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ORIGINAL ARTICLE

Evaluation of outcome of bilateral cleft lip repair using a simplified scoring system

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Abstract

Background: *Bilateral cleft lip is a complex congenital deformity of face. Restoration of the normal facial form is one of the primary goals for reconstructive surgeons. Surgical repair of bilateral cleft lip is complex and still controversial, though various techniques have been reported and described in detail. The repair can be a challenge even to an experienced surgeon and the results of primary repair of bilateral cleft lip traditionally have been less satisfactory than those of unilateral cleft lip.*

Objective: *This study aimed to evaluate the surgical outcome of bilateral cleft lip surgery by the modified Millard technique using a simplified scoring system.*

Materials and Methods: *This study was conducted from January 2013 to December 2021 at a private Hospital, a cleft center of Smile Train. 46 cases of bilateral cleft lip were operated by the modified Millard technique during this study period. Data analysis included age and sex of patients, type of cleft deformity and type of surgery (primary or secondary) and whether the cleft deformity was syndromic or non-syndromic. Technique of repair, surgical outcome and complications were also recorded. The photographic evaluation was done between 3 months to 3 years after lip operation by a surgeon and a social worker on three regions- lip, nose and general facial appearance with a total score of 10.*

Results: *A total of 46 cases of BCL (Bilateral Cleft Lip) comprising of 29 males and 17 females were operated which constituted 9.2% (46/500) of all cases of cleft surgery done during this study period. The age of patients at the time of surgery ranged between 4 months and 16 years. 38 patients had bilateral cleft lip and palate deformities and 8 had only bilateral cleft lip deformities. Primary surgery was performed in 45(97.82%) cases and secondary (revision) surgery was performed in only 1(2.18%) case. There was no syndromic case. All cases were operated by the modified Millard technique. Aesthetic outcome was evaluated by a simplified scoring system. The outcome was good with this repair technique and evaluated by this scoring system.*

Conclusion: *This is an effective scoring system to evaluate the outcome of bilateral cleft lip repair.*

Keywords: *Bilateral, Cleft lip, Outcome, Scoring*

Introduction

Cleft lip and palate is one of the most common congenital anomalies in the world. The incidence of cleft lip and palate across the world is generally accepted to be 1 in 1,000 births. However, this incidence is greatly affected by ethnic background, geographical origin and socioeconomic level.1 The presence of bilateral cleft lip and palate alter facial form and structure and causes cosmetic, feeding, speech and dental development and psychological problems such as lowered self-esteem and difficulties during social interaction, depression.2 Patients with bilateral cleft lip and palate represent the challenging condition for the reconstructive surgeon. The common challenges of repair are the extremely protruded premaxilla, the variable size of premaxilla and prolabium, the columella is deficient and sometimes almost absent and the palatal clefts are wider than usual, and occasionally, the maxillary palatal shelves are collapsed. In many cases domes are usually wide apart and tip projection is decreased. The central third of the face is commonly distorted by the bilateral cleft and restoring the normal form and

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functions are the primary goals for the reconstructive surgeon.[3]

The first reports of bilateral cleft lip repair emerged in the 14th century and were performed by the Belgian surgeon Johan Yzerman. Since then, several other surgical techniques have been employed for BCL repair. Among them Veau, Tennison, Manchester, Mullekein, Millard are the most common surgical techniques.[5-7] Presurgical nasoalveolar moulding helps repositioning the maxillary and alveolar segments into a more anatomic position that allows the surgeon to repair the lip and associated nasal deformity under more optimal conditions.[4]

The ideal lip repair achieves symmetrically shaped nostrils, nasal sill, and alar bass, adequate colomeller length, a well-defined philtral dimple and columns, a natural-appearing cupid`s bow with a pout to the vermillion tubercle and an adequate labial sulcus. In addition lip scars should be minimum and approximate the natural landmarks. While standards are clearly established for the assessment of functional outcomes, it is so for aesthetic outcome.[8] There are many scoring systems available to access the results of cleft lip surgery. Each scoring system for outcome assessment has its own advantages and disadvantages. Aesthetic outcome will vary from person to person if there is no clear criteria or scoring system for assessment. A complex scoring system sometimes influences the outcome. This study aimed to assess the surgical outcome of bilateral cleft lip (BCL) by using a simplified scoring system.

Methods

This retrospective study was done from January 2013 to December 2021 at a private hospital in Khulna, Bangladesh which is a partner hospital of the international cleft charity, Smile Train, America. During this period 46 cases of bilateral cleft lip were operated by the same surgeon. All cases were operated under general anaesthesia with orotracheal intubation. Guardians were interviewed to collect data. Data were collected on the sex of patients, date of birth, type of cleft deformity, the technique of repair (Modified Millard technique), associated anomalies and surgical outcomes including complications. In our study, we operated all bilateral cleft lips with the modified Millard technique. In the modified Millard technique, after the complete elevation of the prolabium and reconstitution of the orbicularis across the premaxilla, the lateral segments of the prolabium were discarded. Patients with facial clefts and syndromic clefts were excluded from this study. Pre-operative, intraoperative and postoperative photographs were taken with the same resolution camera, from same distance and recorded. Post-operative photographs were taken between 3 months to 3 years and the photographs were analyzed by a surgeon and a social worker on ten components of three regions with a total score of 10. Both of the evaluators were male and not involved in any part of surgery. The evaluators were to score the three regions, ie, lip, nose and general facial appearance. Each region was scored separately by the evaluators as follows-

Lip region : Lip Height–1, Symmetry of Phitral column –(.5), Philtral dimple - (.5), Cupid's bow - (.5), Hypertrophic scar - (.5), Vermilion (Notch, Fullness) – 1, (The total score was 4)

Nose : Symmetry of alar base – 1, Symmetry of Nostril – 1, Columelar height – 1, (The total score was 3)

General facial appearance : (The total score was 3)

After scoring the individual regions, a total score was calculated for each patient and finally, the mean score was calculated for a total of 46 cases evaluated by both the evaluators. Aesthetic outcome was evaluated as follows-

A score of 1 to 4 = poor outcome, A score of >4 to 7 = fair outcome, A scoreof >7 to 10 = good outcome

Written informed consent was taken from guardians. Data collected were subjected to simple statistical analysis using the Statistical Package for Social Sciences (SPSS), version 16.0 (SPSS Inc., Chicago, IL) statistical software package. Frequencies and means of the variables were estimated. Both manual and computer-based statistical analyses of data were done. P value <.05 was considered as significant.

Results

A total of 500 patients were managed for cleft lip and palate deformity during the period. 46 (9.2%) of these were Bilateral cleft lips. There were 17 female and 29 male. Age ranged between 4 months to 16 years. 37 patients had a bilateral cleft lip and palate deformities and 9 had only bilateral cleft lip deformities. The majority (52.17%) of the subjects had bilateral complete cleft lip deformity. 32.60% had bilateral incomplete cleft lip deformity. 8.69% had right complete and left incomplete while 6.52% had right incomplete and left complete cleft lip deformity. The surgical technique employed was Modified Millard's technique, which was employed in all cases. 45 (97.82%) of the cases had primary surgery while 1 (2.18%) case had secondary (revision cheiloplasty) surgery done. All patients were admitted for a period

of 3 to 5 days. Surgical outcome was good in all cases evaluated by both the surgeon (mean score=8.09) and social worker (mean score-8.90) (Fig 1&2).

1a 1b

1c 1d

Fig. 1: Photograph of case-1 (1a-preop frontal, 1b-postop frontal, 1c-preop worm's eye view, 1d-postop worm's eye view)

2a 2b

2c 2d

Fig. 2: Photograph of case-2 (2a-preop frontal, 2b-postop frontal, 2c-preop worm's eye view, 2d-postop worm's eye view)

There was no significant difference of scoring of lip, nose and general facial appearance by these two groups (Table I).

Table I

Assessments by Surgeon & Social worker (n=46)

Evaluation	Mean score		
	Lip	General facial appearance	Nose
Surgeon	3.1	2.6	2.4
Social worker	3.5	2.9	2.5
P value	0.898	0.932	0.986

Out of 46 cases, complications like minor wound infection and vermilion notch occurred in 2(4.34%) cases respectively. In 4(8.69%) cases, hypertrophic scar developed (Table II)

Table II

Complications of the procedure performed

Name of the Complications	Frequency	%
Wound infection (minor)	02	4.3
Vermilion notch	02	4.3
Hypertrophic scar	04	8.7

Discussion

Bilateral cleft lip deformity is a common cleft deformity seen in clinical practice, surgical repair of which is complex and still controversial, though various techniques have been reported and described in detail. The repair can be a challenge even to an experienced surgeon. The results of primary repair of bilateral cleft lip traditionally have been less satisfactory than those of unilateral cleft lip. The typical labial stigmata are a broad, bowed and undimpled philtrum, lateral muscular bulges and a thin median tubercle accentuated by hanging lateral labial elements. The most striking feature of BCL is the premaxilla, which for centuries has been considered the principal obstacle to closure and excision and was therefore advised and practised for many years. Established and well-described surgical procedures with many variations for the repair of bilateral cleft lip include Veau, Tennison, Manchester, Mullekein and Millard technique. In Manchester repair a longitudinal straight line incision is made down on either side of the prolabium and the prolabium is then sutured to the lateral lip elements in layers. This technique is often used when the prolabium is relatively small. But the aesthetic outcome is not good with this technique. Mulliken

was one of the earliest techniques of synchronous repair of bilateral cleft lip and nasal deformity. He described the basic principles for BCL repair which are maintaining nasolabial symmetry, securing orbicularis oris continuity to construct the muscular ring and minimize philtral distortion, designing proper plural size and shape, constructing the median tubercle using the lateral labial elements, positioning and securing the displaced lower lateral cartilages to establish normal nasal projection and columellar length.

Millard's repair involved the complete elevation of the prolabium and reconstitution of the orbicularis across the premaxilla. In addition, Millard banked lateral segments of the prolabium as "forked flaps" to add columellar height at a later stage. The prolabium is an important component in BCL repair. Millard has earlier stressed that in BCL, the prolabium regardless of its size should always be positioned to the vermilion border. The surgical outcome was assessed as achieving adequate length of the upper lip, symmetrical nostrils, reconstructed nasal floor without excessive scar tissue, and reconstituted philtrum and philtral ridges. In our study, after raising two lateral elements and one central element, the lateral elements of the prolabium were discarded instead of banking for the lengthening of the columella in future. The central element was used to reconstruct the philtrum and the philtral column. A careful muscle dissection and more anatomical repair resulted in the good shape of the bilateral lip repair in our study. Elhadity et al. showed extensive orbicularis oris muscle dissection improved the outcome of BCL repair outcome.[9]

Correction of nasal deformity associated with cleft lip may be performed primarily at the time of lip repair or delayed until nasal growth is complete. Delayed correction is usually performed in the teenage years via an open rhinoplasty approach. The nasal deformity will improve to some extent by repositioning facial muscles into normal locations during primary cleft lip repair. McComb used to dissecting over the dorsum of the nose in the plane between the nasal cartilage and the skin and percutaneous sutures were then placed through the mobilized nasal cartilage to hold them in position.10 In our study, we didn't correct nasal deformity primarily but the nasal deformity improved with repositioning of muscles. Rhinoplasty can be done later if the need arises. Presurgical orthopaedics applications bring the dento-alveolar segment together, which facilitates a tension-free labial repair with less undermining of tissues. It will make subsequent surgical repair easier and improve the outcome. But not all cleft units use presurgical orthopaedics as it may be detrimental to subsequent growth and their use is controversial. They are only reserved for severe deformities like wide bilateral cleft lip and palate and several protruded premaxillae.[10] We didn't use presurgical orthopaedics in our study. For asthetic outcome assessment, qualitative and quantitative analyses are done. Quantitative analysis involves anthropometric measurements expressed in numerical data.[11] Qualitative analysis is based on evaluation from an image of the patients or by directly looking at the patients which is a more relatable evaluation. In this study, we assessed the aesthetic outcome of BCL repair by qualitative analysis. Many scoring systems are available to assess the results of surgery performed for the repair of cleft lips. But each scoring system has its own advantages and disadvantages. The five-point Asher-McDade score is the most widely used and validated tool for evaluation of unilateral cleft lip repair.But it is relatively complicated and time consuming because four different nasolabial parameters are rated on two photographs (frontal and profile) with the aid of a five-point scale. RM Thomson reported aesthetic outcome of 22 BCL cases validating the Asher-McDade score repaired by Millard technique. Standardized photographic evaluation showed that the Asher-McDade scoring system is a valid tool to use when assessing bilateral cleft lip repairs.[12]

Richardson S and Krishna S evaluated the aesthetic outcome following bilateral cleft lip repair using the Mulliken technique.13 They scored on three regions of lip, nose & general facial appearance with a total score of 3. In our study, we evaluated the outcome of BCL repair using modified Millard's technique. We rated ten components of these three regions with a total score of 10. We believe that ten components assessment will give a more accurate result than an assessment of 3 components. Only frontal view photographs were evaluated in their study. But in our study, we evaluated both the frontal and worm's eye view pre & postoperative photographs. This contributed more accurate assessment of the nose and lip components. Five medical & five nonmedical personnel scored individually in the study by Richardson S and Krishna S. But in our study, we only assessed by a surgeon and social worker as it was difficult to select more medical

and nonmedical personnel and make them available at the same time.

Social worker scored higher than the surgeon. It meant that they were highly satisfied with the dramatic change of appearance after surgery. Both the evaluators scored higher for general facial appearance and scored less for nose regions. Among three regions, the social worker was less satisfied and scored less for the nose. It is due to their unrealistic expectation of having a normal appearance of a nose after the operation. The outcome was good in all cases evaluated by both the surgeon (mean score-8.09) and social worker (mean score-8.9) which had similarities with Richardson S and Krishna S study. Assesment of bilateral cleft lip nose appearance by Lo LJ et al. also showed the judgment of results by cleft surgeons was similar to that of the laypersons.8 A simple two-point rating system was applied by Bonanthya k et al. to separately analyze a total of 10 components of lip, nose, and scar of BCL repair using modified Millard technique. The results showed a good surgical outcome.[14] Out of 46 cases, complications like minor wound infection and vermilion notch occurred in 2(4.34%) cases respectively. This is similar to a study by Aziz SR et al. who showed 5.5% nonlife- threatening complications like infection or wound dehiscence requiring subsequent revision surgery.15 In 4(8.69%) cases, hypertrophic scar developed. Columella shortening was a major drawback in the Modified Millard technique and was obvious in many cases immediately after-operation. However, improvement was noticed over time. In this study, follow up period was wide ranged (3 months to 3 years) due to inability to attend the follow up of all the patients timely.

This was a small-scale single-centre study and two-person evaluation study. A large-scale study and evaluation by many more evaluators might give a more accurate outcome. Wide range of age and follow up period might influence the exact aesthetic outcome in this study. Study of same age group patients and same duration of follow up might give an accurate results.

Conclusion

Modified Millard's technique for bilateral cleft lip repair is a reliable technique associated with good surgical outcome using this scoring system. So this scoring system can be used for evaluation of aesthetic outcome of bilateral cleft lip operation.

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