Ensuring Survivability of the Skin Island of the Free Iliac Osteocutaneous Flap with Double Arterial Inflow Techniques

Thomas Constantinescu, MD, CM, FRCSC; Ketan M. Patel, MD; Giuseppe Visconti, MD; Pedro Ciudad, MD; Fabio Nicoli, MD; Hung-Chi Chen, MD, MHA, PhD, FACS

BACKGROUND: The iliac osteocutaneous flap provides excellent vascularized bone for hardware fixation and osseointegrated implants, but a main drawback is the reliability of the skin island. The purpose of our study was to present novel techniques to increase the reliability of the iliac osteocutaneous flap using vein grafting, resulting in a single flap donor site and a single set of recipient site anastomoses, to help ensure total flap survival.

METHODS: A retrospective review was performed of all patients who underwent iliac osteocutaneous free tissue transfer. Consecutive adult patients that underwent reconstruction with a free iliac osteocutaneous flap by the senior author from 1984 to 2014 were included. Two vein grafting techniques were used on the arterial side of the flap: either a vein graft (VG) connecting the terminal superficial circumflex artery (SCIA) to the deep circumflex iliac artery (DCIA), or a Y-shaped vein graft (YVG) from the recipient artery to both the SCIA and DCIA (Figures 1 and 2). Patient demographics, indications, perioperative details, and long-term outcomes were reviewed.

RESULTS: A total of 44 free iliac osteocutaneous flaps were performed with the proposed techniques. The reconstructive indications were extremity (50%), head and neck (48%), and chest wall (2%). The flap survival rate was 100%. Recipient site complications included two (5%) reexplorations for hematoma, with one (2%) resulting in partial loss of the skin island. Another case (2%) had partial loss of bone manifesting as non-union. Donor site complications included two (5%) cases of incisional hernia that were repaired, and three (7%) cases of neurapraxia of the lateral femoral cutaneous nerve, all of which resolved by one year postoperatively. There were no complications at the vein graft donor site. The complication rates with each technique were the same at 9% each. Mean harvest time was 175 minutes. Mean follow up was 19 years (range, 1 to 30 years).

CONCLUSION: Our novel technique of vein grafting to augment the reliability of the inflow to the iliac osteocutaneous flap provided total flap survival. Reversing the direction of flow in the SCIA did not adversely affect outcome. The described vein grafting techniques, both in series and in parallel, are safe and reliable even in patients with compromised results and complications from prior reconstructions.

LEGENDS:
Figure 1. Markings of Dopplered vessels and flap surface anatomy, including large skin island.
Figure 2. Dissected vessels ready for anastomosis with vein grafting.