

The Incidence of Palatal Fistula Postpalatoplasty in Children with Dental Caries: A Multi Centre Study

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Background: Cleft lip and/or palate (CL&/P) is the most common congenital craniofacial abnormality, affecting approximately 1 in every 700 newborns. Patients with cleft lip and/or palate (CL&/P) generally display poor oral hygiene and a higher prevalence of caries. This may be due to the difficulty in achieving adequate plaque control associated with dental anomalies and defects from the lips and/or palate. Palatal fistula is a significant complication following cleft palate repair. It is the aim of this research to find correlation between palatal fistula and dental caries.

Patient and Method: Patients with unilateral complete cleft palates admitted to the Cipto Mangunkusumo hospital, Adam Malik hospital within the period July 2012 till March 2013 were included in this study. All cases underwent modified two flap palatoplasty leaving lateral periosteum technique and follow-up were done in two weeks to see if there are any palatal fistula.

Result: Thirty eight patients with unilateral cleft palate were enrolled in the study. Fifteen (39.5%) of them are boys and 23 (60.5%) are girls. Fifteen of the patients (41.7%) had dental caries, with six patients (40%) had palatal fistula in the follow up after palatoplasty, while there was none (0%) of the 21 (58.3%) patients that were found negative for dental caries developed a fistula.

Conclusion: Dental caries is one of the important predisposing factors of palatal fistula in patients who undergo palatoplasty.

Keywords: Palatal fistula, dental caries, cleft palate

Latar Belakang: Sumbing bibir dan/atau langit-langit adalah kelainan kongenital kraniofasial yang paling sering terjadi. Dengan angka prevalensi 1 setiap 700 kelahiran. Pasien dengan sumbing bibir dan/atau langit-langit pada umumnya memiliki higiene oral yang buruk dan angka prevalensi karies yang tinggi. Hal ini dapat terjadi karena kontrol plak yang sulit dicapai pada pasien dengan kelainan pada gigi dan adanya defek pada bibir serta palatum. Fistel palatum adalah komplikasi yang dapat terjadi setelah operasi sumbing langit-langit. Penelitian ini bertujuan untuk menemukan korelasi antara fistel palatum dan karies dentis.

Pasien dan Metode: Subjek penelitian adalah pasien dengan palatoschizis komplit unilateral di rumah sakit Cipto Mangunkusumo, rumah sakit Adam Malik, pada periode Juli 2012 hingga Maret 2013. Pada semua kasus dilakukan operasi *modified two flap palatoplasty* dan dilakukan follow-up dalam waktu 3-4 minggu untuk mengetahui ada tidaknya fistel.

Hasil: Tiga puluh delapan pasien dengan palatoschizis komplit unilateral diikutsertakan dalam penelitian ini. Lima belas pasien (39.5%) adalah laki-laki dan 23 pasien (60.5%) adalah perempuan. Enam (40%) dari lima belas pasien yang didiagnosa karies dentis, mengalami fistel pada saat pemeriksaan follow-up setelah operasi. Tidak ada pasien (0%) dengan fistel dari 21 pasien (58.3%) tanpa karies dentis.

Kesimpulan: Karies dentis adalah salah satu faktor predisposisi fistel palatum pada pasien yang menjalani operasi palatoplasty.

Kata Kunci: Palatal fistula, dental caries, cleft palate

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Cleft lip and/or palate (CL&/P) is the most common congenital craniofacial abnormality, affecting approximately 1

in every 700 newborns in the USA.¹ Patients with cleft lip (CL), cleft palate (CP), or both (CL&P) generally require extensive treatment by an interdisciplinary team of medical and dental specialists to rectify their cosmetic, speech, hearing, psychosocial, and dento-

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orthopedic problems. It is essential to maintain excellent oral health and prevent dental decay, unfortunately, the majority of studies have shown that patients with CL/P exhibit poor oral hygiene and a higher caries prevalence.² This may be due to the difficulty in achieving adequate plaque control associated with dental anomalies and defects from the lips and/or palate.³

Dental caries is an oral disease that leads to tooth cavities. Cavities result from the loss of minerals from the tooth, caused by the acids produced by bacteria. Research suggests that dental caries is a transmissible infectious disease that can be prevented, and that the presence of cavities is only the most noticeable sign of the disease. The bacteria that cause dental caries and cavities accumulate around and between the teeth, forming what is called dental plaque.⁴ Frequent ingestion of sweets and low saliva flow also favor the development of cavities in the presence of dental plaque. Cavities may sometimes result in the tooth being sensitive. Dental caries results from dental plaque (bacteria) being present in and around teeth for extended periods of time. Some conditions increase the chances for cavities to develop, such as the frequent intake of sweets, a dry mouth, and poor oral hygiene. Cavities can be prevented, but once present they need to be filled to stop their progression and to restore the tooth to its normal contour and function.⁵

Patients with oral clefts have been reported in several studies to have poorer oral hygiene when compared with noncleft patients.⁶ The higher incidences of supernumerary teeth and the limited dental arch space attributed to the underdeveloped maxilla may lead to malalignment of teeth in the CL&P patients. Crowding causes restricted access for the toothbrush and the natural cleansing of the teeth by the tongue and saliva.⁷ Therefore, the oral hygiene in these patients is compromised.

Oral cleft children from families with low socioeconomic usually show poor oral hygiene and dietary habits. Parents in higher social classes are more likely to comply with the nutrition recommendations.¹⁰ Parents also tended to overindulge their children to offer

some satisfaction because of their children's medical conditions. This means that they may provide their children with inappropriate diets that are conducive to caries destruction.⁷ Therefore, limited parental understanding of an appropriate dietary habit and adequate oral hygiene of these children with CL&P has the potential to contribute to the higher caries prevalence.¹¹

The most important outcomes after palatoplasty are measured in terms of speech, feeding, maxillary growth, and hearing. Nevertheless, more than half of postoperative causes fistulas.¹² Fistula formation is not uncommon complication of primary palatoplasty. The actual reported incidence of this complication varies widely, ranging from 0% to 68% in published reports.¹³ a surgical correction and more than two-thirds of secondary repairs require reoperation to achieve successful closure.¹⁴ It is clear that the prevention of fistulas is also an important aspect in the treatment of the cleft palate. Palatal fistulas are often symptomatic, depending on the size and location of the fistula. Symptoms include hypernasality of phonation due to audible nasal air escape during speech, leakage of fluids into the nasal cavity, and lodging of food with risk of infection.¹⁴ Although postpalatoplasty fistulas may occur anywhere along the site of the original cleft(s), they are more common on the hard palate and at the junction of the hard and soft palate.¹⁵ Multiple aetiologies have been proposed for the formation of fistula following cleft palate repair: tissue breakdown due to tension at the site of wound closure¹⁶, tension after maxillary orthodontics, infection¹⁷, hypoxemia¹⁸ and rarely, hematoma formation. However, it appears that necrosis of the mucoperiosteal flap, used for cleft closure, is the most common cause of simple fistula formation, especially when the greater palatine arteries have been injured.¹⁹ Other reports emphasize the importance of the size and type of original defect, whether unilateral or bilateral clefts were present^{19,20}, the technique used to close the cleft, patient sex¹⁸, and associated anomalies. Depending on the extent of functional impairment, a palatal fistula may

have psychological, social, and developmental consequences and should be repaired.²⁰

It is the goal of this study to review the fistula rate in correlate with dental caries.

METHOD

The study is conducted in cohort study. The study takes place at Cipto Mangunkusumo General National Hospital Jakarta and at Adam Malik General Hospital Medan started on June 2012 until June 2013. Outpatients with unilateral complete cleft palates, found positive for dental caries are included in group A and outpatients with unilateral complete cleft palates, found negative for dental caries are included in group B. Inclusion criteria for subjects are as follows: patients with unilateral complete cleft palate, ranging from 1 to 5 years old, and willing to join the research. Subjects are excluded from the study if the patients are syndromic, unwilling to join the research and failed to follow up.

Source of data is primary data. Data obtained directly from research subjects including name, age, address, telephone number and diagnosis. The patients then evaluated after the surgery. Patients asked to control on the third day, first week and second week after the surgery, and the surgeon examines the occurrence of the palatal fistula. Patient's oral hygiene and oral intake also recorded. Clinical photography of the cleft palate and surrounding intraoral, including teeth and gingiva prior to surgery, immediate after surgery, third day, one week and two weeks after surgery are recorded.

The study design is two-group-prospective study, comparing the incidence of palatal fistula in children found positive for dental caries with children found negative for dental caries. The samples were analysed using independent T test and significant if the p value is less than 0.05. The total cost of surgery will be analysed with χ^2 test.

Hypothesis testing in this study is done using SPSS 20.0 to test the significant difference between the two groups.

RESULT

Thirty-eight patients with unilateral cleft palate were included in this study. Fifteen (39.5%) of them are boys and 23 (60.5%) are girls (Figure 1). The mean age of the sample was 21.8 months old, or about 1 years and 9 months old with a range of 1 to 5 years (Figure 2). Fifteen of the patients (41.7%) had dental caries, with six patients (40%) had palatal fistula in the follow up after palatoplasty, while there was none (0%) of the 21 (58.3%) patients that were found negative for dental caries developed a fistula (Table 1).

Table 1 shows that patients with dental caries had the risk of complication after palatoplasty that is the occurrence of palatal fistula increase about 3.33 times than patients who did not have dental caries prior to surgery. We use the Fisher's exact test with p value = 0.003 (Table 2).

$$RR \text{ (Relative Risk Ratio)} = \frac{6}{(6+0)} = 3,33 \\ \frac{9}{9+21}$$

DISCUSSION

Although the causes of palatal fistula as one of the complication after palatoplasty are vary,²⁰ this study shows that dental caries cleft children are more prone to having palatal fistula as a complication after palatoplasty. Previous study by Kirchberg et al. and Chapple et al. concluded that patients with cleft itself had a higher dental caries risk compared to the non cleft one.²⁻³ It means that patients with cleft grow risk of dental caries that later will grow the risk of palatal fistula complications after palatoplasty. It is important that the surgeon, the paediatrician or the general practitioner that had the first handling to a cleft patient, to educate the parents or other family members that it is also important for patients to have an optimal oral health, other than management of the disease and dietary administration. However in this study we still haven't got an optimal results since sample number are too small and the age range 1 to 5 years old are too wide apart. It will be ideal if the sample could have been in the same range of age to lessen the dietary differences postoperatively.

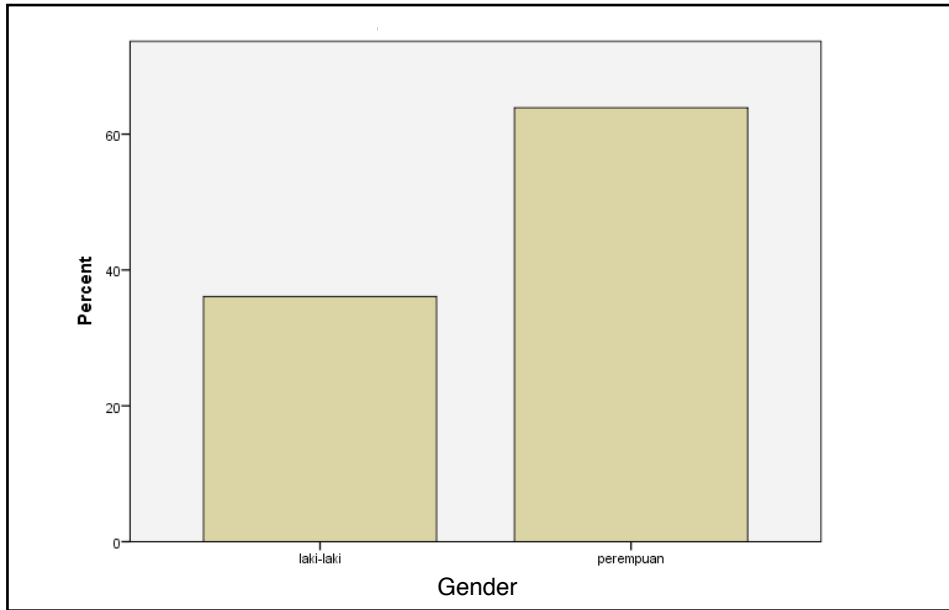


Figure 1. Gender Distribution

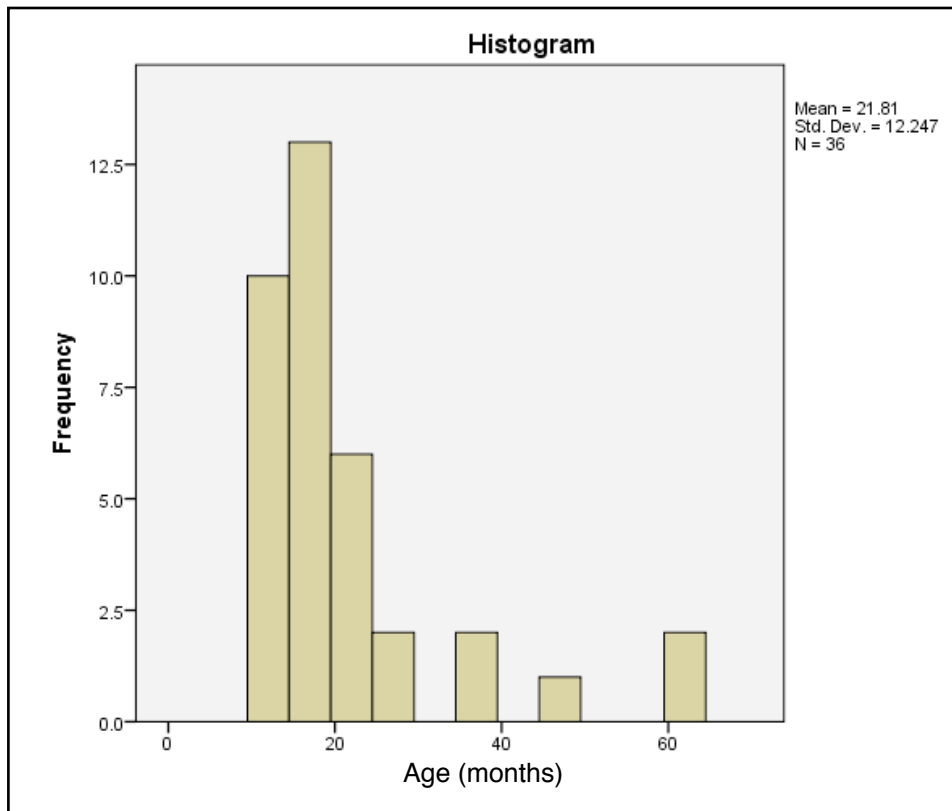


Figure 2. Age Distribution

Table 1. Cross tabulation of dental caries and fistula after palatoplasty

		Palatal Fistula Positive	Palatal Fistula Negative	Total
Dental Karies Positive	Count	6	9	15
	Expected Count	2.5	12.5	15.0
Dental Karies Negative	Count	0	21	21
	Expected Count	3.5	17.5	21.0
Total	Count	6	30	36
	Expected Count	6.0	30.0	36.0

Table 2. Chi-Square test

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.080 ^a	1	.001		
Continuity Correction ^b	7.406	1	.007		
Likelihood Ratio	12.250	1	.000		
Fisher's Exact Test				.003	.003
Linear-by-Linear Association	9.800	1	.002		
N of Valid Cases	36				

CONCLUSION

Caries is one of the important predisposing factors in the predisposition of palatal fistula in patients who undergo palatoplasty. Subjects with cleft lip and palate are susceptible to dental caries. On the other hand, neglecting early treatment of dental caries may subsequently lead to a higher risk of the incidence of palatal fistula after palatoplasty. The author strongly advised the need to give an adequate information and education on cleft patients parents or guardians about how important to maintain a good oral health.

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