Modified Two-Flap Palatoplasty With Leaving Lateral Periosteum and Application of Honey Pack : A Preliminary Study

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Background. According to our experience in Ciptomangunkusumo hospital, most cleft palate patients has wide gap. It makes the epithelialization of the lateral defect takes longer time (3- 4 weeks). In this study, the authors propose a modified technique to the two-flap palatoplasty by not elevating the lateral part of the periosteum with the flap, and then apply honey packs to cover the lateral defects. The technique modification and additional honey-soaked dressing are expected to hasten the epithelialization rate.
Methods: Twelve consecutive patients with non-syndromic cleft palate (with or without cleft lip) are included in the study. They undergo the modified two-flap palatoplasty with the lateral periosteum left behind, covering the palatal bone and the utilization of Honey pack. The rate of epithelialization is then observed every 2 days after operation until full healing is achieved.
Result: Complete epithelialization was attained within 5 days in one patient (2,8 mm/day), within 7 days in 8 patients (2-2,5mm/day), and within 9 days in 3 patients (2,2-2,7mm/day). There were no surgical complications, such as hemorrhage or wound infection. The fistula of the palate was not found until the defect closed.
Conclusions: Our technique hasten the rate of epithelialization. It may prevent the maxillary growth disturbances in the future because faster healing reduces scar formation and wound contraction.
Keywords: *Two-Flap Palatoplasty, Cleft, Honey, Lateral Periosteum.*

Latar Belakang: Menurut pengalaman kami di RSCM, pasien sumbing mempunyai lebar palatum yang lebar. Hal ini membuat epitelisasi di defek lateral lebih lama (3-4 weeks). Di dalam studi ini penulis mengusulkan sebuah teknik two-flap palatoplasty dengan tidak mengangkat periosteum flap, dan memakai pack madu untuk menutupi defek lateral tersebut. Teknik diharapkan dapat mempercepat rerata epitelisasi.
Metodologi: 12 pasien dengan sumbing non-syndromic (dengan atau tanpa sumbing bibir) dimasukkan dalam sample. Teknik two-flap palatoplasty dengan meninggalkan periosteum dan aplikasi pack madu diterapkan.
Hasil: Epitelisasi komplit tercapai dalam 5 hari dalam satu pasien (2,8 mm/hari), dalam 7 hari di 8 pasien (2-2.5mm/hari) dan dalam 9 hari di 3 pasien (2,2-2,7mm/hari). Tidak terdapat komplikasi operasi maupun fistula
Kesimpulan: Tehnik kami mempercepat rerata epitelisasi. Dapat mencegah gangguan pertumbuhan maxilla, karena penyembuhan yang cepat mengurangi formasi skar dan kontraktur.
Kata Kunci: *Two-Flap Palatoplasty, Cleft, Honey, Lateral Periosteum.*

Cleft palate is a frequently occurring congenital malformation. Surgical closure of these clefts is indicated to overcome feeding and speech problems. According to our experience in Ciptomangunkusumo hospital, most cleft palate patients have wide gap. It makes the epithelialization of the lateral defect takes longer time (3- 4 weeks). Two-flap palatoplasty which is a very common technique used in our institution will result in lateral defects without any periosteal coverage. These denuded lateral defects are prone to contamination as palatoplasty is an intraoral procedure which is a clean contaminated procedure (Figure 1).

We use partially non denuded mucoperiosteal palatoplasty technique. Our intervention is not to elevate all layers of mucoperiosteal flap in order to gain lateral defect covered by a thin

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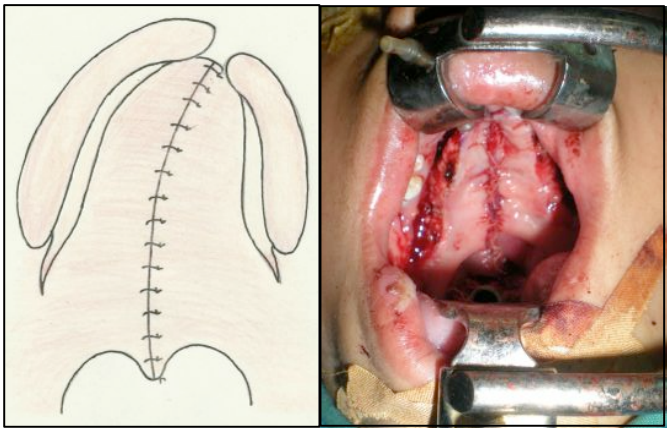

Figure 1. Illustration and photos of denuded palatal bone exposed on the lateral sides after palatoplasty.

periosteal layer and soft tissue above. This layer's function is to accelerate reepithelialization by reducing the infection process. In this study, patients also will be given honey pack post operatively on the lateral defects. Wound treatment using honey was known since 6000 B.C. Honey has been shown to have an anti inflamatory effect, acts as anti-microbials and auto debridement agent, preserves moisture, reduces odor, and stimulates healing process. Honey is a dietary product and safe to consume, hence it can be applied intra orally. The purpose of this study was to objectively improve the quality of the primary palate surgery by evaluating the rate of epithelialization of lateral defects after palatoplasty on the patient with palatoplasty technique leaving lateral parts of the periosteum and honey pack.

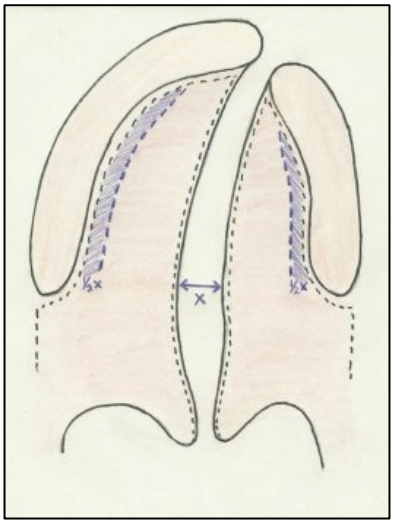

Figure 2. The design of the palatoplasty.

METHODS

In Juny 2010, Twelve consecutive patients with non-syndromic cleft palate (with or without cleft lip) are included in the study. They undergo the modified two-flap palatoplasty with the lateral periosteum left behind, covering the palatal bone. The rate of epithelialization is then observed every 2 days after operation until full healing is achieved. All the operation was done by one operator.

Surgical technique

We made design in order to measure the width of periosteum that will be left. The width of the cleft (x) were measured using sterile shove, and the half size of the measurement were used for the lateral edge of the flap (1/2x) (Figure 2)

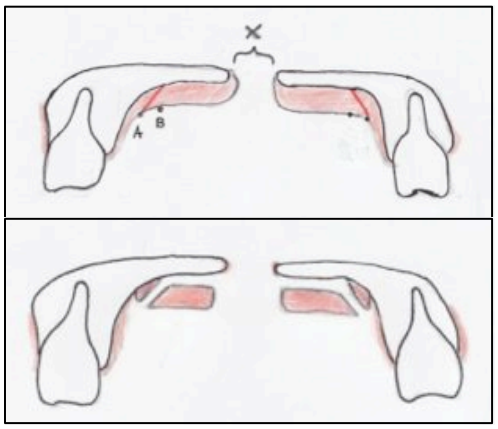

Figure 3. Antero-postero projection of the hard palate (A: the start point of the incision, B: the medial edge of the periosteum that left, X: The width of cleft palate, A-B = ½ x, blue zone : the zone that leaving the periosteum, red line : the line of the incision)

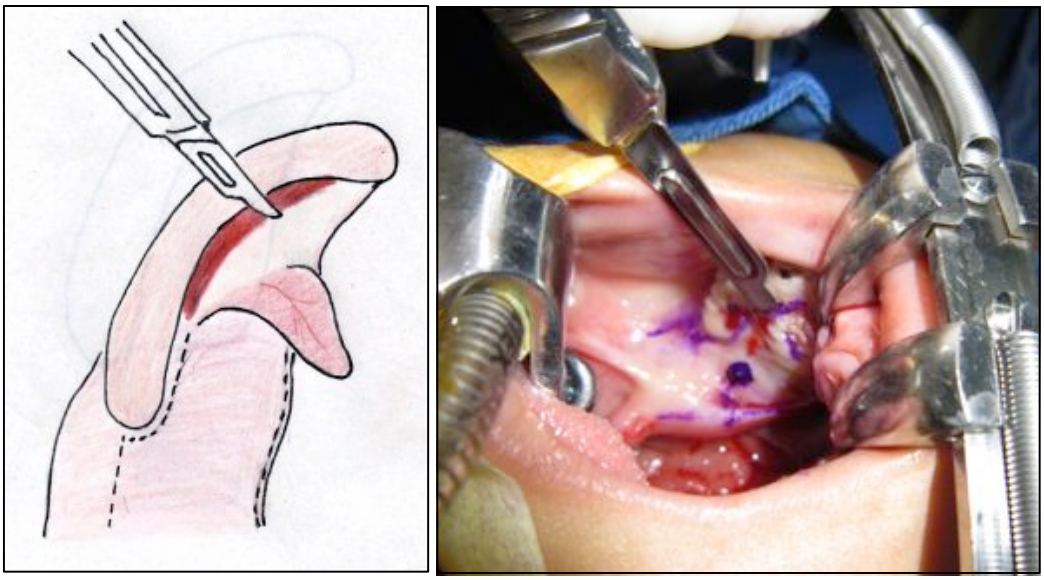

Figure 4. The dissecting technique to elevate the flap on the lateral using blade .

2. The palatoplasty technique that leaves lateral part of the periosteum is performed by : the blade was not directed perpendicular (90°) on the basis of the hard palate but the degree of blade is directed to the medial edge line of the periosteum that has been drawn previously can be left (½x) (Figure 3).

3. We dissected the mucoperiosteal flap using blade on the lateral side of the hard palate, so we can leave some parts of the periosteum (Figure 4-5). After suturing the flap, there is no denuded palatal bone on the lateral sides (covered by some parts of the periosteum) (Figure 6).

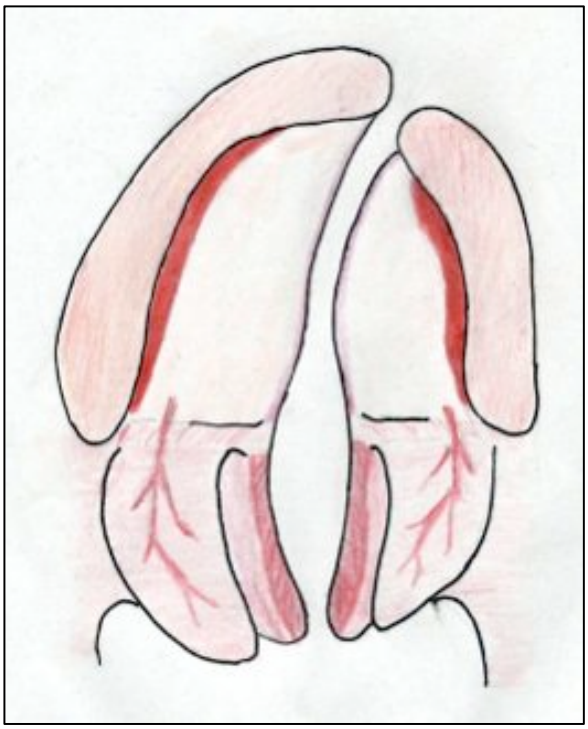

Figure 5. After the flap has elevated, there are some part of periosteum left on the lateral side.

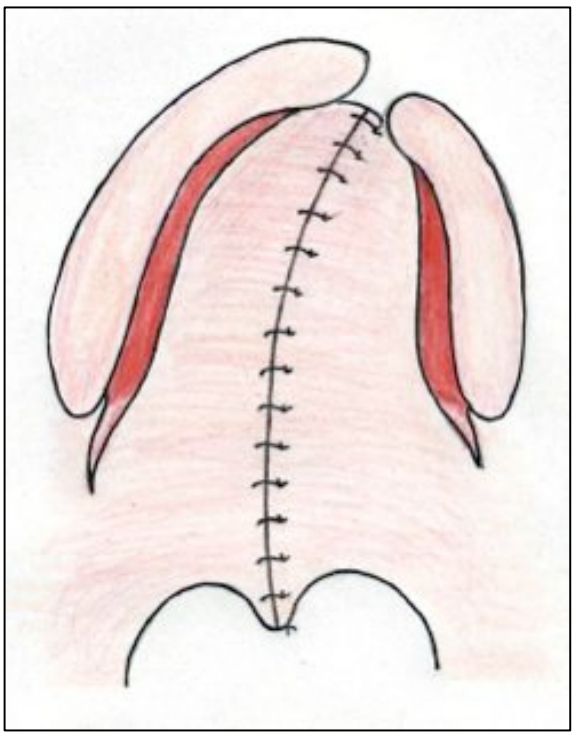

Figure 6. After suturing the flap, there is no denuded palatal bone on the lateral sides (covered by some parts of the periosteum).

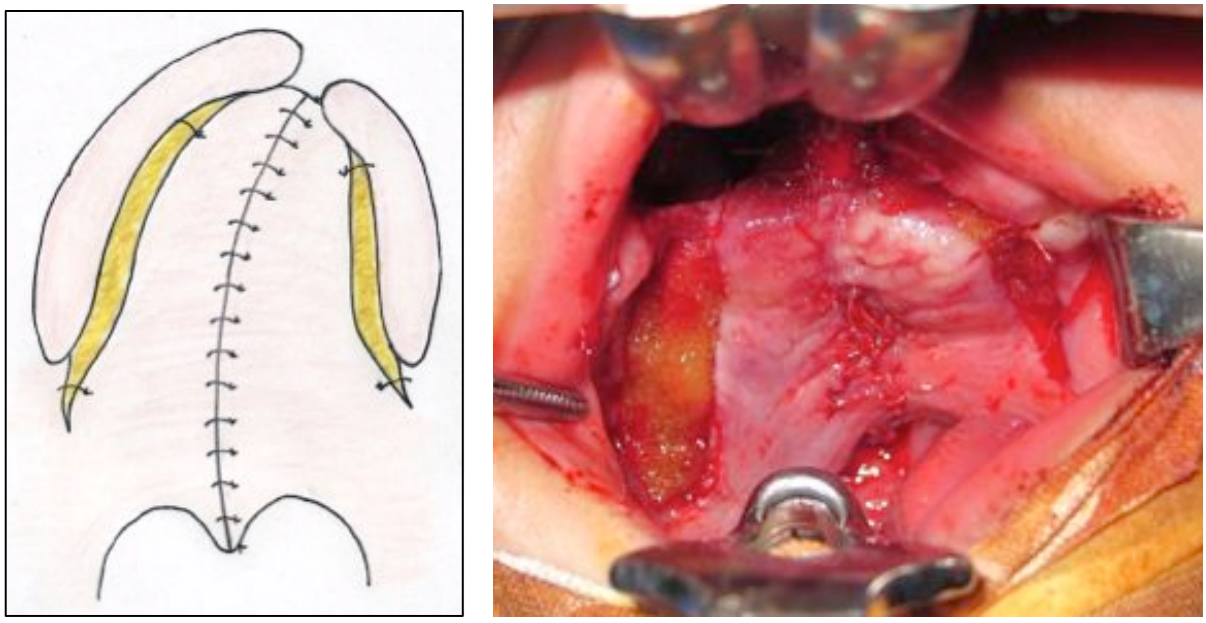

Figure 7. Last, lateral defect closed with absorbable cellulose (surgicell®) + honey.

4. Last, we covered the lateral defect with inserted with absorbable cellulose (Surgicell®) that has given honey and fixated the pack (Figures 7). Honey that used in this research is indonesian honey product.

Postoperative medication and instruction

Postoperatively, patients were hospitalized for 1 days. Patients were instructed to gurgle with honey 5 times a day. Antibiotics and analgetic given orally. After hospitalized for one day and systemic or local abnormalities is not found, the patient is discharged with instructions to control every 2 days and to gurgle with honey 5 times a day. Postoperative nutritional intake were given by the rule : In the early 72 hours, patients is were given liquid diet with normal temperature. After third day, patients were given liquid slurry diet. (day 4 – 6). Weeks 2 until the end of third week patients were given soft diet.

Postoperative follow-up

Systemic condition and surgical wound were evaluated on the first day and patients were instructed to return for control every 2 days until the defect closed.

The closure of lateral defect is recorded and evaluated when the patients control.

RESULTS

The results are shown in Table 1. In total 12 individuals, these patients undergo the palatoplasty technique leaving lateral parts of the periosteum and applicating the honey pack to cover the lateral defects. With regards to age when the palatoplasty was performed, mostly the participants were between the one and two years old, and 3 participants are in older age, 6 years old, 8 years old, and 24 years old. The percentage of males was 41,67 % (5 out of 12 patients), while female was 58,3 % (7 out of 12 patients).

For the participants in this preliminary study, the classifications of the cleft palate are variable among the patients. Regarding to the diagnosis of the palate, in all patients the vast majority was having unilateral left cleft palate, 3 patients with incomplete cleft palate, and 2 patients with unilateral right left palate.

After sugery in Ciptomangunkusumo hospital, we conducted the follow-up of the patients to observe the closure of the defect. The results show the average of the width of the palate with mean value 17,75 mm. We look forward in different duration of days of follow-up. One patient get the epithelialization on 5 days (2,8 mm/day), 8 patients on 7 days (2 -2,5 mm/day) and 3 patients on 9 days (2,2 – 2,7mm/day).

Table 1. Characteristic, diagnosis, width of cleft, duration, epithelialization rate of the patients.

Patient	Sex	Age	Diagnosis of palate	Width of cleft (mm)	Duration (days)	Epithelization rate (mm/day)
1	Male	26 Mo	Right	17	7	2,4
2	Male	31 Mo	Right	18	7	2,5
3	Female	19 Mo	Left	23	9	2,5
4	Female	15 Mo	Incomplete	14	5	2,8
5	Female	24 Mo	Left	16	7	2,3
6	Female	23 Mo	Left	17	7	2,4
7	Female	15 Mo	Incomplete	16	7	2,3
8	Female	24 Mo	Left	16	7	2,2
9	Male	21 Mo	Left	17	7	2,4
10	Male	11 Y 8 Mo	Left	14	7	2
11	Female	6 Y 6 Mo	Incomplete	25	9	2,7
12	Male	24 Y	Left	20	9	2,2

No medical complications were encountered during surgery. There were no surgical complications, such as hemorrhage or wound infection. The fistula of the palate was not found until the defect closed.

DISCUSSIONS

The result of this study is in line with previous study by Deni in 2010, whereby using the modi-fied two-flap palatoplasty technique by leaving some of the periosteum at the lateral part, the lateral defect closure (epithelialization) is faster than with conventional techniques.

The Conventional two-flap palatoplasty technique which is a very common technique used including in our institution will result in lateral defects without any periosteal coverage. In the conventional technique, epithelialization of lateral defect was achieved within 3-4 weeks. The loss of cover on this bone facilitate the occurrence of contamination, especially this operation is an act which constitutes an act intraoral clean polluted because of the area already contained endogenous bacteria became contaminant. The existence of the periosteum can prevent the contamination of the palatal bone. And the periosteum can also become mediator for the wound healing due to its high vascularity and it has progenitor cells that essential to the healing process.

Heni, 2010 had studied on 48 people who were performed palatoplasty with which half were given honey as oral drops on the lateral defect, she got the result that the honey accelerate epithelialization 2.1 x compared with those not given honey

Important factors in honey that have roles in wound management are (1) anti inflammatory activity, (2) antimicrobial activity, (3) help to debride, (4) reduce the odor, (5) retain moisture in the wound and (6) stimulate wound healing. Therapeutic effects of honey in the management of wounds in other parts of the body gives hope that honey also has the potential to prevent and overcome the infection in the wound after tooth extraction or intraoral surgery. In a publication of clinical trials in surgery inraoral use of honey, honey is given in the cavity after extraction of impacted third molar teeth before the wound stitched. There was a decrease of incidence of pain, edema, and postoperative complications in the group given honey compared to group was not given honey. Honey in the wound intraoral antimicrobial effects as well as to give effect to relieve pain by reducing the inflammatory reaction in the wound. In addition, honey also stimulates granulation tissue and eventually reepithelization.
The process of wound healing in the palate is slightly different. There palate osteogenic reaction which will result in scar tissue are

closely attached to the palate bone. Immobility this scar tissue will inhibit the growth of maxillary. The faster repithelialization is expected to reduce the occurrence of wound contraction and reduce the occurrence of scarring, so that in the long run will reduce the incidence of maxillary growth disturbance.

CONCLUSIONS

In this study, the palatoplasty leaving lateral parts of periosteum and honey pack show the fast epithelization rate, that in the future, it may prevent the maxillary growth disturbances. Further studies are required to confirm that the faster epithelialization will result the better maxillary growth.

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