Research Article

Outcomes of Mishra technique in unilateral cleft lip repair

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Abstract

Introduction: Since early days of medicine, there has always been a need for evidence based practices which enable the physician to determine the best treatment strategies and replicate the results again and again. The importance of evidence based medicine was stressed by Hippocrates who declared that the physician needs to “rely on actual evidence rather than on conclusion resulting solely from reasoning because arguments in the form of idle words are erroneous and can be easily refuted.”

Aim of the work: The aims of our study are to evaluate and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair.

Patients and Methods: Our study is a prospective study which was conducted at Minia University Pediatric Hospital. We enrolled 50 patients with unilateral cleft lip operated upon with Mishra technique from September 2020 to September 2021. Results: A total of 50 pediatric patients with unilateral cleft lip were included in our study at Pediatric Surgery Unit of General Surgery Department of Minia University Hospital. Children’s age ranged from three to twelve months with a mean±SD of 6.8±3.1 months (Table 3). Conclusion: The goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery.

Keywords: Mishra technique, Hippocrates, Pediatric Surgery

Introduction

Cleft lip is a birth defect that happens due to inappropriate formation of the fetus’s lip early during pregnancy between the fourth to seventh weeks of gestation. It occurs due to failure of union of the smaller upper central frontonasal prominence of the first pharyngeal arch and the two lateral maxillary prominences which result in cleft lip defect of a newborn- leading to affection of the upper lip, the palate or both.

Cleft lip nearly affects one baby of every 700 to 1000 born. Overall, clefts occur more common in American Indian and Asians (1 in 500 births), less commonly in Caucasians (1 in 1000 births) and even more rarely in African Americans (1 in 2000 births).

The reasons of clefting between newborns are unidentified. It is thought to be caused by a mixture of genes and other factors, such as things the mother encounters in her environment. Smoking, diabetes, and use of certain medications during pregnancy have been reported by the Center of Disease Control (CDC) as some factors that increase the chance of having a baby with an orofacial cleft.

Over the past century, there have been key advances in unilateral cleft-lip (UCL) repair modalities toward the up-to-date form. Straight-line closure repairs were used in the early 1900’s. However, straight-line closures had the drawback of producing a vertical scar contracture, leading to notching of the lip.

This led to the generation of several techniques in the mid-twentieth century that are grouped as rotation-advancement techniques, quadrangular flaps, and triangular flaps. The first documented cleft-lip repair in the literature involved simple freshening and approximation of the cut edges,
followed using curved incisions to allow increase the length of the lip.

Surgical methods for repairing unilateral cleft lips have advanced continuously over the past few decades. Although a multitude of approaches have been described, the rotation-advancement technique described by Dr. D. Ralph Millard in 1957 remains the most popular worldwide. This technique releases the malformed medial lip segment from its columnellar attachment and rotates it into normal position. The lateral lip segment is advanced with the alar base across the cleft. Since its introduction, this procedure has been performed by innumerable surgeons worldwide. With experience, many cleft surgeons tend to further modify this technique for better outcome. This continuing evolution of the surgical technique is just a reflection of a plastic surgeon’s struggle to combine reconstructive principles with a good aesthetic sense to restore both form and function with beauty. Any modification in the procedure which allows normal facial growth and development, near-normal facial appearance and lessens the need for future secondary procedures should be every cleft surgeon’s goal. The operating surgeon must have full understanding of the embryological and anatomical factors guiding the repair of cleft lip and should seek to improvise and try to normalize all the tissues involved in the cleft lip.

The two basic and most commonly used techniques for UCL closure are the Tennison-Randall and the Millard rotation-advancement techniques. Both modalities report the importance of repositioning the lip muscle (orbicularis oris) in the right anatomic alignment for best functional and aesthetic outcomes.

The ultimate goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery.

Mishra technique that called "White Roll Vermilion turn down Flap" (WRV Flap), an adjustment in the Millard’s technique is an effort to prevent these secondary deformities as “paramedian scars over the vermilion in continuation with the philtral line scar are often visible and scar contracture, vermilion notching is visible in close up view, sometimes medial hypoplastic vermilion or partial loss of medial vermilion” during the primary cleft lip surgery. WRV flap aims to focus on the importance of accomplishing a near normal look of the cleft patient. Overall, WRV flap modify the Millard’s procedure and incorporate the WRV flap from the lateral lip section to be used for the construction of the vermilion and white roll on the medial lip segment.

Outcomes are measured with postoperative photographs that assess various anatomic landmarks and features. Depending on the use of the Asher-McDade rating scale.

**Aim of the work**

The aims of our study are to evaluate and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair.

**Patients and Methods**

Our study is a prospective study which was conducted at Minia University Pediatric Hospital. We enrolled 50 patients with unilateral cleft lip operated upon with Mishra technique from September 2020 to September 2021.

**Inclusion criteria**

1- Patients presented with incomplete and complete unilateral cleft lip. 
2- Both sexes. 
3- Age less than 1 year.

**Exclusion criteria**

1- Age more than 1 year. 
2- Patients with recurrent cleft lip. 
3- Patients with cleft palate. 
4- Patients with associated major congenital anomalies as major cardiac anomalies as Fallot’s tetralogy and trans-position of the great vessels, syndromic patients as Down syndrome, and neurological diseases as cerebral palsy. 
5- Bilateral cleft lip.

**Informed consent**

Signed informed consent was obtained from the parents after discussion regarding the nature of the surgery, the outcome, and the possible complications.

All patients were subjected to the following:

(1) **Pre-operative assessment:**

Full history and full clinical examination with
special stress on the possible associated anomalies as cleft palate.
Patients were referred to their pediatrician for clinical evaluation to rule out cardiovascular diseases, upper respiratory tract infection……etc and any conditions that may be of clinical significance.

(2) Pre-operative preparations:
   a) Laboratory:
      Routine laboratory investigations include:
      1. CBC.
      2. PT, INR.
      3. PTT.
   b) Echocardiography.
   (3) Surgical Technique

Mishra technique
Perioperative details:
   1- Anesthesia:
      All patients received general anesthesia with midline oral endotracheal intubation. Ointment eye protection and oropharyngeal packing were always checked.
   2- Positioning:
      Patients were placed in supine position with neck slightly extended using small shoulder roll and with supporting the head using ring cushion. The operating table was tilted into reverse Trendelenburg position. Face was prepared and draped.
   3- Operative details of Mishra technique:
      1- Landmarks.
      2- Cutting.
      3- Suturing.

Procedure: After the child is intubated and draped, the marking is done as per Millard’s rotation-advancement technique. The markings for the WRV turn down flap are as follows (green marking in Figure 24a).

Landmarks:
   A) Points:
      * Nasal points.
      * Vermilion border points.

Results
A total of 50 pediatric patients with unilateral cleft lip were included in our study at Pediatric Surgery Unit of General Surgery Department of Minia University Hospital. Children’s age ranged from three to twelve months with a mean±SD of 6.8±3.1 months (Table 1).

The sex distribution of cleft lip showed high prevalence of males compared to females, out of 50 patients treated in our unit, there were 35 (70%) males and 15 (30%) females, with male: female ratio was 2.3: 1.
Out of 50 patients, 24 (48%) were isolated complete unilateral cleft lip and the remaining 26 (52%) consists of incomplete unilateral cleft lip. The mean operative time was 72.7±7.9 minutes.

Data about sex distribution of patients, age, type of cleft lip (complete or incomplete), and operative time were summarized on table 1.

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>6.8±3.1</td>
<td>(3-12)</td>
</tr>
<tr>
<td>(Range)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>35</td>
<td>70.0%</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>30.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of unilateral cleft lip</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>24</td>
<td>48.0%</td>
</tr>
<tr>
<td>Incomplete</td>
<td>26</td>
<td>52.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operative time (minutes)</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>72.4±7.9</td>
<td>(62-90)</td>
</tr>
</tbody>
</table>
Table (2): Postoperative cosmetic results.

<table>
<thead>
<tr>
<th></th>
<th>Total (N=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>white roll</td>
<td></td>
</tr>
<tr>
<td>Not matching</td>
<td>6</td>
</tr>
<tr>
<td>Matching</td>
<td>44</td>
</tr>
<tr>
<td>Alar base</td>
<td></td>
</tr>
<tr>
<td>Non-symmetric</td>
<td>8</td>
</tr>
<tr>
<td>Symmetric</td>
<td>42</td>
</tr>
<tr>
<td>Cupoid's bow</td>
<td></td>
</tr>
<tr>
<td>Non-symmetric</td>
<td>5</td>
</tr>
<tr>
<td>Symmetric</td>
<td>45</td>
</tr>
</tbody>
</table>

We judged on the cosmetic results after three months post-operative. Follow-up showed that 44 (88%) of patients were found to have white rolls matched postoperatively, 42 (84%) had symmetrical alar base. With respect to Cupid’s bow symmetry, 45 (90%) of patients had symmetrical Cupid’s bow (Figure 33).

**Figure (1):** Postoperative cosmetic results.

**Discussion**

Over the past century, there have been major advances in unilateral cleft-lip repair techniques toward the method’s modern form. The first documented cleft-lip repair involved simple freshening and approximation of the cut cleft edges, followed by using curved incisions to allow lengthening of the lip. Straight-line closure repairs were used in the early twentieth century; however, straight-line closures had the disadvantage of creating a vertical scar contracture, leading to notching of the lip. This led to the development of several methods in the mid-twentieth century that are grouped as quadrangular flaps, triangular flaps, and rotation-advancement techniques.

The two basic techniques that are most used for unilateral cleft lip closure are the Tennison-Randall and the Millard rotational advancement techniques. Each technique has its advocates, and both techniques address the importance of repositioning the lip muscle (orbicularis oris) in the correct anatomic orientation for optimal aesthetic and functional outcomes.

The ultimate goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The
symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery.

Mishra technique that called "White Roll Vermilion turn down Flap" (WRV Flap), an adjustment in the Millard’s technique is an effort to prevent these secondary deformities as “paramedian scars over the vermilion in continuation with the philtral line scar are often visible and scar contracture, vermilion notching is visible in close up view, sometimes medial hypoplastic vermilion or partial loss of medial vermilion” during the primary cleft lip surgery. WRV flap aims to focus on the importance of accomplishing a near normal look of the cleft patient.

Measurement of treatment outcome is vital to evaluate the success of cleft management and the degree of improvement, especially in the present age of evidence-based medicine where treatment guidelines for best practice are becoming an integral part of contemporary clinical practice.

Numerous studies have been performed for anthropometric analysis but have suffered from inconsistent or inaccurate data. This is due to the difficulties in pre- and post-operative assessment of the patients. Photography is inaccurate due to 2 dimensional pictures. Direct facial measurement is often hard in infants. Soft tissue radiograph is difficult technically and inaccurate due to problems identifying external soft tissue landmarks and carries a radiation risk to patient. Three-Dimensional Laser scanning is inaccurate unless under general anesthesia and is a complex methodology.

These difficulties lead to the implementation of reliable and useful simple methods for rating the aesthetic results of cleft lip repair as they can help identify the best treatment methods.

AmeriCleft, a large, multicenter study in the U.S, validated the use of the Asher- McDade rating scale. This is one the most used rating scales till today. The system stratifies cleft patients on a point scale in each of the following nasolabial characteristics; a. Nasal form b. Symmetry of the nose c. Shape of the vermilion d. Nasal profile including upper lip.

Our study included 50 patients and aims at evaluating and assess the advantages, disadvantages, and outcomes of Mishra technique in unilateral complete or incomplete cleft lip repair using multiple outcomes including; 1) operative time, 2) post-operative cosmonis (white roll, alar base, and cupid’s bow), 3) post-operative complications (wound infection, wound dehiscence, wound scarring, and lip notching), 4) parent’s satisfaction score, and 5) Asher-McDade aesthetic Index.

In our study, we evaluated cleft repair outcomes three months postoperatively. A three-month postoperative evaluation study was also done by Adetayo et al.; however, Gadre P et al., evaluated the patients for outcomes after one month post-operatively.

In our study, the age at which the repair was done ranged from 3-12 months with the average age of the patients being 6.8 ± SD 3.1. In the study done by Adetayo et al., and Gadre P et al., patients’ age at the time of lip repair ranged from 1 to 12 months. Most lip repairs was performed within 3 to 6 months for both groups.

As regarding sex distribution in our study, 35 (70%) of cases were males & 15 (30%) were females. In the study done by Adetayo et al., females (ratio=1: 1) in the Millard group and there were 15 (62.5%) males and 9 (37.5%) females (ratio=1.7: 1) in the Tennison group. In the study done by Gadre P et al., the total male patients were 39 to females adding up-to 21. Equal male and female distribution were present within the two groups.

Conclusion

The goal of cleft lip operation is to attain a perfectly symmetrical lip and nose. The symmetry and appearance of the nasolabial region is also seen as one of the principal characteristics when evaluating the results of any facial surgery.

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Our study findings show that after three months of post-operative follow-up; a very good cosmetic results “matching white roll, symmetric alar base, and symmetric cupoid’s bow” were obtained in the majority of the patients. Most of the parents were happy or satisfied by the look of their children’s. Asher-McDade aesthetic Index was ranked as very good appearance or good appearance in most of the patients. Early post-operative complications were observed in less 2% of the patients. While late complications like wound scarving and lip notching were observed in only five patients.

Best results are achieved when the whole multidisciplinary team believe and take part in the program and individual interventions are implemented altogether.

Surgeons should feel confident in using whichever technique they are comfortable with keeping in mind the advantages and disadvantages of each technique.

Our results concluded that Mishra technique is a very good technique regarding cosmosis, less secondary deformities, less early and late complications, high parents satisfaction, and good aesthetic results.

We recommend more randomized controlled trials to compare between Mishra technique and the two mostly used techniques “ Millard Rotational Advancement and Tennison-Randell techniques” for more consistent results to guide the surgeons for the best technique with no bias.

References

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