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Case Report

Role of intra-velar Veloplasty- A center based case report

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ABSTRACT:
The presence of a cleft palate introduces feeding difficulties, problems in speech development, and the possibility of impaired facial growth. Intravelar veloplasty aids to gain functional repair of the palate. Velar port closure is highly affected by cleft palate type, thus best closure achieved with submucous and incomplete cleft palate. Early repair of cleft palate, before 1st year of age, yield best results in regard to adequate velar port closure, less hypernasality of speech, and better development of speech articulation. Here we present a case of midline cleft in the palatal region which was repaired with the time tested Bardach procedure of double palatoplasty.
Keywords Cleft palate; Palatoplasty; Intravelar veloplasty; Velopharyngeal insufficiency.

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INTRODUCTION

Cleft lip and palate (CLP) are the most common congenital craniofacial anomalies. The presence of a cleft palate introduces feeding difficulties, concerns regarding speech development, and the possibility of impaired facial growth. The cleft palate (CP) is surgically classified as complete, incomplete, or submucous types.[1] There are two most commonly used cleft palate repair techniques: a two-flap palatoplasty with intravelarveloplasty (IVV), or Furlow double-opposing z-plasty to achieve the levator repositioning and lengthening of the palate. Both techniques aim to create transverse orientation of the reconstructed levator sling.[2] Intravelar veloplasty (IVV) is the procedure of reconstruction of the levator muscle sling in CP patients in order to gain velopharyngeal (VP) closure. It is achieved by detaching the levator muscles from their abnormal attachment to the hard palate and repairing them in the midline with the muscle fibers oriented more normally,[3] transversely rather than vertically. The normal velum consists of the levator muscle in the middle and the tensor aponeurosis anteriorly. While in CP anomaly, the two muscles are closely related, with the tensor aponeurosis attaching to the posterior border of the hard palate and the levator inserting at the margins of the cleft in the anterior half of the velum.[4] Adequate VP closure is essential for the balance of oronasal resonance during speech production. The complete VP closure occurs from the simultaneous movement of the soft palate and the lateral and posterior pharyngeal walls, which ensures the complete separation between the oral and nasal cavities during the production of oral speech sounds.4 Previous anatomic studies of the palatal musculature concluded IVV would decrease the incidence of postpalatoplasty VP insufficiency (VPI).[5] The term velopharyngeal insufficiency (VPI) refers to a structural deficit in VP sphincter. In this case, there is a communication between the oral and nasal cavities, so, part of the air current is diverged to the nasal cavity during the production of oral speech sounds,

leading to the appearance of characteristic symptoms, such as hypernasality.[6] Electromyographic studies demonstrated that lateral pharyngeal wall motion is mainly the result of levator veli palatine muscle contraction and an increase VP competence following primary palatoplasty with IVV had been reported.[7] Palatoplasty is mostly performed at 6-12 months of age and this provides for early VP competency and the development of normal speech.[8]

CASE DETAILS

A 12-month-old child patient reported to our clinic with the chief complaint of difficulty in swallowing. No systemic abnormalities were detected in the patient. On clinical examination, it was observed that there was a midline cleft in the palatal region. (Figure 1) For its closure, Bardach procedure was performed (Figure 2). After nasal closure radical muscle dissection was performed by taking the full anterior attachment of palatopharyngeous muscle along with Levator attachment and was pushed it back and sutured. The muscle closure was a passive one. (Figure 3)

Figure 1- Clinical examination revealed a midline cleft in the palatal region.

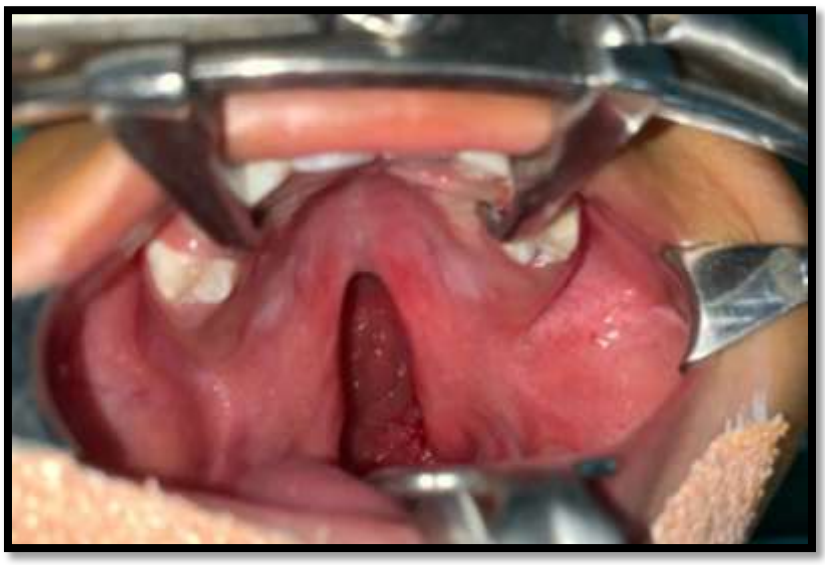


Figure 2- Typical complete cleft of the primary and secondary palates (A). In the Bardach palatoplasty, incisions are designed along the cleft edges and at the junction of the alveolus and hard palate, bilaterally. Two large full thickness mucoperiosteal flaps are raised on the hard palate; the soft palate is dissected into 3 layers (nasal mucosa, soft palate muscle, oral mucosa). Incisions end at the area of the incisive foramen anteriorly (B). Layered palatal closure proceeds with approximation of the nasal mucosa followed by release of the levator palatini muscles from the posterior hard palate. The newly released levator muscles are then posteriorly repositioned and repaired to create a dynamic sling that allows for velar closure (C). Closure of the oral mucosal flaps completes the repair; first, the midline is sutured, followed by the lateral releases. Rarely, the lateral releases are left to heal by secondary intention. The cleft anterior to the incisive foramen is left untouched and will be repaired in the mixed dentition stage of development (D).

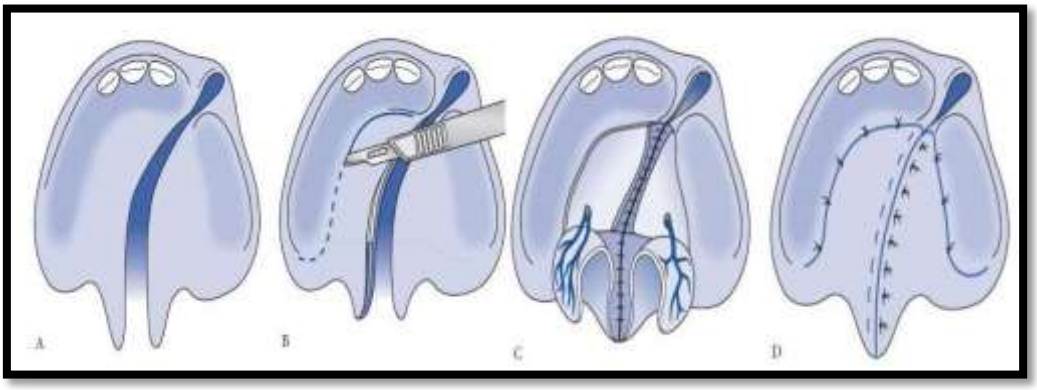
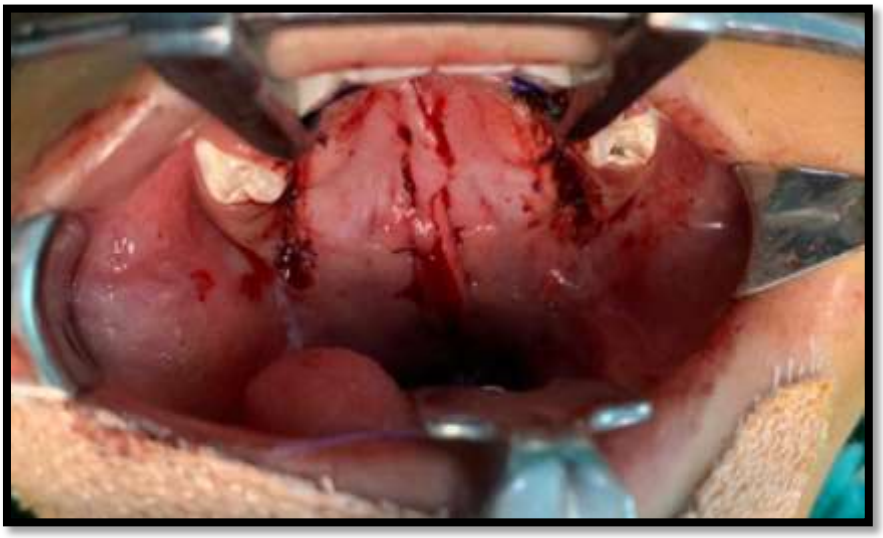


Figure 3- Bardasch procedure was performed for closure of the palatal cleft.



DISCUSSION

The velum is known to have a great role in producing intraoral pressure and thereby producing certain sounds by its movement against and down the pharyngeal musculature and maintenance of nasopharyngeal closure during feeding.[9] That's why we aim to repair the abnormal velar muscle attachment to gain a normal functioning velum. In other words, the success of palatal repair is directly related to the adequacy of velar muscles repair.[10] Veloplasty is a key step in gaining more favorable results in term of velar physiology starting from baby feeding problems elimination and speech improvement later on.[11] A study by Henkle et al in 2004, stated that repositioning of the velar muscular sling is achieved by intravelar veloplasty with dissection of muscle from the posterior shelf of hard palate with three years follow up. Articulation of pharyngeal sounds like /n/, /l/, /d/ were satisfactory for both groups; control (IVV) and (IVV with wave line technique), as in our study 70.2% of patients could fairly pronounce pharyngeal sounds, while the rest 29.8% who couldn't, most of them were the sample age extremities; the young for having mile stone still not developed well (the youngest patient was 2 years old at time of examination), and the older age group for delay presentation or having other disabilities or associated syndrome.[12] Inadequate VP closure could be part of VP dysfunction (VPD) as the normal function of Velo-pharynx requires not only Velum closure but proper coordination and speed of closure as well as a reopening appropriate for the specific task.[6] Therefore, children showing defective speech should get speech therapy which will aid to rehabilitate the compensatory mal-articulation and abnormal phoneme production. Operating on the adult patient has many challenges including wide clefts, adherent mucoperiosteal flaps due to chronic inflammatory process related to poor hygiene and/or smoking. Late effect of age is mainly related to mal-articulation with or without poor velopharyngeal function. In a study done in India by Murthy in 2009 for primary palatal repair in adult patients (sample included children more than 10 years old), the author chose two flaps palatoplasty with IVV in patient with complete cleft palate and he suggested that it was superior to pharyngeal flap in term of complications with less VPI but no much statistical significance for detailed speech outcome, as speech is affected by much more factors for articulation other than the velum, however IVV was done even when using other techniques; like Langenbeck or V-Y push back for incomplete CP.[13] The two-flap palatoplasty technique (Bardach technique), was first described in 1967, allows for complete closure of the palatal cleft, with two-layer closure in the area of the hard palate and three-layer closure of the soft palate. Using this technique, many palatal clefts can be closed without leaving bare bone exposed lateral to the mucoperiosteal flaps in the area of the hard palate. Precise dissection of the muscles of the soft palate from the posterior edge of the bony palate and from the nasal periosteum allows for increased mobility as well as lengthening of the soft palate. Normal speech production is achieved in approximately 75% to 80% of patients. This technique was used in our study, which resulted in minimal post-operative complications for the patient.[14]

CONCLUSION

We recommend performing intravelar veloplasty as a routine step during cleft palate repair, whatever the cleft palate type is, and whatever palatoplasty technique is chosen, because even the mildest incomplete cleft palates are known to ave some degree of abnormal muscle attachment. Team work is needed to evaluate, treat, and follow up patients with cleft palate especially speech therapy and long-term follow-up.

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