Abstract

OBJECTIVE: To introduce sling snoreplasty with permanent thread. 

STUDY DESIGN: Ideal snoring surgery has merits such as minimal resection, minimal complications, and maximum effect.

SURGICAL TECHNOLOGY: Under local anesthesia, sling snoreplasty has been performed on 15 patients from January, 2007 to January, 2008. Sling snoreplasty is a three-dimensional suture technique applied to 3 portions of redundant soft palate to widen oro/nasopharyngeal spaces. Five patients were operated on using sling snoreplasty. Ten patients were operated on using sling snoreplasty with radiofrequency volume reduction. Two patients were operated on using sling snoreplasty with radiofrequency volume reduction and laser snoreplasty.

RESULTS: After a mean follow-up of 12.5 months till June, 2007, 11 of 15 patients reported significant improvement in snoring and sleep apnea. Three patients informed some improvement. One was lost to follow-up (Table 1). There were minimal postoperative complications.

CONCLUSION: Sling snoreplasty with permanent thread (SST), to improve snoring and sleep apnea, we can consider oro/nasopharyngeal surgery. Long term follow up is necessary. Sling snoreplasty is a new minimally invasive technique that can be combined with other surgical techniques. After a mean follow-up of 12.5 months till June, 2007, 11 of 15 patients reported significant improvement in snoring and sleep apnea. Three patients informed some improvement. One was lost to follow-up (Table 1). There were minimal postoperative complications.

Introduction

Surgical methods for snoring and sleep apnea focus on widening spaces by resection or volume reduction, and also focus on decreasing vibration by sclerosing of soft palate and uvula. When narrowing of oro/nasopharyngeal space is a major cause of snoring and sleep apnea, we can consider oro/nasopharyngeal surgery such as Uvulopalatopharyngoplasty (UPPP). Laser-assisted radiofrequency ablation (LARFA) is a new and promising technique that can be combined with other surgical techniques. No resection methods also have advantages such as for maintaining nasopharyngeal volume (nasopharyngeal regurgitation, no resection methods such as Radiofrequency volume reduction of soft palate (RFVR)) and, and Palatal injection scleroplasty, and Palatal volume reduction, and also focus on decreasing vibration by sclerosing of soft palate and uvula.

METHODS 

Preoperatively, informed consent for SST was obtained. After gargle anesthesia with 4% lidocaine for 10 to 15 minutes, local anesthesia is done with 2% lidocaine with a 1:100,000 dilution of epinephrine. A 25-gauge needle is inserted at the anterior palatal arch, just lateral to the incisive papilla. A purse-string suture has been used as a suture material. The end of the needle is inserted into the soft palate. The starting point of suture has been at the point of the center between soft and hard palate. The first suture is mainly performed counter-clockwise with a triangular or pentagonal aspect from the starting point (Fig). The insertion point of needle has to be exactly corresponding with the extraction point of needle at each point (Fig). The depth of a bite has to be deep enough to get into muscle layer. The ending point must precisely meet at the starting point. No incision is needed. Tie is done about 5 to 7 times at the apex, the starting and ending point. Cutting is done just near the knot which is buried into soft palate. Mostly, the second suture is carried out clockwise at the right portion of soft palate and third suture is done clockwise at left with a triangular, rectangular or pentagonal form (Fig). When SST with RFVR is operated simultaneously, RFVR is first and SST later. RFVR is performed into 2 points of the center and 2 points of each side. All patients received prophylactic antibiotics and analgesics for 1 to 3 days.

SST was operated on 15 patients from January, 2006 to January, 2007. They were inspected for the mean follow-up of 12.5 months till June, 2007. The operative results were evaluated by using acoustic rhinometry (acoustic measurements) before and after surgery and the results were compared with the results of other biocompatible materials.

In case of no resection, the patients had postoperative pain for 2 to 6 hours because the uvula was tied tightly at the starting point without any suture material. In case of resection, the patients had postoperative pain for 2 to 6 hours because the mucosa was preserved and the knots were buried. On the next day after surgery, they could eat solid foods. But if the sutures were not tightly fastened, the patients had postoperative pain for 2 to 6 days. The tightly tied knots are going to get buried into the mucosa and cause postoperative discomfort. The tightly tied knots are going to get buried into soft palate. The knots are tied to 3 to 7 times to prevent unfolding. SST, RFVR and partial uvuloplasty can be carried out simultaneously in the first operation and we can expect better results after the second operation. Occasionally tonsillectomy or nasal surgery can be used. We can use the permanent material such as nylon, polypropylene, polyester, polypropylene mesh, or other biocompatible materials.

RESULTS

According to the table, sling snoreplasty was operated on 15 patients from January, 2006 to January, 2007. Ten patients (6 males, 4 females) had undergone a single operation and 5 patients (3 males, 2 females) had undergone a second operation. The mean follow-up was 12.5 months (mean, 45.5 years). Men’s ages ranged from 20 to 56 years (mean, 42.5 years). Women’s ages were from 35 to 62 years (mean, 57.7 years). Follow-up ranged from 6 to 17 months (mean, 12.5 months) till June, 2007. 5 cases were inspected for 12 to 17 months, 6 cases for 12 to 13 months. 1 case for 10 months, 1 case for 6 months and 2 cases for 6 months. The range of BMI is from 18.6 to 30.7 (mean, 24.8). 5 cases had BMI more than 25.

Five patients (10 early cases) only had SST and ten patients (from No. 6 to No. 15) were operated on using SST with RFVR (Table 1). 2 of 15 patients had second operation (male, 1 female). A male had 2nd SST 5 months later after 1st SST and a female, 2 months later.

Discussion

Structural problems are the narrowing of oro/nasopharyngeal space due to redundant soft palate or the posterior displacement of hard palate, the narrowing of nasopharyngeal space due to hyperplasia of lingual tonsil, and the narrowing of nasal space by hypertrophied nasal turbinates. These narrowing problems form negative pressure and increase air velocity (Bernoulli Effect), which cause additional narrowing or collapse of nasopharyngopalatopharyngeal space and result in snoring and sleep apnea. Thin and loose soft palate and uvula are easy to stick to the posterior wall of nasopharyngopalatopharyngeal space and this causes snoring and sleep apnea. It is just like thin plastic wrap is easy to adhere to its surroundings (Plastic Wrap Effect). The posteriorinferior displacement of redundant soft palate narrows oro/nasopharyngeal spaces and makes it easy to adhere to the posterior pharyngeal wall in supine position. To reduce these causes of snoring and sleep apnea, author has been trying to transpose soft palate anterosuperiorly to widen the spaces, enhance the tension, shorten the length of soft palate, and congesturate redundant soft palate by using SST. The results have been satisfactory.

The tone of snoring sound may be predictable according to the vibration level of the redundant soft palate and uvula. Long frequency and low tone sound results from much redundant soft palate and uvula. Less loose soft palate and uvula result in short frequency and high tone sound. For example, in case of tent or placard, we can hear the lower pitched sound because theuvula makes much louder sound than the other structures. When the tongue and uvula are relaxed, we can hear much louder sound (String Effect). Like this, idea for SST was obtained from these effects. Low and loud snoring sound changed into high and light sound after 1st SST in some cases. The sound improved a lot after 2nd SST. Analyzing snoring sound would be a useful reference to decide operative sites or to evaluate postoperative effects.

In case of no resection, the patients had postoperative pain for 2 to 6 hours because the mucosa was preserved and the knots were buried. The patients could have normal diet and carry on daily life as usual. If needed, partial uvular resection or the 2nd SST could be done. SST has minimal postoperative complications such as postoperative pain, nasopharyngeal regurgitation, foreign body sensation, pharyngeal dysphonia and discomfort, speech disturbance, and swallowing difficulties. The tightly tied knots are going to get buried into soft palate. The knots are tied to 3 to 7 times to prevent unfolding. SST, RFVR and partial uvuloplasty can be carried out simultaneously in the first operation and we can expect better results after each operation. Occasionally tonsillectomy or nasal surgery can be used. We can use the permanent material such as nylon, polypropylene, polyester, polypropylene mesh, or other biocompatible materials.

Conclusion

SST can be a new effective palatal snoring procedure with minimal side effects. SST can be the merits of both ressective and nonressective surgery of oro/nasopharyngeal spaces and no resection (safe, less pain, short recovery time and minimal complications). It can be combined with other snoring operations such as nasal, oropharyngeal, or hypopharyngeal snoring surgery. Long term follow up and objective evaluation would be needed.

Bibliography