Single perforator based anterolateral thigh flap for reconstruction of large composite defects of oral cavity

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SUMMARY

Composite defects of oral cavity are a reconstructive challenge. Anterolateral thigh flap provides large and pliable tissue for reconstruction of these defects. However, wide variations in the vascular anatomy, variable perforator number and location are reported. The aim of this study was to evaluate the reliability of single perforator based large anterolateral thigh for reconstruction of complex oral cavity defects following ablative surgery. We report a series of 25 consecutive patients who underwent reconstruction of oral cavity defects with anterolateral thigh flap based on single perforator between August 2009 and August 2010. The mean flap dimension was 261 cm² (range 80–540 cm²). In 21 patients the flap was bi-paddled and used for inner and outer lining for cheek. None of the flaps developed perforator insufficiency. Two flaps were lost due to delayed neck wound sepsis after 7th post operative day. This study establishes safety and reliability of using a large and/or bi-paddled anterolateral thigh flap based on single perforator for reconstruction of complex oral cavity defects.

Introduction

Oral cancer is one of the most common cancers in South Asia. The common risk factors besides smoking include the habit of placing tobacco and betel nut quid in the gingivobuccal sulcus. The limiting factor in complete resection of these tumors is the inability to provide adequate functional reconstruction and rehabilitation resulting in poor over all survival. Resection of these tumors result in a large full thickness defect of cheek, with or without defect of upper alveolus, mandible, floor of mouth, tongue and infratemporal fossa. Extensive skin and soft-tissue defects of oral cavity are a reconstructive challenge. Reconstruction of these defects require large and pliable soft tissue flap which can provide both inner and outer lining to the cheek. The anterolateral thigh flap (ALT) flap has gained popularity for reconstruction of oral cavity defects. The ALT flap has multiple advantages, including thin, pliable skin; adequate pedicle length, potential for harvest of large flaps along with fascia and muscle. However, wide variations in the vascular anatomy are reported. It is not uncommon when large flaps have to be harvested based on a single perforator. In such a scenario, there are concerns of perforator insufficiency, particularly when the flap is contoured in different plains, with de-epithelization and bi-paddling.

Therefore, the purpose of this study was to retrospectively evaluate a single center’s experience and reliability of single perforator based anterolateral thigh flaps for post ablative reconstruction of large composite defects of oral cavity.

Material and methods

Patients who underwent free ALT flap for reconstruction of oral cavity defects at our center from August 2009 till August 2010 were identified using the database. All patients in whom oral cavity defects were reconstructed with single perforator based ALT flap were included for this study.

Flap technique: the techniques used for anterolateral thigh flap harvest have been previously described. An attempt was made to locate the perforator using hand held Doppler. The flap was usually centered on the mid thigh perforator. The flaps were harvested based on single dominant perforator arising from descending or transverse (oblique) branch of lateral circumflex femoral artery (Fig. 1). Distally, the flap extended approximately 3–4 cm above the patella when larger flaps were harvested. Superiorly, perforator from tensor fascia lata (TFL) muscle was included in the flap whenever flap was extended over the muscle.
Insetting and contouring: in cases with full thickness cheek defects, the flaps were bi-paddled to provide external as well as the oral lining. The flap edge closer to perforator was anchored first in order to stabilize the perforator and avoid any kinks and compressions. The intervening area was de-epithelized and sutured to the inner and outer edge of the defect superiorly (Figs. 2 and 3).

Results

Characteristics of 25 patients who underwent reconstruction of oral cavity defects with ALT flaps based on single perforator are listed in Table 1. The median age of patients was 48 years (range 18–65). There were 14 females and 11 male patients in our series. All patients underwent ablative surgery for oncological purpose. Three patients had primary tumor of the tongue, while remaining patients had buccal mucosa or retromolar trigone disease. Resection involved full thickness of cheek in 21 patients. Seventeen patients had previously untreated disease while remaining 8 patients had recurrent disease at presentation.

The average size of flap was 261 cm² (range 80–540 cm²). All flaps were harvested on a single dominant perforator. The perforator was musculocutaneous in 22 patients, while septocutaneous in 3 patients. In patients with musculocutaneous perforator, it was dissected through the muscle. In 21 cases the perforator was arising from descending branch, while in 4 cases from the oblique branch of the lateral circumflex femoral artery. In three cases tensor fascia latae perforator was included in the flap. The TFL branch usually arises from the ascending branch of lateral circumflex femoral artery, but rarely as a direct branch from profonda femoris artery. In three of our cases the TFL branch was found arising directly from profonda femoris artery and could not be used for anastomoses.

In most cases the defects involved full thickness of cheek, with variable involvement of mandible either marginal or segmental, with upper alveolus, hard palate, soft palate, floor of the mouth, tongue and lip. In this series, ALT flap was used as a single flap to reconstruct these defects. The flap was bi-padded to provide inner lining for the oral cavity and outer skin cover in 21 patients. In two cases, with more than two-third excision of upper and lower
lip, a dumbbell shaped contouring of flap with fascia lata sling was done.

The overall flap survival rate was 92% in our series. There was delayed loss of 2 flaps due to neck wound infection leading to thrombosis of the internal jugular vein. One patient who underwent salvage procedure following radiotherapy developed suture line dehiscence required resuturing. Two patients had partial skin graft loss at the donor site which was managed conservatively with regular dressings. None of the flaps were lost due to perforator insufficiency.

Discussion

Oral cancers are one of the most common cancers in South Asia. Most of these lesions are located in gingivo buccal sulcus, adjoining
buccal mucosa and present in advanced stages with involvement of muscles of mastication and cheek skin. Resection of these tumors involves excision of full thickness cheek, with large soft tissue component involving floor of mouth, tongue, upper alveolus, hard and soft palate and infratemporal fossa with segmental of marginal mandibular defect. Significant number these of the patients develop loco-regional failure; adversely affecting their survival. This may reflect inability to perform adequate resection constrained by limited reconstruction capabilities.

The goal of reconstruction in composite oral cavity defects is to provide oral lining, external cheek cover, provide cover for the exposed vessels, oral competence, rehabilitate the normal speech, articulation, swallowing function and provide facial contour. Variety of regional and free flaps are described for soft tissue reconstruction of the cheek defects. Bi-paddled pectoralis major myocutaneous (PMMC) flap has been traditionally used for reconstruction of full thickness cheek defects with associate segmental mandibular defects. PMMC flap is a reliable and robust flap and has been a work horse for head and neck reconstruction. The disadvantages of this flap include limited reach superiorly, contouring in different planes may be difficult, flap is bulky and skin paddle may be unreliable in female patients. When free flap option is considered, free radial forearm flap, rectus abdominis flap, latissimus dorsi and anterolateral thigh flap are the flaps of choice. A double free flap option may be considered in cases with extensive defects of oral cavity particularly those associated with anterior/anterolateral segmental mandibular defects for optimal functional and cosmetic outcome. However, the double flap option may not be always feasible due to poor general condition and resource constrains.

The anterolateral thigh flap has become the flap of choice for head and neck soft tissue reconstruction. The ALT flap has multiple advantages, including thin and large pliable skin, large pedicle vessels without compromising any major vessel; possibility for harvest of vascularized skin, fascia, and muscle along with. This vascular fascia can be used as sling for the lip reconstruction. ALT flap scores over radial forearm free flap due to availability of large skin surface for inner and outer lining for oral cavity, donor site scar at a less conspicuous location and no major vessel is harvested. As compared to latissimus dorsi flap, ALT has advantage of simultaneous harvest without changing patient position. Although, rectus abdominis myocutaneous free flap can be used for large defects, prominent abdominal scar and associated risk of problems like hernia are potential disadvantages.

Although, it is considered safer to harvest ALT flap on multiple perforators, in this study the flaps were based on a single perforator since only one perforator was identified. Cadaver perfusion studies of isolated anterolateral thigh flaps have suggested 240 cm² as an upper limit of skin that may be harvested based on the perforating vessels. Earlier reports indicated a risk of head and neck soft tissue reconstruction. The ALT flap has always feasible due to poor general condition and resource constrains; adversely affecting their survival. This mandibular defect. Significant number these of the patients develop loco-regional failure; adversely affecting their survival. In our series, there were 2 cases of complete flap loss. In both cases the flap loss was after the 7th post operative day secondary to neck sepsis. Both cases were re-explored but the flaps could not be salvaged due to fulminant infection and thrombosis of internal jugular vein. Secondary salvage reconstruction was performed after control of infection. The overall 92% flap survival rate was found in this series.

In summary, the ALT flap provides adequate soft tissue for reconstruction of large, composite oral cavity defects. Single perforator based ALT flap is a reliable and safe option for reconstruction of multi dimensional complex oral cavity defects.

Conflict of interest statement
None declared.

References


