

Large Anterior Oronasal Fistula with Short Palate: New Technique for Fistula Closure and Palatal Lengthening

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Abstract

Background: Oro-nasal fistulae (ONF) is considered one of the commonest sequelae of cleft palate repair. Fistulae closure can represent a simple procedure or a great challenge. Usually, it is not easy to close large ONF using adjacent local tissues, which necessitates the displacement of tissues from nearby anatomical regions.

Objective: Evaluation of a new technique for fistula closure and palatal lengthening in ONF.

Patients and Methods: Between the period of 2017 to 2020 this prospective study was performed on seven cases with large anterior ONF underwent surgical repair using bilateral Buccinator Myomucosal Flaps (BMMF), one acts as a second layer for fistula closure and the second one added more length to the palate. Patient evaluation was based on clinical evaluation for fistulas recurrence, speech intelligibility using Intelligibility in Context Scale (ICS) which performed preoperatively and one year post-operatively, and improvement of nasal regurgitation.

Results: Seven non syndromic cases with large anterior ONF were included in this study of them five females and two males with mean age (7.57±1.90) underwent fistula closure with our new technique. On postoperative follow-up one case (14.3%) complicated with oral layer disruption that resolved conservatively, also two cases (28.6%) suffered from chest infection which required prolonged hospitalization. Improvement of nasal regurgitation, with no fistula recurrence occur in all seven cases. Assessment of speech intelligibility was done using Intelligibility in Context Scale (ICS) showing that (71.4%) were improved to score >3.5 which means that their speech is usually to sometimes understood to others.

Conclusion: The use of our new technique is a reliable method that may be used for large anterior ONF closure and lengthening of short scarred palate with few drawbacks and multiple benefits.

Key Words: Oronasal fistula – Palatal lengthening.

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Ethical Committee: The study was approved by the Ethical Committee of Ain Shams University. Code (IRB 00000379) January 2017.

Introduction

Oronasal fistula (ONF) is a common complication after cleft palate repair [1]. It can occur secondary to many causes as dehiscence or healing failure, flap tension and necrosis, hematoma and infection [2].

Its incidence ranges from 4-35% [3]. There are many different classifications for ONF. According to size, Muzaffer and his colleagues defined small fistulas as these less than 2mm in diameter, medium fistulas 3-5mm and large fistulas with size more than 5mm [4].

According to the location, ONF can be anterior, mid-palatal, at the junction between hard and soft palate or at the soft palate [5].

Patients and Methods

A prospective study during the period of 2017 to 2020 was conducted at plastic, Burn and Maxillofacial Surgery Department, Ain Shams University, Cairo, Egypt. We included all no syndromic patients with large anterior oronasal fistula secondary to previous repair/s to cleft palate ± lip. Patient's data was collected regarding personal data, age, sex and previous interventions. All patients were thoroughly examined. A preoperative speech assessment was done to all patients using a special scale Arabic version "Intelligibility in Context Scale (ICS)" which was repeated at one year postoperatively and after completing speech sessions [6].

A written consent was signed by the patient or his guardian after explaining the surgery and other options. The operation was performed by the senior author. Ethical committee approval code (IRB 00000379) January 2017.

Operative procedure (Figs. 1-3):

Under general anesthesia, local anesthetic with adrenaline saline solution (1:200000) was infiltrated into the palate. Wo layers' repair were aimed in this technique by the following manner:

1- Closure of nasal layer:

Two large turn over palatal flaps based on fistula edges was elevated and sutured.

2- Islandization and advancement of the remaining part of the mucoperiosteal flap:

Elevation of 2 large turn over flaps to close the nasal layer will exhaust already small and scarred mucoperiosteal flaps. We select the larger one and elevate it then examine the presence of pulsating greater palatine artery and after insuring good vascularity to that flap, a complete Islandization of the flap was completed based on the greater palatine artery then the flap was advanced as much as we can get to cover the suture line.

3- Palatal lengthening:

A transverse oral layer incision was planned at the junction between hard and soft palate. The levator muscles was then visualized and examined, if still wrongly attached to the posterior palatal shelf, it was completely released, repositioned and sutured in the middle 60% of the soft palate.

4- Bilateral design and elevation of Buccinator Myomucosal Flaps (BMMF):

Now, two defects were encountered so, Bilateral BMMF were elevated, the first one was transposed in the retro-molar trigone area to act as a second layer over the repaired nasal layer at the site of the fistula and at the same time to resurface the bare bone after advancement of the mucoperiosteal flap. The second BMMF was used to reconstruct the resultant defect after oral layer release and sutured at the junction between soft and hard palate to lengthen the short-scarred palate.

Exposure of oral mucosa of the cheek, infiltration of adrenaline solution 1/200000 and a buccinator myomucosal flap then elevated. Bounded anteriorly by oral commissure, superiorly by parotid duct opening and inferior limit detected according to defect size. The flap then elevated from anterior to posterior direction with a thin layer of the buccinator muscle, to enhance its vascularity. The donor is usually closed primarily but in large fistulae we may leave small raw area at the base of the flap to heal by secondary intension.

Postoperatively patients were followed for occurrence of early complications as bleeding, airway obstruction, wound disruption and fistula recurrence. After 1 month they were encouraged to start speech therapy.

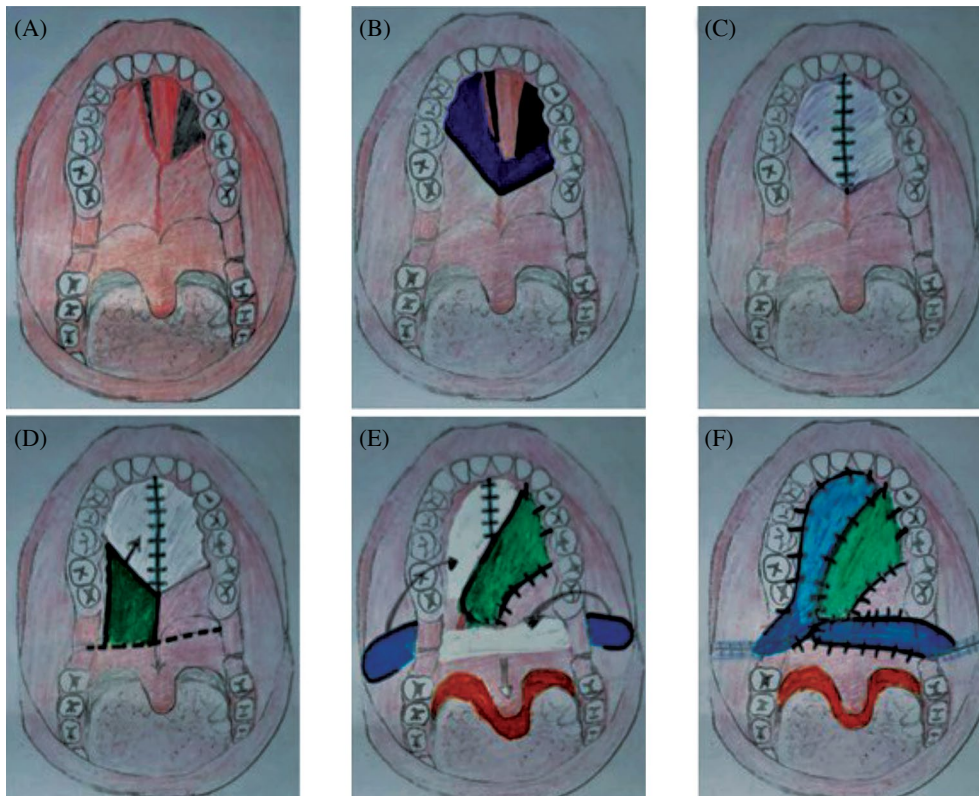


Fig. (1): Diagram representing surgical steps: Large anterior palatal fistula (A); Designing turn over flap based on fistula edges (B); Closure of the nasal layer (C); Islandization of Right Mucoperiosteal Flap and transverse release at junction of hard and soft palate (D); transposition of the mucoperiosteal flap, designing two buccinator myomucosal flaps and lengthening of the soft palate (E); In setting of Right Buccinator flap in the anterior defect and the left one in the release incision for palatal lengthening.

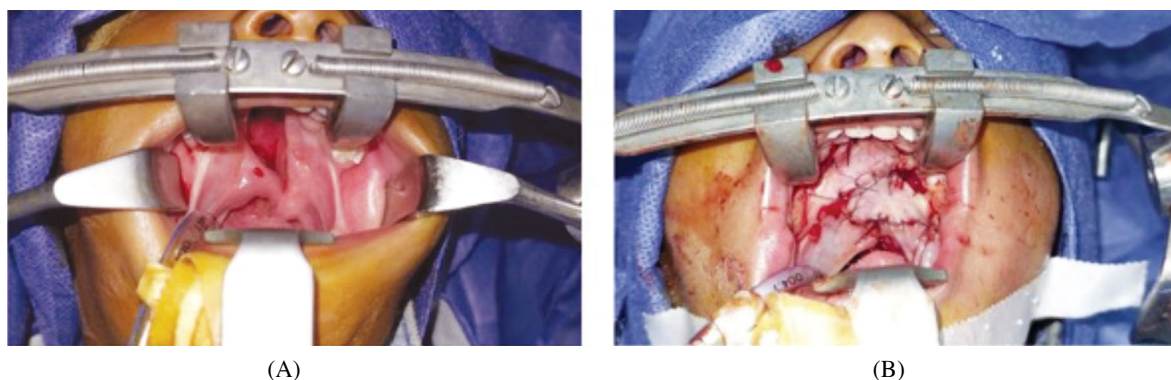


Fig. (2): A 5-years old male patient with large anterior palatal fistula and short palate (A); at the end of surgery (B).

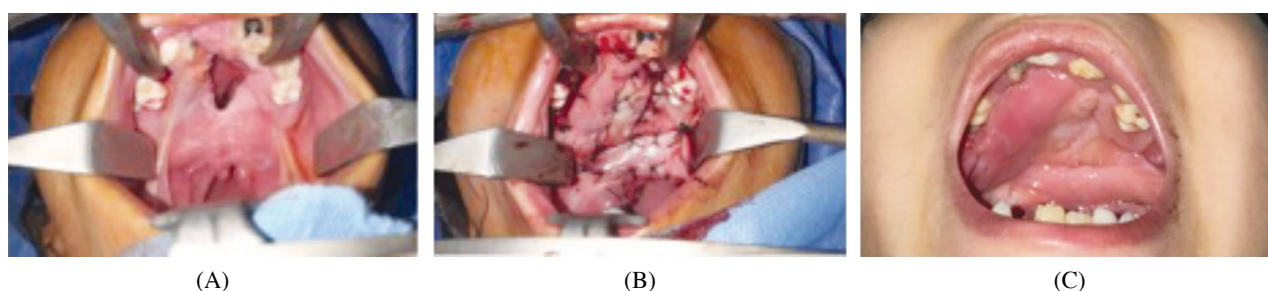


Fig. (3): Another female child with large anterior palatal fistula and short palate (A); at the end of surgery (B) 6 months post-operatively (C).

Results

The study was conducted on 7 patients presented with large anterior palatal fistula with short palate and were admitted at plastic, Burn and Maxillo-facial Surgery Department, Ain Shams University, Cairo, Egypt in the period between 2017 and 2020. Their mean age was (7.57±1.90) with 5 females and 2 males.

In the first week post operatively, there was 1 case (14.3%) with disrupted oral layer but without complete wound disruption and ended by complete healing, 2 cases (28.6%) with chest infection that required prolonged hospitalization.

In this study, we reported no recurrence of the fistula with improvement of the nasal regurgitation to food and fluids. No cases with impaired flap vascularity (Table 1).

Intelligibility in Context Scale (ICS) was repeated for all patients one-year post-operative after receiving strict speech therapy and compared by the score recorded pre-operatively. There was a high statically significant difference between pre-operative and postoperative results. 71.4% of the patients were improved to score ≥3.5 which means that Speech is usually to sometimes understood to others (Table 2) (Fig. 4).

Table (1): Patient’s data and postoperative sequelae.

	No. = 7
Age:	
Mean ± SD	7.57±1.90
Range	5-10
Sex:	
Female	5 (71.4%)
Male	2 (28.6%)
Postoperative complication:	
Bleeding	0 (0.0%)
Air way compromise	0 (0.0%)
Wound disruption	1 (14.3%)
Others (chest infection)	2 (28.6%)
Fistula recurrence:	
Zero	0
Nasal regurgitation to food and fluids:	
Improved	7 (100.0%)

Table (2): Pre and 1-year postoperative results of Intelligibility in Context Scale (ICS).

	Pre No. = 7	Post No. = 7	Difference Mean ± SD	Test value*	p- value	Sig.
<i>Total score:</i>						
Mean ± SD	16.29±1.25	26.43±2.99	10.14±3.76	7.136	<0.001	HS
Range	14-18	22-30				
<i>Average score:</i>						
Mean ± SD	2.33±0.18	3.78±0.43	1.45±0.54	7.136	<0.001	HS
Range	2-2.57	3.14-4.29				

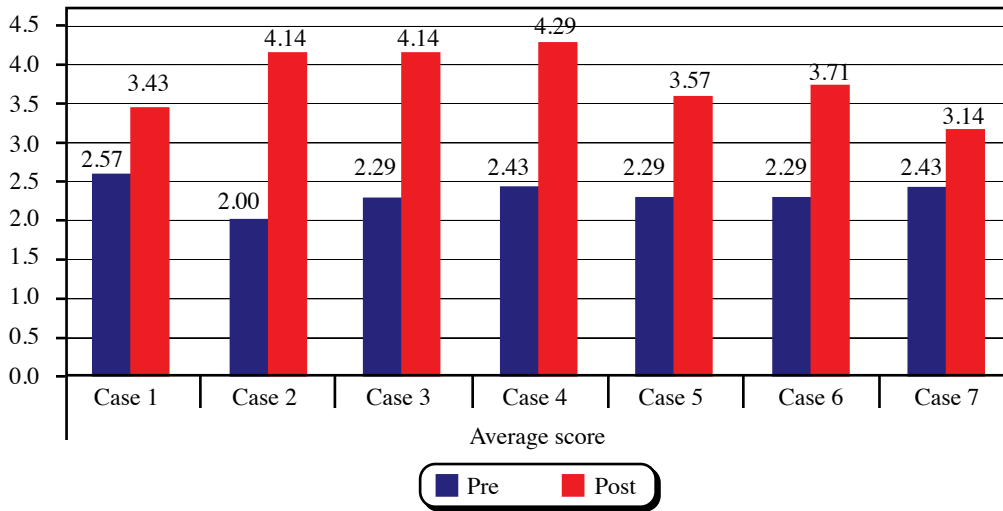


Fig. (4): Pre- and post-operative Average score of ICS for all study patient's.

Discussion

Muzaffar et al., [4], were classified the palatal fistula according to site and size. From this classification the most difficult to approach and treat is the large anterior ONF where in some cases most of the hard palate is lost with exhausted local tissues and scarring from previous attempts of repair. Usually these cases present with triad of ONF, Short scarred palate and velopharyngeal dysfunction (VPD).

ONF closure is always problematic secondary to deficiency of the surrounding available healthy tissues [7] and most cases necessitates multiple stages for fistula only closure. The short palate is another challenge that needs other surgical interventions for management. So, in this new technique we present a single stage treatment of large anterior palatal fistula with palatal lengthening at the same time to treat velo pharyngeal dysfunction.

The buccinator myomucosal flap (BMMF) is a robust buccal flap which is effective in secondary palate repair. It brought a well vascularized tissue that can close the fistula without tension, add length to the palate and hence improves speech outcome. [8].

In this study, we elevated BMMF bilaterally, one acts as a second layer for fistula closure and the second one added more length to the palate.

Other alternative in treating large ONF is the use of tongue flaps. Assunçao AG in his study mentioned 100% success rate. On the other hand, Guerrero Santos and Altamirano reported 70% success rate, whereas Piggot reported 85% success in closure of palatal fistulae by means of anterior based tongue flaps [9-11].

Despite tongue flap is considered the workhorse for large palatal defects, but we find major difficulties in its use like difficult mouth opening, higher rate of wound disruption, the need of second stage for flap division, aesthetically bulky tissue and possible postoperative tongue deformity with difficult articulation.

On the other hand, the principal advantages of our technique are; single stage procedure with no anesthetic difficulties seen as encountered during tongue flap division with difficult intubation. Also, normal oral feeding may be resumed soon following surgery.

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