TIME OF REPAIR AND ROLE OF SUTURES IN WOUND DEHISCENCE FOLLOWING CLEFT PALATE SURGERIES - A SINGLE CENTRE EXPERIENCE

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ABSTRACT

Cleft palate repair like any other surgical procedure is not without complications. Among various factors, the role of sutures are not explicitly studied despite the clear mention that sutures are a nidus of infection. The aim of this study was to determine if there is a relationship between wound dehiscence and timing of surgery and number of sutures used for closure. A study with retrospective cohort design was undertaken in our institution. The study period was June 2019 to March 2020. All casesheets pertaining to primary and secondary cleft palate repair were reviewed and incidences of wound dehiscence were identified. Among the 42 patients, 88% (37) were primary palatal repair out of which one case (2.38%) of wound dehiscence was reported and 11.9% (5) cases were secondary repair and two cases (4.76%) of wound dehiscence were reported (p value- 0.002). Wound breakdown was seen in patients for whom 3 to 4 suture material was used. A guarded conclusion made from this study is that delayed primary surgery, secondary palatal repair and the use of more number of sutures influence the occurrence of wound dehiscence following cleft palate surgery. However, the presence of various confounding factors such as patient feeding habits, compliance to oral hygiene instructions, post operative wound care, anatomy of cleft, type of repair done, have not been thoroughly evaluated in this study and hence further prospective studies can be designed with larger sample size to evaluate the long term effects of type and number, technique of suturing on the incidences of wound dehiscence and thereby palatal fistula formation, taking into account the shortcomings of this study.

KEYWORDS: Sutures; Suturing Technique; Cleft Palate Repair; Palatal Fistula; Wound Dehiscence

1. INTRODUCTION

Cleft palate is the most common congenital craniofacial defect which requires a complex multidisciplinary team for its management including maxillofacial surgeons, cleft and craniofacial surgeons, plastic surgeons, otolaryngologists, speech/language therapists, audiologists, pediatricians, pediatric dentists, orthodontists, psychologists, geneticists and nursing co-ordinators (Zhang et al., 2017). Surgical protocol, timing of repair, surgical technique, perioperative and postoperative management of cleft palate patients vary from center to center.

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center. The extent of palatal defect and certain individual case variations along with differences in surgical management, advocates a need for an ideal approach for management of cleft palate on a case to case basis (Katzel et al., 2009).

The techniques used for cleft palate repair vary depending upon multiple variables which are both patient and surgical team associated such as the anatomical extent of defect, type of training received by the cleft surgeon, experience of the surgical team in dealing with complicated cleft cases, type of surgical setup, etc (Agrawal, 2009). The primary aim of all surgical techniques known for cleft palatal repair is to ultimately achieve closure of nasal and oral layers of the palate using simple or interrupted absorbable sutures.

As in other surgical specialities, different sutures and suturing techniques are frequently used in the maxillofacial region (Esterberg, 1941; Siervo, 2008; Fujita, 2010; Shirol, 2016; Kim, 2019; Raghavan et al., 2020). For the repair of cleft palate interrupted suturing technique or continuous suturing technique has been advocated for closure (Fayyaz et al., 2018; Kim, Hwang and Yun, 2020; Preidl, Kesting and Rau, 2020). Previously our team has a rich experience in working on various research projects across multiple disciplines (Neelakantan et al., 2015; Ramamoorthi, Nivedhitha and Divyanand, 2015; Abdul Wahab et al., 2017; Eapen, Baig and Avinash, 2017; Manivannan et al., 2017; Patil et al., 2017; Ezhilarasu, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; Ravindiran and Praveenkumar, 2018; Wahab et al., 2018; Malli Sureshbabu et al., 2019; Mehta et al., 2019; Rajeshkumar et al., 2019; Samuel, Acharya and Rao, 2020; Sathish and Karthick, 2020).

The influence of the total number of sutures used for cleft palate repair has no documentation in the existing literature. It was hypothesized that if more sutures are being used, they can get infected and further lead to wound breakdown after cleft palate repair in both primary and secondary cases. The aim of this study was to determine if there is a relationship between wound dehiscence and number of sutures used for cleft palate repair in both primary and secondary surgeries along with the timing and type of surgery.

II. MATERIALS AND METHODS

A retrospective study was conducted in our cleft and craniofacial institute over a period of ten months from June 2019 to March 2020. All patients between the ages of 1 year to 20 years who were undergoing primary and secondary cleft palate repair were included in the study. Institutional ethical committee clearance was obtained for retrospective data retrieval and usage as needed for the study (SDC/SIHEC/2020/DIASDATA/0619-0320).

Demographic details such as name, age, sex, and patient identification number were recorded along with the type of sutures used, number of sutures used and type of cleft palate repair being done i.e, primary or secondary. Incidences of wound breakdown after primary and second palatal repair were also identified. The collected data was analysed using SPSS software version 20. Chi square test was used and p-value of <0.05 was taken as statistically significant.

III. RESULTS AND DISCUSSION

A total of 42 patients undergoing cleft palate repair were included in the study. Out of 37 patients for primary repair 16 patients had complete cleft palate and 21 had incomplete cleft palate during the primary repair stage. 5 patients in whom secondary repair was done, the palatal fistula were those that required local flap (n=1) and redo complete palatal surgery (n=4). Grouping of patients ideally requires categorization based on the anatomy of the cleft palate, which has an influence on the number of sutures, however, due to less sample size, pooled sampling was done based on age and type of surgical repair for the present study. In all patients undergoing primary and secondary palatal repair polyglactin sutures of the same brand and length were used (VICRYL© ⅜ circle cutting needle, 45cm). All surgeries were performed by the same surgeon and surgical team using the same surgical technique. In all our patients, the techniques used for primary cleft palate repair were Bardach two flap palatoplasty for complete cleft palate and Langenbeck palatoplasty for all incomplete cleft palate and secondary palatal repair cases. Closure was done using interrupted suturing technique.

There were equal number of male and female patients, 21 patients in each gender and the distribution of primary and secondary palatal repair were almost equal with 45.2% female (n=19) patients and 42.8% male (n=18) patients treated for primary palatal repair and 7.1% male (n=3) patients and 4.7% female (n=2) patients treated for secondary palatal repair. (Figure 1).
Age wise treatment distribution of patients shows that the number of patients undergoing primary repair was more in the younger age group, less than 5 years (54.76%, n= 23 patients) whereas secondary repair were seen only among the older age group ranging from 5 - 20 years which was statistically significant- Chi Square test, p value- 0.046 (Figure 2).

Among the 37 patients who were treated for primary repair, 2.38% (n =1) patients had a wound breakdown and among the 5 patients treated for secondary repair, 4.76% (n = 2) patients had wound breakdown (Figure 3). 33% patients needed 3 suture packs for closure, 29% patients needed 4 suture packs for closure, 22% patients needed 2 suture packs for closure (Figure 4).

The number of suture packs used in the patient who had a primary repair wound breakdown was 3 suture packs for an incomplete cleft palate, 4 suture packs for a secondary redo palatoplasty and one suture pack for another mid palatal fistula. Within the limitation of this study, it was observed with clinical relevance that more the sutures placed in relation to the defect and especially in resurgery, wound breakdown was seen. (Figure 5).

As observed in the study, patients unto 4 years of age had no wound breakdown after primary cleft repair. The occurrence of palatal fistula as a result of wound dehiscence and secondary repair were among patients who were more than five years of age. This higher rate of secondary repair in an age group otherwise compliant to post operative instructions and ability to maintain good oral hygiene can be attributed to the fact that primary repair was done very late in life. Pubertal growth spurts can also lead to an increased incidence of cleft palate repair failure rate in this age group. As the tissues are under constant change due to growth spurts in pubertal age groups, it can thus influence the final outcome of palatoplasty, which may explain the higher rate of wound dehiscence in this age group as is observed in our study.

The ideal age for primary cleft palate repair is 9 – 18 months as agreed by most surgeons(Slator et al., 2020). However, in a developing country like India, the age of presentation for primary cleft palate repair can range to much later in life(Deol et al., 2020). This delayed care is due to reasons such as literacy rate, religious barriers, occupation, socioeconomic status, God’s will, “wicked people”, “evil spirits” (Adeyemo, James and Butali, 2016). This is evident among our study population where 37.8% (n =14) patients in our study population were over five years of age. Delayed timing of surgery, has been a known factor for wound dehiscence (Murthy, 2014). This is in consensus with our study, where there was no wound dehiscence in patients who had primary repair at less than 5 years of age.

Surgical complications can be immediate or delayed. The most common immediate postoperative complications evident in the first month of the repair, include dehiscence of the wound and total or partial flap necrosis(Deshpande et al., 2014). Immediate postoperative complications are influenced by surgical techniques used for palatal repair and post operative care.

Our study looked into the number of sutures used for palatal closure. There was no statistically significant relationship between the total number of suture materials being used for cleft palate repair and incidences of resurgery (p-value <0.05). Relationship of suture materials with wound healing on skin is well established with most authors recommending use of resorbable sutures(Trott, 2012). The ideal ratio of suture length to wound length is recommended to be 4 in current literature(Millbourn, 2009). However, there are no studies so far to have evaluated the ideal number of sutures to be used for palatal closure.

Suture materials play an important role in healing and reassembly of tissues in the oral cavity, which includes the ones separated by surgical repair techniques employed for treatment of cleft palate (Gazivoda, Pelemiš and Vujasšković, 2015). There are various studies comparing clinical efficacy of different types of suture materials on oral wound healing, (Suthar et al., 2020). Studies have been performed in the oral cavity using coated suture materials to study the efficacy in prevention of surgical site infection (Cruz et al., 2013). Various studies have been performed with a design to compare the efficacy of resorbable sutures with that of various other methods to achieve wound closure . Authors have compared the properties of absorbable and non absorbable sutures in cleft lip repair where it was concluded that absorbable suture materials are a viable option for lip repair as non resorbable sutures have to be removed postoperatively (Datarkar, Rai and Rewanwar, 2014). A study by (Fayyaz et al., 2018) on the use of continuous versus interrupted sutures for primary cleft palate repair in 152 patients showed no significant differences on the use of continuous suturing technique over interrupted suturing. In all cases interrupted suture was used for both nasal and oral layer closure.
Development of postoperative wound infection is a complex problem of considerable magnitude in cleft palate surgery due to lack of healthy soft-tissues for re-suturing, friable tissues, postoperative pain and influence of oral microbiome on suture materials (Yi, Kang and Oh, 2020). It is hence obvious that the type of suture material and number of sutures being used for closure of cleft palate plays a role of paramount importance in development of wound infection (Alexander et al., 1967).

Literature has shown that most wound infections begin around suture material left within the wound (Burkhardt and Lang, 2015). So, more the sutures, more the chances of infection. Hence it is important to use the appropriate number of sutures. This is also supported by the studies conducted in third molar removal and other minor oral surgical procedures (Etemadi et al., 2019). Currently, literature has lot of studies on sutures and their properties in cheiloplasty, but not the same can be found for cleft palate repair (Kim, 2019).

Although the study has its shortcomings due to a less sample size, clinical implications made from the observation of the study were that delayed primary surgery, re-repair surgeries, and use of more sutures for repair were factors influencing wound breakdown. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharsini, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

The authors recommend further studies on cleft palate and relationship of suture materials in wound dehiscence in different age groups, and also taking into account confounding factors, so as to further increase the strength of correlation between suturing in cleft palate surgery. The current study design can be used to further investigate the role of different gauges of suture materials, type of needles used, braided versus non braided suture materials, coated versus non coated suture materials in cleft palate repair and the rate of postoperative complications in the form of palatal fistula and wound dehiscence.

IV. CONCLUSION

A guarded conclusion made from this study is that delayed primary surgery, secondary palatal repair and the use of more number of sutures influence the occurrence of wound dehiscence following cleft palate surgery. However, the presence of various confounding factors such as anatomy of cleft, its metric measurements and post operative wound care have not been thoroughly evaluated in this study and hence further prospective studies can be designed with larger sample size to evaluate the effects sutures on the incidences of wound dehiscence and thereby palatal fistula formation, taking into account the shortcomings of this study.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

GRAPHS

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Figure 1: Bar graph representing the association of primary and secondary palatal repair in both genders where X and Y axis represents the gender and number of patients operated for cleft palate respectively.

Figure 2: The number of patients undergoing primary repair was more in the younger age group whereas secondary repair were more in the older age group (>5yrs) which was statistically significant with p value = 0.046 < 0.05 using Chi Square test.
Figure 3: Bar Graph illustrating cleft palate cases undergoing secondary repair exhibited a higher rate of wound dehiscence, which was statistically significant, p value = 0.002 <0.05, using Chi square test.
Figure 4: 3-4 suture packs were most frequently used for primary cleft palate repair and 2 suture packs for closure of secondary cleft defects. Association was however not statistically significant, p value = 0.134 (> 0.05) using Chi square test.
Figure 5: Bar graph represents more the number of sutures used more chances for wound breakdown. However this difference was not statistically significant, p value = 0.580, using Chi square test.

REFERENCES


