

Microvascular Free Tissue Transfer at Chittagong Medical College Hospital – A Milestone

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Abstract:

Introduction:

A defect in any part of the body involving extensive soft tissue loss adversely affects the functional ability. With the advent of microvascular free tissue transfer in the reconstruction of large defects, the problem is going to be solved. However, studies are still going on about the different aspects of its success and failure. The present study is one such step to share our early experience.

Methods:

The study was carried out in the Department of Plastic Surgery, Chittagong Medical College Hospital from August 2009 to April 2010. We reviewed the operative experiences of free tissue transfer on 5 cases. Standard microvascular anastomotic techniques as well as peroperative & postoperative heparinization were maintained in all the cases. Follow up results were evaluated at varying periods following standard protocol.

Results:

Of the 5 cases reconstructed, 4(80%) had lesions in the maxillofacial region and 1(20%) in the ankle region. In terms of diseases they suffered, 3(60%) had squamous cell carcinoma and 2(40%) sustained mechanical injury. The outcome of treatment demonstrates that 3(60%) cases recovered uneventfully, one developed slight loss of sensation on the left thumb (20%) and another one failed to recover (20%).

Conclusion:

In this study successful microvascular free tissue transfer was possible in 80% cases. With the increase in experience we can expect increased success rate as well.

Introduction:

Microsurgical techniques are considered to be an important armamentarium for plastic surgeons. In

fact, the fields of breast reconstruction, head and neck reconstruction and hand surgery have been greatly expanded by the widespread use of reliable, consistent and safe microsurgical techniques.¹

Microsurgical procedures, although equipment- and labour-intensive, allow efficient treatment of selected soft-tissue, bone and peripheral nerve defects. The precise surgical skills required and the high equipment and institutional costs have been deterrents to initiating programs in developing countries.² Besides these, reconstruction after head and neck cancer extirpative surgery frequently requires the replacement of bone and soft tissue to provide the most functional and aesthetic result. Microvascular free flaps have the advantage of providing healthy, vascularized, nonirradiated tissue for recipient sites that may have been compromised by surgery, radiation, chemotherapy, or a combination of the three.

Microsurgery with free muscle and free forearm flap transfer is a recent introduction in Chittagong Medical College Hospital. A total of 5 (five) reconstructions have so far been performed. The experiences gained with these 5 cases need to be shared with

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other reconstructive surgeons at home and abroad. The present study was intended to share our early experience.

Methods:

We reviewed our operative experiences on 5 cases with respect to training and learning gained from Dhaka Medical College Hospital & Ganga Medical Centre. The study includes detailed history, operative technique and the outcome of the procedure. Basic principles of microvascular anastomosis were followed using high magnification Loupe. Intraoperative and postoperative heparinization were done in all cases.

Case-1

Badiul Alam a 48-year old patient got admitted in Chittagong Medical College Hospital with exposed lateral aspect of left ankle having a fracture at the lower end of fibula and calcaneum with loss of soft tissue following a road-traffic accident. He is a known diabetic and smoker.



Fig 1A: Exposed left ankle with soft tissue defect following RTA.

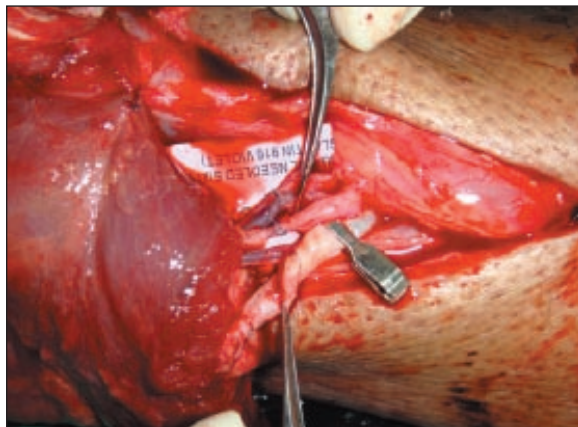


Fig 1C: End-to-end and end-to-side microvascular anastomosis between anterior tibial vessels and the vessels to the muscle.

Being immobilized with 'K-wire', he was referred to Plastic Surgery, where reconstruction was done with Gracilis muscle free flap with split thickness skin graft (STSG). An end-to-side anastomosis was done between anterior tibial artery (4 mm diameter) and an artery of the muscle (2 mm diameter). Two venous anastomosis were performed between anterior tibial vein (3 mm) and the concomitant veins (2.5 mm) from the muscle. Donor site was closed primarily. The period of ischemia was 3 hours.

A bolus dose of injectable heparin (1000 unit) was infused intravenously as soon as the flap circulation established. The same amount was mixed in 500 cc of normal saline and administered daily in IV drip for 5 consecutive days postoperatively. Patient was under insulin therapy and antimicrobial coverage with Amoxicillin+Clavulanic acid and Amikacin. The patient recovered uneventfully.



Fig 1B: 'Gracilis' muscle free flap harvested.



Fig 1D: 3 months postoperative result showing acceptable aesthetic appearance.

Case-2

Md. Javed, 18 years of age, presented with soft tissue loss from the left angle of mouth following a machinery injury.



Fig 2A: Loss of soft tissue from left angle of mouth following machinery injury.

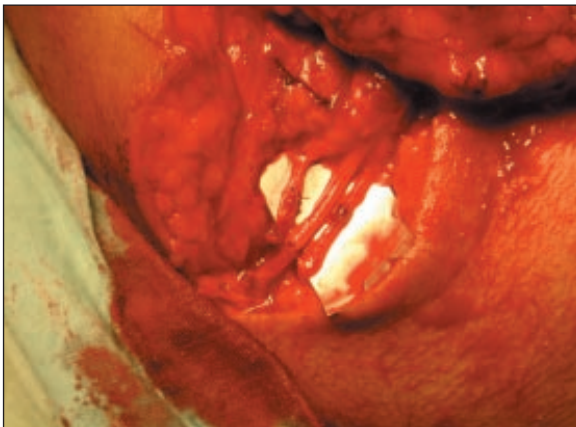


Fig 2B: Microvascular anastomosis showing one artery and two concomitant veins.

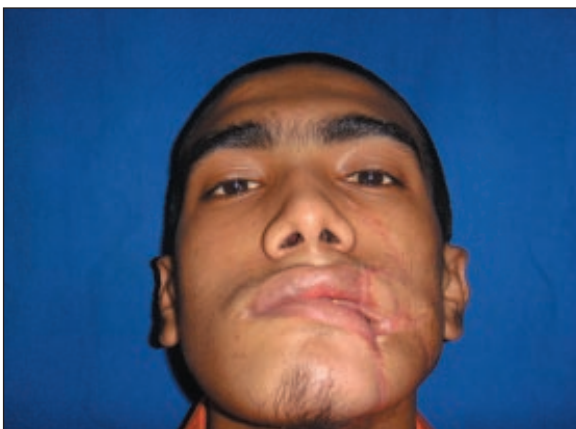


Fig 2C: 6 months postoperative result showing slightly deformed commissure of the mouth.

Reconstruction was done using radial forearm free flap (RFFF) harvested from the left forearm under general anesthesia. Donor site was covered with STSG. Operation was performed in 7 hours with an ischemia time of 2.5 hours. An end-to-end arterial anastomosis was performed between facial artery (2.5 mm) and radial artery (3 mm), while two end-to-end venous anastomoses were performed between concomitant facial veins and radial veins (2.5 mm). Heparinization and antimicrobials used were as in 'Case-1'. The patient recovered with slight loss of sensation on left thumb.



Fig 2D: Healthy donor site of the same patient after 6 months.

Case-3

Mrs. Bibi Jahanara, aged 52-years had been suffering from squamous cell carcinoma (SCC) on the lower lip and left angle of mouth for 6 months.

Treatment includes a wide excision of squamous cell carcinoma followed by reconstruction of left angle of mouth



Fig 3A: SCC on left angle of mouth.

mouth using fasciocutaneous RFFF with STSG on the donor site under general anesthesia. Re-exploration had to be done 3 hours postoperative due to reactionary bleeding. The total duration of operation was 10



Fig 3B: Fascio cutaneous RFFF Harvested from left forearm.



Fig 3C: Immediate postoperative photograph showing inset of the flap rolled over on itself for inner lining.



Fig 3D: 7th postoperative day, showing a little bulky flap with well matched skin colour.

hours with ischemic time of 2 hours. We followed the similar technique of microvascular anastomosis & heparinization. Antimicrobials used were Ceftriaxone, Flucloxacillin and Amikacin. The patient recovered without any major complications.

Case-4

Mrs. Anwara Begum, aged 70, presented with squamous cell carcinoma on left angle of mouth for 7 months.

Management includes wide excision of the lesion followed by reconstruction of left angle of mouth using



Fig 4A: SCC on left angle of mouth



Fig 4B: Recipient site defect after excision.

left RFFF with STSG on donor site. Microvascular anastomosis, heparinization & antimicrobials were the same as in the 'Case-2 & 3'. However, venous congestion of flap was noticed on the 1st postoperative day. Skin pricking was done over the flap to reduce the congestion with a wide-bore needle. But unfortunately, the flap became necrosed on the 3rd postoperative day



Fig 4C: Inner lining is formed by rolling over the RFFF on itself.



Fig 4D: Flap necrosis on 3rd POD.

possibly due to venous thrombosis.

Case-5

Porimal Shil, a 48-year old farmer had a squamous cell carcinoma on right cheek for 8 months.



Fig 5A: SCC on right cheek.

Management includes wide excision of the lesion followed by reconstruction with left RFFF & STSG on donor site under general anesthesia. The duration of operation was 8 hours with an ischemia time of two &



Fig 5B: After excision of the lesion, showing large soft tissue defect.



Fig 5C: 3 months postoperative result showing good aesthetic appearance with well formed right commissure.



Fig 5D: Patient regained good functional result after 3 months.

half hours. Microvascular anastomosis was done as in the 'Case-2, 3 & 4' but only one venous anastomosis was done due to unavailability of another recipient vein. Heparinization and antibiotics were the same as the others.

However, venous congestion of flap was noticed on

4th POD which was managed by needle pricking over the flap. The patient successfully recovered.

Discussion

Reconstruction of defects in the maxillofacial region still remains a real surgical challenge due to its complexity and the tri-dimensional defects responsible for serious functional impairment. Microvascular free tissue transfer offers the surgeon an opportunity to adapt a specific reconstruction of each defect and to allow the patient to lead a near normal social life.³

As a recent introduction of microsurgical reconstruction, it seems important to share our experience. Of the 5 cases reconstructed, 4(80%) had lesions in the maxillofacial region and 1(20%) in the ankle region. In terms of diseases they suffered, 3(60%) had squamous cell carcinoma and 2(40%) sustained mechanical injury. The outcome of treatment demonstrates that 3(60%) cases recovered uneventfully, one developed slight loss of sensation on the left thumb (20%) and another one failed to recover (20%). Marshall and associates⁴ reconstructed six cases that required soft tissue replacement in the central mid-face. The greatest number of flaps was used for large defects in patients with cleft palates who had undergone multiple previous operations. There were no flap losses suggesting that the use of RFFF for face reconstruction gives excellent result if the technique is applied by a competent surgeon.

RFFF since its introduction by Yang et al⁵ has become a workhorse flap in head and neck reconstruction. The RFFF's popularity has stemmed from its superior soft tissue characteristics, which offer a large amount of thin, pliable skin that conforms well to the native contours of the recipient site. The flap is relatively easy to harvest and can be dissected at the same time as the extirpative procedure. It has a long vascular pedicle with large caliber vessels, predictable innervations for establishing local sensation and minimum donor-site morbidity. Though use of free flaps in lip reconstruction have always been criticized for its failure to replace like with like tissue, the 'Case-5' was successfully reconstructed without having any major complications.⁶

Other factors that might preclude optimal results include microvascular thrombosis^{7,8} caused by a less-than-ideal technique,^{9,10} poor choice of recipient vessel, or systemic problems such as arterial hypotension or a hypercoagulable state.¹¹

Conclusion

As amateur, the proportion of uneventful recovery is not less. With the increase of experience and sharing of expertise, uneventful recovery will hopefully be increased making the procedure a popular one. However, as cost of this surgery is still a deterrent factor, Government should come forward to reduce the cost and/or to provide subsidy to the cost incurred, particularly, by the poor patients.

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