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Free groin flap for aesthetic and functional donor-site closure of the anterolateral thigh flap[☆]

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KEYWORDS

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Summary *Background and aim:* Better methods for anterolateral thigh flap donor-site reconstruction are desirable in cases when direct closure is impossible. Multiple surgical strategies have been attempted, and each has its shortcomings. The use of a contralateral free groin flap to repair the anterolateral thigh flap donor site is investigated in this report.

Methods: From October 2015 to February 2016, free groin flaps were harvested on six patients for aesthetic and functional donor-site closure of the anterolateral thigh flap, which could not be directly closed. In these cases, the reverse-flow distal portion of the descending branch of the lateral circumflex femoral artery and vein were used as recipient vessels and anastomosed to the superficial circumflex iliac artery and vein, respectively.

Results: One flap had presented a few blisters on the distal margin; the other five flaps fully survived without any complications. Patients were highly satisfied with the aesthetic outcomes of both the anterolateral thigh area and the groin site.

Conclusion: Although with theoretical risks of compromised venous blood flow, free groin flaps are an effective strategy for closure of massive anterolateral donor-site defects and can be safely performed with thoughtful planning and meticulous microsurgical techniques.

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[☆] All procedures have been approved by the IRB of Beijing Jishuitan Hospital.

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Introduction

Anterolateral thigh (ALT) flap, its applications, and merits as a workhorse flap have stood the test of time. Nonetheless, reducing donor-site morbidity for aesthetic and functional considerations has become the recent focus of research.¹ When direct closure at the ALT donor site is impossible, standard skin grafting is the most commonly adopted solution amid the additional morbidity and unpleasant appearance. Other modalities have been explored, including tissue preexpansion,² using freestyle "buddy-flap,"³ or local flap advancement⁴ to minimize the donor-site morbidities. Each attempt has its own advantages and drawbacks. A better approach to close the ALT donor site with improved aesthetic and functional outcomes is needed.

The groin flap is considered to have minimum donor-site morbidity but technically difficult to handle. One of the key reasons for its declining popularity is due to the presence of a small, short pedicle.

Here, we propose a new design that deploys a free groin flap for ALT donor-site reconstruction, in which the free groin flap is nourished by the reverse flow from the distal portion of the descending branch of the lateral circumflex femoral artery (DBLCFA).

Patients and methods

This study was approved by the Institutional Review Board of Beijing Jishuitan Hospital and informed consent was obtained from all patients.

Operative technique

ALT flaps were first harvested for soft tissue reconstruction, for which the DBLCFA served as the pedicles. Subsequently, to close the ALT donor site, the distal and proximal margins of the defect were initially approximated by 2/0 absorbable monofilament sutures, which left a resultant defect located at the mid-to-lower third of the thigh (Figure 1). A piece of template was customized to define the defects. The location of the remaining DBLCFA stump was labeled on the template.

The proposed donor site was loosely demarcated based on the template on the contralateral groin area. To ensure sufficient coverage, the groin flap was made slightly longer (0.5–1 cm) in length and width. The superficial circumflex iliac artery (SCIA) was the pedicle, empirically located at 1.5 cm inferior to the midpoint of the groin ligament (Figure 2), and confirmed by Doppler preoperatively. The projection marks of DBLCFA and SCIA on the template are approximated in close proximity. The incision started medially to reveal the femoral artery, through the course of which the origin of the SCIA was identified and guarded, and the deep branch of the circumflex iliac artery was ligated. Of note, it is our experience that the superficial circumflex iliac vein (SCIV) is commonly found roughly 2 cm inferior and medial to the SCIA. The groin area was directly closed without difficulties.

The free groin flap was transferred to the ALT donor site. Subsequently, SCIA and SCIV were anastomosed to the

distal stumps of the DBLCF vessels. In such a case, the groin flap was supplied by a reversed blood flow. The reperfusion of the flap was meticulously evaluated before closure. The circumferences across the midline of the ALT donor site before and after surgery were measured and documented.

Postoperative details

The postoperative course was smooth thereafter. There was no need for limb immobilization. Within 2 weeks, the sutures were removed, and patients were allowed to ambulate.

Results

Six patients were included in this report. Four of them sustained mutilating machinery injuries in their hand. The other two patients were diagnosed with epithelioid sarcoma in their upper extremity. All resulted in a massive soft tissue defect. Patients' data are presented in Table 1.

ALT flaps were harvested for wound coverage. After the preliminary approximation from distal and proximal ends, the remaining defects of ALT donor sites ranged from 13.5×5.5 to 17.5×8 cm²; accordingly, the sizes of groin flaps ranged from 14×6 to 18×9 cm².

All of the free groin flaps survived without major complications. One flap had some blisters on the distal margin, and it was salvaged with conservative measures. The groin area healed without any complications. The functions of the lower extremities were unaffected to any degree. The circumferences of the thigh rendered minimal changes. Patients were highly satisfied with the aesthetic outcome in both the groin area and the ALT donor site. With up to a 2-month follow-up period, patients had minor complaints of skin tightness, slight and transient pain, and discomfort, while limited range of motion of the lower limbs was not noted in any of the patients.

Case reports

Case 1

A 31-year-old man with epithelioid carcinoma on the right palm refused amputation. An extended excision was initiated to ensure radical elimination malignancy. A 20×17 cm² ALT flap was used for soft tissue coverage; the resultant defects of 14×7 cm² were covered by the contralateral free groin flap sized 15×7.5 cm² (Figure 1; Supplement 1).

Case 2

A 32-year-old woman was referred for treatment of a mutilating crush injury on the left hand. After three sessions of vacuum-assisted suctioning and debridement, a bilobed ALT flap was harvested for hand reconstruction. Afterwards, the patient received a 16×7 cm² free groin flap with no major complications except for a few blisters on the distal margin, recovered in a few weeks (Figure 2; Supplement 2).

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