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Mini Review

Plastic Surgery

**ABSTRACT:**

Introduction: One of the objectives of the different reconstruction alternatives in plastic surgery is to protect/cover defects and exposed wounds, which favors the restoration/healing process and, in the case of the lower extremities, accelerates the functional recovery of the patient.

If the treatment option is the use of a flap, it must meet vascular flow and permeability as a fundamental requirement, since diabetic patients, with peripheral arterial vascular disease, vasculitis, congestive venous disease and different alterations in the vascular system can condition the failure of the flap. The recent proposals on supermicrosurgery and the multidisciplinary participation between services such as plastic surgery, vascular surgery, traumatology, infectology, endocrinology and rehabilitation can guide towards an ideal therapy with improvement in the quality of life of the patient.

Keywords: Wounds, microsurgery, plastic surgery, super microsurgery, reconstruction surgery, skin grafting, tissue expansion, local flap, regional flap.

Introduction

One of the objectives of the different reconstruction alternatives in plastic surgery is to protect/cover defects and exposed wounds, which favors the restoration/healing process and, in the case of the lower extremities, accelerates the functional recovery of the patient, including mobilization, autonomy and reintegration into their ordinary activities, although in cases where there is vascular compromise the risk of amputation is always present. Ideally, if a wound can be treated with primary closure leaving minimal tension, this treatment option should be chosen. However, it can be very complex for the surgeon to cover large skin defects, especially in the lower extremity, adding the need to preserve the biomechanics of the limb. In orthopedic patients or those with exposed bone tissue, the risk of osteomyelitis increases considerably if adequate coverage by vascularized soft tissue is not achieved, in addition to the imminent risk of necrosis and sepsis, especially in immunocompromised and/or diabetic patients.¹ Correct reconstruction of a traumatized limb should be performed only after repairing the vascular injury, fixing the bone, and removing all necrotic and contaminated tissue. Debridement is crucial for the ultimate success of any reconstruction. Timely closure within the first 10 days is associated with decreased risk of osteomyelitis, infection, and additional tissue loss.² Clinical trials have reported a 50% to 18% decrease in the incidence

of complications when closing wounds within the first 6 weeks compared to wound closure during the first week, respectively. Treatment alternatives are usually guided by the reconstructive ladder in which treatment options increase in complexity and include second intention closure, primary wound closure, skin grafting, tissue expansion, local flap, regional flap, bone transfer, tissue, free flap and recently super microsurgery.³

A flap is a vascularized block of tissue that is mobilized from a donor site and transferred to another location for reconstruction purposes. It may be by maintaining its vascular connection with the site of origin, as in local flaps, or that the vascular nexus is interrupted, but then restored with microsurgical techniques in the recipient area, as in the case of free flaps. The difference with a graft is that it does not have a vascularized pedicle and obtains its blood flow from the revascularization of the recipient site, while the flap has its own intact irrigation.⁴ Local flaps use tissue adjacent to the wound and regional flaps use tissue close to the leg, useful for covering small to medium defects, generally used in the proximal or middle third of the leg as the distal third of the leg has limited options. This can result in a challenge for the surgeon. Generally, bipediced fasciocutaneous flaps, gastrocnemius and soleus muscle flaps, reverse sural artery flap, lateral calcaneal perforator flap, medial plantar flap, posterior tibial flap, and dorsal foot flap

are used. Free tissue transfer is a complex procedure that requires the removal of a piece of tissue with its vascular system and placing it under a microscope-guided receiving system. The new tissue is considered to act as an auto transplant, providing skin and/or muscle for coverage. The rectus abdominis flap, gracilis flap, latissimus dorsi flap, anterolateral thigh flap, and radial forearm flap are generally used.³ There are factors that can increase the survival of a flap, humidity, heat, intermittent ischemia (preconditioning) and hyperbaric therapy are some physical factors that can improve its survival.⁵ In relation to the sole of the foot, for defects in areas of non-support, grafts are an excellent therapeutic option and in defects in the support area, perforator fasciocutaneous flaps have been proposed as the treatment of choice⁶ since those are considered adequate, without technical difficulty and provide plantar skin. If the size of the defect is larger, or in heel defects, the medial plantar flap or the intrinsic muscle flaps can be used. In larger defects, the use of microsurgical muscle flaps has been proposed. The graft applied subsequently on the muscle flap remains firmly adhered to it, thereby eliminating the sliding effect that exists in the fasciocutaneous flaps between the skin and the subcutaneous cellular tissue.⁷

Discussion

Given the different alternatives for the closure of large skin defects, primary closure should be chosen in case of achieving a tension-free suture, and in small areas of exposed bone or tendon they can be successfully treated with dressings and closure by second intention. This requires constant care of the wound and in some cases negative pressure devices can be opted for, so it generally does not require additional operations, it is used especially in patients who are not candidates for more complex reconstructions,⁹ one of the main disadvantages is the prolonged treatment time before achieving adequate skin coverage.

If the treatment option is the use of a flap, it must meet vascular flow and permeability as a fundamental requirement, since diabetic patients, with peripheral arterial vascular disease, vasculitis, congestive venous disease and different alterations in the vascular system can condition the failure of the flap. In recent years, new reconstruction techniques have emerged using super microsurgery, which allows providing good-quality tissue at a distance, away from the bed to be reconstructed and performing anastomosis to perforators, thus preserving the main vessels of the limb, with good aesthetic and functional results. Among these flaps we find the SCIP (Superficial Circumflex Iliac Artery Perforator, Superficial Circumflex Artery Perforator), described in

2004 by Koshima and which differs from the inguinal flap, the first free flap described in 1973, in that it is based solely on a perforator of the superficial circumflex iliac artery (SCIA).¹⁰⁻¹² SCIP can be a good reconstructive option for the distal portion of the lower limb, with low morbidity and rapid recovery of the donor area, and which can avoid the need for amputation of the limb, however, it must be taken into account that its dissection and anastomosis can be technically complicated, since the caliber of the vessels is very small and the pedicle has a short length that is sensitive to vasospasm, so one of its main complications is venous congestion and edema, which is why it is recommended to perform 2 venous anastomoses whenever possible and carefully modify the postural changes of the limb during the first postoperative days due to the low capacity of the flap to adapt to hemodynamic changes.¹³ Regardless of the flap performed, multidisciplinary patient management is always very useful, especially in those with risk factors such as vascular disease and diabetes.¹⁴

Conclusion

The recent proposals on super microsurgery and the multidisciplinary participation between services such as plastic surgery, vascular surgery, traumatology, infectology, endocrinology and rehabilitation can guide towards an ideal therapy with improvement in the quality of life of the patient.

Conflicts of Interests

There was no conflict of interest during the study, and it was not funded by any organization.

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