

V–Y two-layer repair for oronasal fistula of hard palate

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ABSTRACT

Objective: Oronasal fistula represents a functional problem after cleft palate repair; its closure is technically difficult with a high recurrence rate after primary treatment. The aim of this study was to evaluate the efficacy of closure of oronasal fistula using 2 layers of oral mucoperiosteum in a V–Y manner.

Methods: Fourteen patients were subjected for repair of their oronasal fistulas using 2 layers; the first is the oral mucoperiosteum that is elevated and inverted to close the nasal side as a hinge flap, and the second is also the oral mucoperiosteum that is elevated and sutured in a V–Y manner to close the oral side.

Results: In all cases, the fistula was completely closed at first attempt, no cases developed operative or postoperative complications. Recurrence with not recorded in any case after a follow-up period of at least 12 months.

Conclusion: Closure of oronasal fistula of the hard palate that may develop after cleft palate repair using a two-layer closure in V–Y manner is an easy and ideal method with a high success rate.

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1. Introduction

Fistula of the palate may occur as a complication for cleft palate repair, it is the second most common complication after velopharyngeal insufficiency, as its incidence after primary cleft palate repair is averaging 10–20% even in the experienced hands. It can occur at any site; however, it is common at the junction of the hard and soft palate posteriorly or at the premaxillary–maxillary junction anteriorly [1]. An anatomically based numerical palatal fistula classification system was created by Smith et al. [2], they classified the fistulas into seven types: type I referred to bifid uvula; type II means fistula in the soft palate; type III means fistula at junction of the soft and hard palates; type IV means fistula in the hard palate; type V indicates that the fistula at junction of the primary and secondary palates; type VI means lingual alveolar fistula; and type VII means labial alveolar fistula.

Oronasal fistula may lead to regurgitation of food and fluid to the nasal cavity, also it may cause escape of air during speech resulting in hypernasality [3].

Causes of fistula formation after cleft palate repair may be the type of cleft, type of repair, wound tension, single-layer repair, infection and dead space deep to the mucoperiosteal flap [4,5]. Complete dehiscence is uncommon, unless the neurovascular bundle is divided. If the greater palatine artery is sacrificed, necrosis and loss of the distal mucoperiosteal flap are possible, particularly in

older children and adults but small fistulas occurring at the areas of maximal wound tension are more common [6].

Many techniques have been proposed for the repair of palatal fistulas. However, the incidence of recurrence after initial fistula closure is high. Faced with recurrence, the surgeon's options extend to flaps; tongue flap [7,8], orbicularis oris musculomucosal flap [5,9], free flaps [10] or grafts; buccal mucosal graft [11], Conchal graft [12], bone graft [13]. Acellular dermal matrix has also been used in palatal fistula repair with good results [14]. When speech disturbance occurs as a result of a fistula of significant size, prosthetic obturation of the fistula (even temporary) can be considered when weighed against repeated failed surgical procedures [15].

The aim of this study was to evaluate the efficacy of closure of hard palatal fistula using two layers of oral mucoperiosteum that is elevated in a V–Y manner like in cleft palate repair.

2. Methods

2.1. Subjects

This study was conducted on 14 cases diagnosed to have fistula of the hard palate after repair of their clefts. The ages of the patients ranged from 4 years to 6 years and 4 months (with a mean of 4 years and 8 months), 8 males and 6 females. The patients were collected from referred cases to the otolaryngology outpatient clinic of the Children Hospital of Cairo University in the period from January 2007 to March 2009. The original defects included nine cases of bilateral complete cleft lip and palate and five cases of

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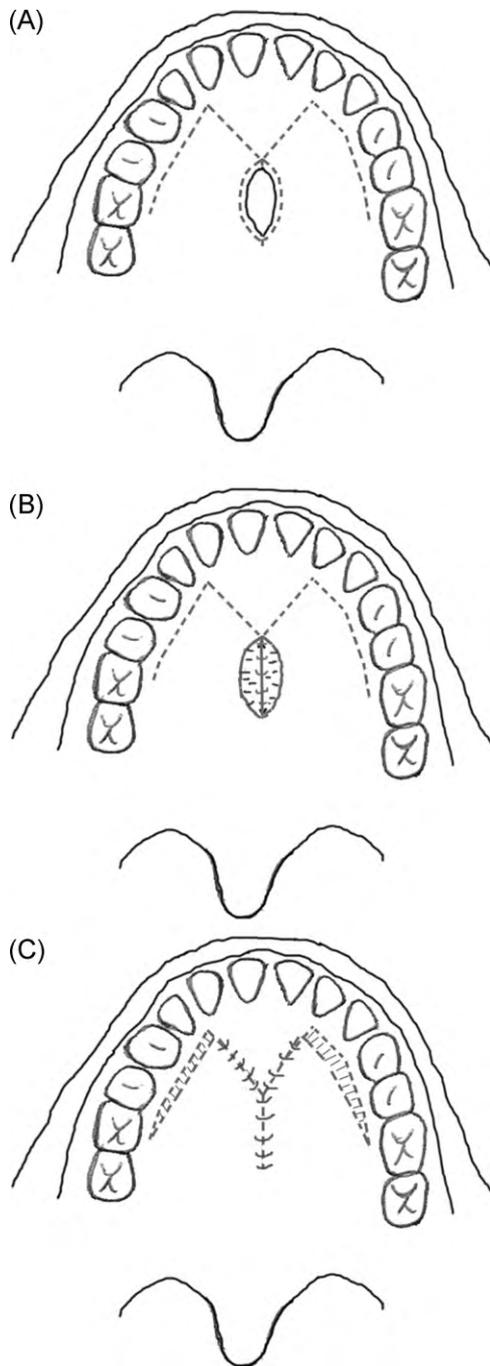


Fig. 1. Illustrations for the procedure. (A) Markings for incisions. (B) Closure of the nasal side with inverted oral mucoperiosteal hinge flap. (C) Closure of the oral side with oral mucoperiosteum in a V-Y manner.

unilateral complete cleft lip and palate, in all cases the palate was repaired by 2 flap palatoplasty technique. Informed consents were obtained from the parents of the patients and the principles outlined in the Declaration of Helsinki were followed. Also, we obtained approval for the study from our institutional review board. Patients who subjected before to fistula repair were excluded; none of our patients was lost during the follow-up.

2.2. Operative procedure

Under general anesthesia with oral endotracheal intubation, the hard palatal mucosa is injected with 0.5% Xylocaine in

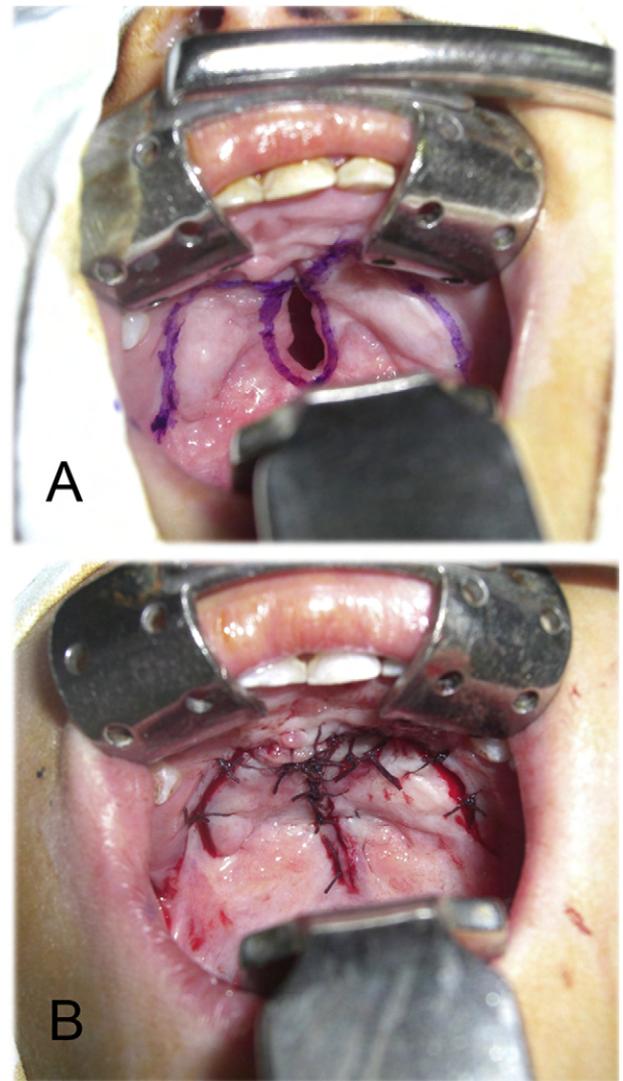


Fig. 2. Oronasal fistula of hard palate. (A) Markings for incisions. (B) After surgical closure.

adrenaline (1:100,000). The mucoperiosteum around the fistula is elevated as bilateral hinge flaps, both flaps are inverted so that the mucosal surface faced the nasal cavity and then sutured together using 4-0 Vicryl. The mucoperiosteum of the hard palate is elevated in a V-shaped manner with the apex at the nearest point of the fistula, and then both flaps are approximated and sutured in a Y-shaped manner using 4-0 Vicryl as in Veau–Wardill–Killner palatoplasty (Figs. 1 and 2). Cases were seen postoperatively at one week interval for three weeks, with follow-up appointments at 3, 6, and 12 months.

3. Results

The length of the fistulas ranged from 6 to 17 mm (mean of 10 mm) and their widths varied from 3 to 7 mm (with a mean of 5 mm). Fistulas were located in the hard palate behind the premaxillary–maxillary junction; according to Smith et al. [2], the patients were described to have type IV palatal fistula. No cases developed operative or postoperative complications. In all cases, the fistula was completely closed at first attempt (Fig. 3), and no evidence of recurrence with a follow-up of at least 12 months.



Fig. 3. A patient with repaired oronasal fistula, 3 weeks postoperatively.

4. Discussion

Oronasal fistula represents a functional problem after cleft palate repair; as it may result in nasal regurgitation of food and fluids and also it leads to hypernasal speech that may be accompanied with compensatory articulation disorders. Although, its incidence is variable in the literatures, however, it is a common problem [16].

Hypernasality and its associated articulation disorders can render a child's speech unintelligible and can affect communication, children with hypernasal speech are often considered less intelligent, less pleasant, and less attractive. Such perceptions can seriously affect the social life of children. However, speech problems that may develop after cleft palate repair may be due to many factors such as shortening of the palate, limited mobility of the palate caused by excessive fibrosis, or presence of palatal fistula [17]. As the fistula is not essentially the only cause of these problems, we did not consider improvement of speech a criterion for success of fistula closure, in other words; hypernasality may persist even after palatal fistula closure as the condition may be due to other factors that may follow cleft repair.

In a previous study, we treated anterior palatal fistula that located at the premaxillary–maxillary junction using two layers; the first one is a hinge oral mucoperiosteal flap and the second is a superior lip myomucosal flap including the orbicularis oris muscle. We achieved a success rate of 91% with partial necrosis of the distal part of the flap in 3 cases [9]. While in another study, we used a buccinator myomucosal flap from the inner side of the cheek and a hinge mucoperiosteal flap in closure of posterior palatal fistula at the junction between the hard and soft palates. All fistulas had been closed successfully with no failure [17].

In this study, we treated oronasal fistula of the hard palate using two layers, the first is the oral mucoperiosteum that is elevated and inverted to close the nasal side as a hinge flap, and the second is also the oral mucoperiosteum that is elevated and sutured in a V–Y manner to close the oral side. We achieved a success rate of 100%. This is an easy procedure for cleft palate surgeons as it is same Veau–Wardill–Killner technique plus elevation and inversion of the hinge flap.

The repair of palatal fistula is technically difficult, most often due to the paucity of local tissue for closure or excessive fibrosis in the same area as a result of the previous surgery. The recurrence rate is relatively high after its primary repair, it may constitute up to 34% [18]. In front of this high recurrence rate, surgeons are continuously searching for solutions.

Several techniques have been described to circumvent these problems; Honnebier et al. [11] divided the methods currently employed for fistula repair into two groups: those that use mucoperiosteal flaps in one form or another, e.g., hinge flaps, and those that use additional tissue to close the defect. Sources of additional tissue are usually in the form of pedicled flaps from elsewhere in the mouth. They treated seven patients with oronasal fistula using a local mucoperiosteal flap lined with buccal mucosal grafts placed on the nasal side of the flap. The fistula was completely closed in all cases without complications. However, their patient's sample was small with the need for two donor areas; one located in the inner aspect of the cheek that had been closed primarily which could cause pain, and another on the hard palate that had been left to heal with granulation which would necessitate long time.

Nakakita et al. [19] closed palatal fistula by the use of a buccal musculomucosal flap. Complete closure at the first attempt was obtained in 69% of the cases and they needed to divide the pedicle two weeks after the initial operation.

Assunção [20] used successfully tongue flap to close post-palatoplasty fistulas in 12 patients, all flaps survived but with partial recurrence only in one case. Also, Guzel and Altintas [21] used the same type of flap and they obtained complete closure of all fistulas but recurrence occurred in one out of ten during maxillary expansion. However, changes in articulation and resonance after tongue flap closure of palatal fistulas have been reported by Kummer and Neale [22].

Free flap closure for palatal fistula has been used by some authors with promising results. Ninkovic et al. [23] used the dorsalis pedis–first dorsal metatarsal artery free flap, Schwabegger et al. [24] used osseous angular scapular flaps and Krimmel et al. [25] used a mucosal prelaminated lateral upper arm flap, but these methods leave a wound in another part of the body adding to the cumbersome of the patient in the postoperative period.

The advantages of our method is that; it is a single stage operation, familiar to the cleft palate surgeons and it causes no pain in another area of the body, however, dissection of the oral mucoperiosteum from the hard palate is usually difficult due to tissue fibrosis caused by primary cleft palate repair.

Finally, we can conclude that treatment of oronasal fistula of the hard palate that may develop after cleft palate repair using a two-layer closure in V–Y manner is an easy and ideal method with a high success rate.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.ijporl.2010.06.003.

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