

Free Flaps Reconstruction in Head and Neck Cancers: Frequency and Outcome in a Tertiary Care Hospital

Free Flaps
Reconstruction in
Head and Neck
Cancers

Fahmina Buriro¹, Syed Akbar Abbas², Syeda Amna Bukhari³, Mazhar Nizam¹, Furqan Mirza⁴ and Sana Sadiq⁵

ABSTRACT

Objective: To determine the Frequency of different Free flaps for head and neck reconstruction and their outcome.

Study Design: Retrospective study

Place and Duration of Study: This study was conducted at the Plastic and reconstructive surgery department and department of ENT, head and neck surgery, Patel Hospital Karachi from July 2011 to June 2015.

Materials and Methods: 110 patients with different head and neck cancer who underwent reconstruction with free tissue transfer were evaluated. Most of the free flaps performed for squamous carcinoma of cheek with or without bony involvement. There were 93 free flaps for soft tissue reconstruction and 16 for bony reconstruction.

Results: The most common free flap performed was Anterolateral flap (n: 50) followed by radial forearm flap (n:44) and free fibular flap (n: 16) An overall success rate of 94.5% for free-tissue transfers is reported. Radial forearm was most common flap for tongue reconstruction and anterolateral thigh flap for cheek and other larger defects while fibular free flap for bony reconstruction. Donor and recipient site complications, including flap failures and anastomotic revisions, are analyzed in detail with respect to age, radiation status, donor site, and primary or recurrent neoplasm.

Conclusion: Different Microvascular free flaps in head and neck depends on type, size and composition of defect and surgeon's preference and expertise and anterolateral thigh flap has become most popular free flaps for variety of defects.

Key Words: Microvascular, free flaps, reconstruction, head and neck

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INTRODUCTION

Microvascular free-tissue transfer to the head and neck has become most popular method of reconstruction nowadays. Reconstruction in head and neck require complex reconstruction. It ranges from lining defect to composite defects involving soft tissue as well as bone. Time of patient presentation is very important. If patient presents early and T stage is low reconstruction will be simpler than the patients present late with advanced T stage making reconstruction more

challenging and difficult. Key to success of surgery is choosing an appropriate reconstructive option based on the patient's requirements and fitness for major surgery. Where possible, free tissue transfer provides the best functional and aesthetic outcomes for the vast majority of defects.⁽¹⁾ Free flaps offer more reliable wound coverage with superior cosmetic and functional outcome and minimized donor site morbidity as well. There are many different free flaps used worldwide depend on site size and composition of recipient defect, surgeon's expertise and preferences. Perforator flaps rapidly gained popularity due to their main advantages: sparing of the underlying muscle with the resultant decreased donor-site morbidity and the possibility of improving aesthetic outcome.⁽²⁾

Regarding choice of free flaps, majority of surgeons set their preferences for small soft issue and lining defects, large soft tissue defects and composite defects necessitating bony reconstruction. Anterolateral thigh flap is nowadays flap of choice for large soft tissue defects because of its versatility. The choice of an osseous flap for mandibular reconstruction depends on pedicle length requirement and the availability of donor tissue.⁽³⁾Free fibula is still first choice of majority of head and neck reconstructive surgeons for these reconstructions. For lining defects and tongue reconstruction there are various options in modern era

¹. Department of Plastic Surgery, Patel Hospital, Karachi.

². Department of ENT, Agha Khan University, Karachi.

³. Department of Otorhinolaryngology, Fatimiyah Hospital, Karachi.

⁴. Department of ENT, Jinnah Medical & Dental College, Karachi.

⁵. Department of ENT, Sir Syed Medical College, Karachi.

Correspondence: Fahmina Buriro, Consultant Plastic Surgery, Patel Hospital, Karachi.

Contact No: 0300-2294189

Email: fahmina.fame@gmail.com

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like thinned ALTF, MSAP, lateral arm flap etc. but still radial forearm and rectus abdominis flaps are widely used for such defects.

Several flaps, including the anterolateral thigh, fibula osteocutaneous, and suprafascial radial forearm fasciocutaneous free flaps, have emerged as workhorse flaps for reconstructing a wide variety of defects. As the anatomy of these flaps has become more familiar, their reliability and versatility have increased.⁽⁴⁾

Success rate of free flaps routinely exceeds more than 95% in majority of centers practicing microsurgery.⁽⁵⁾ Re exploration of flaps is most of the time because of venous compromise followed by arterial compromise and with timely pick of problem and urgent re exploration majority of flaps survive.⁽⁶⁾ Complications like wound infection and dehiscence, neck hematoma formation, fistula, implant exposure vary with center to center but are well documented complications in head and neck reconstruction.

MATERIALS AND METHODS

A retrospective review was carried out of all patients who underwent free flap surgery for head and neck cancer reconstruction at Plastic and reconstructive surgery department of Patel hospital Karachi; between July 2011 to June 2015 to evaluate the frequency and outcome of different free flaps over this period. Data was collected about age, gender, comorbids, radiation, and histopathology, stage of disease, site and size of defect, flap chosen, donor site closure, early flap complication and final outcome of flap. A flap was labelled as successful if it survived with or without any complications. We compared the flap failures with age, comorbids, radiation and type of flap.

During this study period 110 free flaps were done to reconstruct variety of defects. Most of the free flaps performed for squamous carcinoma of cheek with or without bony involvement (n=72) followed by tongue (n=15) mandibular body (n=6) retro molar area (n=6) palate (n=4) lower alveolar ridge (n=4) lip (n=3), There were 93 free flaps for soft tissue reconstruction and 16 for bony reconstruction, as shown in Figure 1.

Among these 110 patients 71 were male and 29 females with mean age of the patient was 47 years. 18 patients had comorbids among which diabetes mellitus, hypertension and hepatitis C were most common comorbids. Number of patients presented with primary lesion was 100 while 4 residual, 3 recurrent and 3 presented with synchronous lesions. T4 was observed to be most common T stage both clinically (n:56) and pathologically (n:39). Cervical lymph nodes were involved clinically (n:47) and pathologically (n:45). Squamous cell carcinoma, as shown in Figure 2.

Surgical protocol and Technique: Our protocol was to evaluate the patient pre operatively in weekly combine ENT/Plastic surgery clinic (head and neck clinic) after complete work up and selected patients

discussed in official MDTs. In our unit we routinely did anterolateral thigh flaps for soft tissue defects, radial forearm for majority of tongue and lining defects and fibula for mandibular reconstruction, as shown in Figure 4.

Statistical Analysis: Data was entered and analysis in to SPSS version 22. Descriptive statistics were calculated in term of mean ± SD as appropriate. Categorical variable was computed in term of frequency and percentages. All results were display in the form of charts and tables.

RESULTS

A total of n=110 patients of free flap meeting the inclusion criteria were enrolled in the study. The most common free flap performed was Anterolateral flap (n: 50) followed by radial forearm flap (n:44) and free fibular flap (n: 16). Soft tissue reconstruction was performed in 94 (%) and bony reconstruction along with soft tissue was done in 16 (%), depicted in Figure 4. Complete flap survival was obtained in 104 patients (94.5%). Eight flaps got compromised out of which 5 flaps were re explored and 3 were not re explored. Among 5 re explored flaps 3 had venous compromise, one had arterial compromise and one had neck hematoma causing compression over pedicle which was otherwise normal. Two flaps survived and 3 did not survive after re exploration. Among three flaps which could not re-explored, 2 had venous and one had arterial compromise clinically, as shown in Figure 3.

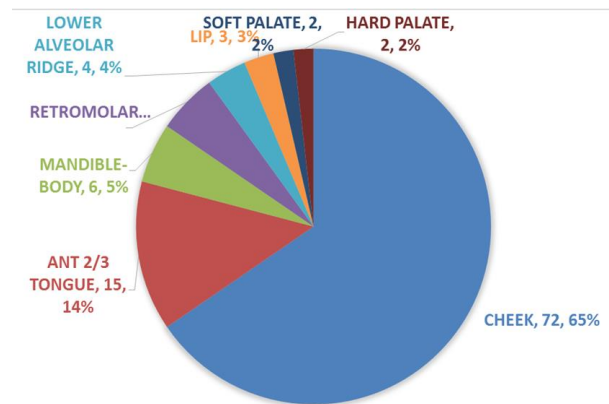


Figure No.1: Site of Lesion

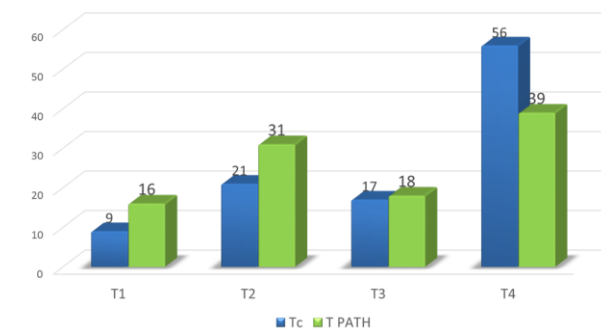


Figure No.2: Size of the Lesion

Complications other than flap compromise were observed in 26(23%) flaps. These were neck wound infection (6.3%), flap dehiscence (4.5%), donor site graft loss (4.5%), chest infection (3.6%), hematoma without flap compromise (1.8%), lower lip necrosis (0.9%), partial flap necrosis (0/9%), as shown in Figure 3.

We compared the flap failure with age of patient by dividing patients in 2 groups. First group was of age below 45 years and second group of age above 45 years. In first group number of patients were 54 and in second group number of patients were 57. In first group number of flap failure were 3(2.7%) and in second group number of failure were also 3 (1.7%) suggesting that advanced age does not statistically significant have impact on flap failure. We compared the flap failure with history of previous radiation. Nine patients had history of radiation (8.1%), among which 2 (22%) patients faced flap failure. So, among 6 flap failures 2 (33.3%) had history of radiation suggesting previous radiation has role in flap failure.

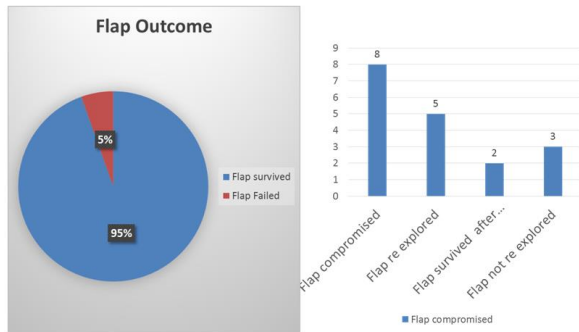


Figure No.3: Flap Success and Failures



Figure No.4: A: Anterolateral thigh flap for composite cheek defect, B: Radial forearm free flap for tongue reconstruction, C: Fibular free flap for mandible and soft tissue defect

We compared the flap failure with history of comorbid. Among patients with comorbid, 3 (16.6%) had flap failure while among patients without comorbid flap failure was observed in 3 (3.2%), suggesting comorbidities has role in flap failure.

We compared the flap failure with type of flap. Anterolateral thigh flap has highest number of failure (n:3) followed by free fibula flap (n:2) and radial forearm flap (n:1).

Radial forearm was most common flap for tongue reconstruction and anterolateral thigh flap for cheek and other larger defects while fibular free flap for bony reconstruction. Overall success rate of 94.5 % were found more statistically Significant for success rate (P<0.0001).

DISCUSSION

Reconstruction in head and neck cancer has always been a challenge. These defects need to be reconstructed at the same time after ablative surgery to maintain form and function of highly specialized region of head and neck. In search of replacing like with like tissue researchers has done extensive job.⁽¹⁾

Since the advent of free tissue transfer, marked improvement in both form and function is noticed. Free flaps are nowadays mainstay of head and neck reconstruction in majority of centers practicing head and neck cancers worldwide.

With advances in the field of free flaps and advancement in knowledge of anatomy, new flaps and flap techniques also emerged. Perforator flaps revolutionized the free tissue transfer surgery. There are so many flaps available in human body but not all of them got popularity in routine use. Commonly used flaps for soft tissue reconstruction are anterolateral thigh flap, radial forearm flap, lateral arm flap, latissimus dorsi flap, thoracodorsal artery perforator flap, rectus abdominis and its variants etc. while for bony reconstruction most popular flaps is free fibula flap, followed by DCIS, scapula, and radius. Each flap has its own merits and demerits in regard to elevation, length of vascular pedicle, diameter of vessels, quality and quantity of soft tissue and bone, and donor site morbidities. Selection of flap has its own learning curve for reconstructive surgeon. In my personal experience young reconstructive surgeons want to do each and every flap but with the time and experience they realize that not each and every flap is worth doing and consistency of their success with particular flaps help them decide their choice with high comfort level. Donor site considerations are highly considered in selection of free flaps in current era.

We evaluated our 110 free flaps in head and neck reconstruction done in 4 years' time which is not a big number as compared to many other centers. We found in our data that we are doing three most commonly used free flaps in head and neck cancer reconstruction with consistent results and with the time operative time has reduced significantly. Senior author (dmn) has been using latissimus dorsi free flap, rectus abdominis free flap, and gracilis free flap in non-head and neck reconstruction but for head and neck he worked mostly on three free flaps, and set an institutional practice of doing radial forearm for tongue and lining defects, anterolateral thigh flap for large soft tissue defects and fibular flap for bony reconstruction. Although

sometimes we used radial forearm for medium size soft tissue defect and ALTF for tongue reconstruction and very large soft tissue and bony defect with reconstruction plate and ALTF.

We discuss the case in combine head and neck clinic with our otolaryngologist and make individualized plan for each case. In some high-risk patients and for patients not fit for prolonged surgery we make different plan with pedicled flap also.

In our set up late presentation is very common and, in our data, high number of patients presented in T4 stage, as shown in Figure 2. Such patients are also big challenge for both ablative and reconstructive surgeons. Many patients present with history of reduced mouth opening to general physical and then found to have ulcer. Squamous cell carcinoma is most common presentation in our data as well as worldwide.

A number of authors have investigated the causes and timing of flap failure. In a series of 990 patients Kroll et al reported that 50 cases (5.1%) developed pedicle thrombosis.

Venous thrombosis was more than twice as common as arterial thrombosis and tended to develop later. Hidalgo et al identified venous problems (35%) as the most common etiology of flap failure followed by arterial problems (28%), hematoma (26%) and recipient vessel problems (11%).^(6, 8) In our data also venous complication is the most common complication and reason for flap failure. We documented venous compromise (4.5%), arterial compromise (1.8%) and hematoma (0.9%). Grammatica et al reported no role of advancing age in flap failure in their study on expected outcome of free flaps in elderly.⁽⁷⁾ We also did not find more failures in elderly patients.

Overall success rate of free flaps varies in literature from 94% to 97% and some centers reported even more than 97%.⁽⁵⁾ We documented overall success rate of 94.5% which is comparable with international standards.

Successful free flap is sometimes not enough for patient of head and neck if functional outcome is not good or if patient is not satisfied with cosmetic appearance of flap. Patient develops problems after radiation therapy. And majority of patients with advanced stage has reduced mouth opening pre operatively which further reduced after radiation. This is limitation of our study that it does not address late outcomes as true success can be better determined by late outcome of surgery. In this situation a prospective series or retrospective cohort is highly recommended.

CONCLUSION

Different Microvascular free flaps are used in head and neck depends on type, size and composition of defect

and as far as success rate matches standard and donor site morbidities are minimized choice of flap is surgeon's preference and expertise. Anterolateral thigh flap has become most popular free flaps for variety of defects.

Author's Contribution:

Concept & Design of Study: Fahmina Buriro
 Drafting: Syed Akbar Abbas, Syeda Amna Bukhari
 Data Analysis: Mazhar Nizam, Furqan Mirza, Sana Sadiq
 Revisiting Critically: Fahmina Buriro, Syed Akbar Abbas
 Final Approval of version: Fahmina Buriro

Conflict of Interest: The study has no conflict of interest to declare by any author.

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