The outcome after huge oronasal fistula closure by tongue flap in Yala hospital

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Abstract

Background: Cleft palate is significant public health problem in Thailand. However, after surgical correction the rate of ONF was 3% to 38%. Tongue flap is a choice for coverage oronasal fistula. Previous study shown huge oronasal fistula closure as a case report.

Objective: Our study aims to examine the viability of the tongue flap, fistula closure, residual tongue function and speech impairment in individuals with cleft palate who presented with an oronasal fistula bigger than 2 cm^2.

Methods: This study was a retrospective study at Yala Hospital from July 16, 2018, to August 31, 2022.

Results: This study examined ten cleft palate patients with oronasal fistula (50% males and 50% females). The majority of cases were unilateral complete cleft palates, with the ONF typically located in the middle of the palate and measuring approximately 11.38 cm^2. The entire tongue flap was viable, and there was no donor site morbidity. Wound dehiscence occurred in one case. The patient's hypernasality (p-value = 0.006) and regurgitation (p-value = 0.025) improved after surgery.

Conclusion: The tongue flap was effective for repairing a huge oronasal fistula and enhancing palatal function, particularly regurgitation and hypernasality.

Keywords: Cleft palate, Oronasal fistula, Tongue flap

Introduction

The worldwide incidence of cleft lip and palate is approximately between 0.1 and 2 per 1,000 births[1] and between 1.10 and 2.49/1,000 live births in Thailand. Thus, cleft lip and palate are significant public health problems in Thailand.[2] The rate of the oronasal fistula was 3% to 38%. Oronasal fistula can be asymptomatic or lead to regurgitation and hypernasal speech. The most common site for oronasal fistula was the middle part of the palate.[3]

According to previous studies, the definition of a huge oronasal fistula was more than 5 mm because it was difficult to close and may have required a flap for coverage.[4] There are many options for covering a huge oronasal fistula, including the FAMM flap, free flap, and tongue flap. However, each option may be suitable for a given patient depending on the defect, soft tissue surrounding the defect, and the circumstances. However, the tongue flap may provide more tissue for hole closure reliably and with minimal donor site morbidity.[5] Several previous studies have reported huge oronasal fistula closures, but they are less than 2 cm^2 and limited by population.[6-20]

This study aimed to evaluate the outcome after oronasal fistula closure by a tongue flap in cleft palate patients who had an oronasal fistula greater than 2 cm^2 after palatoplasty.

Material and Methods

Retrospective analysis of cleft palate patients with failed initial palatoplasty and holes larger than 2 cm^2 after Yala Institutional Board Review approval. From July 16, 2018, to August 31, 2022, one plastic surgeon at Yala Hospital operated on patients in this group who underwent tongue flap surgeries. All participants in the study were deemed to have given their informed permission. Parental consent was also required for patients under the age of 18. If the patient and parent are unable to provide informed consent at the OPD, we will phone them to inquire about informed consent. Patients without follow-up or with incomplete data were not included in the study.

The outcome was investigated after a huge oronasal fistula closure by a tongue flap. For this study, we enrolled cleft palate patients with an oronasal fistula after primary palatoplasty larger than 2 cm^2 to collect demographic data, process, outcome, complications, and donor site morbidity.

Surgical Procedure

All patients underwent surgery under general anesthesia with nasotracheal intubation in hyperextension position of the neck.
A Dingman retractor was inserted for the exposed oronasal fistula, and local anesthesia with 1% lidocaine with epinephrine 2 ml was injected around the defect.

The palatal flap was elevated to cover the nasal layer and sutured with Vicryl 4-0. Then the defect was assessed, and the dorsal lingual flap was elevated based on the anterior ranine Arh, the size being larger than the defect (10-15%), and sutured with Vicryl 4-0. Three weeks after the first phase of surgery, the patient was registered for tongue flap division. Surgery was performed under general anesthesia with nasotracheal intubation in hyperextension position of the neck during this procedure. With the oral cavity exposed, a mouth gag was inserted, and local anesthesia containing 1% lidocaine with epinephrine 3 ml was injected into the tongue flap. The tongue flap was cut at the posterior edge of the flap and sutured to the palate with Vicryl 4-0. The tongue was also repaired with Vicryl 4-0.

Follow-up and Evaluation

Patients were followed up one month, three months, and six months after the procedure to assess the outcome. All data were analyzed using SPSS for Mac version 21, version 21.0.0.0. Median (interquartile range), mean (±SD), and Wilcoxon signed-rank test were used for data analysis. Statistical value with statistical significance at $p < 0.05$.

Result

In a study lasting more than four years, ten cleft palate patients who had failed primary palatoplasty and had an oronasal fistula more extensive than 2 cm^2 were enrolled for oronasal fistula closure with a tongue flap.

There were five male and five female patients. The average age was 9.5 years, and 60% had a unilateral complete cleft palate. The size of the oronasal fistula is approximately 11.38 cm^2 and is usually located in the middle of the palate (Pittsburg type III), as shown in Table 1. In table 2, the specifics of each patient are displayed.

Table 1. Demographic cleft palate patients with oronasal fistula

Variables	n	(%)
Sex		
Male	5	(50%)
Female	5	(50%)
Age (years), Median (IQR)	9.5	(1.5)
Cleft type		
Unilateral Cleft palate	6	(60%)
Bilateral Cleft palate	4	(40%)
ONF size, Median (IQR)	11.38	(8.56)
2-7 square centimeter	3	(30%)
7.01-14 square centimeter	4	(40%)
≥14.01 square centimeter	3	(30%)
ONF location		
1	-	-
2	-	-
3	6	(60%)
4	4	(40%)
5	-	-
6	-	-
7	-	-
Follow-up time(month)		
Mean(±SD)	7.5	(±4.301)
Median(IQR)	6	(6.75)

Data were presented as n (%), median (interquartile range), and mean(±SD).

*ONF: Oronasal fistula

Table 2 Demographic data in each patient

Case No.	Age(year)	Sex	Cleft type	Cleft size(cm)	ONF location (Pittburg)
1	3	Male	BCP	3X4	3
2	9	Female	BCP	4X4.5	3
3	12	Female	UCP	3X4	3
4	9	Male	BCP	3.5X4	3
5	10	Female	UCP	2.5X2.5	3
6	10	Male	UCP	2.5X2.6	4
7	9	Male	UCP	2X1.5	4
8	10	Male	BCP	5X4.5	4
9	9	Female	UCP	3X2.5	4
10	16	Female	UCP	4X3	3

*BCP: bilateral cleft palate, UCP: unilateral cleft palate,
ONF: oronasal fistula

In this study, surgery was performed in two phases. The average duration of the first phase was 77.90 minutes and that of the second phase was 25.70 minutes. After the procedure, the tongue flap was fully functional without morbidity at the donor site, but only one flap had dehiscence due- to ingestion of solid food particles.
The average length of hospital stay was 3.3 days in the first phase and 2.4 days in the second phase. After interviewing patients about postoperative pain, we found an average postoperative pain score of 1.9/10. As shown in Table 3.

Table 3. Operative Result

Variables	n	(%)
Duration of Procedure (Minute)		
Stage 1, Mean(±SD)	77.90	(±18.101)
Stage 2, Mean(±SD)	25.70	(±11.116)
Hospital Stay (Day)		
Stage 1, Mean(±SD)	3.30	(±0.823)
Stage 2, Mean(±SD)	2.40	(±0.699)
Post-operative Pain, Median (IQR)	1.90	(0.25)
Flap Viable		
Full Viable	10	(100%)
Partial Necrosis	-	-
Full Necrosis	-	-
Complication	1	(10%)
Dehiscence	1	(100%)
Bleeding	-	-
Infection	-	-
Donor site morbidity		
No	10	(100%)
Yes	-	-

Data were presented as n (%) , median (interquartile -range), and mean(±SD)

*Stage1: Closure fistula with tongue flap pedicle

*Stage 2: Tongue flap division

The average follow-up time was 6 months, and palatal function was evaluated preoperatively and postoperatively by speech therapists and surgeons. In most cases, there was significant statistical improvement in hypernasal voice (p-value=0.006) and regurgitation (p-value=0.025). As shown in Table 4.

Table 4. Functional outcome

Variables	Palatal function		p-value
	Pre-Operative	Post-Operative	
Hypernasality (%)			0.006
Mild Hypernasality	- -	4 (40%)	
Moderate Hypernasality	5 (50%)	6 (60%)	
Severe Hypernasality	5 (50%)	- -	
Regurgitation (%)			0.025
No Regurgitation	- -	9 (90%)	
Mild Regurgitation	- -	1 (10%)	
Moderate Regurgitation	1 (10%)	- -	
Severe Regurgitation	9 (90%)	- -	

Data are presented as n (%).
P-value corresponds to the Wilcoxon Signed-Rank test.

Figure 1 Result after oronasal fistula closure with tongue flap

Discussion

Oronasal fistula is a hole that connects the oral and nasal cavities and may be asymptomatic or symptomatic, such as regurgitation and hypernasality. Previous studies have attempted to define a huge oronasal fistula, such as a defect size greater than 0.5 cm. However, there is no definition for a huge fistula.[4]

There are many techniques for the closure of an oronasal fistula. However, if a huge oronasal fistula is present, almost tissue can be used to cover the defect. The tongue flap can provide more tissue to cover the defect, be reliable, and limit donor site morbidity.[5-7,10-14,16-20]

Previous studies have shown that closure of the oronasal fistula with a tongue flap provides good results, but in huge defects, this is usually presented as a case report. [6,7,10,14-16,19]

Our studies include cleft palate patients with a huge oronasal fistula that was more than four years and the outcome is followed for at least six months after surgery. There were no differences in demographics in this study. Normally, ONF appear following recent surgery and grow with age. In the previous study[5], the majority of patients were over the age of 11but in this study, the majority of patients were over the age of 9 which may be the reason for the huge oronasal fistula in this study group.
The operation time was 1 hour in the first phase and 30 minutes in the second phase, which means it was a simple procedure.

After the procedure, all flaps were viable, and there was no donor site morbidity. Only one case experienced wound dehiscence two months after the procedure due to swallowing solid food particles and mild regurgitation.

Most earlier studies did not concentrate on palatal function, however two studies showed improvements in regurgitation in 90–95 percent of patients,[5,11] whereas this study showed no regurgitation in 90% of patients and mild regurgitation in 10% of patients. Speech According to three previous studies, the majority of patients recover following surgery from moderate to mild and from severe to moderate.[5,11,12]However, earlier studies included defects larger than 5 mm but did not accurately reflect the mean size of defects that enroll in studies. In this study, the majority

of patients improved from severe and moderate hypernalsality to mild and moderate improved over time as a result of relearning to speak.

Conclusion

The tongue flap was a reliable flap for a huge oronasal fistula in cleft palate patients in whom primary palatoplasty had failed and improve palatal function.

Conflict of interest

No conflict of interest in this study

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