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A Case Report

Management of Tessier No. 2 Facial Cleft Using Millard Technique with Zig- Zag Advancement Flap: A Case Report

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Abstract:

Introduction: Craniofacial cleft is a rare congenital disorder that affects facial and skull. development, with an incidence estimated between 1.4-4.9 per 100,000 births. This condition often results in significant complications such as feeding difficulties, impaired speech, hearing issues, and psychosocial challenges. Among craniofacial clefts, the oblique facial cleft, including Tessier No. 2 cleft, is the rarest and least documented. This cleft is characterized by specific soft and hard tissue deformities resulting from a failure of fusion among facial processes during embryonic development. Case: An 8-month-old female presented with a unilateral cleft of the lips, gums, and palate on the left side, accompanied by a Tessier No. 2 facial cleft. The patient's mother reported no history of teratogenic exposure or family history of clefts. Clinical examination revealed hypoplasia of the middle third of the nasal margin, a flattened lateral nose, a widened nasal bridge, and a deviated nasal septum. The patient was diagnosed with unilateral complete labiognatopalatoschizis accompanied by Tessier No. 2 cleft. Case Management: The patient was prepared for labioplasty under general anesthesia after meeting the "rules of ten" criteria (10 weeks old, 10 pounds, 10 grams/dl hemoglobin). The surgery was performed using the Millard technique with a zig-zag advancement flap to achieve optimal tissue coverage and symmetry. Postoperative care included antibiotics, pain management, and follow-up visits. At the 3-month follow-up, the surgical site showed good healing with no signs of infection or significant complications. Conclusion: Understanding the specific anatomy and pathophysiology of Tessier No. 2 clefts is essential for effective surgical planning and outcomes. The modified Millard technique provides satisfactory aesthetic and functional results, although challenges remain. Comprehensive postoperative management and long-term follow-up are crucial to monitor healing and address any complications. Further research and multidisciplinary.

Keyword: *Facial Cleft, Tessier 2, Millard Technique, Zig-zag Advancement Flap*

Introduction

Craniofacial cleft is a rare congenital disorder that causes facial and skull abnormalities of varying patterns and severity.[1,2] Although the exact incidence is unknown, it is estimated to be between 1.4-4.9 out of 100,000 births, and is one of the congenital abnormalities that cause the death of 303,000 babies before 4 weeks of age.[2] If survived, the infant will face feeding difficulties and have impaired speech, hearing, and tooth shape and arrangement, which causes individuals with craniofacial clefts to experience difficulties in their psychosocial functioning.[2,3]

Among all craniofacial clefts, oblique facial cleft is the rarest and there is little literature on it. Oblique cleft is defined as a cleft that extends between the nasolateral and maxillary prominences which is usually accompanied by cleft lip formation, including Tessier cleft No. 2-6.4 This type of cleft occurs sporadically and is associated with failure of fusion between the medial nasal prominence, maxillary process, and lateral nasal process in embryos at 4-8 weeks of age.[4,5]

Tessier 2 cleft is a very rare oblique facial cleft with unique soft and hard tissue characteristics that distinguish it from Tessier 1 and 3.1 In Tessier 2 cleft, the soft tissue deformity in the middle third of the nostril rim is hypoplastic, in contrast to Tessier 1 which is notch-shaped, and Tessier 3 with undermining alar region. The bony involvement in Tessier 2 cleft is also distinctive as it crosses the alveolar bone in the lateral incisor socket to near the piriform aperture.1,4,6 Tessier 2 cleft patients also have other clinical features such as hypertelorism, wide nasal bridge, and deviated nasal septum due to deformity of the surrounding tissues.[4,6]

Management of craniofacial cleft patients can be carried out provided that the baby has met the “rules of ten” criteria as a prerequisite indicating that the baby is declared healthy and ready for surgical procedures.[7] The earliest surgical procedure performed on cleft patients with lip defects is labioplasty.[7,8] One of the labioplasty techniques for the management of Tessier 2 cases as well as a frequently used technique is the Millard technique, also known as the rotation advancement technique, which in this case was combined with zig zag advancement flap.[9,10,11]

In this study, due to the importance of the issue and also the lack of literature on craniofacial cleft and articles with related discussions in Indonesia, the authors conducted a case report study conducted at RSGM UNPAD to provide in-depth insight into the management of a patient with craniofacial cleft Tessier 2 accompanied by clefts of the lips, gums and palate. Through this article, it is hoped that useful insights can be obtained in improving understanding and clinical practice related to the management of craniofacial cleft cases, especially in Indonesia.

CASE

The patient was an 8-month-old female baby who came with her mother to the oral surgery polyclinic of UNPAD RSGM with the main complaint of facial abnormalities accompanied by a cleft of the lips, gums, and palate on the left side since birth. The mother's history of taking anti-seizure drugs, alcohol consumption, maternal smoking, diabetes mellitus, fever, trauma during first trimester, and family history of of cleft lip and/or palate was absent. There is no family history of cleft lip or palate. The baby was born full term with adequate weight and no other congenital abnormalities.

The results of the physical examination found the patient in good general condition with a pulse of 117x/min, breathing 30x/min, and afebrile temperature. On the patient's face there is an abnormality in the middle third of the nasal margin in the form of a hypoplastic area with a flat lateral part of the nose and a widened nasal bridge

accompanied by a complete cleft of the lips, gums and palate unilaterally on the left side of the patient's face and a deviated nasal septum, while the ears and throat are within normal limits. The patient was diagnosed with Labiognatopalatoschizis unilateral complete sinistra accompanied by Facial Cleft Tessier No. 2 and planned for labioplasty surgery.

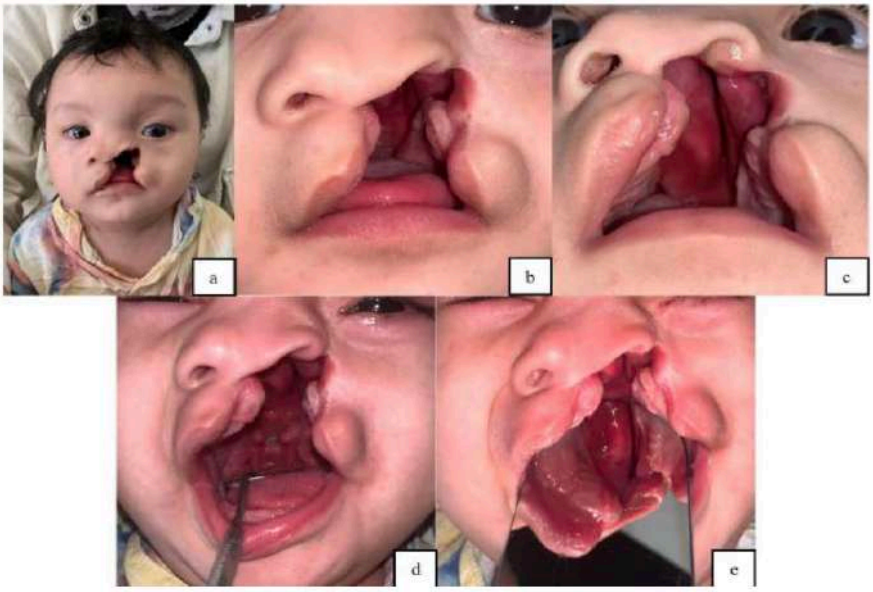

Figure 1: Preoperative photograph. Left facial cleft is classified as Tessier No.2 **a)**Postoperative Profile **b)** Extraoral Photograph **c,d,e)** Intraoral Photograph

Case Management

Patients are prepared for labioplasty surgery under general anesthesia when they meet the "rules of ten" criteria. Previously, the patient's parents were given informed consent as approval of the surgery to be performed. Blood laboratory examination results on September 19, 2023, hemoglobin 13.6 g/dl, hematocrit leukocytes 16.99/mm3, platelets 394,000/mm3, glucose 102 mg/dl, Bleeding time 1 minute 30 seconds and clotting time 6 minutes.

Labioplasty surgery was performed on October 2, 2023 using the Millard technique with zig-zag advancement flap. The patient was positioned on her back on the operating table under general anesthesia. Then, aseptic and antiseptic procedures were performed followed by marking the surgical field with methylene blue on the nasolabial area. Next, adrenaline infiltration 1:200,000 was performed on the operating field and incisions were made on the previously marked areas. Finally, suturing was performed according to the design with the Millard technique until the philtrum and labia superior were formed, using vicryl for suturing the muscles and mucosa and the skin area above it was sutured with nylon thread.

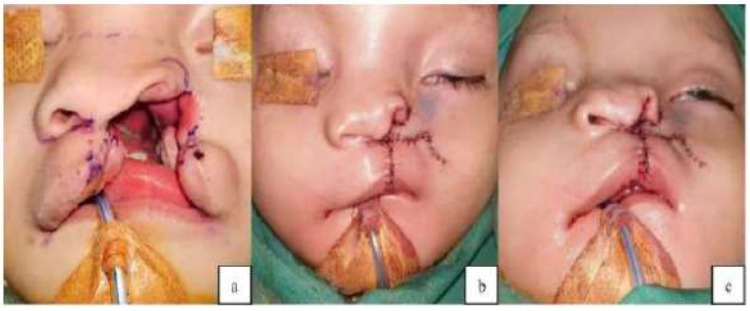

Figure 2: Intraoperative Photograph **a)** Incision Design **b-c)** Primary Closure of Facial Cleft

After surgery, the patient was discharged with antibiotics, painkillers, and anti-inflammatories such as amoxicillin, caltopren, dexamethasone, and aloclair gel, the patient was also prescribed ikamycetin to prevent infection and instructed to come back 1 week later for control and suture removal. At the 3-month postoperative follow-up, in the superior labialis region where labioplasty was previously performed, the suture wound appeared to be good, with no visible bleeding and infection, and no gap in the area.

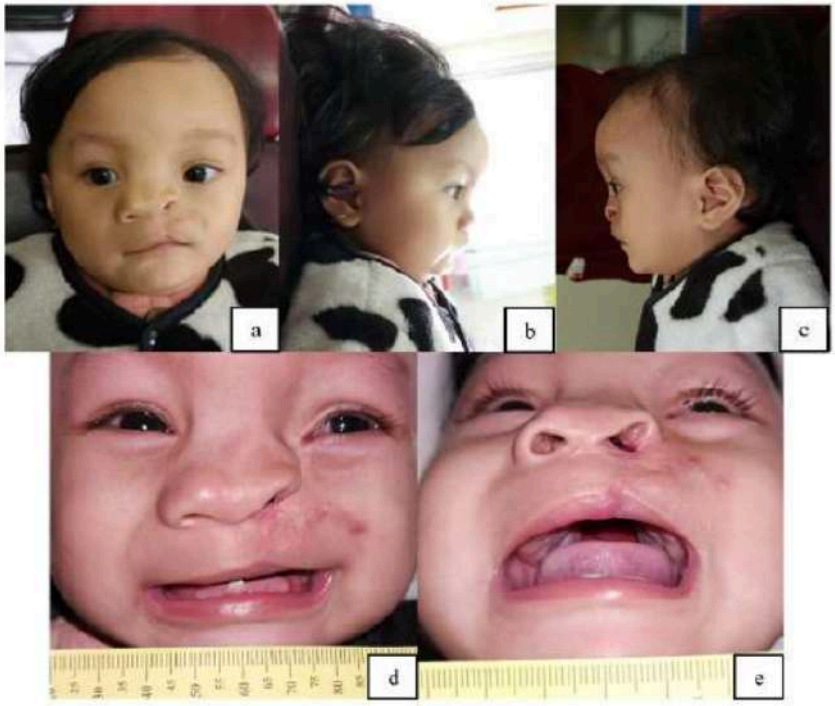

Figure 3: Postoperative Photograph **a,b,c)**Postoperative Profile **d)** Extraoral Photograph **e)** Intraoral Photograph

Discussion

Craniofacial cleft, especially the oblique type, is a rare congenital anomaly and one of the most striking facial abnormalities among other facial developmental abnormalities.[12,13] Based on the classification described by Tessier (1976), Tessier 2 craniofacial cleft is a very rare type of cleft with characteristics similar to Tessier 1 cleft in a more lateral direction.[6] It arises through the ala nasi between the most posterior part of the alar cartilage and the alar base with a unilateral cleft lip defect.6 In the hard tissues, the cleft passes through the lateral ethmoid period causing the eyes to appear further apart or known as hypertelorism.[1,6,14] In this case report, the patient had an abnormality in the middle third of the nasal margin in the form of a hypoplastic area with a flattened lateral part of the nose and a widened nasal bridge accompanied by a unilateral cleft lip and a deviated nasal septum due to deformity of the surrounding tissues.

Surgical management in cleft patients begins with lip repair through labioplasty if the baby has met the “rules of ten”, namely 10 weeks old, 10 pounds, and 10 grams/dl hemoglobin.[7,8,9] This aims to minimize the risk of anesthesia, the child can better withstand the stress of surgery, maximize nutritional status and healing, and the lip element is larger, allowing for more thorough reconstruction and appropriate tool sizing.

In addition to the rules of ten, the patient should be free from respiratory infection for at least 2 weeks, no skin infection at the time of surgery, and blood test results of leukocytes less than 10,000/µL, and

hematocrit 35%.[15,16,17] Lip repair in patients with labioplasty aims to form an upper lip with appropriate vertical length and symmetry, repair of the underlying structure with normal muscle function and repair of the deformed nasal structure.18 One of the methods to correct unilateral cleft deformity at the same time used in this case report is the Millard technique or also known as the rotation-advancement technique.[10,11] This technique involves rotation of the medial element of the cleft lip to close the cleft and form a natural lip contour, and extending the lateral cleft element on the cleft side to cut near the labial-columellar junction to fill the hypoplastic tissue and form a normal lip contour. [10,11]

In this patient, the large distance between the elements and the medial and lateral lips posed a challenge in performing this technique, so in this case, the operator considered modifying the technique by creating a zig-zag advancement flap on the lateral element of the lip to increase the available flap length, which would provide greater coverage to close the hypoplastic area. Nonetheless, it is important to maintain symmetry of the lips and nose as much as possible as emphasized by Millard. This is because mispositioning will lead to asymmetry of the lips and unsatisfactory aesthetics, as well as potential complications such as vertical contracture scar with vermillion lip notch or alar base subsidence leading to a tendency to produce small nostrils.[11]

The management of this patient's Tessier 2 cleft required correction of the cleft lip and palate through labioplasty followed by palatoplasty. However, achieving satisfactory results for each of these procedures is difficult, often requiring repeated surgeries.[7,8,9] The main focus of the management of this case was the aesthetic improvement of the lips and nose, closure of the palate, normalization of speech and hearing, chewing function, dental health so that the patient could achieve normal psychosocial development.[11] Improvements in the patient's appearance could be observed at the 3-month postoperative control, although with a limited follow-up period. Further procedures such as palatoplasty, scar correction, bone grafting and orthodontic treatment will be required to provide optimal results. In the future, more research is needed on the variations of Tessier 2 cases and their management to improve the understanding of the management of Tessier 2 cleft cases. Long-term follow-up on these cases is also needed to evaluate the function and aesthetics of the surgical results.

Conclusion

Understanding the specific anatomy and pathophysiology of Tessier 2 clefts is essential for effective surgical planning and outcomes. The Millard rotation-advancement flap technique is effective in achieving satisfactory aesthetic and functional results, although with some limitations. Careful postoperative management, including the use of antibiotics, anti-inflammatory drugs and proper wound care, is essential to prevent complications and ensure optimal healing. Studies with more subjects and longer follow-up periods are needed to improve treatment protocols and improve long-term outcomes for patients with Tessier No. 2 cleft. A holistic approach involving a multidisciplinary team is essential to address the structural, functional and psychosocial aspects of this condition.

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