



COMPARISON BETWEEN MICROVASCULAR FREE FIBULA & FREE RADIAL FOREARM FLAP AFTER MAJOR HEAD & NECK RECONSTRUCTION

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ARTICLE INFO

Received 10th July, 2020
Received in revised form 2nd
August, 2020
Accepted 26th September, 2020
Published online 28th October, 2020

Key words:

Free flaps; Head and Neck;
Reconstruction; Microvascular

ABSTRACT

Oromandibular reconstruction continues to be a challenge for head and neck reconstructive surgeon. Composite resection after neoplasm results in large soft tissue and bony defects. Microvascular free flap reconstruction after a major head & neck oncological resection is getting popular because of better functional outcome, improved aesthetics & fairly higher success rate. Many techniques are available for functional and aesthetic restoration with osteocutaneous and faciocutaneous free flaps. In this study we will evaluate the clinical outcome with different microvascular flap reconstruction. Several donor sites are available, but the most commonly being used are fibula, radius, scapula and iliac crest. The free forearm flap offers mobile, pliable, thin, sensate soft tissue, without added bulk. These advantages of forearm flap made it a popular option for the reconstruction of oral soft tissue defects with much less donor and recipient site complication rates. However FRAFF was limited to its use for bony reconstruction due to the associated morbidity during harvesting the radius and the limited bone stock (6, 7). Ultimate results are based on pre-existing co-morbidity and the surgeons operating skills.

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INTRODUCTION

Resection of advanced stage malignancies of the head and neck region often require innovative reconstructive procedure. The ideal reconstruction should be performed as a single stage procedure, should be reliable and restore swallowing. Free flaps enable reconstruction of complex mandible, tongue and mid facial resections following extensive oncological resections. Osteocutaneous and faciocutaneous free flaps enable reconstruction of complex areas such as mandible and mid facial following extensive oncological resections. Here we focus on both the donor & recipient site morbidity with two commonly performed free flaps for head & neck reconstruction, namely free fibula flap(FFF) & free radial artery forearm flap (FRAFF) (6, 7).

Objective

- To evaluate the clinical outcome after different microvascular free flap reconstruction following major head and neck oncological resection.

- To compare the clinical outcome between free fibula and free radial forearm flap in a tertiary care hospital.

MATERIAL & METHODS

This is a retrospective & prospective study for different microvascular free flap reconstruction after a major head and neck oncological procedure. The study included 76 patents in a span of 3 years from 1/1/2017 to 31/12/2019.

Mainly two types of microvascular free flaps were used namely free fibula (40) & free radial forearm flap (36).

Patient's demographic data were collected and the surgical outcome measured in terms of flap survival & complication. Post operative functional & oncological outcome were also analyzed.

Medical complications were recorded like pneumonia, myocardial infection, cardiac arrhythmia and deep vein thrombosis that occurred in the post operative period.

RESULT

The present study was conducted to compare the clinical outcome between free fibula and free radial forearm flap in patients undergoing microvascular free flap reconstruction after head and neck oncosurgery procedure. Out of the total (76) patients, (70) were men while (6) were women. The maximum age were 86 & the minimum age 26 years, the mean age being 49 years. The most common tumour location was the buccal mucosa followed by tongue. Histopathologically squamous cell carcinoma was the most common tumour (97%) with most of the patients 69 (91%) being in stage IV disease. A total of 76 free flap reconstructions were performed during the study period. 40 patients underwent FFF reconstruction and 36 patients underwent FRAFF reconstruction.

The most common recipient artery was the facial artery 73(96%), and the most common recipient veins were the internal jugular & ext jugular vein. Six patients landed in complications and out of these three patients required emergency surgical re-exploration, venous thrombosis being the most important cause. The overall flap success rate was 96%. Other complications included wound infection, partial or complete flap necrosis. Majority of the patients had satisfactory cosmetic & functional outcome of both donor & recipient site after 18 months of mean follow up.

The operative time was significantly lower for FRAFF and so does the tourniquet time. Mean time for intensive care unit (ICU) and hospital stay were also shorter for FRAFF. Primary site post operative complications were also less for FRAFF.

The problem with wound infection, wound breakdown & post operative fistula were higher in FFF. The rate of revision of vascular anastomosis of the flap pedicle was similar in both. Rate of flap failure total or partial was more in FFF than FRAFF.

With regard to minor complications, the radial forearm group had a 26% rate of minor flexor tendon exposure after the split-thickness skin graft of the donor site. None of these cases required surgical intervention and all resolved without sequelae and with local wound care.

The mean follow up period was similar in both groups (18months). As most of the patients presented in stage IV disease 69(91%), therefore as expected the follow up period was also significantly affected.

Type of Flap Used In N-76 Cases

Sr.No	Type of Flap	No Patients
1	Free fibula flap (FFF)	40 (53%)
2	Free radial artery forearm flap (FRAFF)	36 (47%)

DISCUSSION

In this study we evaluated a single-institution experience with FRAFF and FFF during the same time period and with the same group of surgeons.

Ling and Peng (2) found that 6.5% patients reported chronic pain (>3months) at the donor site. However, a number of retrospective studies were included in this analysis which may have relied on patient volunteering this information on routine follow-up and therefore underestimated the true incidence of chronic pain after free fibula transfer.

Recipient site surgical complication rate in our study was significantly better in FRAFF as compared to FFF. So was the

microvascular anastomosis success rate being better in FRAFF than FFF owing to decreased chances of atherosclerosis in upper limbs. Similar were the views of Thoma et al (3) & Villaret & Furtran (4).

First introduced in 1978, the FRAFF has been gaining popularity in head and neck reconstruction. Its superior soft tissue characteristics, including thin pliable skin that maintains mobility, contour & lack of bulk make FRAFF a workhorse flap for head and neck reconstruction. These characteristics allow variety of soft tissue defects such as palate, tongue & floor of mouth to be easily reconstructed. The FRAFF was limited in its use for bony reconstruction in the head and neck because of the morbidity of harvesting the radius. Reports of significant donor site morbidity have deterred the use of free osteocutaneous radial forearm flap.

The longer pedicle of the forearm flap & large caliber vessels also simplify the procedure. Another advantage of the radial forearm is that it is a reliable means of restoring sensation of the free flap. Besides the chances of atherosclerosis in upper limb vessels is much less compared to the distal limb vessels.

In our study we also found that the free flap harvest time and the operating time were significantly less in FRAFF and so was the ICU stay making a significant financial saving.

CONCLUSION

Oro mandibular reconstruction continues to be a challenge for head & neck surgeon and reconstructive surgeon. Major oncological resections result in large soft tissue & bony defects. For functional & cosmetic reasons, it is important to maintain the crucial 3-dimension anatomical relationship. Physiological function such as speech, deglutition, mastication & oral competence will certainly be safely affected if these anatomical relationships are not preserved.

Microsurgical free flap reconstruction has proven to be a valuable & reliable method of reconstruction after head & neck oncosurgical procedure. It can be used safely & effectively with minimal morbidity. The reconstruction can be performed by appropriately skilled surgeons with acceptable outcome.

Acknowledgement

The authors are grateful to the management of Shri Sidhivinayak Ganpati cancer hospital, Miraj, for all the necessary support during this study.

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How to cite this article:

Dr Gur Paramjeet Singh Gill *et al* (2020) ' Comparison between Microvascular Free Fibula & Free Radial Forearm Flap after Major Head & Neck Reconstruction ', *International Journal of Current Medical and Pharmaceutical Research*, 06(10), pp 5348-5350.
