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CASE REPORT
Hand/Peripheral Nerve

Hand Allograft Saved by an Ultrathin Groin Flap

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Summary: We report a case of a young double-hand allotransplant patient who presented with a full-thickness skin necrosis of the dorsum of the left hand after vascular compromise of the allotransplantation. Considering the lack of viable dorsal tissue overlying the extensor tendons and the need for early hand rehabilitation, an ultrathin pedicled groin flap was used for the coverage. This procedure resulted in salvaging the allotransplantation, and the patient was able to successfully return to work after his surgery. To our knowledge, this is the only case of an upper extremity allotransplant salvaged by a pedicled flap. *(Plast Reconstr Surg Glob Open 2016;4:e869; doi: 10.1097/GOX.0000000000000806; Published online 29 September 2016.)*

For the past 20 years, composite allotransplantation has become increasingly popular due to the experience and success gained from multiple worldwide hand and face allotranplantations.

The Lyon team has gained significant experience; despite this, some surgical setbacks after allotransplantation can be difficult to avoid. We present a case of hand allotransplantation salvaged by an ultrathin pedicled groin flap.

CASE

This case report describes a right-handed 27-year-old patient who suffered a bilateral upper limb amputation at the distal quarter of both forearms after an explosion from an artisanal bomb at 16 years of age.

After his injury, the patient was declared unable to work, and his Disabilities of Arm Shoulder and Hand score was 44 of 100 for both upper limbs. He requested a bilateral hand transplantation to restore and reach the highest level of social integration.

A multidisciplinary evaluation conducted by the allotransplantation team from the University of Lyon failed to show any medical and psychological contraindication for surgery.

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A bilateral forearm/hand allotransplantation was performed on July 11, 2009 (Fig. 1). Unfortunately, on postoperative day 11, the patient developed grade 1 bilateral allotransplantation acute rejection.

A Doppler ultrasonography showed a right radial artery thrombosis at the elbow and a left proximal ulnar artery thrombosis. Despite this, both allotransplants remained vascularized.

Five days later, acute ischemia of the left allotransplantation developed after the loss of blood flow in both ulnar and radial arteries.

A humeroradial venous bypass was performed urgently. Postoperatively, a compressive hematoma occurred that caused a second ischemic event in the left allotransplantation. Surgery was urgently performed to evacuate the hematoma and restore proper blood flow to the upper extremity.

A third-degree burn developed over the dorsum of the left hand after the urgent bypass surgery. Eight days later, excision of the burn eschar led to exposure of the extensor tendons with the loss of the peritendon (Fig. 2).

The initial attempt at covering the exposed extensor tendons with artificial dermis failed; finally, a decision was made to perform a left pedicled groin flap.

An ultrathin flap was dissected under the operative microscope to preserve the maximal amount of perforator arteries from the superficial circumflex iliac artery and enhance vascularity.

Three weeks later, the section of the pedicle was performed after a positive pedicle clamp test. No postoperative complications occurred. Stable and thin coverage over the left hand dorsum was obtained, and aggressive postoperative rehabilitation was instituted right after the flap

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Fig. 1. Left allotransplant hand dorsum postoperative day 10.

Fig. 2. Tendinous exposition after burn excision.

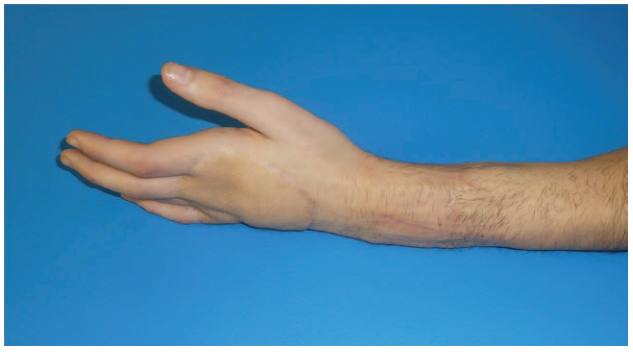

Fig. 3. Cosmetic aspect 3 years after allotransplantation and reconstruction using a superthin inguinal flap.

procedure. To further improve function and appearance, a debulking procedure was performed 2 years later (Fig. 3).

At present, the left allotransplant mobility is not limited by the flap, and the cosmetic result is good (**See video,**

Video Graphic 1. See Supplemental Digital Content 1, which displays a preoperative aspect on the left and at 2 years post operation on the right, ***http://links.lww.com/PRSGO/A229***.

Supplemental Digital Content 1, which displays a preoperative aspect on the left and at 2 years post operation on the right, ***http://links.lww.com/PRSGO/A229***). The donor-site morbidity is very low.

DISCUSSION

The important experience of the Lyon surgical team for hand allotransplantation[1] combined with strict patient selection criteria has contributed to the absence of surgical failures.

However, viewing the complexity of such a procedure, the absence of complication is almost impossible. This case report illustrates this with 2 episodes of ischemia, leading to the development of a full-thickness skin necrosis of the allotranplant.

The burn injury of the left hand dorsum was probably related to prolonged contact with the ice during transportation. The microvascular lesions created during the first procedure were probably revealed by the ischemia secondary to a radial and ulnar thrombosis.

The depth of the burn injury did not allow us to cover the soft tissue loss by a skin graft. The use of artificial dermis for the initial dorsal hand coverage failed and led us to consider using a flap.

A homolateral locoregional flap was not possible, and given the vascular status of the allotransplantation, a free flap was deemed too high risk.

For all these reasons, a viable reconstruction with a pedicled groin flap was selected.

Described for the first time by McGregor[2] in 1972, one of the major shortcomings of the groin flap is the thickness. In order not to impede the range of motion and therapy postoperatively, flap thickness has to remain limited.

For these reasons, flap elevation was performed under microscope magnification as described by Kimura and Saitoh[3] in 2006 referring to the work by Acland[4] in 1979 and Murakami et al[5] in 1996.

The objective was to optimize the subdermal vascularization of the groin flap by conserving as many perforating vessels from the circumflex iliac artery as possible. Because of the operative microscope, the dissection was more precise and allowed the surgeon to keep the maximum of perforat-

ing vessels intact by the "worm-eating defatting" technique described by Kimura and Saitoh[3] and Kimura et al.[6]

The thickness of the ultrathin groin flap was well comparable with the thin skin of the hand dorsum, particularly in the metacarpophalangeal region.[7–10] There were no postoperative healing problems of the flap because of the reliability of the subdermal vascularization.

We have not found any reports of flap reconstruction for composite allotransplant in the literature. This case report is a meeting of 2 microsurgical evolutions: on one hand, composite allotransplantation and on the other, microsurgical debulking during flap elevation.

CONCLUSIONS

This case report has described the salvage of a composite hand allotransplant with a traditional flap. Technical refinements in microsurgery and knowledge of vascular anatomy have allowed optimization of the groin flap reliability and applications.

To our knowledge, this is the first case report describing the salvage of composite allotransplant using a pedicled groin flap.

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PATIENT CONSENT

The patient provided written consent for the use of his image.

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