

Continuous Versus Interrupted Sutures for Primary Cleft Palate Repair

Ghulam Qadir Fayyaz,
MBBS, MS, DSS*
Nauman Ahmad Gill,
MBBS, MRCS, FCPS (Plast)*
Iftikhar Alam, MBBS*
Ayesha Chaudary, MBBS, FCPS*
Muhammad Aslam,
MBBS, FCPS*
Irfan Ishaq, MBBS*
Abdul Hameed, MBBS,
FRCS, CRCS†
Ashraf Ganatra, MBBS, MS‡
Tahir Sheikh, MBBS, FRCS§
Muhammad Bilal, M. Phil
(Statistics)¶

Background: Cleft palate is a common congenital problem. It is traditionally surgically repaired with interrupted sutures between the ages of 6 and 18 months, with the aim of achieving closure of both nasal and oral layers. In various fields of surgery, continuous, rather than interrupted, sutures are the norm. There are no reports, however, of continuous suture repair for cleft palate.

Methods: A comparative study was designed at Clapp Hospital Lahore, to compare the effectiveness of 2 techniques. A total of 152 patients were included in the study over a period of 3 years. Per-operatively, the duration of surgery (time for nasal and oral layer closure) and the number of suture materials used were noted and compared between the 2 groups. Postoperatively, we compared the rate of wound dehiscence and fistula formation between the 2 groups.

Results: Out of 152 patients, 84 patients were operated on by continuous technique and 68 patients by interrupted technique. The mean duration of nasal layer closure in group A was 7.08 minutes, whereas that in group B was 11.50 minutes. The mean number of sutures required for the continuous suture group was 2.12, whereas that for the interrupted suture group was 4.59 ($P < 0.05$). There were no differences seen in either of the 2 postoperative outcomes compared in this study.

Conclusion: A continuous closure technique can be utilized in palate repair, as it is more cost-effective and time-efficient. (*Plast Reconstr Surg Glob Open* 2018;6:e2001; doi: 10.1097/GOX.0000000000002001; Published online 13 November 2018.)

INTRODUCTION

Cleft palate is one of the most commonly occurring congenital deformities.¹ Isolated cleft palate has an incidence of 0.45/1000 births, with no racial variation. The incidence of cleft lip and/or palate is 2.1/1000 in Asians, 1/1000 in whites and 0.41/1000 in blacks.² Consequences of a palatal cleft are feeding difficulties, hearing problems, dental abnormalities, and speech problems.³ Cleft palate is ideally repaired between the ages of 6 and 12 months, to ensure optimal speech development in a child.⁴ The primary goals of cleft palate repair are separation of the nasal and oral cavity and anatomic transverse alignment of the levator muscle sling. This helps establish a normal velopharyngeal mechanism and optimize facial growth.⁵ The surgical treatment of cleft palate depends on the type of cleft, whether complete

or incomplete. Various well-established techniques are currently in use for cleft palate repair. These include the von Langenbeck and the Furlow's double-opposing Z-plasty for incomplete cleft palates, and the Bardach's 2-flap palatoplasty for complete clefts.⁶ These techniques differ with respect to their incision sites, dissection methods and flap elevation techniques. In all techniques, however, closure of the nasal and oral layers of palate is achieved with simple, interrupted, absorbable sutures as a standard practice.

As in other surgical disciplines, various suture techniques are utilized in different plastic surgery procedures. One suturing technique frequently used especially in the face and neck region is a continuous or "running" suture. The advantage of the continuous suture over the interrupted suture is its efficiency and cost-effectiveness. It generally requires less time and less suture material to close a wound of the same length when continuous rather than interrupted suture is applied.^{7,8} On the downside, a continuous suture compromises vascularity to a greater degree than an interrupted suture,⁹ potentially increasing the risk of wound dehiscence. Given the robust vascular supply in the head and neck region generally, this particular disadvantage is of minor importance (Table 1).

From the *Services Institute of Medical Sciences, Lahore; †Sheikh Zayed Hospital, Lahore; ‡Dow University of Medical Sciences, Karachi; §Ziauddin University, Karachi; and ¶University of Veterinary and Animal Sciences, Lahore.

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Table 1. Comparison of Different Variables of Group A (Continuous Suture) and B (Interrupted Suture)

Variables	Group A (Continuous Suture)	Group B (Interrupted Suture)	P
Males respondent	45	36	
Females respondent	39	32	
Mean age	10.29±1.09	10.53±1.13	0.1863
Average duration of nasal layer closure	7.08±1.19	11.50±1.16	0.0001
Average duration of oral layer closure	10.82±1.33	19.23±1.48	0.0001
No. sutures utilized	2.12±0.33	4.59±0.49	0.0001
Fistula formation, n (%)	2 (2.38)	2 (2.94)	0.8307



Fig. 1. Right-sided complete unilateral cleft palate.

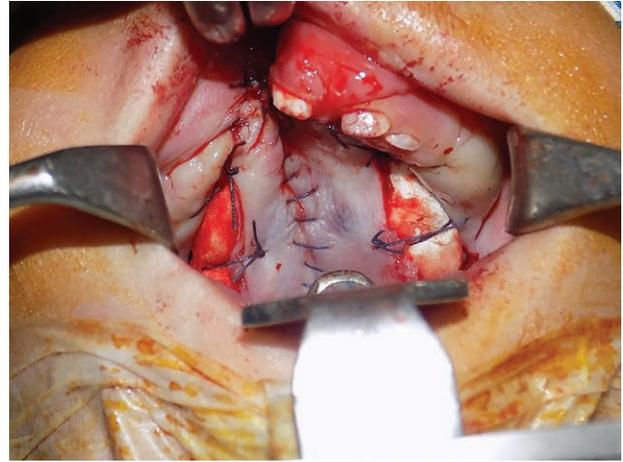


Fig. 2. Continuous suturing done for oral layer.

While continuous sutures are frequently applied to skin, there is as yet no report in the literature of achieving closure with continuous sutures in cleft palate repair. In the limited space of the oral cavity, suturing and knotting becomes particularly challenging. The ease of application of continuous sutures is a welcome option in these patients. The senior author (G.Q.F.) has been practicing continuous suture technique for nasal and oral layer closure over the last 12 years without any significant disadvantage as shown in Figures 1–4. Rather, he believes that it saves time and is cost-effective. To prove the effectiveness of continuous technique, we designed a comparative study of cleft palate repair with the 2 techniques.

The present study aims to compare interrupted versus continuous suture application for the closure of nasal and oral layers of palatal mucosa in terms of total time required for surgery, suture material required, postoperative wound dehiscence, and fistula formation. Based on these results, we intend to suggest that application of continuous sutures to oral and nasal layer of palate takes less time and is cost-effective without jeopardizing the outcomes of cleft palate repair.

MATERIALS AND METHODS

This study was conducted at the Department of Plastic & Reconstructive Surgery, Services Hospital Lahore and CLAPP Hospital Lahore, over a period of 3 years. After obtaining consent from institutional review board, all patients between the ages of 9 and 12 months who presented with a primary unilateral complete cleft palate between

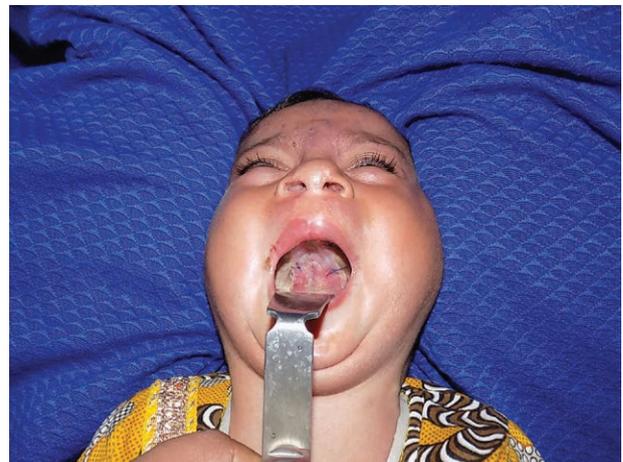


Fig. 3. Postoperative result at 10th day.

July 2014 and June 2017 were included in the study. The parents of the children were briefed about the study and consent for inclusion in the study was taken. Syndromic patients and patients with other comorbid conditions were not included. At the time of initial presentation, all demographics were recorded for each patient on a Performa, which was filed with the patient’s chart. Patients were randomly assigned to either group A (continuous suture) or group B (interrupted suture) by using Goldfish Lottery Method, and this was also documented on the Performa. All patients underwent Bardach 2-flap palatoplasty. For the pedicle, we performed radical dissection of the great-



Fig. 4. Postoperative result at 6 months.

er palatine artery in all cases.¹⁰ Levator muscle dissection and repositioning was carried out as a standard procedure. Patients in group A underwent closure of the nasal and oral layers of the palatal cleft by continuous suturing technique by the senior surgeon adept in this technique. Patients in group B underwent closure using standard interrupted sutures by another senior surgeon who routinely applies interrupted sutures for palate closure. Both the surgeons have more than 15 years of experience in cleft surgery. Identical suture material (polyglactin) of equal size and length of same brand was used in all patients. Nasal layer closure was performed with 5/0 polyglactin and while oral layer closure was performed with 4/0 polyglactin. During the surgery, the duration of suturing was noted, as the time taken to complete the nasal and oral layers of the palatal cleft. This was recorded in minutes with the help of a stopwatch. The time taken in dissection of the palatal flaps, the pedicle, and levators was not noted as it may take more time in some patients due to varied anatomy, difficulty in dissection, and sometimes more bleeding. At the conclusion of the surgery, the number of sutures utilized was noted. Both of these parameters (suturing time and number of sutures) were then documented on the Performa. Wound dehiscence and fistula formation were assessed during the postoperative stay and subsequent follow-up visits. Patients of both groups received same preoperative, per-operative, and postoperative care. The patients were followed up for a minimum period of 3 months.

All data were collected and analyzed using SPSS version 21.0. For quantitative variables, mean value was used. Comparison between the 2 groups was done using independent samples *t* test. A *P* value of <0.05 was taken as significant.

RESULTS

A total of 152 patients were included in the study. There were 75 males and 77 females. There were 84 patients in group A (continuous sutures) and 68 patients in group B (interrupted sutures). The mean age was 10.29 ± 1.09 months in group A and 10.53 ± 1.13 months

in group B. The mean duration of nasal layer closure in group A was 7.08 ± 1.19 minutes, whereas that in group B was 11.50 ± 1.16 minutes. The mean duration of oral layer closure was 10.82 ± 1.33 minutes in group A and 19.23 ± 1.48 minutes in group B. The mean overall duration of nasal and oral layer closure was 17.90 ± 2.09 minutes in group A and 30.73 ± 2.36 minutes in group B. On average, 2.12 ± 0.33 suture packets were used in group A and 4.59 ± 0.49 in group B.

Independent samples *t* test was applied to compare means of the 2 groups. The *P* value for outcome variables like time for nasal layer closure, oral layer closure, overall time, and number of sutures utilized was <0.05.

Regarding the complications, a total of 4 patients developed fistulae (2.63%), 2 in each group (2.38 in group A and 2.94 in group B). Chi-square test was applied for comparing proportion of 2 groups with reference to fistula formation. There was no incidence of palatal dehiscence, infection, or any other complication in rest of the patients. Average follow-up of the patients was 6 months (range, 3–15 months).

DISCUSSION

The management of a cleft palate patient contributes significantly to the healthcare burden in any region of the world, but more so in Pakistan, as the overall incidence of cleft lip with or without palate is higher in Asians.¹¹ The management of these patients encompasses all aspects of care, starting from prenatal diagnosis (where available) and continuing into adulthood for secondary procedures when required. However, the prime aspect of care of a cleft patient is the surgical repair of this deformity.

The results of this study demonstrate that a continuous suturing technique for the repair of cleft palates decreases the duration of suturing time and utilizes less suture material, as compared with an interrupted suturing technique. This is in accordance with previous studies that have demonstrated similar results at other surgical sites such as traumatic facial laceration⁷ and abdominal wall closure.¹² This is the first study of its kind done on cleft palates.

The importance of efficiently utilizing operating room (OR) time, for any procedure, cannot be over-emphasized. Per minute operating theater costs depend on various factors that include the country you are in, as resource costs vary from country to country; the complexity of the procedure being performed; whether the OR staff is being paid hourly or as a fixed pay; and so on. Various studies have estimated OR costs per minute. Raft et al.¹³ state that OR cost is €10.8 (USD, 11.52) per minute of time offered. Other studies quote somewhat higher figures, such as £16/min (USD, 20).¹⁴ These figures are slightly lower in our part of the world, owing to lower resource and labor costs. For instance, in India, a neighboring country of Pakistan, the per hour cost of providing OR services was calculated to be USD 419. This is approximately USD 7 per minute.¹⁵

Keeping the above figures in mind, every saved minute of OR time contributes substantially toward saving total OR costs. This is especially desirable in Pakistan, which is

a low-income country. Even though per minute OR costs are lower as compared with more developed countries, Pakistan also has significantly lower budgets allocated to health as compared with developed countries. Reduction in OR time means a greater number of patients can be accommodated in the given time, which means increase in cost-effectiveness of the procedure. Moreover, when the OR time is reduced, use of anesthetic gases and medicine is reduced accordingly, thus saving the cost considerably.

Some hospitals charge the OR services to the patient for half hourly or one hourly time schedule and if a palate repair is completed (by using continuous sutures) in 1 hour and 30 minutes, patient will pay for 1 hour and 30 minutes OR time only. But if we use interrupted sutures for the same patient, time taken will be at least 13 minutes more so the patient may be charged for 2 hours as per hospital OR cost policy.

The other parameter that shows a significant difference between the 2 groups is the amount of suture material utilized for closure. On average, 2.12 sutures were used for the continuous suture group, whereas 4.59 sutures were used for the interrupted group. This demonstrates that a continuous suturing technique utilizes half the amount of suture material as compared with interrupted suturing technique. This again contributes to saving on cost of surgery and in decreasing the overall burden on the healthcare system.

The concern of giving away (dehiscence of whole of the palate in case of continuous technique) is very natural and pertinent. In practical, that does not happen. At the very beginning of this continuous suturing technique, the senior author used to apply 2 interrupted sutures because of the fear of dehiscence. Later, we found out that use of only continuous suture does not lead to any additional risk of dehiscence. Nevertheless, we recommend any surgeon to apply 1 or 2 interrupted sutures in the soft palate area for additional support. In the present study, we also studied the incidence of dehiscence and fistula and compared the results between the 2 groups. The overall rate of fistula formation in the whole study population was 2.63%. It is almost equal in both groups and is also comparable with rates of fistula formation reported at other centers.¹⁶ However, there are a few limitations of this study. Only 1 type of palate has been studied. The results might show significant differences if soft palate or bilateral complete cleft palate had been included. Similarly, a very narrow age group has been included. Although, bias has been minimized but quite a significant number of patients do present with other varieties of cleft palate and with varying ages. The authors recommend further studies on other varieties of cleft palate and different age groups so as to further increase the trust on continuous suturing in palate surgery.

CONCLUSIONS

Continuous sutures for repair of cleft palate utilize less OR time and suture material as compared with interrupted sutures. Continuous sutures are therefore more efficient and cost-effective, with no increase in the risk of postoperative complications. We recommend that continuous suturing be used as a standard procedure for cleft palate repairs.

Ghulam Qadir Fayyaz, MBBS, MS, DSS
Department of Plastic Surgery
Services Institute of Medical Sciences
Ghaus ul Azam Road, Lahore
Pakistan 56400
Email: gqfayyaz@hotmail.com

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