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Free-flap reconstitutions of head and neck defects after oncologic ablation

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Abstract

Background: Head and neck cancers are the sixth most common cancers worldwide. The primary treatment modality for most head and neck cancers is surgery with reconstruction of resultant defects. Reconstruction of these defects is a unique challenge as it has to not only restore integrity but also function and often cosmesis. The objective of this study was to assess the utility of free flaps in the reconstruction of these defects, done in a tertiary care centre in a three-tier city in India. **Methodology:** We analyzed the computerized medical records of the last 3 years in this retrospective study carried out in the department of head and neck oncology at the cancer centre. The study included cases that had undergone surgery for head and neck cancer and underwent free flap reconstruction. **Results:** Out of the 1061 cases requiring reconstruction after an oncologic ablation, 201 cases underwent free flap reconstruction. For defects requiring Facio cutaneous reconstruction, the radial forearm was the preferred donor free flap site, while the fibula was the preferred donor site for mandibular reconstructions survival rate was 94.5%, with factors like age and comorbidities like diabetes and hypertension or habits like cigarette smoking or tobacco chewing not affecting survival rates. Twenty cases of minor flap complications were observed. **Conclusions:** Free flap reconstructions for head and neck defects after oncologic ablation has been a boon with good survival rates and immense flexibility of use, giving good cosmetic and functional outcomes. Our study shows that a significant number of free flap reconstructions can be done in a tertiary care centre in a three-tier city in India with an internationally comparable survival rate

Keywords: free flap, oncoplastic reconstructon, Free Radial Forearm Flap, Free Fibula Flap, Free Anterolateral Thigh Flap

Introduction

Reconstruction of head and neck defects following onco-ablative surgery is challenging due to the variety of tissues involved in the defects. The variety of tissues involved: skin, mucosa, soft tissue, and bone, along with the complex anatomy of the head and neck, which is involved in the functions of breathing, speech, deglutition, and facial expression, require reconstruction to restore form, function, and cosmesis [1-8].

Options for reconstructing such defects include skin grafting, local flaps, pedicled flaps, and free flaps. The PMMC flap has been and still is the most common way to repair head and neck defects in most parts of India because of a lack of resources and expertise in the three-tier cities and rural areas where people live and work. In the past few years, free flap surgery has been gaining popularity despite the fact that flap failure is a

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major challenge. Another challenge for smaller cities and rural areas has been the availability of expertise and other resources to carry out free flap reconstructions with internationally comparable flap survival rates.

Our study demonstrates that many free flap reconstructions can be carried out in a three-tier city in India with internationally comparable survival rates [9].

Materials and Methods

Study location: Department of head and neck oncology, HCG Manavata Cancer Centr, Nashik

Study period: Three years from March 2014-March 2017

Inclusion criteria: Cases that had undergone Free Flap reconstruction for Oncoablative surgery, were included in the study.

Exclusion Criteria: Patient undergoing reconstruction by other methods except Free Flap Reconstruction

Sample size: Two Hundred and One

Methodology

All medical records were reviewed retrospectively for patients' characteristics, age, type of reconstruction, Co-morbidities, habits of tobacco and alcohol consumption, complications and Flap failures. Data were presented in tables and percentages.

Fig 1. Free Radial Forearm flap inset for Tongue Reconstruction

Fig 2. Free Jejunum Flap Inset

Fig 3. Free Antero Lateral Thigh Flap

Fig 4. Marking for Free Fibula Flap

Results

Table 1. Age wise distribution of cases

AGE (Years)	No of Cases
<10	0
11-20	1
21-30	10
31-40	44
41-50	61
51-60	51
61-70	20
71-80	9
81-90	0

In a period of 3 years, 1061 cases required reconstruction after oncologic ablation. Among these 1061 cases, 201 underwent Free Flap reconstructions, comprising of 174 males and 27 females. Therefore, 87% of the reconstructions were performed on males and 13% on females. Seventy-eight percent of the reconstructions involved patients aged 30–60 years of age. The age range was 12 to 80, with a median age of 46. The most common primary tumor site was the tongue (31.8%), followed by the tonsils and the mouth floor. A donor free flap from the radial forearm was the best choice for repairing defects in the fascia and skin. The fibula was the best choice for reconstructing the mandible. Complications occurred in 20 cases. Flap failure was seen in 11 cases. The free flap survival rate was 94.5%. Failure rates for patients with hypertension

and/or diabetes were 6.25%, and without any comorbidities, it was 5.32%. The failure rate was 9.09% among patients with a history of tobacco and/or alcohol consumption. The risk factors of patients did not increase the complications of free flap transfer. The major donor sites were the radial forearm (69%) and fibula (26%). The failure rates for free radial artery forearm flap, free fibula, and free anterolateral thigh flap were 94%, 96%, and 89%, respectively.

Table 2. Type pf free flap and survival rate

TYPE OF FREE FLAP	n	No of *	Failure	Survival Rate (%)
Free Antero Lateral Thigh Flap	9	2	1	89
Free Fibula Flap	53	4	2	96
Free Radial Artery Forearm Flap	139	14	8	94.25

* Complications

Table 3. No of cases with comorbidities and their habits

No. of cases	No. of cases	Failure rate
With comorbidities	32	6.25
without comorbidities	169	5.32
With habits (tobacco/ alcohol)	150	2.66
Without habits	51	9.80

Discussion

A total of 201 free flap transfers for reconstruction of surgical defects of the head and neck were considered in our study over a period of three years.

In our study, the major donor sites we used were the radial forearm (69%) and fibula (26%), which was comparable to other studies. In a study by Yun Sub Lim et al., the most commonly used free flap transfer was RFFF (57%). In another study by Haughey B et al., the major donor sites were the radial forearm (40%) and fibula (19%). [1, 2]

For defects requiring faciocutaneous reconstruction, the radial forearm was the preferred donor free flap rate for free radial artery forearm flap was 94%, and complications were seen in 13% of cases. According to a study by Yun Sub Lim et al. in the RFFF group, two patients (8.3%) developed partial necrosis and were managed with secondary intention healing [2].

For mandibular reconstructions, we came to prefer the fibula, mainly because it can be harvested easily under tourniquet control with little loss of blood. Also, its versatile cutaneous unit can be used for lining the aerodigestive tract and/or for skin coverage. The survival rate for free fibula thigh flap was 96%, and complications were seen in 6% of cases. This was comparable to a study by Haughey B et al. stating the preference of the fibula over the iliac crest for mandibular reconstructions owing to good hemostatic control. He also stated that these are more prone to the development of atherosclerosis in the arterial pedicle than the iliac crest or scapula [1].

Complications observed in this study included total flap failure as well as minor complications like dehiscence, wound infection, and partial necrosis. Flap failure was seen in 11 cases. A free flap survival rate of 94.5% was observed.

Failure rates for patients with hypertension and/or diabetes were 6.25%, and without any comorbidities, it was 5.32%. The failure rate was 9.09% among patients with a history of tobacco and/or alcohol consumption. In a study by Yun Sub Lim et al., reported complication rates for patients with hypertension and diabetes of 16.7% and 33%, respectively. In the smoking patient group, complications occurred in eight patients (26.7%) [2]. According to our study, risk factors did not increase the complications or failure rate, which were similarly seen in other studies. Bozikov and Arnez reported that only diabetic patients had a higher incidence of free flap complications, although this fact did not achieve significance in the statistical analysis [3]. Bianchi et al. reported a higher frequency of complications in patients older than 70 years, diabetic patients, and patients treated with preoperative radiation, although the differences were not statistically significant [4].

Our flap survival rate was 94.5%, which was similar to another study by Haughey B et al. in which 95% was the flap survival rate [1]. In other major studies by Shaw WW et al., Khouri RK et al., and Hidalgo DA et al., the success rate is reported to be in the range of 91% to 99% in large series [5-7].

Conclusion

Free flap reconstructions for head and neck defects after oncologic ablation have been a boon with good survival rates and immense flexibility of use, giving good cosmetic and functional outcomes. Our study shows that a significant number of free flap reconstructions can be done in a tertiary care centre in a three-tier city in India with an internationally comparable survival rate.

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