Vomopalatoplasty: A Novel Procedure to Reduce Velopharyngeal Distance in Cleft Palate Repair

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Abstract: Despite numerous improvements in the palatoplasty procedure, speech dysfunction tends to develop in many patients, requiring another surgery. In addition, vomer flaps have been used in palatoplasty in various shapes and on purposes. Nonetheless, they have been used mostly to cover the defect in wide and complete type of cleft palate. We introduce the vomopalatoplasty procedure that uses a vomer flap to reduce the nasopharyngeal space in incomplete or submucous type of cleft palate patients.

The mucoperiosteal flaps on the nasal and oral sides were elevated by the conventional palatoplasty procedure, which subsequently elevated the bilateral vomer flaps to the posterior edge of vomer. Then, the vomer flap was sutured with the mucoperiosteal flap of the nasal side to the anterior half of the soft palate, and thus, the soft palate was fixed in more posterosuperior direction than in conventional palatoplasty. For patients whose junction of vomer and hard palate had to be exposed, a part of the bone at the bifid posterior nasal spine of the hard palate may be removed sometimes.

Ostectomy of the bifid posterior nasal spine or the posterior end of the hard palate was performed in 11 patients. Another 12 patients did not need ostectomy. After the surgery, the surgical wounds healed well in all patients without any major complications such as dehiscence or loss of flap.

Our vomopalatoplasty is easy to perform, and the procedure could be combined to the conventional palatoplasty procedure. Thus, we consider vomopalatoplasty as a useful procedure that could reduce the nasopharyngeal space in patients with incomplete or submucous type of cleft palate.

Key Words: Cleft palate, palatoplasty, vomer flap, vomopalatoplasty

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In cleft palate patients, the primary purpose of palatoplasty is to recover the functional structure responsible for phonation by anatomically repairing the defect of the palate, thereby restoring normal phonation ability. Therefore, important factors of the surgery outcome include a proper location of the soft palate by reducing the velopharyngeal distance and maintaining velopharyngeal competence after surgery, ultimately allowing normal phonation. Although surgical techniques for cleft palate repair have been improved greatly, approximately 20% of the patients develop phonation disorders such as hypernasality, dysphonia, and so on, and a second surgery is required in approximately 9% of the patients even if surgery is performed at a proper time using appropriate procedures. In addition, incomplete closure of the palate and the pharynx after cleft palate surgery has been considered as an important causality of subsequent deterioration of phonation capacity and velopharyngeal incompetence. Therefore, we introduced a new vomopalatoplasty procedure to restore more of the anatomic structure responsible for phonation function in cleft palate patients. The new procedure allows closer location of the soft palate in the posterosuperior direction and reduction of the distance from the posterior half of the soft palate to the posterior pharyngeal wall, thus making it easier to perform velopharyngeal closure.

PATIENTS AND METHODS

From November 2006 to December 2008, the new procedure was performed in 23 patients. The age of patients ranged from 8 months to 5 years, and mean age was 16 months. The male-to-female ratio was 8:15. The patients were grouped by the type of cleft palate: the incomplete type (19 patients) and the submucous type (4 patients). To suture the mucosa of the oral cavity, the von Langenbeck method was used in 14 patients, pushback palatoplasty in 4 patients, and Furlow double-opposing Z-plasty in 5 patients (Table 1).

Technique

The mucoperiosteal flap on the oral cavity side was elevated using the von Langenbeck method, pushback palatoplasty, and the Furlow double-opposing Z-plasty procedure. After raising the mucoperiosteal flap on the nasal side, vomer flaps were elevated bilaterally by making a midline incision from the area where the hard palate meets the vomer to the junction of posterior edge of vomer and posterior pharyngeal wall. If patients had unexposed junction of hard palate and vomer, in other words, if their vomer was fused to the hard palate at a more anterior site than the posterior end of hard palate, ostectomy (5–10 mm) was performed at the midpoint of the posterior end of the hard palate or on the bifid posterior nasal spine. Then, the vomer flap was sutured with the mucoperiosteal flap of the soft palate and the hard palate on the nasal side as close to the posterior side as possible (i.e., half of the soft palate), and the mucosa of the further posterior nasal cavity was sutured with each other. Afterward, the mucosa within the oral cavity was sutured using the conventional methods (Figs. 1 and 2).

RESULTS

Ostectomy of the bifid posterior nasal spine or the posterior end of the hard palate was performed in 11 patients. Another 12 patients did not need ostectomy (Table 1). After the surgery, the
surgical wounds healed well in all patients without any major complications such as dehiscence or loss of flap. In 1 child with developmental disorder, mild dyspnea developed after surgery, but he recovered completely after 3 or 4 days.

**DISCUSSION**

Since their first use in 1946, vomer flaps have been used in various palatoplasty procedures. Not only that the vomer is located in the vicinity of the defect area but also that the elevation of flap could be performed readily. Depending on purposes, flap patterns can be designed in many ways. Therefore, diverse vomer flaps have been reported in the literature, and systematical classification of various types of vomer flaps has been recently attempted. Vomer flaps are used to reconstruct or to facilitate the closure of the oral mucosa in many cases. Particularly, vomer flaps have been used for treating only patients with a complete type of cleft palate. It could not be used for the incomplete or submucous type when the vomer was not exposed.

In this study, vomer flaps were used to reduce the three-dimensional nasopharyngeal space and to elongate the nasal airway rather than using simply as a nasal lining or for the closure of oral surface defect. The vomer is located in the midline of nasopharynx. Its posterior edge is connected with the hard palate and runs in a posterosuperior direction to the sphenoid bone of the skull base and the posterior pharyngeal wall. Thus, suturing the soft palate and the vomer flap can make the soft palate move in the posterosuperior direction (Fig. 1D). Therefore, even for an incomplete or a submucous type of cleft palate, vomer flaps were used for patients who had a large space between the soft palate and the posterior pharyngeal wall, which makes velopharyngeal closure difficult to perform. Using the new procedure, we attempted to reconstruct the three-dimensional velopharyngeal closure by changing the location of the soft palate and by shortening the distance from the soft palate to the posterior pharyngeal wall. When the vomer was masked by the hard palate preventing the vomer flap from being used, it was exposed and used by removing a part of the palatal bone. To distinguish this procedure from the conventional vomer flap, it was termed “vomopalatoplasty.”

The limitations of this study are that long-term outcomes have not been obtained yet. Most patients were too young to be analyzed for functional effects of the procedure such as speech evaluation, and so on. There was a concern that the procedure may exert adverse effects on the growth of the midfacial area. Although the controversy over possible adverse effects continues, numerous studies reported no such effects. We followed up the patients to evaluate facial growth through anthropometric and cephalometric study and to report the pattern of velopharyngeal closure through imaging or endoscopic examination, and so on, as well as functional outcomes such as speech evaluation and the like.
CONCLUSIONS

We have introduced vomopalatoplasty, a simple procedure that could be applied in combination with the conventional palatoplasty procedure. We believe it is appropriate to perform vomopalatoplasty even for patients with an incomplete or submucous type of cleft palate and for patients with the soft palate and the pharyngeal wall that are located far from each other.

REFERENCES

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