



Review Article

A Review on Surgical Procedures for Cleft Palatal Fistula Management

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Abstract

The aim of this article is to provide a comprehensive overview of surgical procedures for cleft palatal fistula management. Pubmed and google scholar databases were searched with keywords relating to cleft palate fistula management, and 20 articles were analyzed and reviewed. Cleft palatal fistula is the most common complication associated with cleft palatal surgery. The etiology of CPF and its surgical management are discussed in this review article.

Keywords: *Cleft Palate, Cleft Lip, Palatal Fistula, Congenital Defect, Innovative Method, Surgery*

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INTRODUCTION

Cleft palatal fistula (CPF) is the commonest complication associated with cleft palate surgery. The main symptoms associated with CPF are nasal regurgitation of food and hypernasal tone of voice. Repair of cleft palate under tension is considered to be the main reason for CPF through vascular accidents and infection can also be the cause. Most of the CPFs are situated in the hard palate or at the junction of the hard and soft palate. Repair of CPF depends on its site, size, and mode of presentation [1].

ETIOLOGY OF CPF

The primary cause of the development is repairing air under tension. However, there are some palatal clefts that are quite wide and the available tissue to repair the palate seems inadequate. The other reason is postoperative infection. Besides these, inadvertent use of diathermy, particularly near the greater palatine pedicle can compromise the blood supply [2]. Atrophic nature of the mucosa, inadequate muscular layer centrally over the hard-soft palate junction, high tension along the repair line, upper respiratory tract infection, hemorrhage, absent multilayer closure, poor surgical technique, or unsatisfactory postoperative care all alone or combined may lead to fistula development [3].

SURGICAL TREATMENT OF CPF

Timing of surgery:

Surgical closure of CPF should be attempted at least six months after the previous surgery. Small asymptomatic fistulae are initially managed conservatively as they may close themselves without any bothersome symptoms. Symptomatic fistulae with features such as hypernasal speech or nasal regurgitation of food should be taken up for repair anytime after 6 weeks of palatoplasty [4,5].

Assessment:

Other than the size and site of the CPF the important factor in assessment is the amount of scar tissue present around the fistula. A close inspection will reveal the previous incision mark if used for lateral release. Lateral to this mark, all epithelialized scar tissue which, if elevated as flap has unpredictable vascular supply. If the previous surgery was done a long time ago, this tissue may behave like a normal mucoperiosteal flap. It is wise to elevate the mucoperiosteal flap from the crevicular margin to ensure greater width and length of the flap. The rugosity that is present in the anterior-most aspect of the mucoperiosteal flap should be inspected.

The presence of this landmark usually excludes vascular accidents in the previous surgery. If this is found to be situated almost in the mid-palatal region, it indicates the oral flaps have gone into significant contracture. In cases where the CPF is quite big and a vascular accident is suspected, a handheld Doppler probe can be used before making the incision to assess the greater palatine pedicle. If no signal is registered by the probe, it is better not to elevate the palatal mucoperiosteum on that side.

Surgical principle:

Preferably the fistula should be closed in two layers. Both the layers should have well-vascularized tissue and the suturing should be free of tension. There are also reports in the literature wherein closure of CPF was affected in three layers [1]. As an intermediate layer, cartilage, bone and acellular dermal matrix (ADM) have been used. Collagen matrix (Collagen Membrane or Collagen Graft) as an interposition graft, serve as a mechanical barrier, volumetric spacer, and regenerative scaffold in wide palatal clefts. Collagen Membrane and

Collagen Graft are composed of type I collagen derived from the bovine tendon. Bovine collagen is weakly antigenic because of the high sequence homology between bovine and human collagen [2]. A recent approach is to augment the mucoperiosteal layers as well as cover any resultant defect with ADM to reduce fistula rates and also to improve the outcome anatomically and dynamically. Moreover, used in secondary palatal fistula repairs, ADM has been giving promising results being safe and effective over time with the potential to reduce recurrence rates. Moreover, ADM use did not prolong the surgery time remarkably and made no difference in postoperative care [3].

Soft palate:

For fistula involving the soft palate, evaluation for velopharyngeal insufficiency (VPI) is essential. When the fistula is limited to the soft palate and VPI is absent, the fistula is approached by sharply excising the free mucosal margins, undermining the nasal and oral mucosal layers, and then repairing each of these layers individually. When VPI is present, revision palatoplasty is performed: both double-opposing Z-plasty and straight-line mucosal incision with intravelar veloplasty are considered acceptable approaches [4].

Hard palate:

When approaching a fistula involving the hard palate, there is a need for a tissue source to repair the nasal lining and a distinct tissue source to repair the oral lining [4].

Hard–soft palate junction:

Fistulae involving the junction of the hard and soft palates required addressing both the soft and hard palates. In addition, the frequent co-occurrence of VPI with fistula is present in this location, leading to the incorporation of revision palatoplasty into the soft palate for most patients. For medium defects, the need for wide-undermining over the hard palate to recruit adjacent tissues is present, in addition to the soft palate repair. For large defects, there should be reliance on adjacent tissues to achieve adequate mucosal lining, using a variety of sources, including buccal myomucosal flaps, buccal fat flaps, facial artery musculomucosal (FAMM) flaps, and tongue flaps [5].

Labio and lingual-alveolar:

Fistula of the primary palate and alveolus are viewed as requiring a multistep approach to achieve a successful repair. During surgical repair, the main focus is on reconstructing 3 surfaces: labial (anterior), nasal, and oral superiorly based gingivomucosal flaps for labial surface coverage. The nasal and oral surface lining is principally performed using local tissues, although adjacent tissue transfers are applied as necessary for larger defects or when previous closure [4,5].

Murthy et al [6] found incisive foramen as the most common site. The review of the literature showed that another common site of fistula formation was the junction of hard and soft palates, which was the second common site in this study. The cause of this was attributed to inadequate mobilization, deficiency of tissue, triangular-shaped palatine bones, and a higher incidence of Veau Types III and IV clefts. Depending on scarring, inflammation, and availability of surrounding tissue, the type of flap is decided [5].

Abdel-Aziz M et al [7] states that closure can be carried out in 2 layers; the first layer is the oral mucoperiosteum which is elevated from tissues to the left side of the fistula, the incision is at the anterior end of the fistula, and ended at its posterior limit, it is curved and configured to take the size and shape of the fistula, it is inverted as a hinged flap so that the mucosal surface become facing the nasal side, then its free edge sutured to the nasal

surface of the right fistula edge. The second layer is the myomucosal flap from the inner surface of the cheek to the right side of the fistula. The advantages of this method are that it is a single-stage operation with one wound at the site of the fistula and that there is no donor site morbidity as the donor site is closed primarily in contrast to the tongue flap where there may be severe postoperative tongue deformity along with speech and taste impairment. Also, there is no hard palate bone dissection avoiding growth problems. A minor disadvantage of this method is that the mouth opening is restricted postoperatively for the first few days. Another disadvantage that may occur is an injury to the parotid duct. Nonetheless, closure of posterior palatal fistula using a buccal myomucosal flap is a useful method with a high success rate and no morbidity [7].

Abass et al suggest that the facial artery myomucosal flap is a reliable and useful procedure and can be used as a worthy alternative for the closure of wide, scarred, recurrent palatal fistulas (8). The facial artery usually bifurcates at the oral commissure and becomes two major branches: the superior labial artery and the lateral nasal artery [8,9]. The nasal artery musculomucosal (NAMMC) flap can also be used for the closure of palatal fistulas. The main blood supply comes from the lateral nasal artery, a terminal branch of the facial artery [10].

DISCUSSION

Management of cleft palate fistula is a multidisciplinary approach and proper evaluation of speech and dental arch in addition to the local tissues are very essential. The functional aspect of the fistula should be given appropriate attention before a decision is reached on its structural surgical repair. After proper evaluation and decision regarding surgical repair, one needs to pay attention to the local tissue condition. The previous surgical techniques, scarring, shortage of tissue, inflammation of tissue and oral hygiene, availability of local tissue, and concomitant planned procedures will decide the type of procedure for fistula repair. This approach will help to decide the proper timing and appropriate technique for surgical repair [4,7]. The tongue flap has been a workhorse for a difficult palatal fistula with a shortage of tissue. Similarly, buccal flaps, also known as facial mayo-mucosal flaps, are the most appropriate for junction fistulae if there is a shortage of tissue. The buccal flap is for VPI correction but not for fistula repair [8]. However, if utilized in a junctional fistula, this will also help to lengthen the palate for VPI correction at the same time.

Other flaps which have been described and utilized very rarely in specific indications are temporalis muscle flaps and free microvascular free flaps. However, the latter options are more commonly utilized in closing non-cleft palatal reconstruction [5]. In certain situations, like a failure of multiple attempts of fistula repair, the refusal of surgery by patients, and associated demands for tooth prostheses, the prosthetic cover for the fistula can be applied. However, a prosthesis can never provide a natural barrier like tissue repair and has implications on oral hygiene and dental health [6].

CONCLUSION

The most common causes of fistula recurrence are an inadequate approximation of the opposing raw surface; necrosis of the end of a flap used in closure; tension; infection; careless suturing; and traumatic disruption of the healing wound. Additionally, post-operative scar contraction on a single-layered wound may also disrupt the healing wound. Therefore, it is important to use well-circulated tissue with a wide base and rich blood flow and to close the fistula in a multi-layered fashion.

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