

Clinical Study

Simultaneous Repair of Cleft Hard Palate by Vomer Flap along with Cleft Lip in Unilateral Complete Cleft Lip and Palate Patients

Kazi Md. Noor-ul Ferdous,¹ M. Saif Ullah,¹ M. Shajahan,¹ M. Ashrarur Rahman Mitul,¹ M. Kabirul Islam,¹ Kiorsh Kumar Das,² M. A. Mannan,³ M. Junaed Rahman,⁴ Sanjoy Biswas,⁴ A. J. M. Salek,⁴ and Bijoy Krishna Das⁵

¹ Division of Pediatric Surgery, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh

² Burn and Plastic Surgery Unit, Dhaka Medical College and Hospital, Dhaka, Bangladesh

³ Department of Plastic Surgery, Dhaka Medical College and Hospital, Dhaka, Bangladesh

⁴ The Smile Train-Shohai Bangladesh Cleft Project, Dhaka, Bangladesh

⁵ Department of Pediatric and Plastic Surgery, ZH Sikder Women's Medical College and Hospital, Dhaka, Bangladesh

Correspondence should be addressed to Kazi Md. Noor-ul Ferdous; kmnferdous@gmail.com

Received 7 October 2012; Accepted 25 October 2012

Academic Editors: M. Okazaki and E. Raposio

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The purpose of the study was to see the short-term outcome of simultaneous repair of cleft lip and cleft hard palate with vomer flap against cleft lip repair alone in patients with unilateral complete cleft lip and palate (UCLP). A prospective observational study was carried out in 35 patients with unilateral complete cleft lip and palate who under-went cleft lip and cleft hard palate repair with vomer flaps simultaneously. After 3 months, cleft soft palate was repaired. During 1st and 2nd operations, the gap between cleft alveolus and posterior border of the cleft hard palate was measured. Postoperative complications, requirement of blood transfusion during the operation, and duration of operations were also recorded. Simultaneous repairs of cleft lip and closure of cleft hard palate with vomer flaps are easy to perform and are very effective for the repair of cleft lip and palate in UCLP patients. No blood transfusion was needed. Gaps of alveolar cleft and at the posterior border of hard palate were reduced remarkably, which made the closure of the soft palate easier, decreased operation time, and also decreased the chance of oronasal fistula formation.

1. Introduction

Every year more than 5000 patients with cleft lip and palate are born [1]. The incidence of cleft lip and/or cleft palate in Bangladesh is 3.9 per 1000 live births [2]. Patient with cleft lip-palate usually leads a very miserable life unless surgically treated, due to the lack of social support, inadequate multi-disciplinary approach to deal with the total problems, and most of the cleft patients come to the doctor only when their parents are aware or when the child had some problems like repeated respiratory tract infection, feeding difficulty, and social problems (e.g., even maternal divorce) [1]. For those reasons, we get patients of varying ages and problems like repeated ear infection, abnormal teeth eruption, permanent articular problems, and deafness. Some parents prefer cleft lip

repair first irrespective of the age of the child only for aesthetic region and do not come again for cleft palate or oronasal fistula closure due to poverty, transport problem, and lack of knowledge [1, 3]. There are many procedures for the closure of the cleft lip and palate [4–7]. In unilateral complete cleft lip-palate (UCLP), if only cleft lip repaired first, it needs extensive dissection during palatoplasty, taking more time for operation and more chances of oronasal fistula formation, and if cleft palate repair is done earlier, there may be midfacial growth disturbance [8, 9]. But, after simultaneously repair of cleft lip and cleft hard palate by vomer flap, it does not need extensive dissection, takes less time during subsequent palatoplasty, and later on less chance of oronasal fistula formation and it has less effects on mid facial growth, so, can be done earlier [7–13].

2. Materials and Methods

This prospective observational study was carried out in four hospitals during a period of eighteen months. The patients with unilateral complete cleft lip and cleft palate from 3 months to 10 years of both sexes were included. The patients with previous surgery for cleft lip-palate and unilateral cleft with other deformities of face were excluded. Complete blood count including bleeding and clotting time was done. 35 patients underwent simultaneous cleft hard palate repair with vomer flap and repair of cleft lip (Modified Millard's Procedure), and then after 12-13 weeks cleft soft palate was repaired. Cleft alveolar gap and gap in the cleft of the posterior border of the hard palate were measured and recorded under anesthesia before each surgery. Total time required for operation (time between initiation of incision and last stitch) was also recorded.

2.1. The Steps of the Surgery. Under general anesthesia with oral endotracheal tube (placing in the midline over lower lip), patient is placed supine on the table neck extended, face painted. Oral cavity is wide opened by "Dingmans retractor," and a pack is placed around the endotracheal tube. Oral cavity is washed with povidone-iodine saline, secretion inside the oral cavity cleaned. Cleft alveolar gap and gap of cleft palate (at the posterior border of the hard palate) are to be measured with a special instrument "Calipers."

Oral and nasal mucosal junction line on both sides is marked with marker pen, on noncleft side anteriorly at the anterolateral border of the prolabium extending posterior to the end of the vomer attachment. On cleft side marks starting from the junction between the oral and nasal layers of the mucoperiosteum up to end posterior end of the vomer. A local anesthetic agent (1% lidocaine with adrenalin 1 : 1,00,000) is injected along the incision lines. Care is taken to avoid the superficial tooth buds in the alveolar region. Careful incisions are made on both sides with a number 15 and 12 B-P blade through the periosteum to the bone. Injury to the alveolar soft bone and penetrating the developing deciduous tooth buds should be avoided. The flaps are made by using a periosteal elevators or palatal elevator and flipped across the cleft. 4 Point Mattress sutures of 4-0 vicryl are given between the lateral oral mucoperiosteum and the vomer flap to the nasal mucosal surface, haemostasis is ensured and "Dingmans retractor" removed.

Cleft lip repair is done by "Modified Millard Rotation Advancement technique." In some cases, anterior part of the inferior turbinate is resected to mobilize the cleft alar base. A superiorly pedicled vertical lip flap (C-flap), derived from the minor cleft lip segment, is positioned superiorly in the anterior part of the nasal floor. This flap overlaps the septal-vomer flap of the hard palate. A mucosal flap from each side of the alveolar ridge is dissected inferiorly. Lateral margins of the anterior nasal floor flap sutured with 4-0 or 5-0 vicryl. Primary alar deformity is also corrected.

2.2. Postoperative Follow Up and Oral Feeding. Postoperative follow up starts immediately after operation for any bleeding,

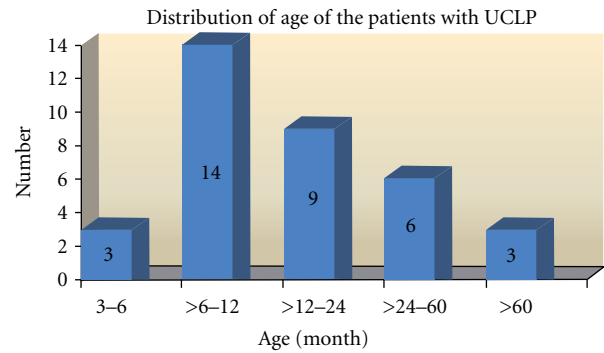


FIGURE 1: Age distribution of the patients.

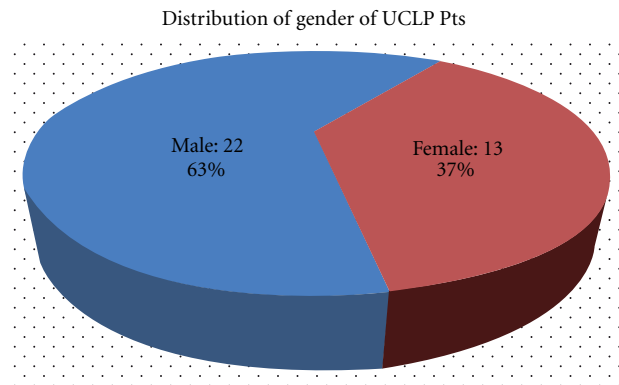


FIGURE 2: Gender distribution of the patients.

respiratory distress, flap necrosis, or any other complications. Plain water orally is to be given after 4 to 6 hours of operation. Patients were discharged on 1st or 2nd postoperative day, with the advice of tropical and oral antibiotics, analgesia, liquid diet with spoon (for at list for 2 weeks) and should take plenty of water after each feeding. Patients were also advised to come for lip stitch off from 5 to 7 PODs and 12-13 weeks after operation. During discharge contract number of the investigator was given to the parents to communicate in case any problem arises.

2.3. Data Collection and Analysis. In each case, information about the patient was obtained in the form of a pretested questionnaire, included age, sex, address, mobile phone number, any family history of cleft, side of the cleft lip-palate, other associated congenital anomalies, other illness, physical findings, preoperative investigations, operative procedure, postoperative complications, and follow up (at 5-7 days and 12-13 weeks later during palate operation).

All the information about each patient was obtained in separate data sheet, arranged in systemic manner, and presented in a table and various figures.

2.4. Ethical Consideration. All the patients' parents or guardians were given an explanation of the study and operative procedures with advantages and disadvantages, and they were included in the study only after giving informed

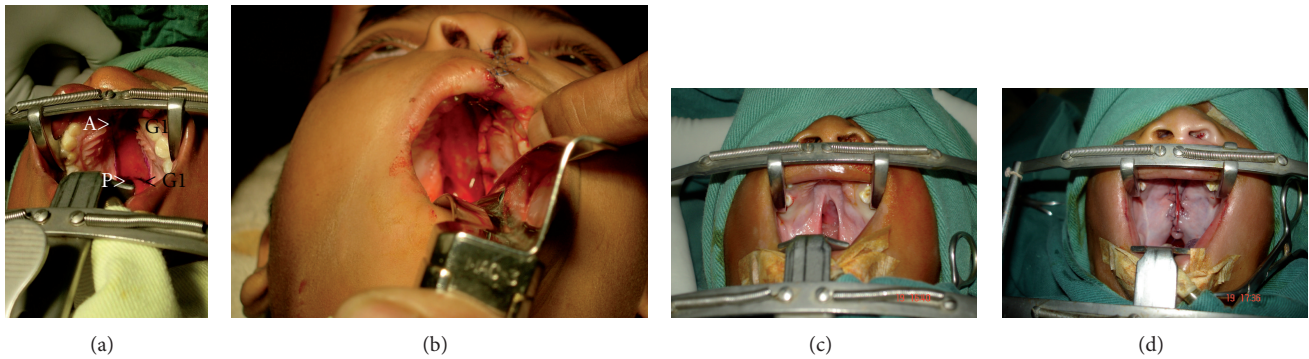


FIGURE 3: (a) Vomer flap marking; (b) hard palate repaired with vomer flap and cleft lip repair; (c) 12-13 weeks after 1st operation (cleft palatal gap reduced remarkably); (d) no lateral releasing incision needs during palatoplasty.

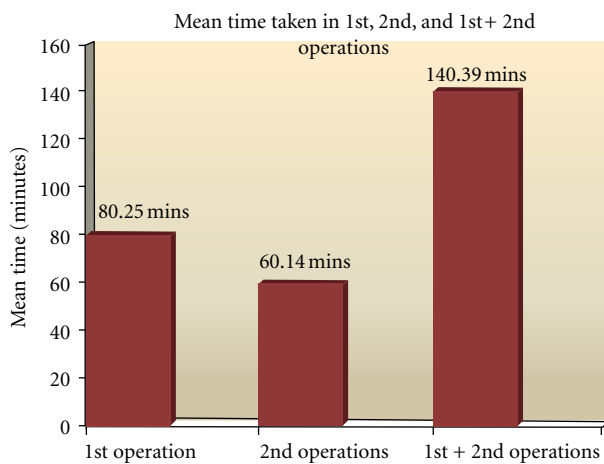


FIGURE 4: Mean time taken in 1st, 2nd, and 1st + 2nd operations.

written consent. Ethical committee of the institute had also approved the study. The study did not involve any additional investigation, did not involve any significant risk, and did not cause an economic burden to the parents.

3. Results

Mean age of the patients was 30.12 months; the majority of patients ($n = 14$) were within 7 months to 12 months. A total of 22 patients were males (62.85%) and 13 were females (37.15%). Male:female ratio was 1.7:1. Right-sided UCLP was involved in 12 patients and left side was involved in 23 patients (Figures 1 and 2).

Mean cleft alveolar gap (AG_1 in Figure 3(a)) and gap in the posterior border of hard palate (PG_2 in Figure 3(a)) before 1st operation were 7.96 mm and 12.52 mm, respectively. After 1st operation, mean cleft alveolar gap was reduced 5.31 mm in the study group. Cleft alveolar gap was reduced by more than 5 mm in 16 patients; the majority of them ($n = 10$) were under 18 months. Mean cleft palatal gap was reduced by 4.92 mm in the study group. Cleft palatal gap was reduced by more than 3.5 mm in 30 patients, of whom 21 patients were under 18 months (Table 1).

In the study, the 1st operation took mean time of 80.25 minutes, but in 2nd operation, mean time taken was 60.14 minutes. Mean total (1st + 2nd) operation time was 140.39 minutes (Figure 4).

Mild postoperative bleeding (after 1st operation) was seen in 7 patients from exposed vomer bone. One patient developed partial vomer flap disruption. No patient developed oronasal fistula.

All the patients came for regular follow up (range 6 months to 3.5 years). Mean follow up time was 2.2 years (Figure 5).

4. Discussion

Cleft lip and palate is one of the common congenital deformities, which can be corrected easily in our country. But most of the cleft patients do not come for proper treatment in time for various reasons [3, 14]. So we get patients of varying ages and with various problems and complications before and after surgery. Irrespective of the age of the child, some parents prefer cleft lip repair first only for aesthetic region and do not come again for cleft palate or oronasal fistula closure [2, 3].

Cleft surgery depends on the types of cleft, age of the patients, and the surgeon's choice [4-7]. After repair of cleft lip alone in unilateral complete cleft lip-palate during palatoplasty, is needed extensive, wide dissection, and there are more chances of oronasal fistula formation which is very difficult to repair and there may be mid facial growth disturbance [8, 9]. But, after simultaneous repair of cleft lip and cleft hard palate by vomer flap, subsequent palatoplasty does not need extensive dissection, has less chance of oronasal fistula formation, takes less time for surgery, and as it has least effects on mid facial growth, can be done earlier [7-13].

This study was done to observe the effects of cleft hard palate repair with vomer flap done with cleft lip repair on UCLP.

The age range of the patients of the study was wider. In some other studies [9, 10, 15], the age of the patients was 3-7.5 months. Parents' educational, socioeconomic, and cultural influences whether the children with cleft would be brought to the hospital or not [16], might be the causes of the wide age range of our patients.

TABLE 1: Cleft alveolar (CA) gap and cleft palatal (CP) gap (in mm, $N = 35$).

	Cleft alveolar (CP) gap				Cleft palatal (CP) gap			
	Gap before 1st operation		Total gap reduced		Gap before 1st operation		Total gap reduced	
	Up to 7.50	>7.50	Up to 5.00	>5.00	Up to 12.00	>12.00	Up to 3.50	>3.50
3–18 months ($n = 23$)	12	12	14	10	14	10	3	21
>18 months ($n = 12$)	6	5	5	6	6	4	2	9
Mean \pm SD	7.96 \pm 2.45		5.31 \pm 1.21		12.52 \pm 2.20		4.92 \pm 0.97	
Median	7.50		5		12.00		5	

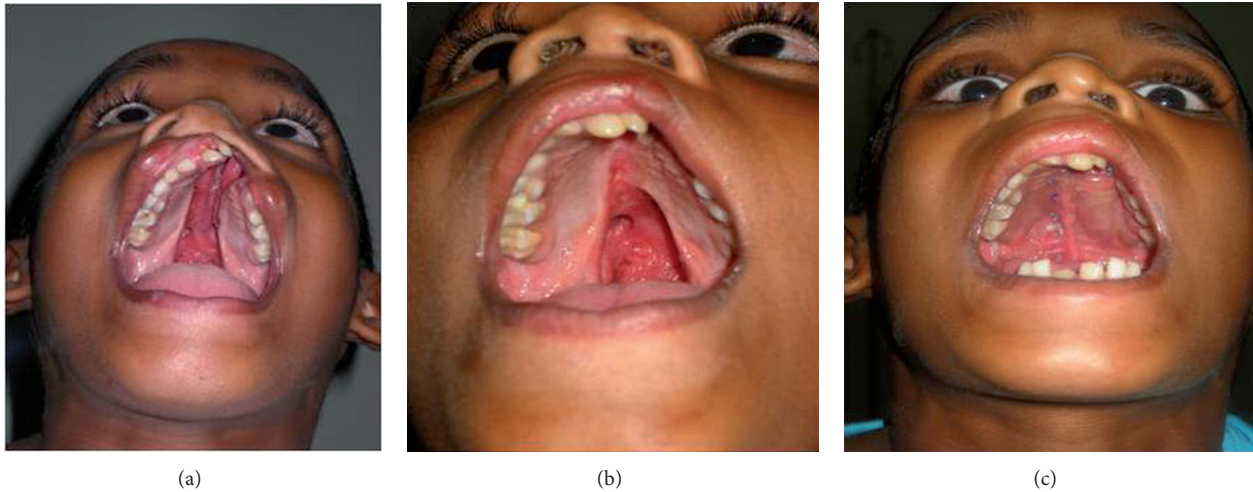


FIGURE 5: (a) A patient with left-sided UCLP (before 1st operation); (b) 12 weeks after repair of cleft lip and hard palate with Vomer flap; (c) 3 months after palatoplasty.

In the study, cleft alveolar gap was reduced by more than 5 mm in 16 (45.7%) patients; the majority ($n = 10$) of them were under 18 months, and cleft palatal gap was reduced by more than 3.5 mm in 30 (85.7%) patients; the majority ($n = 21$) of them were under 18 months. This was similar to the study of Li et al. [9], where mean cleft palatal gap reduction was 4.8 mm. It indicates that early intervention in cleft lip and cleft hard palate causes more reduction of cleft alveolar and palatal gap.

In the study, second operation took mean time of 20.11 minutes less than the 1st operation. In the same type of study [9], 1st operation took mean time of 77 minutes in lip and simultaneous hard palate repair by vomer flap procedure, which took mean time of 13 minutes more than only lip repaired procedure. Initially in our study 1st operation took more time, and day by day it reduced as surgeons became experienced.

Immediate postoperative complication after 1st operation was mild bleeding occurred from the exposed vomer in some patients. But no patients needed blood transfusion. After second operation (cleft soft palate repair), mild respiratory difficulty was also observed in few patients, probably due to reduction of oral cavity space, less space for tongue. On 5–7 postoperative days of 1st operation, one patient developed partial vomer flap disruption near posterior border of the hard palate, which had wide palatal gap, 16.8 mm. On

5–7 postoperative day following 2nd operation, no patient developed oronasal fistula. In the same type of study [9], no oronasal fistula developed in lip and simultaneous hard palate was repaired by vomer flap procedure. In another study [17], where the sample size was 678, on vomer flap palatoplasty, no oronasal fistula was found in anterior palate, but they found 2.95% of fistula in the junction of hard and soft palates. In other studies [14, 18–20], fistula rate was more higher in other than vomer flap procedure.

5. Conclusion

Repair of cleft lip, simultaneously with hard palate by using vomer flap in the patients with UCLP, is a suitable and effective procedure, where extensive palatal dissection and lateral releasing incision does not always require for hard palate closure, which reduce the chance of maxillary hypoplasia. It can be done in early age with the cleft lip repair. It is easy to perform and does not need blood transfusion. It reduces cleft alveolar and cleft soft palatal gap, thus makes easy to repair soft palate cleft and reduces the chance of oronasal fistula formation, also reduces the cleft soft palate repair operating time. It is recommend doing it earlier as the study shown; because cleft alveolar and palatal gaps are more reduced in early age.

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