Emergent free flow-through anterolateral thigh flaps for Gustilo-Anderson III fracture of the upper extremity

Sir,

Gustilo-Anderson III C open fracture requires both bony and soft tissue reconstruction, as well as vascular repair. The main problem of this severe injury is the total absence or extreme deficiency of blood flow to bone fragment or fractured stumps. Late resurfacing with local flap sometimes leads to sequestration and osteomyelitis, necessitating prolongation of the period of external fixation.[1] What is the best treatment for these complex sever injuries? We believe the answer should be an early wound resurfacing with well-vascularized soft-tissue. We present a successful case of a Gustilo-Anderson III C bone-exposing wound surgical treatment with emergent use of a free flow-through anterolateral thigh flap.

A 32-year-old male patient was referred to our emergency unit complaining of a Gustilo-Anderson III C fracture of the right forearm due to being crashed by a falling telephone pole [Figure 1]. Patient had an open fracture of the radius and severe crush of the forearm muscles with wide abrasion of the skin and flexor muscles. Circulation of the right hand had ceased because the ulnar artery was mutilated and about 5 cm the radial artery had been lost [Figure 2].

After the crushed radius was destructed and underwent external fixation, the bone-exposing wound was repaired with a free anterolateral thigh flap with a 12 cm × 5 cm elliptical skin island [Figure 2]. The T-portion of the descending branch of the lateral circumflex femoral vessel was interposed to the defect of the radial artery. Two veins were connected to the cutaneous veins. Consequently, the interrupted radial artery resumed normal blood flow [Figures 3 and 4]. The viability of the skin flap was favorable without infection or necrosis [Figures 5-7].

The conventional options to treat Gustilo-Anderson III C injuries are vascular repair and bone reduction along with a skin graft or local or distant flap.[2] Conservative treatments

Figure 1: A Gustilo-Anderson III C open fracture of the radius

Figure 2: Patient also suffered wide abrasion of the skin and flexor muscles. Circulation of the right hand had ceased due to interruption of both ulnar and radial arteries

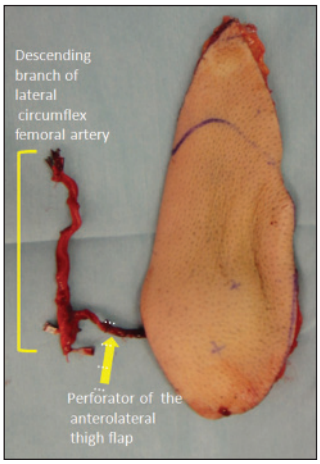

Figure 3: The harvested anterolateral thigh flap. The descending branch of the lateral circumflex femoral vessels and its proximal transverse vessels can be noted

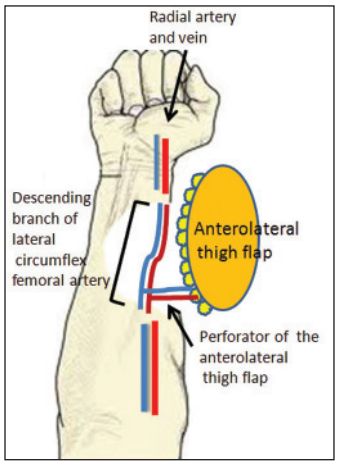

Figure 4: Illustration of transferred anterolateral thigh flap, which shows the descending branch of the lateral circumflex femoral vessel was interposed to the defect of the radial artery

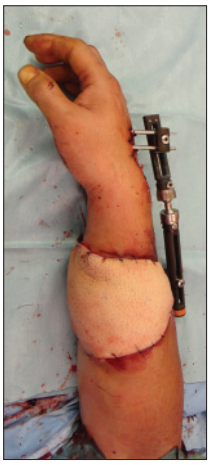

Figure 5: View of the immediate post-operative forearm, showing favorable resurfacing

Figure 6: View of the reconstructed forearm 3 months after surgery. The patient resumed the pinch function. As the patient lost all forearm flexor muscles, he could not resume power grip function. However, he could flex the fingers and pinch owing to the intrinsic muscles' function

Figure 7: An X-ray photo 3 months after surgery

cannot lead to a favorable wound bed on bone; thus, it requires some flap surgeries to resurface the wound.[1] Sometimes, the reconstruction is planned as a two-stage surgery.[3] However, early wound coverage with a free flap within 72 h was recommended, because the highest risk of infection and flap loss occurred in the delayed period.[4]

These vascular injuries requires vascular repair immediately after an injury, such as direct repair, an interposed vein graft and bypass graft, to supply sufficient blood flow to the distal area of the injured extremity.[5] On the other hand, microsurgical flow-through flaps is beneficial, because blood flow of the distal forearm can be maintained normally while the soft-tissue-insufficient wound can be resurfaced at one time. The lateral circumflex femoral arterial system is a favorable source of the T-anastomosis pedicle as it has a long descending branch and a reliable proximal transverse branch. This technique enables both vascular and soft-tissue reconstruction at once with minimal donor site problems, which are potential advantages over conventional methods.

In conclusion, we believe that emergent use of free flow-through anterolateral thigh flap is the primary choice for reconstruction for Gustilo-Anderson III C fracture with soft-tissue defects.

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