Cleft Lip and Palate Surgery

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Abstract
Orofacial clefts are the most common craniofacial malformations and include Cleft Lip with or without associated Cleft Palate (CL/P) or isolated Cleft Palate (CP) [1]. Optimal management of CL/P includes multidisciplinary team comprising of Pediatrician, Plastic Surgeon, Otorhinolaryngologist, Maxillofacial Surgeon, Orthodontist, Speech Therapist, Geneticist, Psychologist and Public Health Nurse. Closure of the lip is usually done around 10-12 weeks of life and cleft palate is repaired before 12 months of age. Various techniques of closure are followed based on the type of the defect. Velopharyngeal insufficiency after cleft palate repair is common and these children should be under follow up and require speech evaluation and speech therapy to have optimum function.

INTRODUCTION
Orofacial clefts are the most common craniofacial malformations and include Cleft Lip with or without associated Cleft Palate (CL/P) or isolated Cleft Palate (CP) [1].

INCIDENCE
The incidence of CL/P is found to be 1 in 500 to 2500 live births and the incidence varies with changes in geographical location, race/ethnicity, sex and maternal age [2,3].

EMBRYOLOGY
Normal development of lip and palate occurs during 4-8 weeks and 6-12 weeks of gestation respectively. Failure of fusion of median nasal process with maxillary processes and fusion of lateral palatal shelves results in cleft lip and cleft palate respectively.

PROBLEMS
Cleft lip can vary from a small notch in the vermillion border (microform type) to complete type associated with an alveolar cleft. It can be unilateral (mostly on the left side) or bilateral (Figure 1). The spectrum of cleft palate varies from submucosal cleft to complete cleft of primary palate (anterior to incisive foramen) and secondary palate (posterior to incisive foramen). Nearly 30% of neonates with CL/P have associated congenital anomalies occurring as part of a syndrome [4]. Most common syndrome associated with CL/P is Vander Woude syndrome [5]. Other syndromes associated with CL/P are Popliteal pterygium syndrome, Hardikar syndrome, Stickler syndrome and Treacher-Collins syndrome.

MANAGEMENT
Optimal management of CL/P includes multidisciplinary team comprising of Pediatrician, Plastic Surgeon, Otorhinolaryngologist, Maxillofacial Surgeon, Orthodontist, Speech Therapist, Geneticist, Psychologist and Public Health Nurse.

The immediate problem in infants with CL/P is feeding. Feeding difficulties can be managed by teaching special feeding positions to mothers or using soft artificial nipples with large openings.

TIMING OF SURGERY
Surgical closure of Cleft lip is usually done around 10 – 12 weeks of age. Wilhelmsen and Musgrave recommended the famous rule of 10 for cleft repair which states that cleft lip can be repaired once the baby reaches the following cut off points: a weight of 10lbs, hemoglobin of 10g/dL and white blood cell count < 10,000 mm3 [6]. Millard modified the commonly used “rule of order 10” and changed the cut off points to weight over 10lbs, hemoglobin over 10g/dL, age over 10 weeks [7].

The optimal timing of cleft palate repair is still controversial and varies with outcome considered. For optimal speech development, palatoplasty is recommended as early as 3 to 6 months but at least before 12 months, when acquisition of language begins [8]. In contrast, with regard to optimal midface growth, recommendations vary as late as 2 to 15 years, as completion of transverse midface growth is thought not to occur until 5 years of age [8].

PRE-SURGERY
Pre-surgical maneuvers can be tried in selected cases for obtaining optimum results during definitive surgical repair. These maneuvers include lip adhesion, lip taping and pre-surgical orthopedics. Various pre-surgical orthopedics tried include parental finger massaging of probalmium, tape pressure on the labial segments, intraoral devices [Latham
mucoperiosteal palatal flaps are elevated and mobilized both palatal mobility to improve velopharyngeal competence [16]. The Kilner technique is used for increasing palatal length and soft are, repositioned normally [16]. This improves both velar and technique, in which the abnormally inserted velar muscles are elevated and mobilized medially for closure of the cleft. [8,15,16]. In this technique bipedicled mucoperiosteal flaps are of the secondary palate without cleft lip or alveolar involvement modifications has been implemented for repair of incomplete clefts concern regarding the mid facial growth. palate, width of the cleft, necessity of lengthening of palate and upon whether the cleft is of the primary palate or secondary literature and the type of technique to be employed depends 

SURGICAL TECHNIQUES

The surgical techniques of closure of cleft lip include straight line closure, geometrical flaps and rotation advancement flaps. Straight line closure also called as Rose Thompson closure is used in closure of microform type of clefts [12]. The disadvantages with this technique include vertical scar contracture, notching of lip and blunting of cupid’s bow. Geometric flaps including triangular and quadrangular flaps correct the defect by interdigitation of flaps. Though they are appropriate for inexperienced surgeons and preserve the cupid’s bow the main drawback is lack of flexibility and occurrence of scar violating philtral subunit. Most commonly used technique in cleft lip repair is Millard’s Rotation advancement flap technique [13]. The main advantage of this technique are its versatility, produce minimal tissue loss, preserves cupid’s bow, reduces nasal flare by creating tension and also creates a suture line consistent with philtral markings. The drawbacks of this technique are requirement of high expertise of surgeon, occurrence of small nostril on the ipsilateral side and vertical scar contracture in some cases [14].

Various techniques of cleft palate repair are described in the literature and the type of technique to be employed depends upon whether the cleft is of the primary palate or secondary palate, width of the cleft, necessity of lengthening of palate and concern regarding the mid facial growth.

The von Lagenback technique along with its various modifications has been implemented for repair of incomplete clefts of the secondary palate without cleft lip or alveolar involvement [8,15,16]. In this technique bipedicled mucoperiosteal flaps are elevated and mobilized medially for closure of the cleft.

Intravelarvelooplasty is a modification of von Lagenback technique, in which the abnormally inserted velar muscles are, repositioned normally [16]. This improves both velar and pharyngeal function.

The VY pushback palatoplasty also called as Veau-Wardill-Kilner technique is used for increasing palatal length and soft palate mobility to improve velopharyngeal competence [16]. The mucoperiosteal palatal flaps are elevated and mobilized both medially and posteriorly, which helps in increasing the palatal length. The main drawbacks are its effect over mid facial growth and higher rates of oro-nasal fistula because of single layer of mucosa anteriorly. This is also a modification of von Lagenback technique.

Two flap palatoplasty is the technique commonly employed for correction of complete clefts either unilateral or bilateral [8]. The mucoperiosteal flaps are elevated both on the oral surface and nasal surface of the hard palate simultaneously. Nasal flaps are approximated first followed by oral flaps. The main limitation is its inability to add length to palate.

Repair of soft palate is done by the Furlow double opposing Z–palatoplasty technique [16]. This technique helps in lengthening of soft palate and also reconstructs the muscular sling. This technique is also used for correction of velopharyngeal insufficiency in infants with submucosal cleft palate [8,16]. Though not an anatomic closure the speech outcomes are similar to other techniques.

COMPlications

Complications of primary lip repair include post-operative bleeding, wound dehiscence, wound infection, feeding difficulties and respiratory tract infections. Common complications noted after cleft palate repair are velopharyngeal insufficiency and Oro nasal fistula with an incidence of ranging from 25 to 30% [17] and 8.7 to 23% [18] respectively.

FOLLOW UP

Velopharyngeal insufficiency after cleft palate repair is common and these children should be under follow up and require speech evaluation and speech therapy to have optimum function.

REFERENCES


