Treatment of Snoring

JMAJ 46(3): 133–138, 2003

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Abstract: For proper treatment of snoring, it is important to perform inquiry, inspect the nasal cavity, pharynx and larynx, and hear the snoring sound by using a tape recorder. If sleep apnea syndrome (SAS) is suspected, overnight monitoring is performed. Dynamic MRI during sleep and upper airway endoscopy are very useful in the determination of sites responsible for snoring and SAS for the selection of an appropriate therapeutic method. Treatment of snoring is broadly classified into two major methods, conservative treatment and surgical treatment. Conservative treatment is indicated for the following cases: (1) high-degree obesity, (2) elderly patients or patients with heart diseases, (3) when improvement is not expected, and (4) when the patient is unwilling to undergo surgery. Conservative treatment includes (1) guidance of living, (2) medication, (3) nasal CPAP, and (4) use of dental appliances. Surgical treatment includes (1) intranasal operation, (2) UPPP (uvulo-palato-pharyngoplasty), (3) LAUP (laser-assisted uvulopalatoplasty), (4) LMG (laser midline glossectomy), (5) tonsillectomy/adenoidectomy (especially for children) and (6) tracheotomy. It is important to select the proper method strictly based on the outcome of diagnosis.

Key words: Snoring; Surgical treatment; Sleep apnea syndrome (SAS); Nasal CPAP (continuous positive airway pressure); Dynamic MRI

Introduction

In times bygone, snoring was regarded as a symbol of a great man and large snoring sound was considered to reflect deep sleep. However, snoring, as matter of fact, is associated with two problems.

The first problem is that loud snoring produces noise during night when it should be naturally quiet. The person himself is usually unaware of his snoring, but his snoring disturbs the sleep of his/her bed partner or family. In addition, when a snorer goes traveling with his/her friends or coworkers, he/she may be secretly worried whether his snoring would be hated or ridiculed.

The second problem is that loud every night snoring is suspected to be associated with sleep

This article is a revised English version of a paper originally published in the Journal of the Japan Medical Association (Vol. 127, No. 1, 2002, pages 74–78). The Japanese text is a transcript of a lecture originally aired on August 17, 2001, by the Nihon Shortwave Broadcasting Co., Ltd., in its regular program “Special Course in Medicine”.

Snoring
apnea syndrome (SAS). In other words, snoring is an inevitable symptom of SAS. In the presence of SAS, sleep is divided into fractions. This results at times in daytime somnolence and also affects the circulatory disorders including hypertension and heart disease.1-3)

Diagnosis and Examinations for Treatment of Snoring

Investigation for the causes of snoring requires inquiry, inspection (nasal cavity, oral cavity and pharynx), hearing of snoring sound, and monitoring of nocturnal sleep. Moreover, upper airway endoscopy and dynamic MRI under drug-induced sleep have to be performed.

1. Inquiry

Presence or absence of nasal obstruction, midnight awakening, early morning headache, daytime sleepiness, and fatigability are inquired.

2. Inspection

It is important to observe the condition of the nasal cavity, oral cavity, and pharynx to examine for the presence of any abnormality. Severe nasal obstruction is observed in some cases, and the cause is repletion of bilateral nasal cavities with polyps that induce mouth breathing and obstruction at the root of tongue in inspiration during nocturnal sleep. In these cases, snoring and/or SAS are expected to improve following polypectomy. If inspection reveals severe hypertrophy of tonsils, snoring and SAS are attributable to the hypertrophy of tonsil in both children and adults, and dramatic elimination of snoring and SAS is, therefore, frequently experienced after tonsillectomy.

3. Hearing of snoring sound

To determine the severity of snoring and the type of snoring, ‘vibratory type’ or ‘stenotic type,’ it is therapeutically useful to ask the patient to record his snoring sound during sleep at home using a tape recorder and to bring the tape to the clinic for reference during treatment.

4. Examinations

At the author’s clinic, patients are hospitalized for 1 to 2 nights to perform overnight monitoring by polysomnography to examine the presence or absence of SAS and the severity of snoring.

In addition, dynamic MRI and upper airway endoscopy are performed under drug-induced sleep to determine the site responsible for snoring and SAS.4) Dynamic MRI examination requires an expensive instrument and is available only at limited facilities, while the upper airway endoscopy is relatively easy to perform and is very useful in the determination of the therapeutic method.

Actual Treatment of Snoring

Treatment of snoring is broadly classified into two types, namely conservative and surgical treatments.
1. Conservative treatment

Conservative treatment is classified into pharmacotherapy and treatment without medication. (Table 1)

(1) Pharmacotherapy

Pharmacotherapy is indicated in the following cases: (1) Patients with high-degree obesity, (2) elderly patients or patients with heart disease in whom operation is contraindicated, (3) when it is not known whether any surgical treatment is available, (4) when the patient is unwilling to undergo operation.

As a pharmacotherapy of snoring associated with obesity, mazindol (Sanorex) is covered by national health insurance for patients with a high-degree of obesity index of 70%, or BMI (body mass index) of 35 or higher after 1992. In other words, pharmacotherapy is applicable to clinical treatment as an auxiliary therapy for diet therapy and exercise therapy. In addition, Chinese medicines including Bofu-tsu-sei-san, Dai-saiko-to, and Boui-ou-shi-to are used to achieve weight reduction.

For snoring associated with nasal allergy, nasal drops of a vasoconstrictor agent before bedtime are effective for the treatment of nasal obstruction. In addition, a number of anti-allergic agents are available for internal use and most of the recently developed drugs effectively improve nasal obstruction with little sleepiness. Moreover, their concomitant use with local remedies improves nasal symptoms and is effective against snoring.

Besides these, acetazolamide (Diamox), progesterone preparations, and tricyclic antidepressants are also used in pharmacotherapy against SAS or snoring though they are not so common.

(2) Conservative treatment other than pharmacotherapy

(i) Life guidance, (ii) instruction of sleeping posture, (iii) dental appliance, and (iv) nasal continuous positive airway pressure (CPAP) are also used.

(i) Life guidance is considered as an important therapy because guidance to living and exercise therapy against obesity may be successful in reducing body weight and thereby improve snoring or SAS. Some patients living an irregular life and consuming excessive alcohol may try to remove sleepiness by drinking canned coffee (canned-coffee syndrome). Life guidance is extremely important in such patients. Furthermore, in order to make these patients realize their obesity, it is very effective to make them record their body weight every day to graphically show the body weight change and to write a body weight diary. Furthermore, at the authors’ clinic, some patients are given instructions about meals by a nutritionist.

(ii) Regarding the guidance of sleeping posture, improvement or even elimination of snoring and/or SAS is achieved in many patients who have snoring or SAS in a supine position by making them sleep in a lateral position. However, some patients have a habit of lying in a supine position and we advise them to attach a baseball on the back to keep a lateral position all the time.

(iii) Concerning the use of dental appliances, it is necessary to make the appliance at the dentist. The appliance is a kind of a big denture which when attached causes the lower jaw to project forward and the pharyngeal cavity to enlarge, thereby producing easy respiration and reduced snoring and/or SAS. It is effective for mild SAS but is not indicated for complicated cases with nasal diseases.

(iv) Nasal CPAP is generally not used for patients suffering only from snoring. However, it may be indicated for cases of loud snoring associated with SAS. Nasal CPAP involves the application of positive pressure through the nose by a device during sleep and is often used in SAS patients in the United States. Also in Japan, it is the most popular medical therapy. The demerits of the method are that the patients need...
to wear a mask in bed every night and the device produces some sound. Therefore, it is not indicated for all patients (applicable to 60–80% of patients). Also, it is not indicated for patients with severe nasal obstruction associated with nasal polyp, septonasal flexure, hypertrophic rhinitis, and nasal allergy.

2. Surgical treatment

Surgical treatment is considered extremely effective against snoring and SAS. Surgical treatment includes (i) intranasal operation, (ii) UPPP (uvulopalato-pharyngoplasty), (iii) LAUP (laser-assisted uvulopalato-plasty), (iv) LMG (laser midline glossectomy), (v) Adenotonsillectomy, and (vi) Tracheotomy. (Table 2)

Table 2 Surgical Treatments of Snoring

| (i) Intranasal operations (turbinectomy, intranasal septal correction, nasal polypectomy) |
| (ii) UPPP (uvulopalato-pharyngoplasty) |
| (iii) LAUP (laser-assisted uvulopalato-plasty) |
| (iv) LMG (laser midline glossectomy) |
| (v) Adenotonsillectomy |
| (vi) Tracheotomy |

Fig. 1 UPPP (uvulopalato-pharyngoplasty) technique
(Quoted from Reference 8)
TREATMENT OF SNORING

(i) Intranasal operation is a radical treatment of snoring caused by nasal diseases including bilateral nasal polyp, deflected nasal septum, and swelling of inferior turbinate due to nasal allergy and of snoring associated with SAS.

(ii) UPPP operation (Fig. 1) is the most common operation for snoring and SAS. This operation is usually combined with tonsillectomy to enlarge the pharynx.9) This operation is widely used as an operation for snoring in Western countries. However, UPPP and LMG are required more than LAUP for the treatment of more severe stenotic snoring.

(iii) LAUP (Fig. 2) involves upward excision of the bilateral soft palate by using CO2 laser followed by excising the uvula short.9) This operation is widely used as an operation for snoring in Western countries. However, UPPP and LMG are required more than LAUP for the treatment of more severe stenotic snoring.

(iv) LMG (Fig. 3) is indicated for patients with a big tongue and for cases in which the tongue is forcefully drawn posteriorly downwards during inspiration to cause obstruction at the pharynx.10)

(v) Adenotonsillectomy has a dramatic effect against snoring and SAS, especially in children. This technique is, also, very useful against severe hypertrophy of tonsils in adults.

(vi) Tracheotomy is used in rare cases with a high-degree of SAS for which improvement is not expected with any other treatment.

Conclusion

According to an epidemiological survey in Japan, SAS has a prevalence of about 2–4% and is always accompanied by snoring. In addition, SAS has significant effects on hypertension and respiratory/circulatory organs. Thus attention should be paid to loud nocturnal snoring and it is advisable to consult a physician for diagnosis and treatment at a special medical institution as early as possible.

REFERENCES

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1. LMG is performed in accordance with the method of Woodson and Fujita. Under general anesthesia, Davis’s mouth gag is attached to provide as wide view as possible of the posterior lower part of the tongue. The CO₂ laser apparatus is set under a microscope and the posterior-medial part of the tongue tissue is deeply watered. In most cases, bleeding is insignificant due to the use of laser.

2. Then the reticulum of tongue is excised superficially with laser (b). Next the excised parts (b) are sutured on both sides of the tongue (c).

3. If the pharyngeal part of tongue cannot be sufficiently viewed for operation, a laryngoscope may be inserted to apply laser irradiation under it to the pharyngeal part of the tongue as shown in the figure in the right below (c).

4. As a result of this operation, a concavity is formed in the posterior-medial part of the tongue and the root of the tongue is drawn forward, thus enlarging the airway. The suture is removed 7–9 days postoperatively.

Fig. 3 LMG (laser midline glossectomy) technique
(Quoted from Reference 10)


