Method of surgical treatment of children with unilateral congenital cleft lip and palate

Abstract: The congenital cleft lip and palate (CCLP) is one of the most common malformations of the face and jaws, and it is among the most severe defects in terms of the severity of the anatomical and functional disorders.

Keywords: congenital cleft lip and palate, primary cheilo-palatoplasty

Introduction

Regardless of the age of a child suffering from the congenital cleft lip and palate (CCLP), the main task of the surgeon is to restore anatomic form of the lip and its adequate functioning. Nowadays there are a lot of methods which provide only underwhelming aesthetic and functional results, but still need some improvement [2; 4; 5; 7; 10; 13; 15 and 19].

According to different authors the number of individuals with the postoperative complications and the poor long-term results after cheilo- and palatoplasty ranges from 16 to 52%. In domestic and foreign literature inadequate attention is paid to the primary cheiloplasty with the most optimal methods taking into account the degree and a form of the cleft. A high percentage of unsatisfactory results points to a lot of unresolved issues and the relevancy of this problem. The most debated issue is the determination of the optimal age and methods for surgical treatment of children with the congenital malformations of the face and jaws [3; 6; 9; 16; 19; 20].

The urgency of this problem is determined not only by the high fertility rate of children suffering from this disorder, but also with the difficulties in selection of the surgical treatment [4; 10; 14]. We think that the main cause of unacceptable functional and cosmetic results could be also the imperfection of the traditional treatment methods, unreasonable choice of those methods of surgical correction and the age approaches to its implementation. Also the important cause of failure is the lack of sufficiently clear and complete picture of the problems which are inherent to these patients, and the effects of the implementation of certain surgical procedures in remote postoperative period [1; 12; 18].

The global experience on treating patients with CCLP caused the possibility of good results of surgical correction of the primary defects and secondary deformities [2; 5; 17; 19]. At the same time, the existence of such issues as the optimal age of the child for the primary surgical correction, choice of the optimal functional and less traumatic method, the cumulative effect of these factors on the subsequent state of the sense of hearing, the speech, the growth of the maxilla and the middle zone of the face and the general development of a child, remains controversial and widely discussed in the domestic and foreign literature. However, it is obvious that timely
and correct implementation of the first stage of surgery determines the success of the rehabilitation of patients with the congenital cleft lip and palate [1; 5; 14].

The main and most effective way of the cleft lip's plastic reconstruction is the flap cheiloplasty, which reasonably undergoes changes and improvements over the last few years. The methods of primary cheiloplasty described by Tennison/Obukhova and Millard are in common use in the world's practice [14]. For palatoplasty are used the traditional methods in age from 2.5 to 7 years in order to prevent the damaging effect of the surgery on the growth of the upper jaw. However, in most cases these techniques do not relieve patients from the problems associated with the deformation of the upper jaw, the presence of abnormalities of occlusion and dentition defect, and they do not allow full recovery of speech, and cause trouble the social adaptation of the child [2; 3; 4; 11; 12; 13].

**The purpose of the study**

Improvement of the efficiency of treatment of the children with the congenital cleft lip and palate, based on anatomically sound approach to surgical treatment and shortening the stages of surgical rehabilitation of the children with the CCLP.

**Material and methods**

Modern understanding of the development process, the formation and growth of the facial skull and surrounding tissues, knowledge of anatomy and physiology premaxillary-maxillary complex in normal and congenital cleft lip and palate have allowed us to develop and to implement in treatment the functional and gentle method of its correction. The proposed method of the primary cheilo-palatoplasty helps to form a full vestibule of mouth, to close oro-nasal fistula, which allows a normal development of the dent-alveolar arch and facilitates to early orthodontic treatment, reduces stage surgical treatment. As the prototype was taken one-step method of cheilo-palatoplasty by F. Burian (1955).

**Planning and conduction of the primary cheilo-palatoplasty by the developed method**

Operative intervention was performed to all patients under the endotracheal anesthesia. We preferred to use the absorbable sutures «VICRYL 5–0», «POLYSORB 5–0» for suturing the muscles and the oral mucosa, and not absorbable sutures «PROPILEN 6–0» or «SURGILENE 6–0» for the skin. Before performing the incisions on the tissue of the upper lip, the nose and the alveolar bone the 0.5% Novocain solution with the traces of adrenaline was injected, which greatly facilitated dissection of tissue and reduced bleeding during the surgery.

The planning of the surgery was started by finding the points of splitting fragments in the upper lip (A, A1) and the definition of the line incision on the skin by Millard (B, B1). Then, from this point was performed incision in the planned lines on the fragments of the upper lip. The incision was continued until the base of the upper lip frenulum (C) and dissected the frenulum under the 45 ° for 0.5 cm. (C, C1), which lengthened the vestibular space and formed out the defect to the triangular shape (Figure 3). Then the required size of the quadrangular flap was cut out on mucous large fragment (C2), and after its transferring to the defect region (C, C1) it was sutured (Figure 4).

By putting the equal distance on the medial fragment to the corner of the mouth the point of splitting was found out on the lateral fragment of the upper lip, and this length of the lateral fragment is copied to the upper lip (A1). The incision was performed from this point in direction to the mucous of the nose wing by the planned lines. Further from the split point (A1) the incision was carried down under the 90 ° to the arc of Cupid, in direction to the defect and down parallel to the lines of scheduled creases transition without reaching it by 0.2–0.3 cm.
Thus the mucosal-submucosal L patchwork was formed out (Figure 5). This flap was moved to the medial fragment and the incision “poker” by Limberg A. A. was performed at the transitional fold of the lateral fragment (D1) (Figure 5). It was followed by separation of the orbicular muscle of the mouth. Further incisions were done in some distance from the edge of the cleft for 2–4 mm till the ½ of the hard palate (Figure 5). This incision might be slightly increased or decreased depending on the length of the flap L. Then the nasal mucosa was separated and eversionally sutured (Figure 6).

Then the L flap was moved down to the transitional fold of the large fragment (Figure 6). The mucous mobilized by “poker” incision was moved medially (D1 → D) and was sutured, and thus the vestibule of the mouth was deepened and the oro-nasal fistula was closed. Then the L flap was applied to the wound surface of the palate’s mucosa and was sutured to the edges of the wound (Figure 7). Finally, the stitches were put on the mucosa, the muscle and the skin of the upper lip (Figure 8).

12 children with the congenital unilateral cleft lip and palate at the age of 6–10 months got the primary cheilo-palatoplasty by the proposed method at the clinic of children’s maxillofacial surgery of the Tashkent State Institute of Stomatology.

By our method of primary cheiloplasty facilitated to simultaneously restore the vestibule of mouth, to close oro-nasal fistula and to correct the cleft in the anterior part of the hard palate. To assess the severity of disease we have used the classification of L. E. Frolova (1974). Analysis of the literature and our clinical experience show that the CCLP almost always is accompanied by a shortening of frenulum. The classification of the Khoroshilkina F. Y. (1982) was used for assessment of the level of shortening of frenulum. Division of the patients according to the gender and the severity of disease is presented in the Table 1.

<table>
<thead>
<tr>
<th>Degree of shortening frenulum of upper lip</th>
<th>I degree</th>
<th>II degree</th>
<th>III degree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCLP I degree</td>
<td>–</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>CCLP II degree</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>CCLP III degree</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>12</td>
</tr>
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</table>

For illustration we give an example (Figure 9):
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Thus, the use of the performed method in congenital unilateral cleft lip and palate allows to simultaneously eliminate the upper lip's cleft and the oro-nasal fistula, to normalize the vestibular space by extending the upper lip frenulum and close the cleft of the anterior part of the hard palate, which consequently reduces the operational and orthodontic intervention stages.

References: