

A statistical analysis of incidence, etiology, and management of palatal fistula

ABSTRACT

Objective: The purpose of this study was to retrospectively review the incidence, profile, and the management of palatal fistula occurring in patients operated for cleft palate in our institute.

Materials and Methods: A retrospective analysis was performed on all cleft palatal fistula patients who presented during the period from August 2007 to October 2017, to classify their site, age of presentation, surgery performed, and outcome. A record of the type of cleft palate and previous palatoplasty was also obtained. The outcome in terms of incidence and fistula formation depending on Veau's classification was analyzed.

Results: Twenty-two patients reported with palatal fistula during this period. The incidence of fistula formation of our institute was 9.6%. Incisive foramen (13/22) was the most common site of fistula formation. Among various techniques used, local and buccal flaps were found to be useful in a maximum number of cases (14/22). The rate of fistula recurrence was 18.2% (4/22). On retrospective analysis of our institutional data, it was found that the incidence of cleft palate fistula was significantly higher in clefts with Veau Types III and IV (13/18) as compared to Veau Types I and II (5/18).

Conclusion: This study shows that the fistula rate of our institution was 9.6%. Complete clefts (unilateral or bilateral) involving both primary and secondary palates predispose more to fistula formation.

Keywords: Cleft palate statistics, flaps for palatal fistula, palatal fistula incidence, palatal fistula repair, palatoplasty

INTRODUCTION

Fistula, defined as an epithelized opening between the oral and nasal cavities,^[1] is the most common complication of palatoplasty (single or two staged). Various causes for its formation are attributed to age of primary palatoplasty, width of cleft, type of cleft, associated syndrome, and surgeon's experience.

Worldwide, the fistula rate ranges from 0% to 58%, with recurrence rate of 33%.^[2-7] Small asymptomatic fistulae are initially managed conservatively as they may close themselves without any bothersome symptoms. Symptomatic fistulae with features such as hypernasal speech or nasal regurgitation of meals should be taken up for repair anytime after 6 weeks of palatoplasty.

Numerous surgical techniques for repair of these fistulae have been described that aim to achieve either normal development of speech or adequate maxillary growth in later years.^[6,7]

This is a retrospective analysis of cleft palate fistulae presenting to our department from a population of patients operated for palatoplasty in our hospital and to highlight the review of literature for the same.

MATERIALS AND METHODS

We analyzed the presentation and management of palatal fistulae presenting to our institute in the period from August 2007 to October 2017. We did not include patients who either

RAMNEESH GARG, SHEERIN SHAH, SANJEEV UPPAL, RAJINDER K. MITTAL

Department of Plastic Surgery, Dayanand Medical College and Hospital, Ludhiana, Punjab, India


Address for correspondence: Dr. Sheerin Shah, Department of Plastic Surgery, Dayanand Medical College and Hospital, Ludhiana - 141 012, Punjab, India. E-mail: sheerinkathpal@gmail.com

Received: 17-05-2018, **Revised:** 06-09-2018, **Accepted:** 29-09-2018

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Garg R, Shah S, Uppal S, Mittal RK. A statistical analysis of incidence, etiology, and management of palatal fistula. Natl J Maxillofac Surg 2019;10:43-6.

Access this article online	
Website: www.njms.in	Quick Response Code 
DOI: 10.4103/njms.NJMS_42_18	

presented early or had postoperative asymptomatic fistula that healed itself within 6 weeks. Intentional fistulae, which fall in Pittsburgh Type 6 and 7, were also not included. In this period, a total of 22 patients presented with symptomatic fistulae. These patients were classified according to the type of fistula as per the Pittsburgh classification. Speech and assessment of other symptoms were done before repair of all fistulae. The type of fistula repair and postoperative stay were recorded. All operated patients were followed up at a regular interval of 2 weeks for the first 2 months and then monthly for the next 4 months for any recurrence or other complications. These 22 patients were retrospectively analyzed for their prior palatoplasty, in terms of type of Veau cleft, type of palatoplasty done, gender distribution, and laterality of cleft.

The data thus collected were analyzed using Pearson's X² and Fisher's exact tests. The difference of $P < 0.05$ was considered statistically significant.

RESULTS

We studied 22 patients, who presented with palatal fistulae during this period. The most common age group of patients presenting was <5 years [Table 1]. There was no gender difference in the occurrence of fistula. Pittsburgh Type 5 fistulae were significantly higher than other types [Table 1]. Among various techniques used for fistula closure, local and buccal flaps were most commonly used. All patients were followed up fortnightly for the first 2 months and monthly for the next 4 months. There were four cases of recurrent fistula, all occurring in the area of incisive foramen (recurrence rate 18.2%). Speech analysis of all operated cases showed a decrease in nasal resonance.

On retrospective analysis of institutional data, we found that the total number of cleft palates operated during this time was 228, of which 22 patients developed fistulae. The fistula rate of our institution was 9.6%. Table 2 shows the occurrence of fistula in each Veau group of cleft palate, a significantly higher number of which were found in Veau Types III and IV. The mean age of primary palatoplasty was 1.6 years, and 2-flap palatoplasty technique was used in 68.2% of these fistula patients.

Surgical technique

In our institution, single-staged palatoplasty was routinely done, except in rare cases where the width of the palate is too large, in which soft palate was closed in the first stage. As a standard procedure, the nasal layer was sutured with Vicryl 4-0. Intravelar veloplasty was done in all cases under

Table 1: Details of palatal fistula patients

Age	Sex	Type	Surgery	Veau type	Palatoplasty age	Palatoplasty
18	Female	6	Buccal flap	III	1½	2-flap
3	Female	5	Buccal flap	IV	1	2-flap
2	Male	3	Local flaps	II	1½	V-Y
6	Female	5	Local flaps	III	4	2-flap
6	Female	5	FAMM flap	III	1½	V-Y
7	Female	5	Redo	IV	2	2-flap
3	Male	6	Buccal flap	III	1	2-flap
3	Male	5	Buccal flap	III	1½	2-flap
4	Female	4	Redo	II	2	V-Y
3	Female	5	Buccal flaps	III	1½	2 flap
4	Male	5	Tongue flap	III	2	2-flap
3	Female	3	Redo	II	1½	Langenbeck
5	Female	3	Local flaps	II	1½	V-Y
5	Male	5	Buccal flaps	III	1	2-flap
5	Female	3	Lateral releasing incisions	III	2	2-flap
5	Male	5	FAMM	III	1	2-flap
10	Female	5	Local flap	IV	2	2-flap
12	Male	5	Tongue flap	III	1½	2-flap
11	Male	5	Buccal flaps	IV	5	2-flap
3	Male	3	Local flaps	II	1	Langenbach
13	Male	5	Local flaps	III	12	2-flap
4	Male	3	Local flaps	II	1½	Langenbach

FAMM: Facial artery musculo mucosal flap

Table 2: Occurrence of fistula in each Veau group of cleft palate

Type of cleft	Number of total patients	Number of fistula patients	Percentage
Veau I	29	0	0
Veau II	104	6	5.7
Veau III	69	12	17.3
Veau IV	21	4	19.0
Submucous cleft	5	0	0
Total	228	22	9.6

magnification using Vicryl 3-0. The oral layer was sutured with Vicryl 3-0. Packs, if placed along lateral incisions, were removed on the 4th postoperative day. Most of the patients were discharged after pack removal.

DISCUSSION

The surgery for cleft palate has evolved from simple paring of edges to raising soft tissue flaps to doing intravelar veloplasty. Despite surgical advances over the years, poor speech outcome and fistula occurrence remain the causes of concern for cleft surgeons. Palatal fistula (defined as patency between oral and nasal cavity) is a well-known complication of palatoplasty.^[1] They may be symptomatic or asymptomatic. Symptomatic fistulae are the ones that present with nasal regurgitation and hypernasality in speech. The incidence may range from as low

as 12% to as high as 45%.^[2] The review of literature suggests a highly variable incidence rate.^[3-7] Sadhu, in his study in 2009,^[8] mentioned fistula rate of <1%. Carstens reported an incidence of 58% in his article.^[9] In a study by Muzaffar *et al.*, the incidence rate was 8.7%, with recurrence rate being 33%.^[7] Our institutional fistula rate was 9.6% and the recurrence rate was 18.2%. The attributable factors for this wide range of incidence could be the surgical techniques used, the severity of the cleft, and the timing of repair.^[10-12] In this study, gender as a variable in determining the incidence of palatal fistula was not a contributory factor. Emory *et al.* in their study on 119 cleft palate patients also did not find gender as a contributory factor to palatal fistula.^[6] There were 104 patients with Veau Type II, of which 6 had fistula. There were 69 patients in Veau Type III, of which 12 (17.3%) had fistula, and there were 21 patients in Veau Type IV, of which 4 (19%) had fistula. In this study, the incidence of fistula was directly proportional to the severity of cleft. Amaratunga^[12] and Lithovius *et al.*^[13] also found a correlation between cleft type and fistula occurrence. Amirize^[14] found higher fistula rate in Veau Type III clefts than in Veau Type II (11 and 8, respectively). He found a direct correlation between cleft width and risk of oronasal fistula, with high fistula rates in patients with wide cleft > 15 mm. Similar direct correlation between the both has also been documented by other authors.^[15-17] Contrary to this, Wilhelmi *et al.*^[18] and Mak *et al.*^[19] did not find any correlation between cleft width and fistula occurrence. In this study, we did not record the width of the cleft in cleft palate patients. Lithovius *et al.*^[20] depicted no significant association between the type of palatoplasty and occurrence of fistula. Our study showed a significantly higher occurrence of fistula in 2-flap palatoplasty patients. Similar results were reported by Cohen *et al.*^[4]

We could not demonstrate any association between timing of primary surgery and fistula formation as we could retrospectively analyze only 22 patients who underwent palatoplasty at a mean age of 1.6 years. On review of literature, no clear-cut association was depicted by authors like Cohen *et al.*,^[4] whereas Emory *et al.*^[6] demonstrated a decrease in fistula rate if palatoplasty was done in < 12 months. The most common site of fistula in this study was incisive foramen. Difficulty in dissecting anterior palate (especially nasal layer) and inability in achieving watertight closure are prime causative factors of fistula in this area. Murthy^[21] also found incisive foramen as the most common site. The review of literature^[22] showed that another common site of fistula formation was junction of hard and soft palates, which was the second common site in this study. The cause of this was attributed to inadequate mobilization, deficiency of tissue, triangular-shaped palatine bones, and a higher incidence of Veau Types III and IV clefts. Depending on scarring,

inflammation, and availability of surrounding tissue, the type of flap was decided. We used local flaps [Figure 1] and buccal flaps [Figure 2] in seven cases each. Superiorly based FAMM flap [Figure 3] was done in two cases. Tongue flap was also done in two cases. Murthy^[21] reported a similar pattern of the type of surgeries. On follow-up of 6 months,

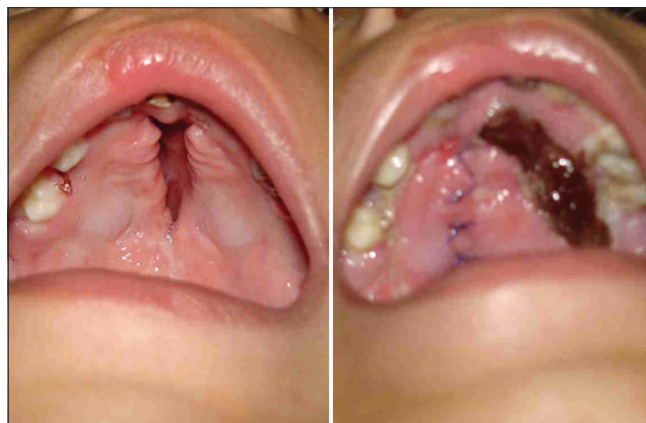


Figure 1: Local flap for fistula coverage

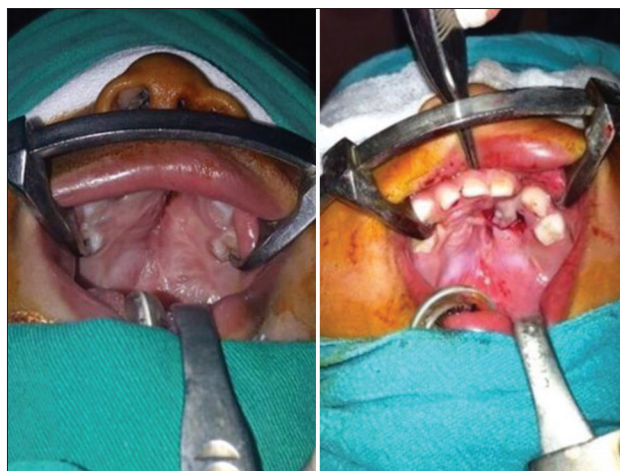


Figure 2: Buccal flap used for fistula coverage

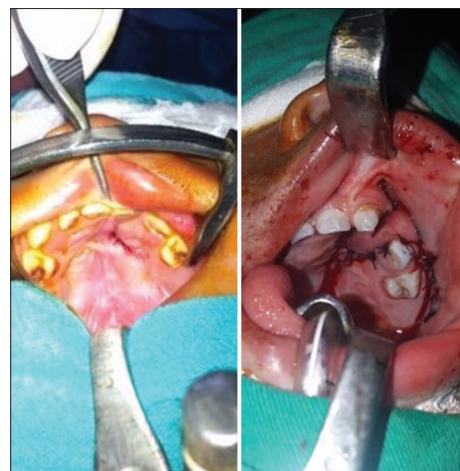


Figure 3: FAMM flap for fistula coverage

we found recurrent fistula in four of the operated cases of anterior fistulae (Veau Types III and IV). Distant flaps such as temporalis muscle flap and microvascular free flaps have been described in the literature,^[23,24] but are rarely indicated. The use of prosthesis that causes anatomical barrier between nasal and oral lining is reserved for patients who refuse surgical intervention.

CONCLUSION

Surgery for closure of palatal fistula is both difficult and demanding. Decision on the type of surgery needed to close the fistula depends on the location and availability of local tissues. One is tempted to close small fistula primarily, but size should not be the only criteria on which this decision be based. Local transposition flaps or regional flaps (FAMM, buccal, and tongue flap) are the workhorse flaps for palatal fistula closure. We have had no experience with free flap or distant flap such as temporalis muscle flap.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Smith DM, Vecchione L, Jiang S, Ford M, Deleyiannis FW, Haralam MA, *et al.* The Pittsburgh fistula classification system: A standardized scheme for the description of palatal fistulas. *Cleft Palate Craniofac J* 2007;44:590-4.
- Schultz RC. Management and timing of cleft palate fistula repair. *Plast Reconstr Surg* 1986;78:739-47.
- Shaw WC, Semb G, Nelson P, Brattström V, Mølsted K, Prah-Andersen B, *et al.* The Eurocleft project 1996-2000: Overview. *J Craniomaxillofac Surg* 2001;29:131-40.
- Cohen SR, Kalinowski J, LaRossa D, Randall P. Cleft palate fistulas: A multivariate statistical analysis of prevalence, etiology, and surgical management. *Plast Reconstr Surg* 1991;87:1041-7.
- Rohrich RJ, Rowsell AR, Johns DF, Drury MA, Grieg G, Watson DJ, *et al.* Timing of hard palatal closure: A critical long-term analysis. *Plast Reconstr Surg* 1996;98:236-46.
- Emory RE Jr., Clay RP, Bite U, Jackson IT. Fistula formation and repair after palatal closure: An institutional perspective. *Plast Reconstr Surg* 1997;99:1535-8.
- Muzaffar AR, Byrd HS, Rohrich RJ, Johns DF, LeBlanc D, Beran SJ, *et al.* Incidence of cleft palate fistula: An institutional experience with two-stage palatal repair. *Plast Reconstr Surg* 2001;108:1515-8.
- Sadhu P. Oronasal fistula in cleft palate surgery. *Indian J Plast Surg* 2009;42 Suppl:S123-8.
- Carstens MH. Management of palatal fistulae. *Indian J Plast Surg* 2011;44:46-9.
- Rohrich RJ, Love EJ, Byrd HS, Johns DF. Optimal timing of cleft palate closure. *Plast Reconstr Surg* 2000;106:413-21.
- Landheer JA, Breugem CC, van der Molen AB. Fistula incidence and predictors of fistula occurrence after cleft palate repair: Two-stage closure versus one-stage closure. *Cleft Palate Craniofac J* 2010;47:623-30.
- Amaratunga NA. Occurrence of oronasal fistulas in operated cleft palate patients. *J Oral Maxillofac Surg* 1988;46:834-8.
- Lithovius RH, Ylikontiola LP, Harila V, Sándor GK. A descriptive epidemiology study of cleft lip and palate in Northern Finland. *Acta Odontol Scand* 2014;72:372-5.
- Amirize EE. The relationship between cleft width and oronasal fistula. *Niger J Plast Surg* 2016;12:4-11.
- Landheer JA, Breugem CC, van der Molen AB. Fistula incidence and predictors of fistula occurrence after cleft palate repair: Two-stage closure versus one-stage closure. *Cleft Palate Craniofac J* 2010;47:623-30.
- Parwaz MA, Sharma RK, Parashar A, Nanda V, Biswas G, Makkar S, *et al.* Width of cleft palate and postoperative palatal fistula – Do they correlate? *J Plast Reconstr Aesthet Surg* 2009;62:1559-63.
- Moris LM, Kuang A, Milczuk HA, Beaulieu K, Wang T, Brockman J. Does cleft palate width impact success of cleft repair? *Otolaryngol Head Neck Surg* 2011;145:45.
- Wilhelmi BJ, Appelt EA, Hill L, Blackwell SJ. Palatal fistulas: Rare with the two-flap palatoplasty repair. *Plast Reconstr Surg* 2001;107:315-8.
- Mak SY, Wong WH, Or CK, Poon AM. Incidence and cluster occurrence of palatal fistula after furrow palatoplasty by a single surgeon. *Ann Plast Surg* 2006;57:55-9.
- Lithovius RH, Ylikontiola LP, Sándor GK. Incidence of palatal fistula formation after primary palatoplasty in Northern Finland. *Oral Surg Oral Med Oral Pathol Oral Radiol* 2014;118:632-6.
- Murthy J. Descriptive study of management of palatal fistula in one hundred and ninety-four cleft individuals. *Indian J Plast Surg* 2011;44:41-6.
- Lu Y, Shi B, Zheng Q, Hu Q, Wang Z. Incidence of palatal fistula after palatoplasty with levator veli palatini retropositioning according to Sommerlad. *Br J Oral Maxillofac Surg* 2010;48:637-40.
- Krimmel M, Hoffmann J, Reinert S. Cleft palate fistula closure with a mucosal prelaminate lateral upper arm flap. *Plast Reconstr Surg* 2005;116:1870-2.
- Schwabegger AH, Hubli E, Rieger M, Gassner R, Schmidt A, Ninkovic M. Role of free-tissue transfer in the treatment of recalcitrant palatal fistulae among patients with cleft palates. *Plast Reconstr Surg* 2004;113:1131-9.