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Original Article

Comparison of Von Langenbeck and Bardach Palatoplasty Techniques for cleft palate repair

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Abstract

Background: Palate repair surgeries are being performed in Bangladesh as well as in whole world by different techniques. The study was done to compare early complications of Von Langenbeck and Bardach Palatoplasty techniques.

Methods and materials: This prospective observational study was conducted with the Patients admitted with cleft palate with or without cleft lip into Department of Plastic Surgery, DMCH. A total of 60 patients were selected according to inclusion and exclusion criteria. Thirty patients were included in Group I who were underwent Von Langenbeck palatoplasty. Another Thirty patients were included in Group II and they underwent Bardach palatoplasty. P value was significant at <0.05.

Results: Majority of respondents belonged to age group 7-12 months and 13-18 months. The mean age was 13.1±4.51 (SD) in Group I and 12.6±4.58 (SD) Group II with female dominance. No statistical significance was noted in age, sex, and other demographic features between two groups. Postoperative hemorrhage (16.7% vs 20%), wound infection (16.7% vs 10%) and wound dehiscence (10% vs 6.7%) was statistically insignificant between two groups (p>0.05). Only 10% in Group I and 6.7% in Group II experienced post-operative fistula formation without statistical significance (p>0.05). No statistical significance was noted between two Groups according to age range.

Conclusion: This study found no difference between Von Langenbeck and Bardach technique of palatoplasty in relation to early complication. However further long follow up study is recommended to validate this findings.

Keywords: Palatoplasty, Von Langenbeck technique, Bardach technique, cleft palate.

Introduction

Cleft palate is a common congenital malformation which has significant functional and aesthetic implication for patients in their social interactions, particularly on their ability to communicate effectively and on their facial appearance. Cleft palate can cause problems such as feeding difficulties, speaking disability and the possibility of impair facial growth.

In Bangladesh congenital anomalies like cleft deformities are common and found in all age groups, a small percentage of population has access to treatment .Cleft patients have to go through tough times throughout their life unless and until managed by adequate multidisciplinary team. There is some superstition in our population and mothers are blamed for their cleft baby. A child born with cleft lip and palate considered as unfortunate but now a days the concept about cleft is changed among parents because surgical repair of palate has reached a satisfactory level. The surgery differs from center to center and surgeon to surgeon. The ideal surgical technique for management of a congenital palate continues to be a source of controversy (Fisher and Sommerlad, 2011).

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In early 19th century first known cleft palate surgery was done .Over the years multiple technique for the repair of congenital cleft palate has been proposed. The Von Langenbeck procedure is the oldest cleft palate operation still widely use, introduced by Von Langenbeck in 1859. Von Langenbeck is performed by elevation and approximation of bipedicled flaps along the midline to repair the cleft palate. In 1967, Polish surgeon Janusz Bardach and Salyer first described a two-flap Palatoplasty technique for cleft closure. The two flap technique is a modification of the Von Langenbeck procedure in each flap the incision made along the cleft margin joins the lateral relaxing incision at the alveolar margin anteriorly. Objectives of palatoplasty are largely functional in nature.The purpose of study was to compare early postoperative complications in cleft palate repair by Von Langenbeck technique and Bardach technique and find out which technique will ensure the most functional outcome.

Materials and Methods:

This is a Prospective Comparative Study, take place in Comprehensive cleft care ward, Department of Plastic Surgery, Dhaka Medical College& Hospital, Dhaka. Patient with cleft palate with or without cleft lip, age below 2 years admitted in Department of Plastic surgery, DMCH from 1 February 2018 to 30 December 2019.Sample size was 60 (sixty) cases. Sampling method was purposive sampling.Samples were selected from patients who admitted in Department of plastic Surgery, DMCH guided by some inclusion and exclusion criteria. First patient took part in lottery and choose one group (I or II, I=Von Langenbeck technique, II=Bardach technique), rest were selected at a fixed interval. Thirty patients were included in group I and underwent Von langenbeck palatoplasty other thirty patients were included in group II and underwent Bardach palatoplaty. Patients were evaluated clinically.

Operation procedure

All operation done under general anesthesia at cleft operation theater. Digital camera used for photography and loupe for magnification. Position of the patient was supine with neck extended, a head ring under the occiput helped to stabilize the head, placement of Sommerlad's mouth gag or Dingman for cleft exposure. The tissue of soft and hard palate infiltrated with lignocaine with epinephrine, the infiltration expands the soft palate tissues, facilitates tissue dissection, minimizes blood loss, and diminishes the amount of the agent administered for general anesthesia.

Steps of Von Langenbeck palatoplasty: Two lateral releasing incision just medial to the alveolar ridge ending just posterior to the maxillary tuberosity. The midline incision follows the cleft margin at the junction of the oral and nasal mucosa which is then separated to form two leaflets. The bilateral mucoperiosteal flaps are undermined and elevated off the intervening palatal bone between the two incisions by creating two bipedicled flaps based off the greater palatine vessels posteriorly and the sphenopalatine arteries emanating from the incisive foramen anteriorly. Nasal closure is achieved first. Followed by medialization of the bipedicles flaps to close the oral side in the midline. The lateral relaxing incision are left to heal by secondary intention**.**

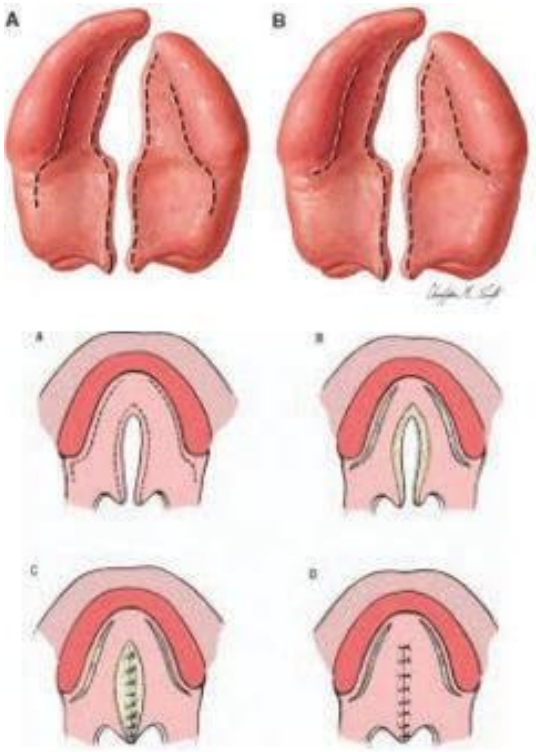


Fig.-1: *Von Langenbeck technique of palatoplasty*

(Chung, kevin C., 2020, Grabb and Smith's plastic surgery, eight edition, vol.1, pp233)

Steps of Bardach palatoplasty: The lateral releasing incision is extending around alveolar margin in continuous fashion into the cleft margin. The mucoperichondrial flaps are extensively undermined to the level of the posterior hard palate. The greater palatine neurovascular bundles are identified and circumferentially dissected for additional mobilization of the mucoperiosteal flap. Muscle dissection from the posterior edge of hard palate, retro position the muscle fibers in the soft palate to create a functional muscle sling, closure of nasal layer, closure of oral layer.

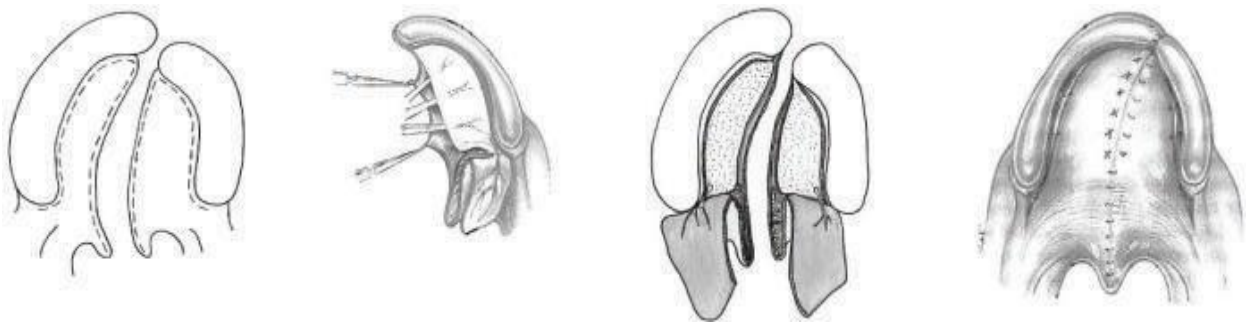


Fig.-2: *Bardach palatoplasty*

(Bardach, J 1995,'Two-Flap palatoplasty:Bardach's technique', vol.2, pp211)

Post- operative care & monitoring

Airway monitoring is particularly important, narrowing of the valopharygeal gap, postsurgical tissue swelling in the soft palate, intrapalatel hematoma, nasal block due to a blood clot and additional bleeding, even if it minimal, collectively result in respiratory obstruction. Position in left lateral, pulse oximetry is needed. Avoidance of over sedation. Analgesia combination of nonnarcotic and narcotic analgesia. Antibiotic according to hospital protocol. Liquid diet is begun shortly postoperatively as the child regains full consciousness. No hard objects should be inside the mouth. Plain clear water after each feed. Management of complication. According to nature of complications action was taken. Follow up of the patient upto three month.

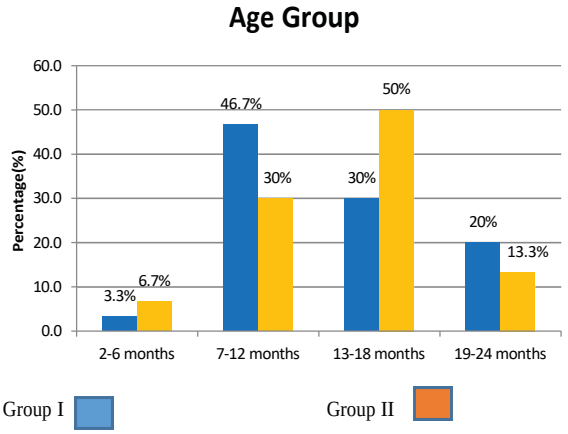


Fig 3: *Age distribution between two groups (N=60)*

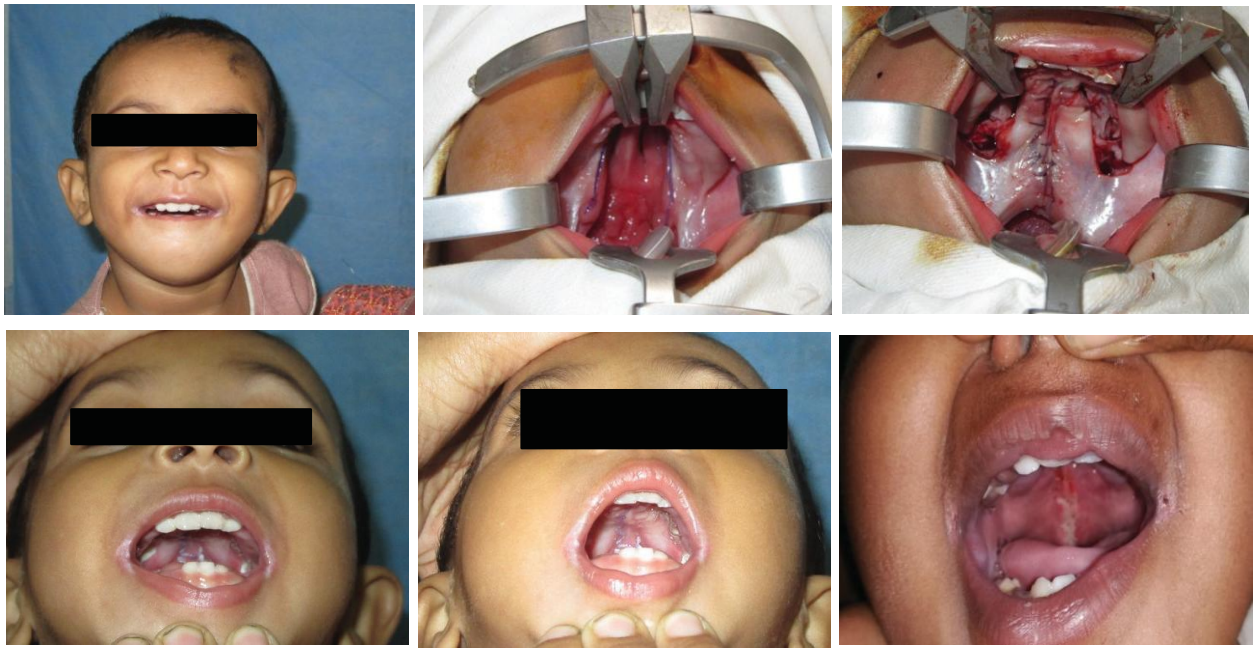
Results

Table 1. *Distribution of respondents by presence of post-operative early complication in two groups (N=60)*

Presence of Postoperative complication	Group I(n=30) No.(%)	Group II(n=30) No.(%)	P value	Total (N=60)
Hemorrhage	5(16.7%)	6(20%)	0.414^{ns}	18.3%
Wound infection	5(16.7%)	3(10%)	0.414^{ns}	13.4%
Wound dehiscence	3(10%)	2(6.7%)	0.407^{ns}	8.35%
Fistula formation	3(10%)	2(6.7%)	0.407^{ns}	8.35%
Total	30(100%)	30(100%)		100%

Figures in the parentheses indicate corresponding percentage
Chi-squared Test (χ^2) was done to analyze the data.
ns = not significant
Group I: Patients who underwent Von langenbeck palatoplasty
Group II: Patients who underwent Bardach palatoplasty

Group I -Von Langenback technique of palatoplasty, immediate post-operative & follow up photograph



Group II - Bardach Technique of palatoplasty, immediate post-operative & follow up photograph

Discussion:

This prospective observational study was done among 60 patients admitted in Department of Plastic Surgery, Dhaka Medical College Hospital having complete or incomplete cleft palate to compare post-operative complication in cleft palate repair by Von Langenbeck technique and Bardach technique. In this study Group I patients who did Von langenbeck palatoplasty and Group II patients who did Bardach palatoplasty.

There were no significant differences between the two groups of patients regarding age. Here the p value was 0.416^{ns}. Highest percentage of patients in group

I belonged to 7-12 months (46.7%) and in group II 50% belonged to 13-18 months. Among total population, majority respondents belonged to age group 7-12 months and 13-18 months. The mean age was 13.1±4.51months (SD) in group I and 12.6±4.58 months (SD) group II. In Karoon Agrawal study, he also found that, that palatoplasty (soft palate at least) should be performed between 6-12 months of age which was similar with our study result (Agrawal, 2009). According to Chan et al study, they also found that von langenbeck palatoplasty and Bardach palatoplasty was most commonly done 7-19 months age group of child (Chan *et al.*, 2014). Age at presentation is important for a good surgical outcome and also flashes the picture of social awareness whether the child has appeared in hospital at proper age. Late presentation related to lack of knowledge about treatment options, poverty, ignorance, and inadequate referral system. Palate repair after 12 years is reported to be of minimal benefit (Sell, 1990). Speech pathologist recommend palate closure at early age as early as possible. But against this very early approach, there are important reasons for delay, there is great difficulty in surgical repair due to small size of the oral cavity, greater likelihood of post-operative airway obstruction, small blood volume in infant and greater wide of the cleft. It is a reasonable compromise to for repair to be planned at 14-16 months of age.

According to this study, no statistical difference was found in gender between two groups. Female respondents were predominant in both groups (56% and 70% in respectively). Among total study population 63% respondents were female. In Annigeri et al study,

statistical difference was found in gender among various type palatoplasty group which corresponds with our study result (Annigeri *et al.*, 2012). In our study, According to this study result, Majority respondents had no family history in both groups (80% and 53.3% respectively). Among total study population 66.7% respondent had no family history of cleft palate. In Krost et al study, they also found that in different pattern of palatoplasty group there was no significant difference had found which corresponds with our study result (Krost and Schubert, 2006).

In this study, no statistical difference was found in between two groups about postoperative hemorrhage, wound infection, wound dehiscence. Majority respondents had no history of postoperative hemorrhage in both groups (80% and 83.3% respectively). Majority respondents had no history of post - operative wound infection in both groups (70% and 66.7% respectively). Majority respondents had no history of post-operative wound dehiscence in both groups (73.3% and 93.3% respectively). According to dubey et al study, they also found there were no difference had found about post- operative outcome like hemorrhage, wound dehiscence and wound infection in von langenbeck palatoplasty and Bardach palatoplasty. Moreover, Majority respondents had no history of post - operative fistula formation in both groups (90% and 93.3% respectively). Among total study population 91.65% respondent had no history of post - operative fistula formation. According to Jen o Hirschberg study the most frequent complications are postoperative bleeding, airway obstruction, fistula formation. They observed among 1104 surgeries serious hemorrhage in 5 cases, aspiration in 2 cases, transfusion was necessary in 5 cases. Surgical complications happen mostly at flap surgeries which need larger incision and mobilization. Consequences of the augmentation technique are minimal (Robb, 2012). Jennifer L. Rhodes and David Alan Staffenberg study, they also found early complications of cleft lip and palate repair including bleeding, respiratory obstruction, wound infection, and dehiscence and which corresponds with this study result (Rhodes and Staffenberg, 2009). In D.Larossa's study, they found that 1st resort to undermining and often relaxing incision to accomplish these goal. Minimal exposure of palate bone as with von Langenbeck, bipedical-relaxing incisions, and the two-flap palatoplasty theoretically has less potential to adversely affect maxillary growth as compared with "push-back" procedures (La Rossa, 2000). Janusz Bardach study he also found that majority of cases, it is possible to close gaps or to approximate the margins to facilitate healing in the area (Bardach, 1995). In Seung min num study they found that there was no significant result had found in von langenbeck palatoplasty and Bardach palatoplasty. Moreover, the selection of surgical treatment for did not found any significant outcome difference between von langenbeck palatoplasty and Bardach palatoplasty (Téblick *et al.*, 2019).

Conclusion:

This study found no difference between Von Langenbeck and Bardach technique of palatoplasty in relation to early complication regarding cleft palate repair.

Conflict of interest statement: None declared

Ethical approval: Ethical committee of Dhaka Medical College

Consent: Informed written consent was obtained from parents

Clinical photography permission: Obtained from parents

References

1. Agrawal, K 2009, 'Cleft palate repair and variations', Indian Journal of Plastic Surgery, vol. 42, no. 1, pp. 102–9.
2. Bardach, J 1995, 'Two-Flap palatoplasty: Bardach's technique', Operative Techniques in Plastic and Reconstructive Surgery, vol. 2, no. 4, pp. 211–4.
3. Fisher, DM & Sommerlad, BC 2011, 'Cleft lip, cleft palate, and velopharyngeal insufficiency', Plastic and Reconstructive Surgery, vol. 128, no. 4, pp. 342–60.
4. Koudoumnakis, E, Vlastos, IM, Parpounas, K & Houlakis, M 2012, 'Two-flap palatoplasty: Description of the surgical technique and reporting of results at a single center', Ear, Nose and Throat Journal, vol. 91, no. 3, pp. 33–7.
5. Kumar, S, Gupta, R, Bansal, V, Mowar, A & Khare, G 2015, 'Comparative Evaluation of Modified Furlow Palatoplasty and Intravelar Veloplasty in Cleft Palate Repair', American Journal of Oral and Maxillofacial Surgery, vol. 2, no. 1, pp. 23–42.
6. Leow, AM & Lo, LJ 2008, 'Palatoplasty: Evolution and controversies', Chang Gung Medical Journal, vol. 31, no. 4, pp. 335–5.
7. Mossey, PA & Modell, B 2012, 'Epidemiology of oral clefts: an international perspective, in Cleft lip and palate', Front Oral Biology, vol. 16, no. 1, pp. 1–18.
8. R. Brusati, GC 2009, 'Complications in Cleft Lip and Palate Surgery', Complications in Head and Neck Surgery with CD Image Bank, vol. 14, no. 166–171, pp. 279–87.
9. Rhodes, JL & Staffenberg, DA 2009, *CHAPTER 25 Complications in Cleft Lip and Palate Surgery*. Second Edi, Complications in Head and Neck Surgery. Second Edi. Elsevier Inc.
10. Salyer, KE, Sng, KWE & Sperry, EE 2006, 'Two-flap palatoplasty: 20-Year experience and evolution of surgical technique', Plastic and Reconstructive Surgery, vol. 118, no. 1, pp. 193–204.
11. Téblick, S, Ruymaekers, M, Van de Casteele, E & Nadjmi, N 2019, 'Effect f Cleft Palate Closure Technique on Speech and Middle Ear Outcome: A Systematic Review', Journal of Oral and Maxillofacial Surgery. The American Association of Oral and Maxillofacial Surgeons, vol. 77, no. 2, pp. 405.e1-405.e15.
12. Thorne, CH, Chung, KC, Gosain, AK, Gurtner, GC, Mehrara, BJ, Rubin, JP & Spear, SL 2013, 'Grabb and Smith's plastic surgery: Seventh edition', Grabb and Smith's Plastic Surgery: Seventh Edition, pp. 1–1017.
13. Woo, AS 2017, 'Evidence-Based Medicine: Cleft Palate', Plastic and Reconstructive Surgery, vol. 139, no. 1, pp. 191–203.
14. Zreaqat, MH, Hassan, R & Hanoun, A 2017, 'Cleft Lip and Palate Management from Birth to Adulthood: An Overview', Insights into Various Aspects of Oral Health, vol. 1, no. 6, pp. 99–121.