ABSTRACT

**Aim:** Aim of this retrospective study was to access the various surgical treatment options available for repair of Anterior palatal fistula depending upon their size and presenting age, and also to anticipate the treatment outcome. **Materials and Methods:** The series include study report of forty patients with secondary anterior palatal fistula post cleft palate repair, reported in a single unit during a duration of 3 years. All the cases were managed surgically under general anesthesia. The patients were classified depending upon the location of anterior palatal fistula (APF), the quality of tissue and age of patients to chalk out a justified treatment option outlay. **Results:** Forty cases were split for surgical correction into various options depending on their size, site, and quality of the tissue. Most of the cases were operated with a Bardach’s Redo for fistula closure (n = 16) (40%) and crevicular flap technique (n = 13) (32.5%). Our overall success (satisfactory results) was 77.5% as observed in 31 out of 40 cases with individual success rates for Bardach’s and crevicular being 75% and 77%, respectively. There was reduction in size of fistula in three cases (7.5%) and a remnant pinpoint hole in four cases (10%) among all the operated cases. **Conclusion:** Management of post palatoplasty fistulas of the hard palate presents a challenging situation for a clinician following the surgical correction of cleft palate. Current paper describes the diagnosis and clinical management of forty cases reporting with unilateral APF following cleft palate surgery, over 3 years. Authors have attempted to propose different treatment modalities for surgical management of unilateral APF. It was concluded in the primary review that the size of fistula was irrelevant in determining the clinical outcome. Instead, the quality and condition of the adjacent tissue appear to be the major governing factors for selecting treatment modality as well as the surgical consequences.

**Key words:** Anterior palatal fistula, cleft palate, tongue flap
**Introduction**

Secondary palate fistulas are not uncommon complications following cleft palate repair. They may occur at any point and age along the line of the repaired cleft. Reported recurrence range, after surgical correction of cleft palate, varies between a wide range of 10% and 30% depending on the technique used and age at the time of primary repair.[1] Small fistulas may be asymptomatic but patients commonly complain of regurgitation of liquids into the nose, and food may become impacted with resultant malodor.[2] Palatal fistulas can be variedly located in reconstructed palate starting from alveolar margin to anterior third, middle third, or posterior one-third of palate. The probable cause for occurrence of anterior palatal fistulas (APFs) is anatomically shorter lesser segment, wide palatal cleft defect with thin palatal shelves, improper reflection of subperiosteal flap, and improper closure.[3]

**Materials and Methods**

This study is a retrospective record review of patients diagnosed with APF in 3.5 years (which reported in our unit between January 2010 and July 2013). A total number of 91 patients with anterior palate fistula were operated in this duration. There were forty cases of unilateral APF which were treated with one or another technique surgically depending on various factors influencing the choice of surgical technique. Patients were categorized in the study depending on the procedure followed for the APF closure.

Analysis of preoperative, immediate postoperative, and 1-month follow-up pictures was done to check for the site of occurrence, type of cleft, evaluation of adjacent tissue, size of fistula, postoperative healing, and closure with various techniques to compare and evaluate the results and outcome along with complication if any.

Out of the forty patients included in the study, primary palate closure of ten patients was done in our unit (Bhagawan Mahaveer Jain Hospital, Bengaluru, India), whereas thirty were treated elsewhere for repair of cleft palate primarily. In the study, unilateral APFs were evaluated depending on their site of occurrence, type of cleft, evaluation of adjacent tissue, and the size of fistula.

Depending on the site of occurrence, APF were categorized into three locations: Alveolar fistulae, alveolar fistulae extending to hard palate, and fistulae in hard palate [Figure 1].

All the palatal fistulas were evaluated for the adjacent tissue in which the quality of tissue was assessed if it is a normal anatomical tissue or secondary mucolized tissue postpalatoplasty. All the fistulas were evaluated for their size too [Figure 2].

Techniques adopted for closure of APF were anterior palate Redo with Bardach’s principle [Figure 3], closure with rotation of island flap [Figure 4], closure with crevicular flap, closure with buccal advancement flap, and closure with tongue flap and vomer flap.

**Results**

As shown in Table 1, forty cases were split for surgical correction into various options depending on their size, site, and quality of the tissue. Most of the cases were operated with a Bardach’s Redo for fistula closure ($n = 16$) (40%) and crevicular flap technique ($n = 13$) (32.5%). Our overall success (satisfactory results) was 77.5% as observed in 31 out of 40 cases with individual success rates for Bardach’s and crevicular being 75% and 77%, respectively. There was reduction in size of fistula in three cases (7.5%) and a remnant pinpoint hole in four cases (10%) among all the operated cases. We observed just two breakdowns of repair in forty cases. During evaluation of all the three cases managed with vomer flap, a satisfactory outcome was evident. Results were considered satisfactory in case of the absence of any symptomatic or asymptomatic fistula, no particular complaints by patient or nasal regurgitation.

**Discussion**

Even today, cleft palate and its associated surgical repair are rated among the greatest challenges in reconstructive surgery. A successful treatment outcome expected after repair of cleft palate includes achieving normal speech without increasing maxillofacial growth disturbances.
The occurrence of a fistula following surgery clearly compromises these goals.[4]

Factors predisposing to development of postoperative dehiscence or fistula include width of the palatal cleft, amount of deficiency of palatal segment, misplacement, and distortion of the cleft segment.[5] Other extrinsic variables considered for the fistula formation are the timing of repair, sex of the patient, surgical procedures, and the operating surgeon. Early dehiscence and fistulas are primarily caused by errors in technique such as inadequate mobilization, closure under tension, injury at reintubation, poor handling of the tissue, failure to achieve a layered closure, and postoperative bleeding and infection.[6]

Denny and Amm[1] proposed closure of palatal fistula with anterior palate Redo with Bardach’s principle. They documented the technique of total palatal elevation to be a safe and reproducible technique for closure of hard palate fistulas using local palatal flaps. The authors were of the opinion that this technique possesses added advantage of allowing direct visualization of all the elements essential for a successful repair. Our results held resemblance to this concept since we were able to achieve a successful treatment outcome in 75% of the cases. Henderson[7] discussed the use of advancement island flap for the closure of APF and named it as the “tadpole flap.” Although lesser number of defects were repaired in the current case series with island flap, but almost all of them showed satisfactory healing outcome.

Carstens[8] in his study put forward the sequential cleft management with sliding sulcus technique and alveolar extension palatoplasty. He stated that conventional methods of cleft lip repair deprive the anterior (buccolingual) alveolar mucoperiosteum of blood supply from the facial‑internal maxillary arcade. After 6 months, while performing palatoplasty, the lingual incisions permanently isolate the lingual mucoperiosteum from vascular supply which is the greater palatine artery, thereby transforming the osteogenic alveolar mucoperiosteum from a richly supplied boundary zone between the two angiosomes into an isolated tissue surviving primarily on osseous backflow. Cleft‑sided growth disturbance is considered from this perspective. Subperiosteal techniques that

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**Table 1:** Indicating the split up of 40 cases into various surgical techniques adapted for APF closure and comparison of result

| Procedure          | Total cases | Satisfactory (%) | Reduction in size | Pin point hole (%) | Breakdown (%) |
|--------------------|-------------|------------------|-------------------|-------------------|---------------|
| Bardach’s ReDo     | 16 (40%)    | 12 (75)          | 01 (6.3%)         | 02 (12.5%)        | 01 (6.3%)     |
| Crevicular         | 13 (32.5%)  | 10 (77)          | 01 (7.7%)         | 01 (7.7%)         | 01 (7.7%)     |
| Island flap        | 06 (15%)    | 05 (83.3)        | 00                | 01 (16.7%)        | 00            |
| Vomer flap         | 03 (7.5%)   | 03 (100)         | 00                | 00                | 00            |
| Tongue flap        | 02 (5%)     | 01 (50)          | 01 (50%)          | 00                | 00            |
| Overall            | 40          | 31 (77.5)        | 03 (7.5%)         | 04 (10%)          | 02 (5%)       |

APF: Anterior palatal fistulas
preserve the blood supply to this tissue is considered in a sequential plan of cleft management. The authors were able to perform APF repair in 13 cases through this technique in our study with a predictable healing result in 77% cases.

Another approach utilized by Jackson\((9)\) for the management of small- and moderate-sized fistulae involved a combination of buccal and palatal flaps along with bone grafting. However, such an intervention was performed in fewer number of patients in this study. Another attempt made by the surgeons to repair APFs with secondary mucolized tissue involved creating a vomer flap in small figure of three which was associated with significantly improved healing outcome in all the cases. Perhaps, an exclusive study on fate of vomer flap would provide more precise details regarding the predictability of this technique.

Henceforth, the authors have made an effort to put forward treatment options for APF depending on their location by means of a simplified algorithm [Figure 5]. For an APF, exclusively in alveolus buccal flap or crevicular flap can be used if patients’ age is over 11 years, whereas for patients’ younger than this secondary alveolar bone grafting with or without prior orthodontics or buccal flap appear to be more suitable. During management of fistulas extending to hard palate or into the hard palate, selection of the treatment modality depends on a major extent on the tissue quality. In case of normal palatine tissue, Bardach’s Redo or crevicular flap can be used. Whereas in cases with secondary mucolised tissue, if it is present over greater segment, a vomer flap is advocated; if it is bilateral, tongue flap is advised; and in case of lesser segment, rotation of the greater segment is recommended.

**Conclusion**

The current study was based on a stringent protocol regarding the selection of a surgical treatment plan based on anatomical location of fistula and the quality of surrounding tissue. Postoperative follow-up of maximum number of cases revealed minimal complication or recurrence rate. Additional factors that could be included in future studies for similar clinical cases include speech, etiology of fistula, and width of palate at the time of primary closure. Furthermore, we believe that a long-term follow-up of at least 6 months would be better to provide more reliable result.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

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