

RETROSPECTIVE ANALYSIS OF FACTORS THAT IMPROVE THE SUCCESS RATE OF RADIAL FOREARM FREE FLAP IN THE RECONSTRUCTION OF ORAL CAVITY FOLLOWING RESECTION OF ORAL CANCER

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Introduction

Surgical treatment of Oral Cancer has become a challenging issue because of the late presentation of these patients with advanced lesions requiring wider resections and composite reconstructions. On the other hand tissues used for the reconstruction of oral cavity defects must be adaptable to the oral environment and must have minimum interference to speech, mastication and swallowing. Microsurgery permits transfer of distant tissue flaps with their blood vessels anastomosed to vessels in the neck.

Radial Forearm Free (RFF) Flap is a reliable method for reconstructing a wide range of oral cavity defects with an acceptable low morbidity rate. Introduced by Chinese surgeons in 1978 (Yang, 1981) this flap could be developed to include fascio-cutaneous components based on the radial artery as its dominant vessel. With thin, pliable tissues and a long vascular pedicle, it provides adequate bulkiness resulting in reconstruction of a wide variety of defects within the oral cavity (Muhlbauer, 1982 and Chang, 1982). While the two venae comitantes of the radial artery provide deep venous return, the cephalic vein ensures a well developed superficial venous return. It is possible to retain the communicating vein between these two systems that will help to maintain blood flow to the flap (Tahara 1995, Valentino 1996, Netscher 1996).

Improved success rate with the preservation of the venous communications has been reported (Weerasinghe, 2007). End-to-side anastomosis of veins to the internal jugular vein also has shown to be increasing the venous return (Yamamoto 1999 and Mao

2007). Donor site morbidity is one of the recognized complication of this procedure (Chen, 2005). While total hospital stay for patients who receive pedicle flaps such as pectoralis major has been found to be more than three weeks (Weerasinghe, 2006), factors such as ischaemic time periods and total hospital stay for patients who receive RFF flap operations have not received much attention in the previous studies.

The objective of this study was to identify the factors that help to improve the success of the use of RFF Flap in reconstruction of oral cavity after tumour resection in relation to: possibility of preservation of communication venous systems, anastomosis method, ischaemic times and total hospital stay.

Methodology

This study has been carried out retrospectively on cases operated from April 2006 to June 2008. All RFF Flap reconstructions have been carried out by one operator. Flap harvesting has been performed by raising the superficial veins initially under tourniquet. Preservation of the communication of superficial and deep veins and use of cephalic vein for anastomosis has been adopted in all cases. Diameter of the deep venae comitantes and the cephalic vein ends were measured. During anastomosis of vessels under operating microscope using 10/0 suture material, end-to-side method has been performed between the cephalic vein ends and the internal jugular vein. Primary (during flap raising procedure under tourniquet) and secondary (during anastomosis procedure when there is no blood flow) ischaemic times have been measured.

Donor site has been covered with a split-thickness skin graft. Heparinization has been used for the first three days. All patients were kept in the ICU for first few days and later transferred to the ward and discharged home. Complications of flap reconstructions, donor sites and the total hospital stay were assessed.

Results

A total of 15 cases have been included in this study (male n=13, female n=2). Primary lesions have been diagnosed as squamous cell carcinoma of six well differentiated, seven moderately differentiated and two poorly differentiated. There were seven of T3 size and the rest were of T4. Neck nodes clinically revealed 4 cases of N1, 4 cases of N2b and 7 cases of N2c. All patients were having stage IV lesions. RFF Flap have been used for the reconstruction of buccal mucosa (n=3, 20%) Tongue (n=6, 40%) cheek full thickness (n=4, 26.6%) and alveolus (n=2, 13.3%). Majority of cases recorded a total operative procedure between 6-9 hrs (mean 7.6+/-0.8). All cases recorded primary ischaemic time within 90 min. Majority of cases recorded a secondary ischaemic time of less than 180 min (mean 155.6+/-17.4). Mean diameter of venae comitantes and the cephalic vein branches at the distal end of the pedicle were 1.8+/-1.1 and 2.4+/-1.2 respectively. Radial artery was anastomosed with superior thyroid artery in 9 cases and facial or lingual arteries in 6 cases. Ends of cephalic vein were anastomosed to internal jugular vein with end-to-side method in all cases. Duration of ICU stay was less than 7 days (mean 6+/-0.8), total hospital stay was less than 21 days (mean 17.5+/-3.4) except for the two cases who developed total failure of donor site skin graft. The donor site had revealed successful healing in 9 cases (60%), partial healing in 4 cases (26.6%) and total failure in 2 cases (13.3%). Forearm Flap survival was 100%.

Discussion

In this study majority of oral cancer cases treated belongs to advanced lesions of stage IV. Lesions involving cheek, alveolus and tongue have been treated with this method of

free flap which require a higher surgical skill level and adequate peri-operative care.

RFF Flap is a reliable method used for the reconstruction of defects after oral cancer resection. This study has revealed the importance of preservation of the communication between the deep and superficial venous systems for achieving success in flap survival. This method ensures blood flow from the radial artery to distribute through fascia and skin and follow the cephalic vein ensuring adequate perfusion. The long pedicle and wider diameter of vessels have made anastomosis less cumbersome in this method. End-to-side anastomosis to internal jugular vein may also have contributed to the success of the flap by providing a high pressure venous return from the flap vessels.

Shortened primary and secondary ischaemic times also may have contributed to the satisfactory wound healing. Shorter hospital stay has been observed in RFF flap patients when compared with patients receiving pedicle flaps.

Conclusion

This study concludes that preservation of adequate superficial venous drainage, end-to-side anastomosis and shortened ischaemic time may have an impact on the success of the radial forearm free flap.

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