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Original Article

Repair of Anterior Palatal Fistula by Local Mucoperiosteal Flap

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Abstract

Background: *The closure of a residual post-palatoplasty anterior palatal fistula can be among the most difficult of all surgical techniques and remains challenging. No single technique is satisfactory and attempts at closure of these fistulae have been associated with high failure rate. The local mucoperiosteal flaps are a useful technique for closing such defect. This flap was selected for its alikeness and its abundant blood supply from the greater palatine vessels. It is also easily accessible, versatile and can be transposed without tension.*

Objective: *To see the outcome of closure of anterior palatal fistula by local mucoperiosteal flap, and also to evaluate the efficacy of closure of this flap without complications such as recurrence.*

Methods: *This is a prospective, non randomized, non controlled clinical trial that was carried out on 15 patients with anterior palatal fistula (Type V), who presented between the time of January 2010 to August 2011 in Medi-Aid hospital, Dhaka.*

Results: *The clinical study comprised of 15 patients (n=15) with anterior palatal fistula with an average of 5.74 years of age. The average size of the fistula in the study group was seen to be 5.93 mm.Donor site morbidity such as haematoma, infection, vascular compromise, flap necrosis, flap dehiscence etc was low and hospital stay was shorter in comparison to a complicated palatal surgery.*

Conclusion: *The clinical results indicated that anterior palatal fistula closure with local mucoperiosteal flap technique is relatively safe, uncomplicated and effective than the other bulky techniques that have been used across the world till date.*

Key words: *Anterior palatal fistula, mucoperiosteal flap.*

Introduction:

Repair of the cleft palate has long been associated with small or large failures of the repair[1]. Complete failure or total dehiscence is rather uncommon. These partial failures result in small or large oronasal communications or fistulae. The commonest cause of fistula formation has been attributed to repair under tension. Vascular compromise, infections and technical limitations are also responsible for fistula formation[2]. A fistula can occur anywhere along the line of repair of the cleft palate. Those forming cranial to foramen caecum of the tongue and caudal to the alveolar arch are regarded as anterior palatal fistula. Other locations are regarded as hard and soft palate fistula[3]. Some oronasal fistulae can cause substantial morbidity, including nasal regurgitation, poor oral hygiene, loose fitting tooth, nasal emission, speech impairment etc[4]. Every visible anterior palatal fistula does not need surgical repair. The indications for a fistula repair depend on the associated symptoms which are in turn related to the size and location of the fistula.

A palate which has been operated on always contains scar and if there is formation of a fistula, the healing of the edges and surfaces occur by granulation, resulting in more scarring of the surrounding tissues. Repeat operation often fails to provide a long and flexible palate. Dissection is more difficult all through. Accentuated scarring leads to contracture of maxillary arch thereby making it further difficult to approach the area, particularly so in bilateral cleft lips and palates. Bleeding is more severe[4].

The use of local mucoperiosteal flap to cover palatal fistula was first used in 1971[5]. Ideally fistula closure should re-establish normal anatomy: a complete partition between the oral and nasal cavities, lined by epithelium on both sides. This can be achieved by reconstructing either the oral or the nasal layer by means of a flap, or by mobilizing and approximating adjacent mucosa. A two layer closure

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providing an epithelial lined surface towards both the oral and nasal cavities, however, gives a greater chance of success, and is to be preferred whenever feasible[5].

With this technique, comfortable closure of fistulas of small to medium size can be achieved. Here the two layer principle is respected, as well as the length of the palate is maintained. The nasal mucosa is reconstructed by turning the oral edges of the crevicular margin of the fistula and the oral lining by approximating the two mucoperiosteal flaps without tension. Since the mucoperiosteal flaps are invariably short in length, the procedure utilizes a transposition flap from the large non-cleft side mucoperiosteal flap to cover the oral side of the fistula.

Rationale:

The closure of a residual postpalatoplasty anterior palatal fistula can be among the most difficult of all surgical techniques and remains challenging. No single technique is satisfactory and attempts at closure of these fistulae have been associated with high failure rate. The local mucoperiosteal flaps are a useful technique for closing such defect, yet no study of their use in closing the fistula has been conducted to date in our country. This flap was selected for its alikeness and its abundant blood supply from the greater palatine vessels. It is also easily accessible, versatile and can be transposed without tension.

Aims and Objectives:

Palatal fistulas may present as asymptomatic holes or may cause such symptoms as speech problems, nasal regurgitation of fluids, or difficulty with oral hygiene[6].Depending on the extent of functional impairment, anterior palatal fistula may have social and developmental consequences and should be repaired.

The most practical solution to these problems often seems to be acrylic obturators especially if it can also carry replacement for missing anterior teeth. But removable plastic appliances have certain disadvantages from the dentist's point of view. Their presence is associated with a sharp increase in oral bacterial counts and the resultant increase in the incidence of dental carries, chronic gingivitis.

The management ofanterior palatal fistula secondary to cleft palate repair is difficult with a high incidence of recurrence after initial closure, most often due to the paucity of local tissue for closure or excessive scarring in the same area as a result of previous repair. Several techniques have been described to circumvent these problems among which mobilization of local mucoperiosteal flaps are the commonest. In this study a tension free repair of the anterior palatal fistula was done in two layers with local mucoperiosteal flaps. To combat the functional shortness of the velum the flaps were advanced and transposed anteriorly to cover the entire defect.

Ethical consideration:

Prior to commencement of this study, the research protocol was approved by the Department of Plastic Surgery, DMCH. The aims and objectives of the study were explained to the patient's attendants in an easily understandable local language, it was also clearly explained that there would be no additional health hazard or financial burden due to the procedure. An informed written consent was taken from the patient's parents.

Materials and Methods:

A prospective, non-randomized, non-controlled clinical trial was carried out over a period of 20 months from January 2010 to August 2011 Medi-Aid hospital, Dhaka. A total of 15 patients with anterior palatal fistula (Type V) were operated.

Patients of unilateral or bilateral clefts, above 1.5 years of age, with post operative anterior palatal fistula at the junction of primary and secondary palate not extending into the hard palate were selected for the procedure. Patients with multiple fistulae, fistulae in other parts of the palate, syndromic cases, those with major congenital anomalies and patients with alveolar cleft were excluded.

All patients were anaesthetized by general anaesthesia. The incision started in the oral mucosaaround the margin of the fistula, about 2-3 mm away from the edge of the fistula. The oralmucosa was elevated and the nasal mucosa was mobilized. The mucosa of the vomar and nasal mucosa from the non-cleft side were elevated. The mobilization was continued till the nasal layers from the two sides reached each other to enable closure without any tension.

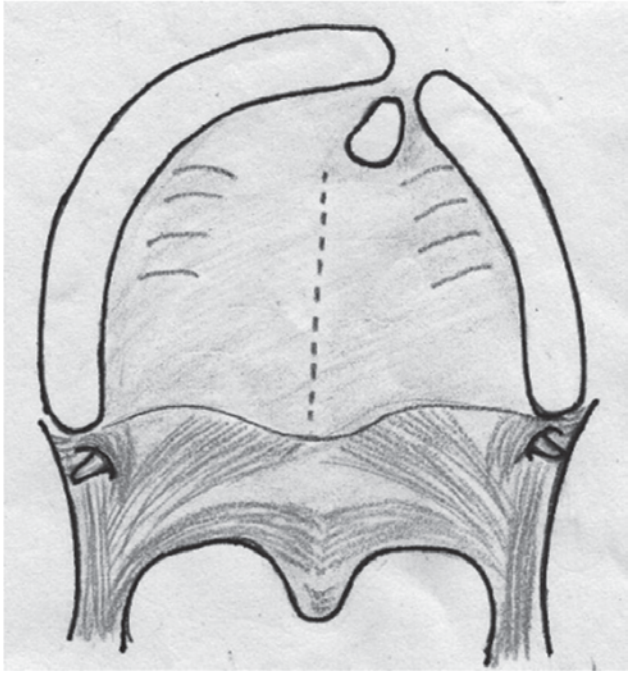

Fig 1: Anterior palatal fistula

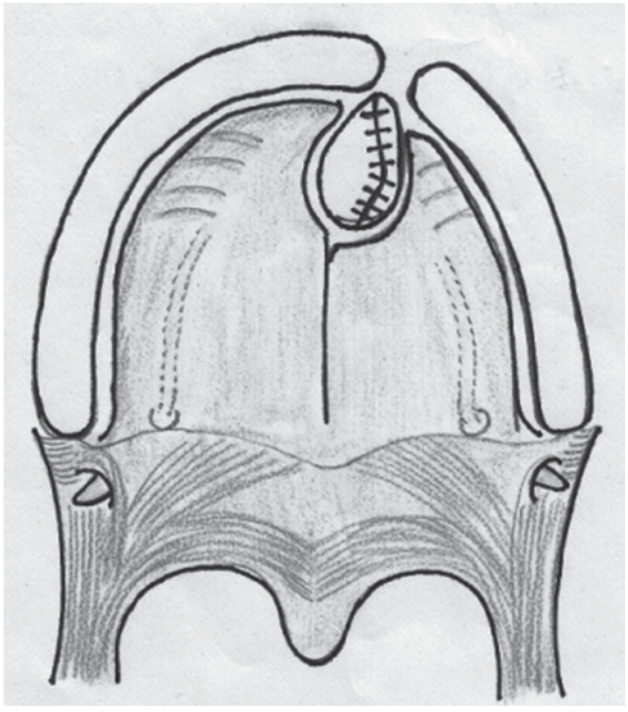

Fig 2: Closed nasal layer

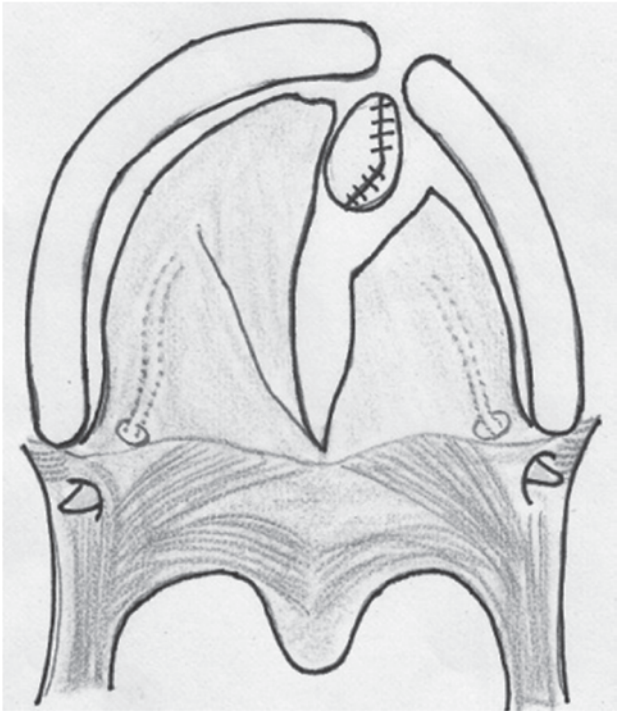

Fig 4: The oblique line of incision

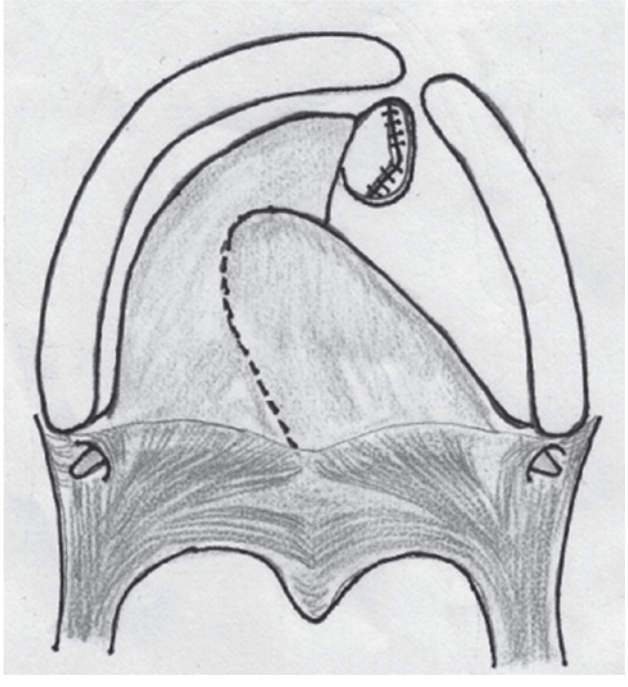

Fig 3: Bringing over the shorter flap on longer flap

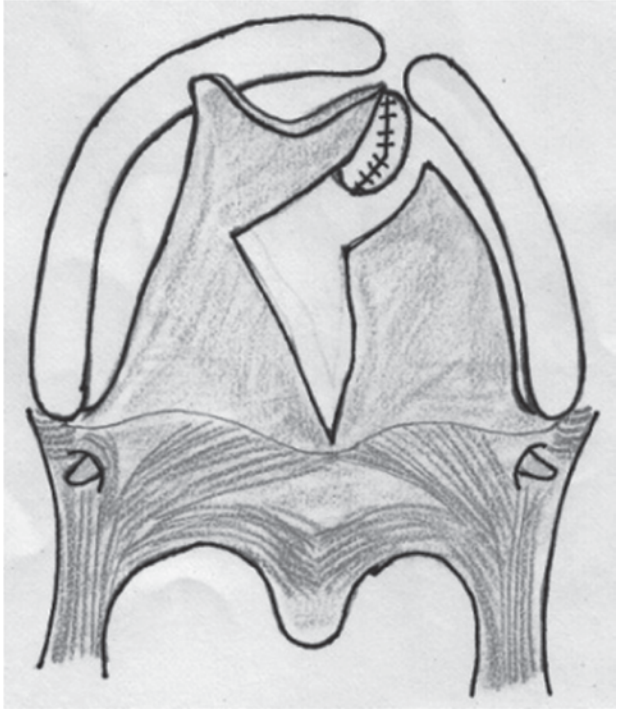

Fig 5: Transposing longer flap

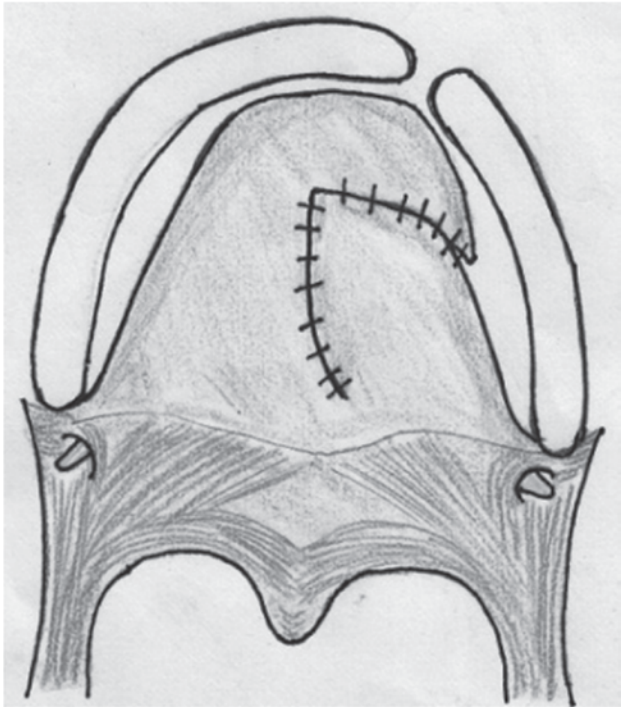

Fig 6: Oral layer completed

Two mucoperiosteal flaps of unequal size were elevated off the bone, a longer and larger flap on the non-cleft side and a shorter smaller flap on the cleft side. Both were well perfused flaps having the greater palatine artery as its axial artery. The oblique line of incision for the transposition flap of the noncleft side was then marked by bringing over the smaller flap over larger one. This technique allowed the cranial part of the noncleftmucoperiosteal flap to be transposed and traverse the distance to reach the alveolar edge comfortably without having to pull the palate cranially during closure. The incision was made through and through on the noncleftmucoperiosteal flap taking care not to injure the main axial vessel of the flap.

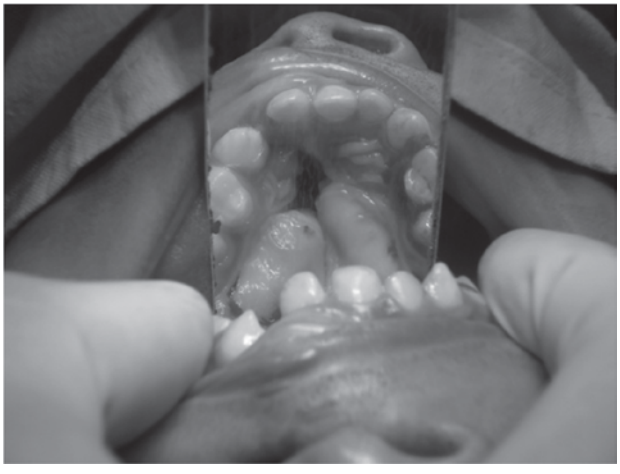

Fig 7: Anterior palatal fistula

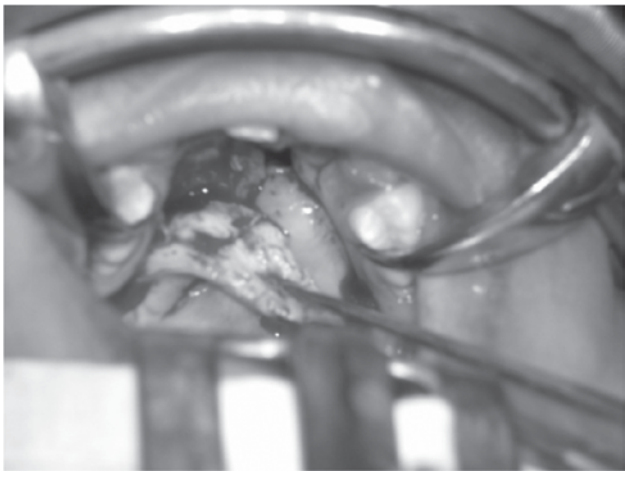

Fig 8: Raising the mucoperiosteal flaps

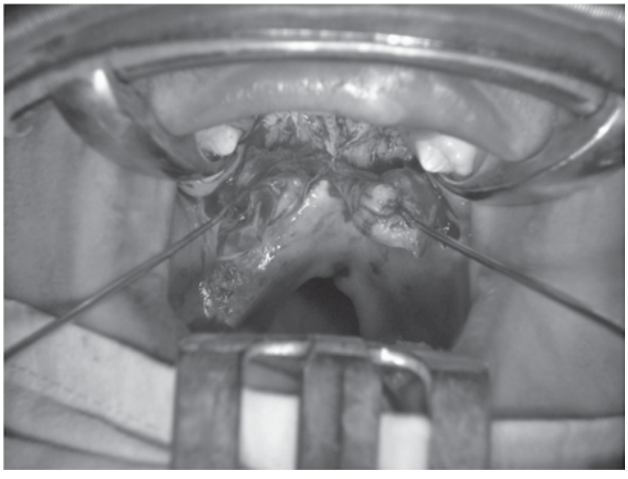

Fig 9: The flaps have been raised

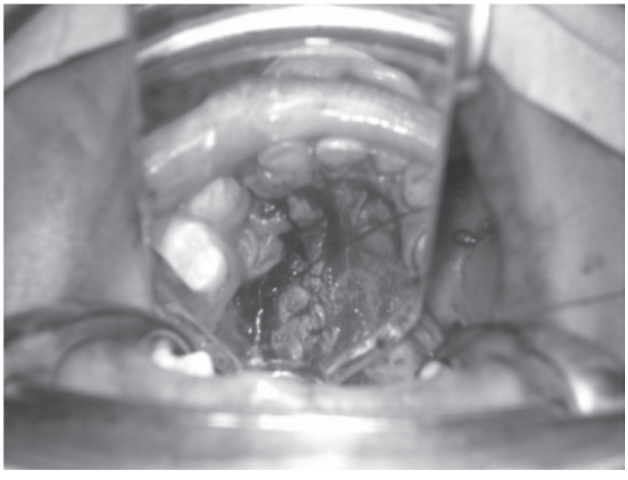

Fig 10: Nasal layer closed without tension

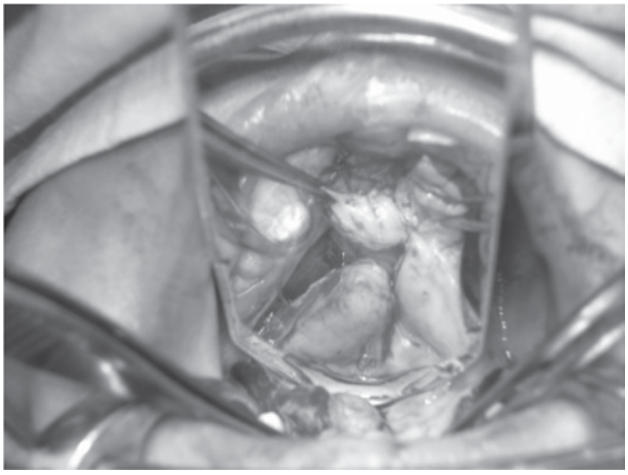

Fig 11: Transposing the flap

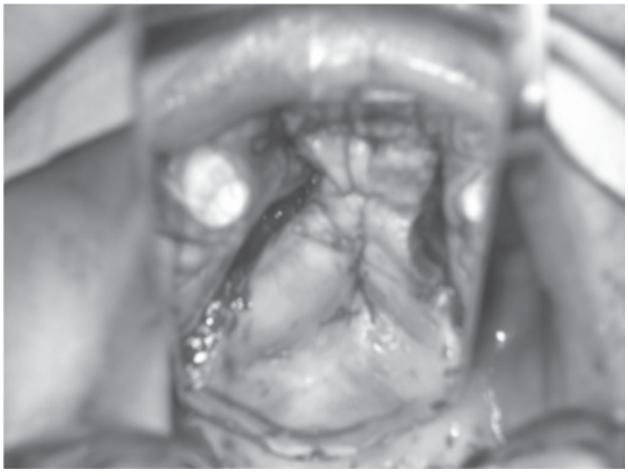

Fig 12: Repaired oral layer

The nasal lining was then reconstructed by suturing the mobilized mucosal flaps encircling the fistula. The flaps were approximated accurately without tension, trimmed if needed and sutured with 4-0/5-0 vicryl stitches with the raw surface of this layer facing the oralside. Closure of the oral lining started by suturing the mucoperiosteal flaps together. The repair was carried out with 4-0 vicryl, interrupted stitch. The closure was continued from a caudal to cranial direction keeping the margins slightly everted and maintaining no tension. Cranially, the mucoperiosteal flap was anchored with the residual palatal tissue adjacent to the lingual aspect of the alveolar arch. Meticulous haemostasis was ensured. A long silk thread through the tongue was routinely left in to enable quick and optimum control in case of an emergency.

Results:

Among the 15 patients, male: female was 7:8. 13 patients had unilateral clefts and bilateral was 2. Out of 13 patients, left sided cleft was more common.

The average size of the fistula in the study group was 5.93 mm. 9 patients had large sized fistula and 5 had medium size. Rest was small. The mean length was 11.4 mm. The procedure was adequate to close even as large as >5 mm.

There was considerable improvement in treating the upper respiratory tract infection among the patients. Before surgery the incidence was 86.66% and all the patients were treated by Otolaryngologist. After surgery it came down to 13.33% even with a six months follow up.

Nasal regurgitation improved significantly after surgery. After 6 weeks only one patient developed recurrent fistula as there was partial flap loss. The patient required secondary correction (Table I).

Table I: Nasal regurgitation

Presence of Nasal regurgitation		No. of patients	Percentage
Pre-operative		15	100
Post-operative	1st week	4	26.67
	2nd week	2	13.33
	3rd week	1	6.67
	4th week	1	6.67
	5th week	1	6.67
	6th week	1	6.67

Complications included haemorrhage, flap loss and recurrence of fistula which were looked for in the early post operative period. Partial flap loss occurred in one patient (6.67%) which resulted in recurrence of fistula (Table II).

Table II: Complications after surgery

Complications		No. of patients	Percentage
Haemorrhage		0	0
Flap loss	Complete	0	0
	Partial	1	6.67
Recurrence of fistula		1	6.67

Discussion:

Anterior palatal fistula formation is a recalcitrant complication following palatoplasty.The accepted incidence of palatal fistulas presently ranges from 3 to 5%[1]. It may cause embarrassing nasal emission of food while chewing and swallowing, fetor oris, air leakage resulting in hypernasal speech[2]. Thus it has led to attempts of repair by different techniques using local, regional and distant tissues[3].

With the local mucoperiosteal flap technique, comfortable closure of fistulas of small to medium size can be achieved.

This technique has the advantage of providing adequate exposure for closure of the nasal mucosal gap and allowing closure of the palatal defect with a tension free line of closure as well as lengthening the palate. So that the chance of development of VPI is minimum. Future scarring is also less as the defect is closed with like tissue and the maxilla are covered with mucoperiosteal flaps.

The use of local mucoperiosteal flap to cover palatal fistula was first used in 1971 by Aarne Rintala[4]. But his recurrence rates were higher than the present study. In the study of Abdel-Aziz[5] 14 patients were subjected for repair using two layers; the first layer was the oral mucoperiosteum that was elevated to close the nasal side as a hinge flap, and the second was also the oral mucoperiosteum that was elevated from the rest of the palatal mucosa and sutured in a V-Y manner to close the oral side. The present study co-related well with the study of M Abdel-Aziz. However present study differed in the lengthening of the mucoperiosteal flaps by local advancement to gain extra length for prevention of VPI. Nicola Freda et al[6] also used local mucoperiosteal flaps 117 patients. Two reverse local flaps from the nasal mucosa of the lateral palatal edges were used to close the fistula. A third flap was elevated from the premaxilla in bilateral clefts. But this study involved relatively smaller sized defects than present study. Also the recurrence rates were quite high due to the use of small sized flaps from both sides causing increased donor site morbidity. The present study did not leave any bone devoid of mucoperiosteum and the mucoperiosteal flaps were highly vascular keeping the pedicle intact. As a result the donor site morbidity was minimum.

The size of the wounds in this study varied from 2 mm to 10 mm in width and 4 mm to 18 mm in length, average of 11.4 to 5.93 mm. Width of the fistula was more important for closure than length as it directly influenced the mucoperiosteal flaps to be raised. All the fistulae were located at the junction of primary palate and secondary palate, categorized as type V fistula[7].

Length of hospital stay was a vital parameter to be taken under consideration. Table II showed the percentage of complications to be 6.67%. Due to partial flap loss, one patient developed recurrent fistula at the same site and the size was smaller than the original defect. The complications did not necessitate the patient to stay in the hospital for more than 3 days. So the hospital stay was shorter. Out of the 15 patients, 4 patients continued to suffer from nasal regurgitation till their 2nd visit in the 2nd week. Among them, one had developed palatal fistula again in the same site. After 6 weeks, recurrence of fistula was in one (6.67%) patient only requiring surgical intervention at a later date.

Local mucoperiosteal flap to close palatal fistula is a reference flap mainly for the coverage of defects in the anterior and mid part of the palate. The advantage of using the mucoperiosteal flap was mainly because of the ease and reliability to harvest it. Not to mention the similarity of the tissue with that of the lost tissue[11]. Replacement of tissue with like tissue results in less fibrosis which in the long term is helpful for re-using the flap if necessary. The transposition of the flap prevented pulling up of the flap anteriorly and consequently the soft palate. The 60° to 90° transposition of the flap enabled the suture line of the oral mucosa not to fall in the same line and direction as that of the nasal mucosal repair thereby reducing the chances of fistula formation again. The recurrence rate in the present study was found to be 6.67%.

Conclusion:

Treatment of anterior palatal fistula in cleft patients remains a surgical challenge because of its high failure rate. No single technique has been satisfactory and attempts at closure of these fistulae have been associated with failure rate of around 33%[6]. The preliminary results of closing it with local mucoperiosteal flaps in this study showed that it is simple and reliable with a recurrence rate of only 6.67. Although prevention is always better than cure, fistula formation after cleft palate repair will probably continue to occur even in the best of hands. It is of utmost importance to repair symptomatic fistulas as soon as possible, before further complications and long term functional disability develops. The technique is safe, relatively uncomplicated and effective. The same technique could also be used in primary cleft palate repair when the oral lining is inadequate. The qualifications of the present study are that 14 patients have been successfully treated with consistent results.

The major drawback of this study was the limited number of cases and lack of experimental studies worldwide. Thereby a shortage of references has been encountered. Although it is a new procedure, it certainly requires further evaluation and long term follow up of the patients.

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