Reconstruction of Forearm, Wrist and Hand Skin Defects with Local Perforator Flaps

Thesis

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BY

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LIST OF ABBREVIATIONS

AIA	Anterior interosseus artery
ALT free flap	Anterolateral thigh free flap
BCC	Basal cell carcinoma
PIA	Posterior interosseus artery
PURA	Posterior ulnar recurrent artery
RA	Radial artery
RAPPF	Radial artery propeller perforator flap
RRA	Radial recurrent artery
SCC	Squamous cell carcinoma
UA	Ulnar artery
UAPPF	Ulnar artery propeller perforator flap

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Introduction

Introduction

The reconstruction of loss of substance due to trauma or oncological excisions has relevant functional and aesthetic implications. Some kind of flaps used for the treatment of upper and lower limb lesions required the sacrifice of major vascular bundles. During the last decades, anatomical studies on skin vascularization provided the base for the development of flaps nourished by perforating arteries and preserving major vascular axis. [(1)]

Soft tissue coverage of the upper limb is a challenging problem for reconstructive surgeons to manage. The ultimate choice of soft tissue coverage will depend on the size and site of the wound, complexity of the injury, status of surrounding tissue, exposure of the vital structures and health status of the patient. [(2)]

With a landmark publication in 1989, Koshima and Soeda described their use of a skin flap based upon a single paraumbilical perforator from the deep inferior epigastric artery .The subsequent skin flap was thin and left the rectus abdominis muscle intact.[(3)] Allen and Treece followed Koshima and Soeda and demonstrated the use of the deep inferior epigastric perforator flap for autologous breast

reconstruction [4] then , perforator vessels throughout the body were being mapped out to design potential flaps. [5]

According to the definition established during the Consensus Conference of Gent in 2003, perforator flaps are constituted by cutaneous and subcutaneous tissue areas nourished by perforator arterial branches originating from major vascular bundles with an intramuscular or intraseptal course. [6]

Based on experimental studies, Taylor et al. reported that a single perforator may safely supply its proper angiosome and up to the half of vascular territory of the adjacent perforator.[7] This possibility is favored by vascular adoption directed toward periphery that occurs by means of increased vascular pressure in the perforator artery after ligature of collateral subcutaneous and intramuscular arterial branches which opens the linking vessels in an axial direction.This mechanism of integument vascularization explains the possible large dimensions of some flaps.[8]

One of the main characteristics of perforator flaps is their versatility. The flap can be selected on the perforator artery depending on the size and the location of defect and can be used both as a free or local flap, exploiting the

possibility of advancement or twisting of the vascular pedicle. [9]

The pedicle can be isolated by means of loupes and microscope is normally not required.[10] Therefore, as reported by Georgescu et al., this local perforator flap that requires a microsurgical dissection without vascular sutures can be defined as a "microsurgical not microvascular flap".[11]

Only late, in 2009 "1st Tokyo meeting on perforator and propeller flaps" settled the definition of a propeller flap: a skin island supplied by a perforator pedicle that has to axially rotate through at least 90 to 180 degrees.The difference between a propeller flap and other pedicled flaps is that the rotation in the case of a propeller flap is "axial"; this means that the flaps turn around a pivot that is made of the pedicle and this is similar to a propeller. [12]

In the last years, perforator flaps have become an appealing option for coverage of a large range of defects. Besides having a more reliable vascular pedicle than traditional flap, perforator flaps allow for great freedom in design and for wide mobilization that extend the possibility of reconstructing difficult wounds with local tissues and

minimal donor-site morbidity. They also allow one-stage reconstruction of defects that usually require multiple procedures. [13]

Harvesting of a perforator flap requires accurate patient selection, preoperative planning, and dissection technique. Complication rate can be kept low, provided that potential problems are prevented, promptly recognized, and adequately treated. [13]

The absence of vascular sutures and the preservation of major vessels and underlying muscles are the main advantages of perforator flaps. [14]

Moreover, from the aesthetic point of view, the reconstruction of the defect can be achieved with optimal results as it takes into account the concept of like-with-like reconstruction by means of donor areas close to that of the defect.Thanks to these potential benefits, the use of local perforator flaps is constantly increased in clinical practice over the time. [14]

Aim of the Work

AIM OF THE WORK

This prospective clinical study is conducted to assess the reliability and efficacy of local perforator flaps in coverage of hand, wrist, and forearm skin defects including operative time and incidence of complications.