) Commission on the Provision of Surgical Services: Report of the Working Party on *Guidelines for Sedation by Non-anaesthetists.*

Sharp, J. F., Jalaludin, M., Murray, J. A. M., Maran, A. G. D. (1990) The uvulopalatopharyngoplasty operation: the Edinburgh experience. *Journal of the Royal Society of Medicine* **83:** 569–570.

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