Oronasal Fistula Closure Using Modified V-Y Pushback Technique: A Case Report

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Abstract
The most frequent complication associated with cleft palate repair is the oronasal fistula. The oronasal fistula developed primarily because of under tension repair and, in some cases, especially in adults, resulting from postoperative infection. The factors that may be implicated in fistula development after palate repair include the patient's age, gender, cleft type and size, operative procedure, postoperative infection, and the surgeon's experience. We reported a 16-year-old female patient diagnosed with a medium-sized oronasal fistula. She had undergone primary palate repair at the age of 3 years old but had an oronasal fistula at her palate one year later. Oronasal fistula closure was done using a modified V-Y pushback technique.

Keywords: Oronasal fistula, cleft palate, V-Y pushback.

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Introduction
Cleft lip and palate is the most common craniofacial birth defect, with an estimated 1 in 700 worldwide.1,2 The definitive treatment for cleft lip and palate is with surgical repair.3 Cleft palate repair goals are to prevent nasal regurgitations, prevent recurrent respiratory tract infection, and avoid hypernasal speech.4 Cleft palate repair is associated with various complications, but the most common complication after cleft palate repair is the Oronasal fistula.1 The incidence of Oronasal fistula formation was varied among surgeons and cleft centers. Emory et al. (1997) reported the incidence rate of oronasal fistula 11.5%, and on the other hand, Smith et al. (2007) described an incidence of 76%.5,6 The incidence rate depends on several variables, including the experience of the surgeon, the patient's age at the time of repair, and the type and severity of cleft palate deformity.5,7,8

The main symptoms found in oronasal fistula cases are nasal regurgitation and hypernasal speech. The fistula develops mostly due to repair under tension and, in some cases, occurs due to postoperative infections.9 Smith et al. (2007) introduced The Pittsburgh Fistula Classification System, which classifies oronasal fistulas into seven types. Fistulas on the uvula are categorized as type I fistula. Type II fistulas occur within the soft palate. Type III fistulas are found at the junction of the soft palate and hard palate. Type IV fistulas are found within the hard palate. Type V fistulas are located at the incisor foramen. The lingual-alveolar type are defined as type VI fistulas, and labial-alveolar fistulas are defined as type VII fistulas.6 In a study of 64 patients, Diah et al. reported that fistulas at the soft palate and hard palate junction or type III fistulas were the most common site of oronasal fistulas (53.1%). Local flaps and two-flap palatal repair were the most common techniques used to repair the fistulas.8

Case Report
A 16-year-old female patient came to the Oral and Maxillofacial Surgery Clinic, Cipto Mangunkusumo General Hospital, with a chief complaint of having a hole in her palate. At three years old, she was diagnosed with an incomplete cleft palate and had undergone palate repair by an ENT surgeon. At that time, the patient was so hyperactive, and a hole was developed at her palate one year after palate repair. The parents decided to postpone the secondary palate repair until the patient gets older. The patient is currently on Thyrozol therapy by Endocrine
Pediatrician, with a diagnosis of Grave's disease.

There is no facial asymmetry on extraoral examination, but there is a lump on the anterior neck with the size of 8x6x4cm. The lump was demarcated with a smooth surface and soft consistency, and there was no tenderness on palpation. On intraoral examination, the oral hygiene was moderate. At the hard palate and soft palate junction, there was an 8 mm Oronasal fistula (Pittsburgh type III fistula) associated with the patient's uncleared speech (Figure 1).

Oronasal fistula closure was performed with redo palate repair using modified V-Y pushback (Veau-Wardill-Kilner) technique with the addition of z-plasty on the nasal layer. Intraoperatively, the V-Y pushback operation design was made (Figure 2). The palatal tissue was infiltrated using lidocaine with 1/100,000 epinephrine to minimize bleeding. A full-thickness incision was made from the anterior portion of the oronasal fistula to the posterior portion. The mucoperiosteal flap was elevated, followed by detachment of the aponeurosis. The greater palatine neurovascular bundle was identified and dissociated from its attachment using a small curved periosteal elevator. The dissection proceeded laterally to detached the tensor veli palatini muscle from the pterygoid hamulus. Then, the levator palatini muscles' abnormal attachment was dissected from the posterior part of the palatine bone and dissected from the palatine aponeurosis. The oral and nasal mucosa were separated, and the soft palate was divided into three layers: nasal layer, muscle layer, and oral layer.

After the fistula was closed, the tip of uvula to the base of uvula was sutured, then a z-plasty design was made on the nasal layer. The nasal layer, including the z-plasty, were sutured (Figure 3), followed by suturing the levator veli palatini muscle using 4.0 resorbable stitches (Figure 4). This suturing procedure created symmetrical levator veli palatini muscle sling and the symmetrical uvula and palatopharyngeal and palatoglossal arches. The oral layer was sutured, and the pushback suture was performed by suturing the oral layer more posteriorly from the original position to the nasal layer (Figure 5). The hard palate's lateral raw area was covered using a collagen-based dressing and protected using a surgical plate for five days.

Figure 1. Clinical appearance of the patient

Figure 2. V-Y pushback incision design.

Figure 3. The nasal layer suture including the z-plasty.

Figure 4. The levator veli palatini muscle suture.
Figure 5. The V-Y pushback closure of the oral layer.

The patient's postoperative condition was satisfactory, and there was no bleeding from the operation site, and no infection was noticed. The patient was discharged after two days postoperatively. The patient was given antibiotics, analgetics and chlorhexidine gargle, and liquid diet was administered for 1 week followed by soft diet instruction for another 2 weeks. The patient came back to the clinic for follow-up at 1, 3, and 6 weeks postoperative, and at six weeks follow up of the patient, the flap was completely healed, and the fistula was completely closed.

Discussion

Oronasal fistula is the most common complication after primary palate repair, leaving a localized hole at the palate.10,11 The factors that may be implicated in the occurrence of oronasal fistulas after palate repair include the cleft palate's width, the amount of deficiency and distortions of the palatal segment, and the extent and type of the cleft. Furthermore, extrinsic factors such as operative technique, number of surgical procedures, patient's gender and age, cleft type and size, postoperative infection, and the surgeon's skill are also related to oronasal occurrence fistula.5,7,8,12

The operative technique performed for cleft palate repair may lead to differences in oronasal fistula incidence rates. Amaratunga (1988) reported that the V-Y pushback (Veau-Wardill-Kilner) technique is associated with a lower incidence of oronasal fistula (17.8%) compared with the von Langenbeck technique (24.3%).13 On the contrary, Cohen et al. (1991) reported that the Veau-Wardill-Kilner technique is associated with a higher incidence rate of oronasal fistula (43%) compared with Furlow double-opposing z-plasty technique (10%) and von Langenbeck technique (22%).14 Lin et al. (2000) reported using a 2-flap pushback technique for wide cleft palate with a measured cleft width of 10 mm or greater, resulting in an overall 21.6% incidence of oronasal fistula, of which 17% were symptomatic, and 5% were asymptomatic.15

Surgical management to close the oronasal fistula is quite difficult, generally due to excessive scar on the palate and fibrotic tissue surrounding the fistula as a result of previous primary repair. The goal of oronasal fistula closure is not only complete closure of the fistula, furthermore also to achieve an adequate velopharyngeal closure. The redo palate repair using the V-Y pushback technique is one of the most frequent techniques used to close the oronasal fistula. The principle of oronasal fistula closure is a two-layer and tension-free closure. Thus, the pushback technique was frequently used to achieve an adequate velopharyngeal closure.

In our Pittsburgh type III fistula case with a diameter of 8 mm, a pushback palate repair was performed to achieve a three-layer closure on the soft palate and tension-free closure. Levator veli palatine muscle was successfully retroposition, and a z-plasty on the nasal layer was made to lengthen the soft palate. Regarding the patient's velopharyngeal insufficiency, we recommend the patient and her parents to have intensive speech therapy in our hospital after the oronasal fistula closure surgery.

Conclusions

Closure of oronasal fistula has been performed using the V-Y pushback technique and the addition of z-plasty on the nasal layer. The closure of oronasal fistulas requires special attention due to the possibility of recurrences. We consider that the V-Y pushback technique is simple and useful, especially for repairing small and medium-sized oronasal fistulas. This technique provides the advantage of three-layer repair on the soft palate, and the pushback suture of the flap is expected to give good closure and support the patient to develop good speech function.
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Declaration of Interest

The authors report no conflict of interest.

References