



Versatile, Bi-paddle Pectoralis Major Myocutaneous Flap in a High Risk Geriatric Male with Multiple Co-Morbidities, Presented with Advanced, Complex Oro-mandibular Cancer: A Case Report

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Authors' contributions

This work was carried out in collaboration among all authors. Author SSK designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author TK managed the analyses of the study, and managed the literature searches. All authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. Bing Yan, Hainan Branch of PLA General Hospital, China.

Reviewers:

- (1) Leonardo Toscano Rubio, University of Republic, Uruguay.
(2) Luis Marcelino Remedios Hernández, University of Pinar del Río, Cuba.
(3) Sangita Arun Shelar, Smt. Sindhutai Eknathrao Vikhe Patil College of Nursing, India.
Complete Peer review History: <http://www.sdiarticle4.com/review-history/68806>

Case Study

Received 24 March 2021
Accepted 28 May 2021
Published 07 June 2021

ABSTRACT

The study reporting a case of a 78 year old elderly male patient with multiple co-morbidities with poor performance status with advanced oro-mandibular cancer who underwent oncological resection followed by reconstruction with bi-paddle PMMC flap as an alternative to micro-vascular free flap. Composite resection of the advanced oro-mandibular cancer results in extensive defects which poses a challenge to the treating team as it will be difficult to restore mastication, speech and swallowing function. In head and neck cancers, free flaps have been used increasingly to cover the defect with the help of experienced and trained surgeons with fine skills of micro-vascular procedures. However, free flaps are not easily available at all centers in developing countries because of resource constraint, cost and expertise of surgeon. PMMC flap is the robust flap and it has been described and established since long in covering the both, intra and extra oral defects. With the help of random flap and multiple perforators, PMMC flap can mould into bi-lobed / bi-paddle

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/ folded version which can cover intra-oral defect with covering of external lining. Bi-paddle PMMC flap is highly vascularized, versatile flap with short and easy learning curve and produces satisfactory aesthetic and functional results and should be considered as a first option in a geriatric patient with multiple co-morbidities.

Keywords: Oral cavity; advanced oro-mandibular cancer; versatile flap; bi-paddle PMMC flap; high risk geriatric; surgeons.

1. INTRODUCTION

The advanced cancer of the oral cavity manifest with complex presentation and its surgical removal followed by reconstruction is the challenging job for the treating onco team. Post oncological resection, the reconstructive team has to provide satisfactory cosmetics to the patient. Composite resection results in extensive defects which poses a challenge to the treating team as it will be difficult to restore mastication, speech and swallowing function. Micro-vascular free flaps are considered as the first choice in achieving aesthetic results if defects are extensive with loss soft tissue, bone and skin. However, its use is restricted due to its cost, expertise, resource and patient selection. Full thickness defects are always considered difficult as it requires staged procedures to obtain tissue bulk with covering at two surfaces. The main disadvantages of micro-vascular free flaps are chances of flap necrosis requiring second surgery, long duration of surgery and possibility of re-exploraton . It should be the first option in young and healthy individuals, however, elderly patients with multiple co-morbidities with poor performance status will be at their risk of life for second surgery, anesthesia and surgical stress. The pectoralis major myocutaneous flap (PMMC), first described by Ariyan stood the test of time since its description and it is considered as workhorse regimen of the head and neck cancer surgeons [1]. The privileged features of PMMC includes, its bulky nature, large area of muscle providing large size of flap, rich blood supply and excellent reach [2]. In head and neck cancers, free flaps have been used increasingly to cover the defect with the help of experienced and trained surgeons with fine skills of micro-vascular procedures [3]. However, free flaps are not easily available at all centers in developing countries because of resource constraint, cost and expertise of surgeon [4]. Micro-vascular free flaps are considered as the first choice for full thickness defects of the oral cavity and the favorable features which makes it first are, malleability, lack of bulk and availability of multiple donor sites [5]. PMMC flap is the robust flap and it has been described and established

since long in covering the both, intra and extra oral defects [6]. With the help of random flap and multiple perforators, PMMC flap can mould into bi-lobed / bi-paddle / folded version which can cover intra-oral defect with covering of external lining. We are reporting a case of a 78 year old elderly male patient with multiple co-morbidities with advanced oro-mandibular cancer who underwent oncological resection followed by reconstruction with bi-paddle PMMC .

2. CASE REPORT

A 78 year old gentleman with Eastern Cooperative Oncology Group Performance Status II (ECOG PS – II) presented with ulcero-proliferative growth over right lower alveolus for the last three months. Patient is a farmer, studied up to 6th standard and living at a remote place in a village . After noticing the growth over alveolus, he didn't visit any local clinician and neglected it for next two months. When the growth was rapidly increasing in the size, he shifted to his son's house in a city and consulted a local clinician who took biopsy from the lesion. Biopsy report was indicative of squamous cell carcinoma of alveolus. With this report, he was referred to our clinic for further management. Patient was suffering from multiple co-morbidities. He was under treatment for bronchial asthma for the last 4 years. Diagnosed case of Diabetes Mellitus for the last 10 years. He had undergone angioplasty 2 years back. Thyroxin 50mcg once a day had been started for the last 7 years to control hypothyroidism. He was taking only thyroxin regularly and defaulted the treatment of other diseases. He had a habit of tobacco chewing for the last 40 years and he used to chew it around 5-6 times in a day. On clinical examination, bilateral ronchi were heard at lower zone of respiratory system. Rest of the systemic examination was unremarkable. On local examination, an ulcero-proliferative growth was present over the right lower alveolus measuring 6.5 x 5 x 2 cm in dimensions. Posteriorly it was extended around 1cm proximal to retro molar trigon, laterally extended to involve gingivo-buccal sulcus, medially floor of mouth was free. Anteriorly it crossed the midline with involvement

of lower alveolus till incisor tooth. It also involved the gingiva-labial sulcus with overlying skin over mentum with a patch of indurated area of skin measuring 3 x 3 cm. Enlarged neck nodes were palpable at Level I, right level II, III, IV and left level II and III. We advised him to undergo Contrast Enhanced Computed Tomography (CECT) of oral cavity, neck and chest and meanwhile referred him to cardiologist, endocrinologist, pulmonologist and diabetologist.

CECT report was suggestive of the same growth with involvement of right lower mandible and skin over the mentum with bilateral multiple enlarged neck nodes with no lung nodules. Case was discussed in our institutional multidisciplinary tumor board. Surgery is the primary therapeutic modality for head and neck cancer, hence, our board also decided to plan for surgical excision of the lesion with regional flap reconstruction with high risk consent in view of multiple comorbidities with poor performance status. We hospitalized the patient and all his parameters were monitored and controlled within next seven days. He was started on low dose heparin 12 hrs before surgery. His blood sugars were uncontrolled with higher values, hence started on insulin. Only thyroid function test was within normal range. Surgery fitness was obtained from cardiologist, endocrinologist and pulmonologist. After optimization in the ward, he was posted for right lower extended hemi mandibulectomy with bilateral selective neck dissection (SND) with bi-paddle Pectoralis Major Myocutaneous Flap (PMMC) with tracheostomy. Free fibula flap was the option of choice to achieve the cosmesis, but to avoid prolonged duration of surgery, flap complications, risk of re-exploration, bi-paddle PMMC flap was preferred. High risk consent had been taken in informed and written form with the risk of prolonged post-operative ventilatory support and possibility of death on table. The procedure of extended right lower hemi-mandibulectomy along with skin over the mentum with adequate macroscopic margins was completed and bilateral SND performed with removal of level I, right level II to V and left level II to III lymph nodes with bilateral preservation of internal jugular vein, common carotid artery and spinal accessory nerve [Fig. 1]. Right bi-paddle PMMC was harvested with the use of the standard technique as described by Freeman [7]. The surface marking was done drawing a line from acromion process to the xiphisternum and another line drawn perpendicular from midpoint of clavicle to the first line [Fig. 2]. Skin paddle was positioned over the pectoralis major muscle.

The size of the paddle used to cover bony defect was 7 x 6cm while that used to cover the skin was 3 x 3 cm. The skin paddle was sutured to the underlying muscle to avoid shearing injury to the perforators. Donor site was closed primarily. Patient underwent the procedure with no intraoperative uneventful episode [Fig. 3]. Total duration of the surgery was 210mins. Patient was extubated next day and shifted to special ward from intensive care unit after 2 days of monitoring and observation. He was started on ryle's tube feeding from day two onwards. He was discharged on 9th post-operative day with tracheostomy in situ. In the postoperative period, he had wound infection at neck and donor site, however, flap was healthy. Wound healed by secondary intention with regular dressing within a period of around 20 days. Tracheostomy was removed after 25 days. He was able to swallow liquids and semi-solid but there was a salivary leak from angle of mouth. Final histopathology report was suggestive of moderately differentiated squamous cell carcinoma of right lower alveolus measuring 7.3cm X 6cm X 3cm and involving mandible, skin and bilateral cervical lymph nodes of which three were positive out of total 53 lymph nodes with extranodal extension in all three lymph nodes. All resected margins were clear. Lymphovascular invasion was present with absent perineural invasion. Adjuvant treatment was planned after discussing the case in our tumor board. AJCC 8th edition staging was Stage IV B (pT4a pN3b M0/G2/LVI+/- ENE+). In view of, perinodal extension, adjuvant concurrent chemoradiation was advised to him.



Fig. 1. Defect after composite oncological resection

After a delay of 25 days, adjuvant treatment was started. During this treatment, he developed a small oro-cutaneous fistula (OCF) hence, feeding was continued through ryle's tube and again

radiation was stopped for next 9 days till healing of the fistula. Ultimately, he completed the planned adjuvant treatment without any major adverse effects. All previous medications were started and he was called for follow up examination according to our institutional follow up protocol. At one year of completion of treatment, he had small nodule at neck over incision line with no other local or distant recurrence (PET Scan). We did excision of the nodule and histopathology was suggestive of only granular tissue with no evidence of malignancy, hence, no further treatment was planned. We kept him on follow up with us every three monthly for the first two years as per our institutional protocol.



Fig. 2. Surface marking of PMMC flap

3. DISCUSSION

The micro-vascular free flaps are considered as the preferred option in the head and neck cancer in the current scenario. However, it requires special surgical skills, operation theatre set up with special instruments and watchful monitoring in critical care unit. Geriatric patients with multiple co-morbidities with advanced head and neck cancer with poor performance status needs shorter duration of the procedure to avoid unnecessary anaesthesia risk. One stage reconstruction procedure, early feeding, early extubation with shorter duration of critical care unit stay are helpful in decreasing surgical morbidity. There is conflicting debate over the

cost of free flaps. Though free flaps are considered as the first choice with higher cost, many authors preferred it over pedicled flaps for reconstruction as it is providing better cosmetic results [8,9]. Other authors did not find cost as a confounding factor while selecting free flaps over regional flaps [10].



Fig. 3. Bi-paddle PMMC (Pink arrow – intraoral component , yellow arrow – external component)

PMMC flap is a highly vascularised flap with excellent reach with minimal morbidity at donor site and it has commendable results in single stage reconstruction [11]. As we have discussed earlier, additional advantage of PMMC flap is in patients who are unable to tolerate longer duration of surgery. It can be used as a salvage flap in patients where free flap undergoes necrosis or complete flap failure. Another advantage is that it can be an option in patients with previous history of radiation therapy where microcirculation network gets impede. The remarkable advantage of PMMC flap is its short learning curve and young surgeons or trainee can pick up faster.

Various case studies had disclosed successful reconstruction with bi-paddle PMMC flap with minimal flap related complications with up to the mark cosmesis [12,13,14]. Bi-paddle PMMC flap has a unique feature of covering extensive defects of intraoral and external component in a

single stage. In the earlier era, more than one flap or staged procedures were carried out to cover oro-mandibular defects. In the index case, the option of micro-vascular free flap was adding an additional morbidity to the disease with chances of re-anaesthesia risk, risk of ventilator support with extended stay in critical care unit. Hence, the best choice was bi-paddle PMMC flap with single stage surgery in a shorter period of time.

An experienced micro-vascular surgeon also can't predict 100% success of the flap and failure of flap leads to re-surgical intervention with financial and psychological trauma to the patient. A good electrocautery and lesser time contact with the tissues will decrease heat production which helps in lesser damage to the perforators. Some of the authors have an issue of hump over the clavicle, however, preservation of clavicular head have less chances of pedicle torsion. The other debatable issue is sacrifice of lateral pectoral nerve. Sometimes this nerve runs above or in close relation with the pectoral pedicle. While raising the flap, the nerve may become taut, thus, sacrifice of the lateral pectoral nerve is an acceptable step [15]. In the index case, we had sacrificed lateral pectoral nerve. Thus, young or trainee surgeons can reconstruct an extensive defect of head and neck cancer post oncological resection in single stage procedure.

4. CONCLUSION

Bi-paddle PMMC flap should be considered as a first option in complex oro-mandibular cancer in a geriatric patient with multiple co-morbidities with poor performance status as it is cost-effective, labour saving, valuable and single stage procedure. PMMC flap is highly vascularised, versatile flap with short and easy learning curve and produces satisfactory aesthetic and functional results.

CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline patients consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/68806>