Closure of Palatal Defects with Greater Palatine Artery Mucoperiosteal Island Flaps: Revisited

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ABSTRACT

Introduction and Objectives: Closure of oronasal fistula is a mandatory component for normal speech and swallowing, several techniques have been described to achieve this goal, but greater palatine artery mucoperiosteal flap has many advantages between these options. In this report we will present our results after application of this flap for different types of palatal defects.

Patients and Methods: Sixteen patients with oro-nasal fistulas result as a complication of palatoplasty, post-traumatic or after tumor excisions were treated with island mucoperiosteal flaps and followed to assess the anatomical and functional outcomes.

Results: All fistulas successively healed, none of our patients developed major postoperative complications, few minor complications occurred in the form of bleeding and wound dehiscence which responded well to conservative treatment. Patients showed a significant overall improvement in their speeches.

Conclusions: Greater palatine mucoperiosteal island flap is an excellent option for reconstruction of different types of palatal defects.

Key Words: Palatal fistula – Oronasal – Greater palatine artery.

INTRODUCTION

The oro-nasal continuity which may occur as a complication of cleft palate repair or after palatal tumor excision represents a great challenge to reconstructive surgeons [1,2]. The reported incidence of post primary palatoplasty fistulas varies widely ranging from 0% to 68% [2,3]. Large palatal defects cause significant speech problems and regurgitation of fluid and food particles into nasal cavity with subsequent sinusitis and otitis media, therefore they have to be repaired early [4]. Several techniques have been described to nullify these problems, [5-18] however reconstruction of the defect with like tissue was fascinating goal for surgeons. Since it was introduced by Gullane and Arena, the palatal island flap got the attraction of reconstructive surgeon and it was submitted to many modifications [19-22]. In this work we will study the effectiveness of island mucoperiosteal flap based on skeletonized greater palatine artery for closure of different types of palatal defects.

PATIENTS AND METHODS

This prospective study was conducted in the department of plastic surgery, Zagazig University from August 2010 to September 2014; sixteen patients with a mean age of 22.93±18.35 years (range 2.5 to 54 years) suffering from palatal fistulas with nasal tone and regurgitation were treated with our elected technique after it had been approved by the university review committee. In these sixteen patients, six of them had palatal fistulas after correction of cleft palate, five patients with post traumatic oronasal fistulas and in five patients these defects were occurred after malignancy extirpation. Informed consents were taken from patients or patients’ guardians after thorough explanation of the whole procedure and possible complications. The lengths of fistulas ranged from 9mm to 42mm at its maximal dimension, and for comparative purpose defects were classified as group A (7 patients) in which the length of defects the were less than 30mm, and group B (9 patients) in which the fistulas lengths were more than 30mm. Previous trials for repair of the fistulas were reported in two of our patients but the territory of flap has good quality of tissue. Most patients treated with unilateral flaps (13 patients) and in three patients bilateral flaps were harvested owing to large defects, Table (1) summarize demographic data of patients. Patients with most anterior palatal fistulas close to the alveolar margin were excluded from this study (type V, VI and VII Pittsburgh Fistula Classification System [23]) as well as those with multiple trails of repair and scared mucoperiosteum. General roles for palatal surgery in our unit were followed; the minimum time interval between fistula repair and last surgery was 6 months.
to allow the inflammatory process to subside completely and giving the chance for spontaneous closure of the small fistulas. Preoperative dose of antibiotic (cefotaxim) 1h before surgery and continued on the same regimen postoperatively for 1 week in addition to miconazol oral jell. Two days postoperatively, the patients were allowed oral fluids only. For the rest of the week, they were allowed soft diet. Patient were followed every week for one month and every month for the next five months, during these visits patient were evaluated for surgical complication and anatomical closure of fistulas as well as functional outcome of the procedure. For assessment of functional status we used visual analog scale adapted from Kim et al. [24] range from 1 to 7, this scale was used to evaluate patients before surgery and repeated six months after surgery, audio samples were recorded of a fixed script to assist the previous goal.

Surgical technique:

All operations were done under magnification using 3.5 magnifying loupe. After application of a mouth gag, the under surface of the palate tissue was infiltrated with epinephrine 1/200,000 to minimize bleeding and facilitate flap dissection. Fibrous tissue at the margin of postpalatoplasty and traumatic fistulas was excised, then our flaps were designed considering five points, first it should centered over greater palatine artery, its size is slightly larger than the defect to allow tension free closure, its medial border is continuous with the outer border of the defect, it should not have any attachment to surrounding mucosa, and lastly the dissection in the soft palate was avoided if possible to minimize scarring with subsequence dysfunction. Formal elevation of the mucoperiosteal flaps was done using a blunt dissector; this dissection was continued till the greater palatine arteries were completely skeletonized down to their bony canal to facilitate the flap rotation. The flaps were rotated to the defect and secured to with surrounding mucosa with 5/0 polygalactine (vicryl).

RESULTS

All fistulas were completely closed. No significant bleeding per nose or infection was noticed in the early postoperative period. One patient in traumatic group had minimal postoperative bleeding which responded well anti-hemorrhagic drugs. Two patient showed minor wound dehiscence which responded well to conservative managements in two weeks. Our patients were followed for a period of 9-49 months with a mean of 29±12 months, with no report of fistula recurrence in any of them. Visual analog scale for Speech intelligibility improved from 4.6 to 6.1, from 4.6 to 6.8 and from 6.6 to 7 in post-palatoplasty, post-traumatic and post-ablative respectively. Statistical analysis of the previous results revealed an overall significant improvement in all patient, however this change was highly significant in post-palatoplasty and traumatic groups (p<0.001) but it was non-significant in post ablative group (p>0.5).

Table (1): Demographic data and results.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th>Sex</th>
<th>Fistula size (mm)</th>
<th>Cause</th>
<th>Reconstruction method</th>
<th>PRVAS-SI</th>
<th>POVAS-SI</th>
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<tbody>
<tr>
<td>1</td>
<td>2.5</td>
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<td>Unilateral flap</td>
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<td>Unilateral flap</td>
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<tr>
<td>3</td>
<td>2.5</td>
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<td>Post ablation</td>
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5.25±1 6.65±0.6

M = Male. PRVAS-SI = Preoperative visual analog scale for speech intelligibility.
F = Female. POVAS-SI = Postoperative visual analog scale for speech intelligibility.
DISCUSSION

Competent separation of nasal cavity from the oral one is an important element for the process of swallowing and speech, so many efforts were expended to achieve this goal in patient with oro-nasal fistulas. Methods currently employed for this task can be broadly divided into two groups: in the first one, local mucoperiosteal flaps are used in different forms [5-8], the other group included the techniques that used additional tissues from the surroundings to close the defect, for example, tongue flap, [25] buccal mucosa flaps [26,27] which always need second stage surgery and anticipated tongue deformity and respiratory problems [11]. Nasolabial, submental and infrahyoid musculocutaneous flaps and be used but they add external skin incisions and poor tissue matching with recipient site [28-30] and finally a more complex techniques using free tissue transfer which needs personnel with high experience and it has high cost and morbidity [17,18].

Since the palatal mucoperiosteal flap introduced in practice it was submitted to many research works to study its anatomical basis 31 and possible clinical applications. In addition to its usage in cleft palate repair and palatal defects closure, recent studies described its employment for reconstruction of nasal cavity, clival and other skull base defects after mobilization of descending palatine vessels [32,33].
In our work palatal flaps was effective for closure of palatal defects with very low complication rate. We noticed that the size of defect doesn’t have any effect on success rate as none of our groups showed higher complication rate than the other. In our work the flap designs was limited to ipsilateral hemiplate, and in big defects more than 15cm² we prefer to use bilateral flaps to close it, although Magdy in his nice work, the whole palatal lining was harvested based on only one neurovascular bundle without ischemia [1]. Regarding the causes of the palatal defects, we found that no group has higher complication than the other so the flap could be used safely regardless the type of palatal defects. Generally our work has a success rate comparable to the other studies, and all of them confirms the reliability of this technique [1,24,34]. Regarding the functional outcome our patient had significant improvement in speech intelligibility, however in post ablative group this improvement was not significant that is due to most of them did not have preoperative speech trouble apart from discomfort due to mass in the palate. Our patients had a very low complication rate (zero major and 12.5% minor complication), in his extensive review Seckel reported fistulization rate of 4-7% [38]. Which is a very low complication rate comparing to other methods of repair [25].

**Conclusion:**

We conclude that this method of repair has distinct advantages of being simple, a one-stage procedure, no donor-site morbidity with good aesthetic results, and finally its sensate nature which is not available in other reconstructive options.

**REFERENCES**


