

Case Report

Anterior Lateral Thigh Flap Salvage Reconstruction of Composite Defects after Recurrent Head and Neck Cancer

Adnan Gelidan *¹

Abstract

The anterior lateral thigh flap (ALTF) provides an excellent free tissue transfer option for one stage reconstruction of large soft tissue defects. The microvascular success rates are equivalent to other methods. Advantages of this flap are numerous.

We describe a 64-year-old woman previously diagnosed with primary squamous cell carcinoma (SCC) of the head and neck. She underwent a local excision and primary closure with selective neck dissection followed by chemotherapy. A recurrence two years later was treated with a complete neck dissection and a second course of chemotherapy. Several years later a second recurrence occurred.

Composite surgical resection was performed, with concomitant reconstruction of the mandible and soft tissue with plate, screws and ALTF. The carotid artery and branch of the external jugular vein were used as the primary recipient vessels. Venous thrombosis occurred on post-operative day 1 and required repeat venous anastomosis. Ultimately, the flap survived completely with no partial flap necrosis.

Keywords: Anterior lateral thigh free flap, head and neck recurrent cancer, head and neck reconstruction, composite resection.

(*J Med J* 2012; Vol. 46 (3):278- 283)

Received

March 28, 2010

Accepted

February 14, 2012

Introduction

Squamous cell carcinoma (SCC) is the most common cancer of the upper aerodigestive tract accounting for 90 – 95%. Tobacco and alcohol are the two main risk factors. Tobacco has been described as the main cause. Alcohol consumption was the second major determinant of head and neck cancer acting synergistically with tobacco. Other predisposing factors may include nutrition, chronic infection, therapeutic side effect, hereditary, and oncogenic viruses such as HPV type16. Eleven percent of oral cancers have separate foci of in-situ carcinoma or isolated islands of invasive SCC.¹⁻²

SCC diagnosis is usually confirmed by scraping, excision, biopsy, or FNA. Imaging investigation includes a U/S, a CT scan, an MRI, a PET scan, and a SPECT scan which can diagnose and stage a tumor, and check the extent of a tumor and its margins.

SCC affecting the floor of the mouth ranks third in the location for SCC of the head and neck, but typically presents late as a ulcer or small mass. Tongue cancer in the early stages can be treated equally well with surgery or irradiation where many lesions can be excised per-orally. Elective neck dissection is indicated in both.^{3, 4}

1. MD, FRCSC, Kingdom of Saudi Arabia.

* Correspondence should be addressed to:

Adnan Gelidan

E-mail: Dr.agelidan@gmail.com

© 2012 DAR Publishers/ University of Jordan. All Rights Reserved.

Patients who underwent salvage resection and reconstruction surgery had significantly improved salvage rates compared to those who received chemotherapy and radiotherapy alone.

This paper was done to show the versatility of ALTF in treating complex recurrent head and neck squamous cell carcinoma with previous radiation therapy, neck dissection surgery and limited recipient neck vessels.⁵

Case Report

A 64-year-old female presented with multiple ulcerative nodules involving the tongue, the floor of the mouth and chin skin. Past medical history is significant for diabetes and hypertension. She is a non-smoker and a non-drinker. Past surgical history is significant for squamous cell carcinoma of the tongue which was resected surgically through a per-oral approach and closed primarily. A selective neck dissection was also done, followed by a chemotherapy course 4 years ago. Two years later, the patient had a recurrence of her cancer which was treated with a complete neck dissection and second course of chemotherapy.

Recently she developed her second recurrence. Her inability to eat and significant pain were the reasons to seek further medical care. A biopsy was done, documenting recurrent SCC. CT scans of the head and neck showed mandibular involvement and no lymph node disease, with a negative metastatic work-up.

The patient was reviewed at tumor board rounds with the decision that the patient would benefit from composite tumor resection with a segmental mandibulectomy and free tissue transfer, but no radiation therapy.

Mandibular reconstruction was with a 2.4 mm titanium plate, and soft tissue reconstruction utilized an ALTF, where no bone was used. The posterior tongue was reconstructed with the superior portion of the ALTF as this was the thickest part of the flap. The anterior tongue, lower lip, and chin skin were reconstructed with the inferior (distal) thin part of the ALTF. After anesthesia clearance, the patient underwent the planned procedure. Recipient vessels were the external carotid artery in an end-to-side fashion and the branch of the external jugular vein in an end-to-end fashion.

The patient was moved to the ICU for hourly flap monitoring, and 12 hours later the flap showed clinical signs of venous congestion, for which the patient was taken back to the operating room urgently. Flap salvage was achieved by decompressing the flap surgically, administering an IV heparin systemically and intra-flap, and performing a repeat venous anastomosis to the internal jugular vein in an end-to-side fashion. Post-operatively the patient did well. The flap survived completely with no evidence of partial necrosis. The patient was discharged after 20 days with a prophylactic tracheotomy and tube feeding. Her donor site healed primarily with no evidence of a functional deficit.



Figure (1) : Recurrent SCC presented with ulcerated lesion and nodule involving the tongue, lip, chin skin a. (Left) Pre-operative picture b. (Right) After intubation.

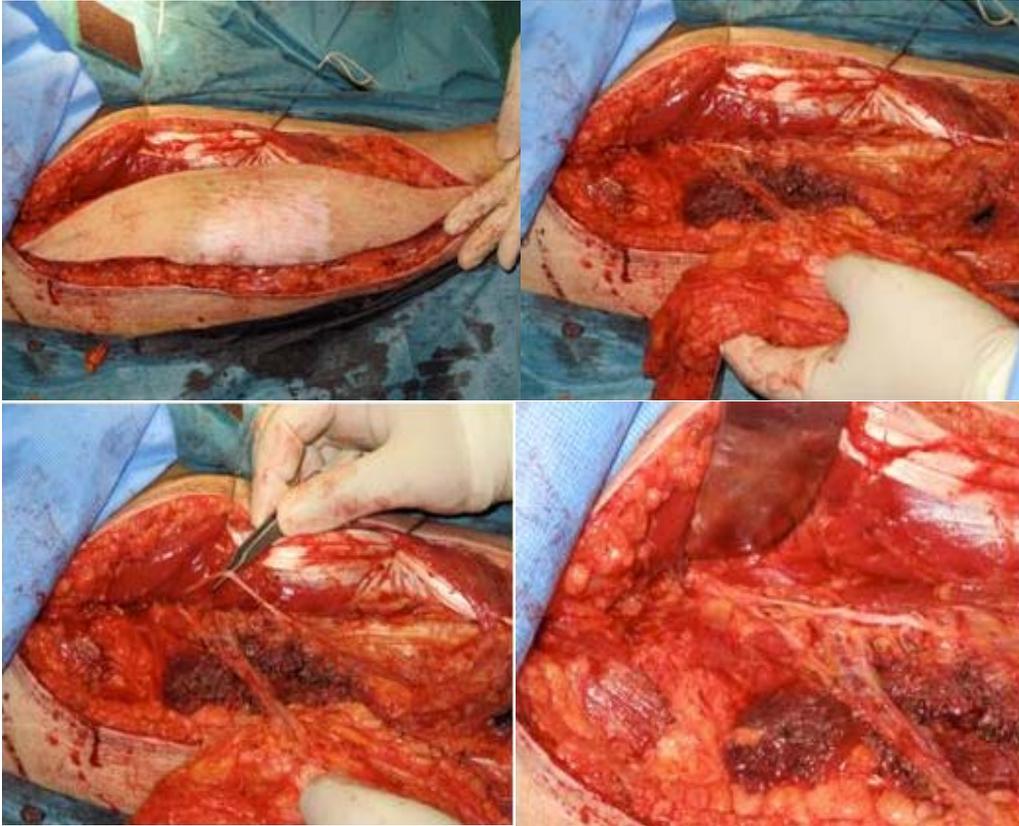


Figure (2): Anterior lateral thigh flap harvest a. (Top left) Flap dimension width and length b. (Top right) Second perforator from the descending branch of the lateral femoral circumflex artery dissected through the vastus lateralis muscle c. (Bottom left) Motor nerve branch to anterior compartment muscle group d. (Bottom right) Magnified view of the flap perforator exiting the main pedicle.



Figure (3): Defect after resection of SCC tumor from the tongue, floor of mouth, lower lip, chin skin, and segmental mandibulectomy.



Figure (4) : Anterior lateral thigh flap Post-operative oral cavity, lower lip, and chin reconstruction pictures a. (Top) Immediate post-operative b, c. (middle, and lower) At two month follow-up.

Discussion

Anterior Lateral Thigh (ALT) free flap has emerged as an alternative method for the defect coverage for the ablative surgical head and neck cancer procedures. Traditionally, the reconstruction ladder was followed which did not always provide the best results. Primary closure was feasible for small lesions only, secondary intension, and skin grafting when used as a reconstruction option but causing extensive scarring with disfigurement and poor functional results.

Flap reconstruction could be either local or distant pedicled flaps. Local flaps have the disadvantage of being involved in the radiation field resulting in poor tissue for reconstruction. Distant pedicled flaps are mostly musculocutaneous utilizing muscles like the pectoralis major, latissimus dorsi, sternocleidomastoid, platysma, and trapezius. They often require multiple staged procedures with increased morbidity and concerns regarding pedicle length, arc of rotation, difficult inset, functional loss at the donor site, and less satisfying cosmetic results.⁶

Free tissue transfer has become the standard of care for major head and neck cancer reconstruction. The ALT free flap has gained major popularity among reconstructive surgeons over the past decade.

It was first described in 1983. Its advantages include having one of the largest surface areas of skin flap available, thin and pliable skin, and the capacity to be innervated. Furthermore, its long vascular pedicle (12 - 15 cm and a vessel diameter of 2 – 3 mm) enters the mid-portion of the flap allowing the flap to be freely contoured and positioned into distant defects while utilizing recipient vessels far from the resection area. It also has the advantage of facilitating a two team approach in major reconstruction cases. Lastly, the morbidity is minimal as no functional muscle is taken and the donor site is closed primarily in the majority of cases.

While fat deposits that are usually distributed more proximally may be used to provide the bulk, thinner distal parts of the thigh are more suitable to reconstruct the thin oral part. The major cutaneous artery is the second or third perforator of the descending branch of the lateral circumflex femoral artery between rectus femoris and vastus lateralis. The course of the perforator is musculocutaneous in 85% and septocutaneous in only 15%. The success rate for the ALT free flap is around 97% for head and neck reconstruction.⁷⁻¹¹

Flap survival is in the range of 95% for head and neck cases. Flap failure most commonly occurs due to venous thrombosis and is attributed to technical errors on the anastomosis or a incorrect choice of recipient veins. Studies show that the

IJV rate of thrombosis is 25% in the early post-operative period (1-7 days), and long-term follow-up for at least three months, which shows a IJV thrombosis rate of 5.8%.

Use of these recipient veins may lead to post-operative venous failure of the flaps. A salvage procedure may require an immediate return to the operating room to release the thrombosis using intra-flap heparin, streptokinase, or t-PA as needed. This is usually followed by redo anastomosis or choosing another vessel if the recipient vessel is thrombosed. Post-operative IV heparin or Dextran may be needed.¹²⁻¹⁵

Conclusion

Free tissue transfer with an ALT flap is becoming a popular flap to reconstruct large head and neck defects. Flap utility is superior and morbidity is minimal. The choice of recipient vessels is crucial to ensure adequate flap perfusion. Post-operative hourly clinical assessment is important to ensure flap survival and enable salvage if the flap becomes vascularly compromised.

References

1. Lissowska J, Pilarska A, Pilarski P, Samolczyk-Wanyura D, Piekarczyk J, Bardin-Mikolajczak A et al. Smoking, alcohol, diet, dentition and sexual practices in the epidemiology of oral cancer in Poland. *European Journal of Cancer Prevention* 2003 Vol. 12 No. 1.
2. Ide R, Mizoue T, Fujino Y, Hoshiyama Y, Sakata K, Tamakoshi A et al. Cigarette smoking, alcohol drinking, and oral and pharyngeal cancer mortality in Japan. *Oral Dis.* 2008;14(4):314-9.
3. Carlos de Vicente J, de Villalain L, Torre A, Pena I. Microvascular Free Tissue Transfer for Tongue Reconstruction After Hemiglossectomy: A Functional Assessment of Radial Forearm Versus Anterolateral Thigh Flap. *J Oral Maxillofac Surg.* 2008 Nov; 66(11):2270-5.
4. Greven KM et al: Positron emission tomography of patients with head and neck carcinoma before and after high dose irradiation. *Cancer* 74: 1355, 1994.
5. Makitie A, Peasley N, Neligan P, Lipa J, Gullane P, Gilbert R. Head and Neck Reconstruction with anterolateral thigh flap. *Otolaryngol Head Neck Surg.* 2003; 129(5):547-55.
6. Bianchi B, Ferri A, Ferrari S, Copelli C, Poli T, Sesenna E. Free and locoregional flap associations in the reconstruction of extensive head and neck defects. *Int. J. Oral Maxillofac. Surg.* 2008; 37: 723-729
7. Celik N, Wei F, Lin C, Cheng M, Chen H, Jeng S et al. Technique and Strategy in Anterolateral Thigh Perforator Flap Surgery, Based on an Analysis of 15 Complete and Partial Failures in 439 Cases. *Plast Reconstr Surg.* 2002 June; 109(7):2211-6; Discussion 2217-8.
8. Novak C, Lipa J, Noria S, Allison K, Neligan P, Gilbert R. Comparison of Anterolateral Thigh and Radial Forearm Free Flap Donor Site Morbidity. *Microsurgery.* 2007; 27(8):651-4.
9. Chen C, Chen C, Lai C, Lin S, Huang Y, Sbieb T. Anterolateral Thigh Flap for Reconstruction of Head and Neck Defects. *J Oral Maxillofac Surg.* 2005 Jul; 63(7):948-52.
10. Valentini V, Cassoni A, Marianetti T, Battisi A, Terenzi V, Iannetti G. Anterolateral Thigh Flap for the Reconstruction of Head and Neck Defects: Alternative or Replacement of the Radial Forearm Flap? *J Craniofac Surg.* 2008 Jul; 19(4):1148-53.
11. Nakayama B, Hyodo I, Hasegawa Y, Fujimoto Y, Matsuura H, Yatsuya H et al. Role of the Anterolateral Thigh Flap in Head and Neck Reconstruction: Advantages of Moderate Skin and Subcutaneous Thickness. *J Reconstr Microsurg.* 2002 Apr; 18(3):141-6.
12. Okazaki M, Asato H, Takushima A, Sarukawa S, Nakatsuka T, Yamada A et al. Analysis of Salvage Treatments following the Failure of Free Flap Transfer Caused by Vascular Thrombosis in Reconstruction for Head and Neck Cancer. *Plas Reconstr Surg.* 2007 Apr 1; 119(4):1223-32.
13. Hanasono M, Barnea Y, Skoracki R. Microvascular Surgery in the Previously Operated and Irradiated Neck. *Microsurgery.* 2009; 29(1):1-7.
14. Yazar S. Selection of Recipient Vessels in Microsurgical Free Tissue Reconstruction of Head and Neck Defects. *Microsurgery.* 2007 ; 27(7) :588-94.
15. Fukuiwa T, Nishimoto K, Hayashi T, Kurono Y. Venous thrombosis after microvascular free-tissue transfer in head cancer reconstruction. *Auris Nasus Larynx.* 2008 Sep; 35(3):390-6. Epub 2008 Jan 31.

ترميم وانقاذ نسيج الفخذ الجانبي الأمامي لعيب مركب لسرطان متكرر لمنطقة الرأس والرقبة

عدنان جليدان

المملكة العربية السعودية

الملخص

الأنسجة المأخوذة من منطقة الفخذ الأمامية الجانبية، توفر خيار ممتاز لنقل الأنسجة عن طريق الجراحة المجهرية الدقيقة، لمرحلة الإعداد والترميم لوأحدة من العيوب المركبة للأنسجة. معدلات الاعتلال والنجاح مساوية للأساليب الأخرى .
شخصت امرأة عمرها 64 عاما بمرض السرطان بمنطقة الرأس والعنق. خضعت لاستئصال محلي للورم واغلاق ابتدائي مع تشريح انتقائي للرقبة، تليها دورة للعلاج الكيماوي .وبعد عامين حصلت على تشريح كامل للعنق ودورة ثانية من العلاج الكيماوي لتكرار الإصابة بالسرطان .بعد سنوات المريضة حصلت على سرطان ثاني للرأس والعنق .حصلت المريضة على بتر جراحي مركب وترممت بواسطة استخدام الأنسجة المأخوذة من منطقة الفخذ الأمامي الجانبي .وللجراحة المجهرية استخدمت الوريد الخارجية، والشريان السباتي الخارجي .
واعتلال للترميم بسبب تجلط وريدي وقد تم انقاذ النسيج الترميمي . الترميم النسيجي قد نجح تماما من دون أي نخر جزئي للنسيج
الكلمات الدالة: نسيج الفخذ الجانبي الأمامية بالطريقة المجهرية الدقيقة، سرطان الرأس والعنق المتكرر وترميم الرأس والرقبة، بتر مركب.