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Research Article

Functional Morbidity and Surgical Outcomes of Tongue Flap Repair for Cleft Palate Fistulas

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Abstract

Background: Though cleft palate repair procedures have become more effective, fistula formation is a common occurrence, not just due to the technique but sometimes due to poor tissue quality. Although local flaps are commonly used for fistula closure, their application may not be feasible in certain cases due to the size and location of the fistula. The use of tongue flaps is preferred over other tissues for the closure of anterior palatal fistulae due to their central location and reliability.

Objectives: This research aimed to evaluate the role of the tongue flap in anterior palatal fistula repair.

Methodology: Patients admitted between June 2013 and December 2016 who had a palatal fistula and was repaired with a tongue flap were included in the research. The location of fistula, its size and complications were noted. After three weeks, the flaps were splitted, and the final inset was completed.

Results: A total of forty-four patients were included in the study. In all forty-four instances, the fistula was positioned anteriorly. The fistulae ranged in size between 1 cm to 3.5 cm. None of the patients had flap necrosis. One patient had bleeding, and in one instance involved a dehiscence of the flap that was restitched. None of our patients had functional problems with the tongue. 75% of people reported satisfactory.

Conclusion: Despite the two-staged surgery, the tongue flap continues to be the preferred and reliable flap for treating extremely complex and demanding anterior palatal fistulae.

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Introduction

Cleft palate is one of the more common congenital abnormalities affecting the orofacial region and occurs due to failure of fusion of the palatal shelves during embryonic development. Surgical repair is required to restore essential functions, particularly speech, swallowing, and normal maxillofacial growth. Despite ongoing refinements in surgical techniques, the development of postoperative palatal fistula remains a persistent problem in clinical practice, with reported incidence rates ranging from 4% to 35%.[1]

Palatal fistulas create an abnormal communication between the oral and nasal cavities and may result in several functional difficulties, including nasal regurgitation of food and liquids, impaired speech, hypernasality, and resonance disorders.[2] Multiple options has been described in the literature for fistula closure and includes local, regional and free flaps. Among these reconstruction options, the use of tongue flap has become popular. The reason behind this is the reliable blood supply and durability of the tissue for the fistula closure.[3,4]

Though the use of tongue flap is becoming popular, there

are concerns regarding the donor site. During the post op period the immobilization of the tongue can temporarily affect the speech, deglutition and oral hygiene.[5,6] This aspect of tongue flap was not studied by many published articles, most of the studies mentioned the flap survival and fistula closure only. There is a research gap regarding the donor site morbidity of tongue flap.[7,8]

The rationale of this study was to review the results of this technique performed at a tertiary care center. The review also included donor site characteristic including donor site healing, speech and deglutition. Secondary outcomes studied were fistula characteristics, including location, size and then fistula closure. The outcomes influence the decision making to improve the end results of this procedure for fistula closure.[9,10]

Material and methods

This retrospective study was conducted at tertiary care hospital between June 2013 to December 2016. The study included 44 patients who underwent cleft palate fistula closure with use of tongue flap. This study looked into the surgical and functional outcome including tongue movement, swallowing, taste and improvement in nasal regurgitation.

The medical record was reviewed to obtain the demographic date and operative notes. Other details obtained were fistula assessment, operative details, surgical outcome and complications. Only patients with complete and accessible medical records were included in the analysis. Patients who had previously undergone alternative surgical procedures for fistula repair or those with incomplete documentation were excluded from the study to ensure consistency and reliability of the collected data.

Patients with collapsed maxillary arches underwent orthodontic arch expansion initially. Turn-over flaps from the fistula borders were used to reconstruct the nasal lining, while tongue flaps provided the oral lining, as shown in Figure 1. The flap's length was modified to fit into the defect and an extra 1 cm was taken to allow rotation of the flap in the defect. It was not allowed to extend past the circumvallate papillae. Although the flap's breadth fluctuated depending on the extent of the fistula, it never exceeded two-thirds of the tongue's width as shown in Figure 1. To preserve the underlying submucosal plexus, flaps were elevated such that up to 5-7 mm of the muscle depth was always removed. To preserve the vascularity of the flap, the donor site was mostly closed with absorbable sutures. Care was taken not to close it too tightly around the pedicle. The flap edges were properly approximated to the mucoperiosteal borders from edge to edge. The division and insetting has to be done on 9th postop day in one case because one of the border was bleeding, although the tongue flaps were typically split after 21 days postoperatively.

Figure 1: *Design of the tongue flap so as not to extend past the circumvallate papillae(A), primary donor site closure sustaining the flap pedicle's vascularity, up to two-thirds of the breadth of the tongue can fit inside the flap's depth, which also includes a muscle thickness of 5-7 mm(B), post-opView of the tongue flap. The flap is flushed with the palatal tissues (C).*

Results

A total of 44 patients underwent tongue flap repair for cleft palate fistula. The age range was 2.5 to 26 years, with a mean age of 12.3 ± 5.8 years, as depicted in figure 2. Gender distribution showed that 55% (n = 24) were male, while 45% (n = 20) were female (figure 3).

In terms of cleft type, 65.9% (n = 29) of patients had unilateral cleft lip and palate, while 34.1% (n = 15) had bilateral cleft lip and palate (Fig 4). The fistula size ranged from 1 cm to 3.5 cm, with the majority (59.1%, n = 26) measuring between 2 -2.5 cm (Fig 5).

Post surgery donor site healing was normal with no long term healing issues. Patients achieved normal tongue movement, speech and articulation. Deglutition and swallowing reflexes were normal after the procedure. Specialized function like taste were remain intact. There were reported difficulties in eating and swallowing in initial few days and improved after third day. There were no documentation of any long term diet

changes or nasogastric feeding.

The fistula closure was achieved in all the cases. There were no recurrence of fistula during follow up. Documented complications were less, one patient (2.3%) had postoperative bleeding which was treated conservatively. Another patient (2.3%) had detachment of distal end of the flap which did not require any restitching and healed on its own. All the patients had improvement in nasal regurgitation and about 75% had improvement is hypernasality.

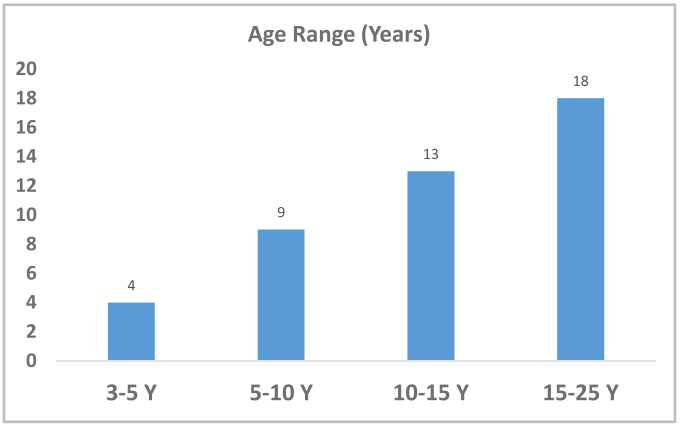

Figure 2: *The Age range of patients. (n=44)*

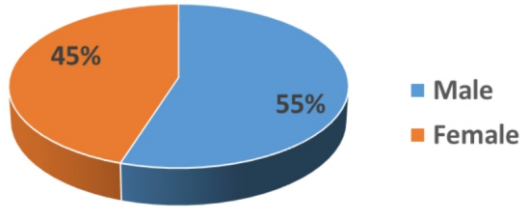

Figure 3: *Gender distribution of palatal fistulae*

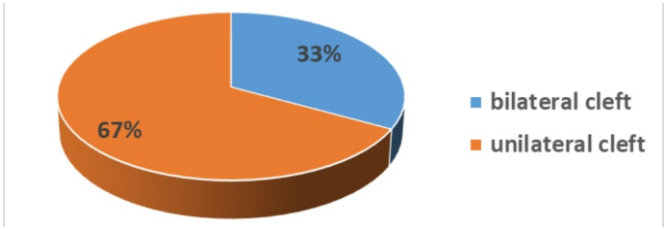

Figure 4: *Anterior palatal fistula distribution in unilateral and bilateral cleft instances*

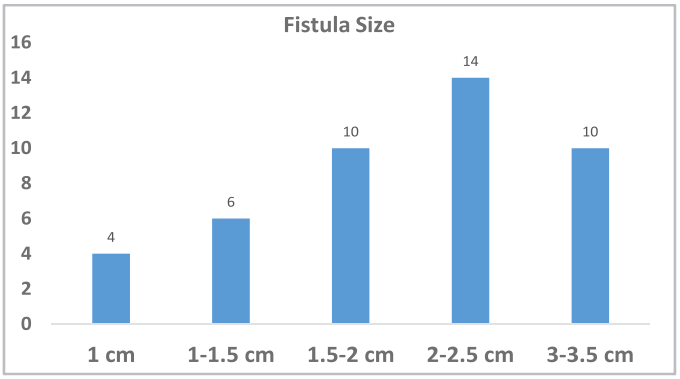

Figure 5: *Size range of anterior palatal fistulas*

Discussion

The tongue flap remains a reliable reconstructive option for managing complex palatal fistulas, particularly in situations where local tissue is limited or has already been compromised by previous surgery. From our experience, this has been especially true in patients with large anterior defects. Since its original description by Guerrero-Santos and Altamirano for the repair of hard palate fistulae, the technique has been valued for its strong vascular supply from the lingual artery and its ability to provide well-perfused tissue for difficult defects, while maintaining low donor site morbidity.[12] In the present series, complete fistula closure was achieved in all patients, which, in our view, further supports the dependability of this method. These results are generally in line with previously reported success rates in the literature, which typically range between 85% and 95.5%.[13]

One of the main concerns with tongue flap reconstruction has always been possible donor site morbidity, particularly its effect on speech, swallowing, and sensory function. In our cohort, however, no patient developed any long-term impairment in tongue movement or function. Swallowing reflexes remained normal, and taste perception was preserved in all cases, which suggests that donor site morbidity with this technique is minimal.

In our study, patients report difficulty in feeding and swallowing during early postoperative period but that is usually self limiting and no patient required nasogastric tube feeding. This observation is consistent with previous literature. Keeping the flap thickness between 5 to 7 mm is important in maintaining articulation and swallowing.[14] Another important finding in our study was that most of our patients were younger than five years of age, and they still did not require tube feeding. This fact highlights that this technique is usefully in young children as well.

Some surgeons recommend additional immobilization of tongue by doing jaw fixation or stitching the tongue to reduce tongue movements. In our group of patients, we did not follow these manoeuvres. The patients had good healing, the logical reason for this would be less tongue movement by patients during early postoperative period due to discomfort on the movements. This suggests that routine fixation is not required and careful flap dissection and insetting are important consideration to achieve good healing and fistula closure.[16]

All patients in our study achieve complete fistula closure which clearly shows that the tongue flap is a robust option for these large and complex defects where local

flaps are not sufficient.[19] This shows that good surgical technique, tension free closure and meticulous flap insetting improve the outcome. Flap division and insetting were performed at three weeks. Flap outcome was assessed for healing, fistula closure and complications. Complications reported in our study were rare. One patient had bleeding, which was treated conservatively. One patient had partial detachment of the flap, which healed without any surgical intervention. Our study results support the literature finding that this flap is safe and reliable method for palatal fistula closure.[17]

The main aim of fistula closure was not just wound closure but restoration of normal function. In our study patients, nasal regurgitation and speech were improved. This shows the importance of separating the oral and nasal cavities.[3,4] The improvement in speech and nasal regurgitation leads to improved functions which in turn improve the patient's confidence. This improves the social interaction and especially in younger patients who are still developing socially.[20,21]

Despite the favourable outcome of the study there are some limitations. As this study is a retrospective study that relied on the existing medical records. The sample size is smaller though it is similar to the existing literature. The other limitation is the lack of comparison group, which makes it difficult to say that tongue flap is superior to other reconstructive options. This warrants further prospective comparative study to have clear information regarding the comparison of different surgical options.

Conclusion

This study concluded that the tongue flap is a reliable option for large palatal fistula with minimum donor site morbidity. This option is particularly reliable for anterior fistulas where the local options are limited or unable to cover the defect.

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Conflict of interest: None.

Author's contribution:

Ahmad Saeed: Drafting of work, Conception and design of the study. Data Collection and analysis.

Farrukh Aslam Khalid: Conception and design of the study, data collection, analysis and interpretation, Drafting the work, Final approval of the version to be published and accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Junaid Ahmad: Study design, drafting of work, Data Collection and analysis

Sania Ahmad: Data collection, Article Editing and Manuscript Revision,

Muhammad Amin: Article Editing, Manuscript Revision analysis and interpretation of data

Bushra Akram: Study design , Data Collection, Data Interpretation and Analysis

All authors meet the ICMJE authorship criteria and agree to be accountable for all aspects of the work, ensuring the accuracy and integrity of the research.

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