Closure of Anterior Palatal Fistula by Tongue Flap: A Prospective Study

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Abstract

Aim To check the efficacy of dorsal tongue flap in closure of anterior palatal fistula without using any fixation devices.

Material and Method It is a prospective study in which 20 patients of anterior palatal fistula, larger than 5 mm, attending the outpatient department of oral and maxillofacial surgery, Genesis Institute of Dental Sciences and Research, Ferozpur over a period of 5 years (from November 2005 to January 2011) were included. The surgical treatment was divided into 2 stages—raising of the flap on the tongue and transfer of the flap from the dorsum of the tongue to fistula site and then separation of flap and its adjustment at the site of defect after an interval of 3 weeks minimum. Follow-up was done for 3 and 6 months.

Result Successful closure was achieved in 90 % of the cases. 80 % patients experienced decrease in hypernasality. In none of the cases decrease in size of tongue, loss or change in taste sensation, difficulty in speech, difficulty in swallowing or bulkiness of flap was observed.

Conclusion The results obtained during the course of this study strongly support the method used to close the anterior

palatal fistula. It is concluded that the dorsal tongue flap is the highly successful method without the need of additional fixation devices in closure of anterior palatal fistula.

Keywords Fistula · Flap · Tongue · Buccal pad

Introduction

Anterior palatal fistula; connects the nasal and oral cavities. It commonly occurs due to necrosis of tips of the flaps following the repair of cleft palate [1]. However other causes of formation of anterior palatal fistula are traumatic injuries e.g. electric burn, infections like noma, removal of tumors and extractions [1–3].

Many techniques have been advocated for the closure of anterior palatal fistula including the surgical and non-surgical techniques [1, 4]. Intraoral obturator is the non-surgical treatment which is a little expensive procedure as it requires repeated and regular changes of the obturator. Palate also cannot be cleaned with the obturator.

Surgical techniques for the closure of fistula includes utilising the local adjacent flaps [2–5]. These flaps are used for closure of very small fistula. These often lead to failure due to thickness and immobility of scarred palatal mucoperiosteum, resulting in closure under tension with subsequent necrosis [2, 4].

In attempts to solve this problem, tissues from distant sites like abdomen, arm, neck and cervico thoracic region have been used. The nasolabial cheek flap and flap from the nasal septum region have also been used to close palatal defects.

The distant tube flaps involve the problem of transport, fixation and long hospitalization [4, 6]. Cheek flaps,

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nasolabial flaps cannot be obtained wide enough to close large defects; in addition, problems are occasionally encountered with vascularity.

None of the above methods proved up to the mark and has one or the other complications; so this led to the use of local tongue flap [7] for the closure of anterior fistula. This technique was first described by Guerrero-Santos et al. [8]. The large mobile vascular and centrally located tongue in the vicinity of fistula is a good choice for closure of fistula. Many authors used Kirschner wires (K-wires), interdental wiring for fixation of jaws, fixation of tongue flap to upper lip, upper incisors, fixation of rest of the tongue to the chin, etc. [8].

In the present study neither of the above fixation methods was used. This allows the surgeon to inspect and clean the flap properly.

Material and Method

Twenty patients of anterior palatal fistula attending the outpatient department of oral and maxillofacial surgery, Genesis Institute of Dental Sciences and Research, Ferozpur over a period of 5 years (from November 2005 to January 2011) were selected for the study. The patients were selected irrespective of the age, sex, caste, creed and socio-economic status. Only fistulas larger than 5 mm in size (Fig. 1) were included. After taking proper history of the patient, the surgical treatment was divided into 2 stages

Stage I: raising of the flap on the tongue and transfer of the flap from the tongue to fistula site

Stage II: separation of flap and its adjustment at the site of defect after an interval of 3 weeks minimum.

All cases were examined for the chief complaint; in addition to any problem in speech, mastication, swallowing, shortening of the size of tongue, etc.

Under general anaesthesia; patient's head position was adjusted and the dott's keilner mouth gag was applied into the patient's mouth.

After infiltrating the palatal mucosa around fistula; circumscribed incision was given around the fistula opening and one or two turnover flaps were raised from the oral mucosa. Turnover flaps were sutured using 3-0 chromic catgut using interrupted sutures with inverted knots (knots towards the nasal cavity) to prevent any dead space when tongue flap was given.

The tongue flap was so designed that the base of the flap lies beneath the posterior border of the fistula when the tongue is in neutral position. The length of the flap was so adjusted that flap from midline was long enough to fill anterior-posterior dimensions of fistula with at least 1 cm to spare to allow for the turnover section to cover and to give some freedom for tongue movement (Fig. 2). The base of the flap was so adjusted that half the width of tongue or in longer fistula 2/3rd the width of tongue was involved for good blood supply to the flap. Depth of the flap was approximately 5–7 mm thick which could involve a thin layer of muscle along with it. The submucosal plexus was utilized as the major source of blood supply for tongue flap. The layer of muscle was included to protect the submucosal plexus. Donor site was closed by deep interrupted absorbable vicryl sutures. Tongue flap was sutured to the defect (Fig. 3). Care was taken not to strangulate the base of the flap. No additional fixation devices were used.

Patients were put on soft diet orally from second post-operative day followed by semi solid for 3 weeks until stage II surgery. After 2 weeks, under general anaesthesia base of the flap was separated and the raw surface defect

Fig. 1 Case with fistula >5 mm

Fig. 2 Tongue flap raised

Fig. 3 Tongue flap sutured to the defect

Fig. 4 Follow-up after 6th month

was sutured using 3-0 vicryl. Follow-up was done after 3rd and 6th month (Fig. 4).

Results

Of these twenty patients most were in the age group of 3–5 years (Table 1) with a male to female ratio of 12:8, 60 % males and 40 % females. The size of fistula in all the cases was larger than 5 mm except in one of the case where there were two slit holes, each slit hole 3 mm in anterior-posterior dimension and 2–3 mm in width in lateral dimensions. All the cases of anterior palatal fistula were following the cleft palatal surgery. All the patients reported with the chief complaint of regurgitation of fluid from the nose. Eight cases of the ten had reported directly to the department whereas one had undergone an unsuccessful attempt to close the fistula by using local tissue while another case was using an obturator. In 20 % of the cases alveolar cleft was also present.

Table 1 Age wise distribution of cases

Age group	No. of cases	Percentage
1–2 years	2	10
3–5 years	12	60
6–10 years	2	10
11–15 years	2	10
16–20 years	2	10
Above 20 years	Nil	10
Total	20	100

Observations after tongue flap closure are included in (Table 2).

Discussion

The palatal defect has been associated with discomfort and disability in speech, mastication and swallowing [6]. Many surgical attempts have been tried in the past for the closure of the same. In the present study an attempt has been made to close the anterior palatal fistula by dorsal tongue flap.

Edgerton and De Vito [6] suggested that a full thickness loss of hard palate involves bone and lining membrane of both nasal and oral surfaces. In the reconstruction of such defects, two lining surface must be produced together with some degree of rigidity.

Piggot et al. [9] stated that for the closure of cleft palate secondary fistula; double closure is necessary; provision for nasal layer cover and oral layer closure.

In accordance with these principles, in the present study the anterior palatal fistula was closed by using local turnover flap from the vicinity of the fistula for providing nasal lining. The oral lining cover was provided by the anterior based muco-muscular flap from the dorsum of the tongue.

Guerrero-Santos et al. [8], Pigott et al. [9] and many others have stressed the importance of correct alignment of base of the flap; design of the flap and provision of adequate tongue mobility with a pedicle of reasonable length. Accordingly, the design of the tongue flap in the present study was such that the midline flap from the dorsum of the tongue was taken. The base of the flap was anteriorly based involving minimum half to two-third width of the tongue. The length was taken such that it could cover the anterior-posterior dimensions of the fistula with at least 2–3 mm to spare, to allow for the turnover section to cover and to give freedom of some tongue movement. The depth was such that few layers of underlying muscle were included; so that the sub mucosal plexus remain covered underneath the layers of muscle.

Contrary to the experiences of Guerrero-Santos et al. [8], it has been found not necessary to provide any

Table 2 Observations after tongue flap closure

Sl. no	Complaint	Number of cases
1.	Separation/tear of flap prior to 2nd stage operation	None
2.	Necrosis of tongue flap	Tip of the tongue in 2 cases
3.	Regurgitation of fluid/food from nose	Two
4.	Decrease in hypernasality	Sixteen
5.	Remnant fistula (size) 1 mm	Two
6.	Decrease in size of tongue	None
7.	Loss or change in taste sensation	None
8.	Difficulty in speech	None
9.	Difficulty in swallowing	None
10.	Bulkiness of flap	None

additional method of fixation like fixation of jaws by intermaxillary ligation, fixation of tongue flap to lower lip or anterior maxillary teeth or fixation of tongue to the chin or angle by means of wires or sutures. No tear of flap, loosening of stitches or any other such problems encountered in the present study.

The advantage over the fixation method is that there is no feeding problem for the child. In addition, surgeon can inspect and clean the oral cavity and the operative site [8]. No additional method of fixation of tongue flap is advocated.

The most common cause of formation of anterior palatal fistula is cleft palate surgery which is mostly encountered at the junction of premaxilla and hard palate due to necrosis of anterior part of muco-periosteal flap. In this study, all cases of anterior palatal fistula were following cleft palatal surgery, other rare causes like infectious diseases, trauma, tumor surgery, irradiation, extraction have not been encountered.

The mid dorsal part of the tongue flap was taken as the highly vascular sub-mucosal plexus that acts as a pedicle and the major source of blood supply for the tongue flap [10]. As the deep lingual artery runs on the ventral surface of the tongue, the idea of unilateral tongue flap sparing the deep lingual artery of the other side is useless. It is the sub-mucosal plexus which is the major source of blood supply to the tongue flap.

In none of the cases in the present study, interference of tongue function, shortening of tongue except a negligible linear scar on the dorsum of the tongue was noticed. Taste sensation, swallowing reflex and speech were normal. However there was improvement in the nasal speech in almost all the cases because of the closure of palatal fistula.

Conclusion

The results obtained during the course of this study strongly support the method used to close the anterior palatal fistula. It is concluded that the dorsal tongue flap is a highly successful method without the need of additional fixation devices in closure of anterior palatal fistula.

Conflict of interest None.

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