

Cleft Palate: Clinical Experience on Various Modalities of Palatoplasty at our Centre

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Abstract

Introduction Cleft lip and palate is the 4th most common congenital malformation and the most common craniofacial anomaly. There is wide ethnic and gender variation of this anomaly along with syndromic association in some. A multidisciplinary approach is required for its treatment involving otolaryngologists, oral maxillofacial surgeons, plastic surgeons, paediatricians, speech pathologists, audiologists, social workers, geneticists, and psychologists.

Method A retrospective study was done from 1st January 2022 to 31st May 2023. 32 patients operated for cleft palate at our institution in department of burns and plastic surgery. Study includes comparison of outcome of different surgical techniques of cleft palate repair which includes von langenbeck technique, Veau-Wardil-Kilner pushback technique, Bardach's two flap palatoplasty, intravelarveloplasty.

Results Among 32 patients who underwent repair of cleft palate, 13 underwent VWK Palatoplasty, 9 underwent Von langenbeck, 8 underwent Bardach two flap palatoplasty & two patients with Intravelar palatoplasty. Complications were noted in terms as fever, hanging palate, necrosis of palatal flap & intra operative bleeding as early complication & palatal fistula as late complication.

Conclusion Cleft palate surgery has seen major refinements over the past 20-30 years. The attempt to create a normal anatomy has improved the overall outcome of surgery. The current trend of early palate repair, early assessment with improved instrumentation, early evaluation of velopharyngeal function and the development of procedures for achieving better bony alignment should result in more predictable end results in terms of speech and maxillofacial growth following cleft palate repair.

Keywords

1. Cleft palate
2. Palate repair
3. Palatal fistula

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Introduction

A mummy in Egypt with cleft palate and Franco knowing hypernasal speech is due to cleft in palate is evidence that the problem of cleft palate was known long back but the surgical soft palate closure was first described by von Graefe in 1816 and Roux in 1819 and hard palate by Dieffenbach(1828,1845).

After trisomy 21 orofacial cleft are one of the most common congenital anomalies. Orofacial clefts being cleft lip with or without cleft palate (CL/P) or isolated cleft palate (CP), differ epidemiologically and etiologically. (Carinci F, 2003) (L., 2005) (Mossey PA, 2009)

Cleft lip and palate is the 4th most common congenital malformation and the most common craniofacial anomaly. There is wide ethnic and gender variation of this anomaly along with syndromic association in some.

A multidisciplinary approach is required for its treatment involving otolaryngologists, oral maxillofacial surgeons, plastic surgeons, pediatricians, speech pathologists, audiologists, social workers, geneticists, and psychologists (Marazita ML, 2004). The surgeon must be well versed with the anatomy and its distortion to choose appropriate surgery from the entire gamut of surgeries

available for cleft palate repair with the goal of re-establishing velopharyngeal apparatus for smooth speech and swallowing as well as improving aesthetic and facial symmetry.

This review has the objective of enumerating our clinical experience in past one and half year of various surgeries performed in our centre.

Materials and methods

A retrospective study was done from 1st January 2022 to 31st May 2023. 32 patients operated for cleft palate at our institution in department of burns and plastic surgery were included to determine the

outcome of various cleft palate surgeries. Study includes comparison of outcome of different surgical techniques of cleft palate repair which includes von Langenbeck technique, Veau-Wardil-Kilner pushback technique, Bardach's two flap palatoplasty, intravelarveloplasty. Demographic data and details of examination and follow up were collected from records. Consent regarding the use of details and photographs were obtained from patients and study was approved by ethical committee of our institute. All patients were divided into four groups according to veau classification

Veau 1 – defects of the soft palate only

Veau 2- defects involving the hard and soft palate

Veau 3- defects involving the soft palate to the alveolus usually involving the lip

Veau 4 - complete bilateral clefts

Inclusion criteria:

- 1) Age group between 1 to 7 years
- 2) All patients having cleft palate with or without cleft lip
- 3) Patient who are medically fit for surgery

Exclusion criteria:

- 1) Patients having age less than 1 year and more than 7 years
- 2) Patient having respiratory infections and serum haemoglobin less than 10 mg%
- 3) Patients not fit for surgery

Aim:

To evaluate the outcome of different techniques of cleft palate repair

Objectives:

To evaluate the intra operative time, post operative complication and outcome of different surgical

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techniques

Ethical clearance:

Ethical clearance of this study has been achieved by institutional ethical committee.

Type of surgical technique used in patients depends on group to which patient belongs. For group 1 – intravelarveloplasty, group 2,3 – von Langenbeck, vwk and group 4- Bardach's two flap palatoplasty were performed. After preoperative work up and anaesthetic check-up patients were planned for surgery.

Surgical techniques:

1) Von Langenbeck technique:

In 1861, Bernard von Langenbeck described a method of palatoplasty using mucoperiosteal flaps for the repair of the hard palate region. He maintained the anterior attachment of the mucoperiosteal flap to the alveolar margin to make it a bipedicle flap. (AF., 1987) Originally only the cleft edges were incised, a lateral incision was made, the flap was elevated from the hard palate, the palatine musculature was divided and finally the sutures were applied. This technique is still used in isolated cleft palate repair. The muscle dissection and muscle suturing are done as additional procedures to create a muscle sling.

2) Veau-Wardill-Kilner Palatoplasty: Cleft Palate: Clinical Experience on Various Modalities of Palatoplasty at our Centre Till a few years back this procedure was the commonest technique of palatoplasty. In this technique V-Y procedure is performed so that the whole mucoperiosteal flap and the soft palate are retroposed and the palate is lengthened. However, it leaves an extensive raw area anteriorly and laterally along the alveolar margin with exposed bare membranous bone. The raw area heals with secondary intention. This causes shortening of the palate and results in velopharyngeal incompetence. The raw area adjacent to the alveolar margin also results in alveolar arch deformity and dental malalignment.

To increase the lengthening of the soft palate George Dorrance advocated horizontal back-cut in the nasal lining at the junction of hard and soft palate. This leaves a large raw area on the nasal surface which is left open. This may contract after healing with secondary intention and may undo the palatal lengthening. Since there is single-layer repair in the region of the back-cut, the incidence of palatal fistula is high. Because of these drawbacks pushback and V-Y techniques have fallen into disrepute and now less and less centres practise this technique.

Bardach Two-flap Palatoplasty:

This is a modification of the von Langenbeck technique in which the incision is made along the cleft margin and the alveolar margin. These are joined anteriorly to free the mucoperiosteal flaps. These flaps are based on the greater palatine vessels. The soft plate is repaired in a straight line. The levatorpalati muscle dissection and reconstruction of the muscle sling is performed as in intravelarveloplasty. This is a technique commonly followed presently.

3) Intravelar Veloplasty

In 1968 Braithwaite first described the dissection of the Levator Palati from the posterior border of the hard palate, nasal and oral mucosa and posterior repositioning. He described independent suturing of the muscle with that of the opposite side for the reconstruction of the Levator sling. Since then intravelarveloplasty has evolved considerably and many surgeons have modified the surgical details to achieve better anatomical muscle sling reconstruction. Sommerlad advocates radical muscle dissection under a microscope. Sommerlad dissects the levator palate belly separately and sutures independently as the Levator is the dominant muscle for elevation of the soft palate during speech. (Sommerlad BC, 2003) Court Cutting transects the Tensor Palati and to keep its function intact, the cut end is transfixed with the hook of the hamulus. (. Cutting C, 1995)

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During various meetings the discussion on “how much muscle dissection is optimum” remains inconclusive. The majority of the surgeons dissect the muscle but the extent varies. Probably, the end result remains the same.

Postoperative protocol

Patient was allowed clear liquid after sieving after 6 hours from surgery. Patient kept on any liquid for 1 month after sieving followed by intake of clear water. Hot and spicy fluids were strictly prohibited. Patient discharged on day 7 to day 9 with weekly follow up for a month. Speech therapy and soft diet started after 1 month.

Result

Among 32 patients who underwent repair of cleft palate, 13 underwent VWK Palatoplasty, 9 underwent Von langenbeck, 8 underwent Bardach two flap palatoplasty & two patients with Intravelarpalatoplasty.

The participants were between 1 - 7 year of age with mean age of 2.4 years. 24 patients (75 %) were diagnosed to have “Incomplete cleft palate”, who were classified into VEAU II cleft. 8 patients had “complete cleft palate” involving both hard and soft palate and were grouped into VEAU III cleft which was 25 %. In our study there were 20 female which 62.5 % of total and 12 male which is 37.5%. (Table 1)

Complications were noted in terms as fever, hanging palate, necrosis of palatal flap & intra operative bleeding as early complication & palatal fistula as late complication. (Table 2)

One patient with VEAU III cleft who underwent bardach two flap palatoplasty(12.5 % of those undergoing bardach’s palatoplasty and 3% of total palatoplasty) had anterior detachment of palatal mucoperiosteal flaps which was noticed at post operative day 2, but there was no other complication like fever, operative site bleeding or fistula formation.

S. No.	Age (years)	Sex	Diagnosis (Veau)	Procedure
1	3	Female	II	VWK palatoplasty
2	1	Male	II	Intravelarveloplasty
3	2	Male	II	VWK palatoplasty
4	3	Female	II	VWK palatoplasty
5	2	Male	II	Intravelarveloplasty
6	2	Female	II	VWK palatoplasty
7	3	Male	III	Bardach two flap
8	3	Female	II	VWK palatoplasty
9	2	Female	III	Bardach two flap
10	2	Male	II	Von langenbeck

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Table 1: Demographic Data, Diagnosis and Procedure performed

11	3	Male	II	Intravelarveloplasty
12	1	Female	II	VWK palatoplasty
13	3	Female	III	Bardach two flap
14	2	Female	III	Bardach two flap
15	1	Female	II	VWK palatoplasty
16	1	Female	II	Von langenbeck
17	2	Male	II	VWK palatoplasty
18	3	Female	II	VWK palatoplasty
19	5	Female	II	Von langenbeck
20	4	Female	II	Von langenbeck
21	3	Male	II	Von langenbeck
22	7	Female	II	VWK Palatoplasty
23	3	Male	II	VWK palatoplasty
24	3	Female	II	Von langenbeck
25	1	Male	II	Von langenbeck
26	1	Male	III	Bardach two flap
27	4	Male	III	Bardach two flap
28	2	Female	II	VWK palatoplasty
29	1	Female	III	Bardach two flap
30	2	Female	III	Bardach two flap
31	2	Female	II	VWK palatoplasty
32	3	Female	II	Von langenbeck

Four patients (12.5 %) developed fever within 24 hour of surgery two patients who underwent VWK Palatoplasty for VEAU II cleft palate (15.3%), one patient with VEAU III cleft palate who underwent Bardach two flap palatoplasty (12.5%)& one patient who underwent Von langenbeck for VEAU II cleft palate(11.1%).

One patient with left sided complete cleft palate flap who underwent Bardach two flap palatoplasty, ischemia were noted at post operative day two at peripheral non cleft margin over left mucoperiosteal flap & complete necrosis of left mucoperiosteal flap was noted at day 8. One patient with right sided complete cleft palate flap who underwent Bardach two flap palatoplasty,

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ischemia were noted at post operative three at peripheral non cleft margin over both mucoperiosteal flap & complete necrosis of left mucoperiosteal flap was noted at day 5. Both these patients developed nasal fistula at 10 weeks of follow up period which comprised 6% of total and 25 % of bardach's palatoplasty.

Discussion

Cleft palate leads to nasal regurgitation of solid and liquid feeds, causes speech difficulty, eustachian tube malfunction leading to frequent middle ear infection and ear discharge and lastly affects maxillary growth. Many surgical methods have been proposed for cleft palate repair. Adoption Fiof type of reconstruction for palatal closure depends upon the group of cleft palate and availability of local tissue. There are various methods of repair for soft and hard palate. In our study we included four such techniques of cleft palate repair:

1. Intravelarveloplasty
2. VWK palatoplasty

3. Von Langenbeckpalatoplasty

4. Bardach's 2 flap palatoplasty

Intravelarveloplasty for soft palate defect is simple option and results in good functional and cosmetic outcome. For cleft in soft and hard palate there are various methods two being von langenbeck and vwkpalatoplasty both of which are effective in closure of such defects. For bilateral or unilateral complete cleft palate. Bardach's 2 flap palatoplasty is a good option if performed meticulously taking care not to injure the palatine vessels. All such repair has the objectives of anatomical closure of the defect, creating an apparatus for development and production of normal speech and minimising the maxillary growth disturbances and dento-alveolar deformities.

Principles of palatoplasty:

1. Closure of the defect
2. Correction of the abnormal position of the muscles of the soft palate, especially levator palate
3. Reconstruction of the muscle sling



Fig. 1 Marking of Incision



Fig. 2 Separation of Oral & Nasal mucosa



Fig. 3 Closure of Nasal mucosa



Fig. 4 Closure of Oral Mucosa

Fig. 1- 4 Intraoperative images of VWK palatoplasty



Fig. 5 Marking of Incisional line



Fig. 6 Raising of Mucoperiosteal Flap & Closure of Nasal layer

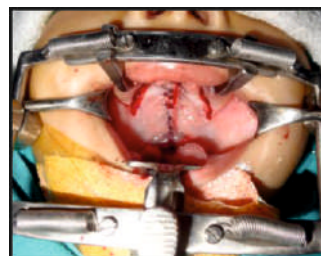


Fig. 7 Oral layer closed



Fig. 8 Anterior fixation with gingival mucosa

Fig. 5-8 Intraoperative images of Bardach's 2 flap palatoplasty

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1. Retro positioning of the soft palate so much so that during speech the posterior part of the soft palate come in contact with the posterior pharyngeal wall during speech.
2. Minimal or no raw area should be left on the nasal side or the oral surface.
3. Tension – free suturing.
4. Two layer closure in the hard palate region and a three layer closure of the soft palate.

In our study we are comparing the outcomes of these 4 methods of palatal repair in terms of complications like postoperative fever, fistula, haemorrhage, hanging palate and flap necrosis.

Common complications of any palate surgery are as follows:

Immediate complications

1. Haemorrhage
2. Respiratory obstruction
3. Hanging Palate
4. Dehiscence of the repair
5. Oronasal fistula formation

Late complications

1. Bifid uvula
2. Velopharyngeal Incompetence
3. Abnormal speech
4. Maxillary hypoplasia
5. Dental malpositioning and malalignment
6. Otitis media

We observed certain complications in our study like 12.5 % suffered from postoperative fever. There was no case who experienced postoperative haemorrhage. Two cases had flap necrosis (Fig.) which later formed oronasal fistula. The incidence

of oronasal fistula varies from less than 2% to over 40 % in various publications but we observed it to be around 6%. The site of oronasal fistula is most commonly the junction between hard and soft palate. Hanging palate was seen in one case of Bardach's palatoplasty which is not an uncommon finding.

Conclusion

Cleft palate surgery has seen major refinements over the past 20-30 years. The attempt to create a normal anatomy has improved the overall outcome of surgery. The current trend of early palate repair, early assessment with improved instrumentation, early evaluation of velopharyngeal function and the development of procedures for achieving better bony alignment should result in more predictable end results in terms of speech and maxillofacial growth following cleft palate repair.



Fig. 9 Flap Necrosis



Fig. 10 Hanging Palate

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Fig.11 Palatal Fistula

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