IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 4 Ver. 11 (April. 2018), PP 34-36
www.iosrjournals.org

Delayed Bipedicle Advancement flap for large middle one-third leg defect: A Case Report

Mittal N Patel[1],Abhinav Kumar Sachdeva[2], Mohammed F.Shaikh[3], Manav P. Suri[4]
(Department of Burns and Plastic surgery, Civil Hospital, Ahmedabad, India)
Corresponding Author: Abhinav Kumar Sachdeva

***Abstract**: Large, lower extremity, soft tissue defect poses a significant challenge and often requires the placement of free flaps, which is a complex procedure and requires microsurgical skills. We report a case of 47 year old male with large middle 1/3 defect having peripheral vascular disease. A delayed bipedicled fasciocutaneous flap was done in two stage and wound was covered which healed well with good cosmetic result. This study is aimed to discuss the use of delayed bipedicled advancement flap in patients with peripheral vascular disease.*

***Key words**: Leg defects, Bipedicle flap, surgical delay*

Date of Submission: 03-04-2018 Date of acceptance: 19-04-2018

I. Introduction

Reconstruction using the bipedicled flaps is an alternative to pedicled flaps and free flaps in large defect with peripheral vascular disease.Large open wounds in the lower limb are usually caused by trauma, tumor resection, peripheral vascular disease and diabetes[1]..Adequate soft tissue coverage of such large wounds is essential to allow for revascularization of underlying tissues. This is needed to reduce the incidence of nonunion and persistent late infections and fulfills the ultimate aim of restoration of limb and maintainence of stability. The reconstruction strategies of such ‘ high-energy’ traumatic defects is challenging due to limited surplus skin and poor circulation[2].A number of local muscle flaps and free flaps are available. Although a very simple and easy to plan and perform, still bipedicle flaps have been used in very rare conditions for the reconstruction of lower limbs. This case report describes our experience with lower extremity wound.

II. Case Report

A 47 year old male patient presented to us with middle 1/3 long defect over anterior aspect of right leg. Patient had road traffic accident 1 month back with crush injury and grade IIIB open fracture of both bone of right leg. He was managed outside with debridement and external fixator and skin grafting and then referred to our hospital for further management.

On presentation, patient had osteomyelitis of tibia and local wound infection. Swab culture and sensitivity was done and patient was started on intravenous antibiotic according to sensitivity and infection was controlled in 1 week. Patient is smoker and had peripheral vascular disease with monophasic velocity on colour Doppler of right leg.

Bipedical advancement flap with delay was planned due to peripheral vascular disease. Defect size 14 x 4 cm and flap size 30 x 8 cm. after 10 days division and inset was given as flap was healthy. Donor sire closed with split skin grafting. Complete wound coverage with flap was achieved and post operatively wound healed completely.

III. Discussion

Traumatic open surgical defects in the lower limb occur frequently and may cause soft tissue defects and bone exposure. This requires the intervention of a plastic surgeon to obtain adequate soft tissue coverage as open surgical defects may lead to malunion and infections[3].Often free flaps are used for the coverage of defects. There has been a major switchover in the treatment of soft tissue defects in open fractures. A strong inclination has developed towards non-microvascular flaps rather than the time-consuming and tedious free flaps. Local flaps are reliable, robust and technically less demanding techniques allows covering small and moderate sized soft tissue defects. Fairly high incidence of failure and the expense of the treatment has led to the sharp decline in the usage of microvascular flaps in the management of acute lower limb trauma. The salvage of limb after failure of free flap is even more difficult[4].These factors reveal that free flaps are useful only when

the locoregional flaps are not possible either because of the large size of the defect or extensive local tissue trauma. In propeller flaps, because of pedicle bending, torsion partial/ total flap failure or venous problems can be observed[5].Bekara et al.compared pedicled perforator flaps with free flaps in the reconstruction of the lower extremity and observed similar complications with both flaps[6].

Because of their various advantages, bipedicled flaps are used in the reconstruction of the lower extremity. Major advantages include the flap being easier compared with microsurgery techniques, having a safe circulation, minimum donor site morbidity, and less postoperative monitorization need.

It is also important for the reconstruction to be performed using a similar tissue. In a study for tibia or implant exposed defects, bipedicled fasciocutaneous flaps were very useful as closing with similar tissue in such defects.Moreover leg defects in the limbs with peripheral vascular disease pose a great challenge for the reconstructive challenge. Due chronic limb ischemia and poor vessel wall condition, these patients are not good candidates for free flaps or unipedicle local flaps. Bipedicle flaps provide an innovative option to circumvent this difficulty by providing improved blood supply due to bipedicle nature of the flap and it can be tailored to cover the large defects. Failure of flap can further be prevented by flap delay.

IV. Conclusion

Bipedicled advancement flaps offer a simple alternative for covering complex open and large wound of the lower extremities. It becomes even more useful in patients with peripheral vascular disease where free flap and unipedical flap are more prone for failure. As a result of the above procedure, full tissue closure and good cosmetic results are achieved with the least damage to the donor site due to dual blood supply. In addition, the operative technique is relatively short and simple to perform, and it doesn't need the use of microsurgical skills and instruments.

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Figure 1- Middle 1/3 defect of right leg with size 14 x 4 cm

Figure 2 – Bipedical advancement flap delayed

Figure 3 – Division and inset of Bipedical flap

Figure 4 – Healed area 2 month post operative.

Figure 5 – Healed donor area

Mittal Patel "Delayed Bipedicle Advancement flap for large middle one-third leg defect: A Case Report"."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 4, 2018, pp 34-36.