Modified Flap Replaces Graft Need in Melanoma

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CHICAGO — The modified Keystone Island skin flap avoids the need for skin grafting in most patients with lower limb primary melanoma, a prospective study from Australia suggests.

The flap, which takes its name from architectural terminology because of its curvilinear, trapezoidal shape, is technically straightforward to perform, substantially reduces hospitalization, and affords better cosmesis compared with skin grafting, investigator Marc Moncrieff said at a symposium sponsored by the Society of Surgical Oncology. The flap also can be used in patients with significant comorbidities that are often regarded as contraindications for fasciocutaneous flap reconstruction in the lower limb.

"Defects resulting from incision of primary melanomas in the lower limb can usually be reconstructed using the modified Keystone flap," he said. "In our experience, a skin graft is rarely required."

Dr. Moncrieff and associates reported on a prospective cohort of 176 consecutive patients, mean age 57 years (range 21-93), with stage I or II invasive primary cutaneous melanoma treated over a 3-year-period at the Sydney Melanoma Unit, where Dr. Moncrieff is a fellow and the Keystone flap is the standard reconstruction technique for lower limb primary melanoma defects.

Major complications were reported in 5 (2.8%) patients. These included one partial flap necrosis, one total flap loss, two infections, and one deep vein thrombosis. Minor complications, including transient neuralgia, minor wound problems, and seroma, were reported in 8 patients (4.5%).

At baseline, the average Breslow thickness was 1.33 mm (range in situ to 9.0 mm), average radial margin 1.5 cm (0.5-2.0 cm), and average defect width 3 cm (1.1-6.3 cm).

The flaps were performed from the proximal lower leg to the dorsum of the foot, with 14% performed on the upper-third of the lower leg, 45% on the middle-third, and 41% on the lower-third. There was no significant increase in complications in the distal third of the limb, a traditionally difficult area to close because of its anatomical tightness, he said.

The reconstructions included 106 standard Keystone flaps, 65 modified, and 5 double-opposing type flaps. Modification of the flap design significantly reduced the major complication rate, and all double-opposing flaps healed without incident.

The standard Keystone flap originally reported by fellow Australian Dr. Felix Behan (ANZ J Surg. 2003;73:112-20) is essentially two conjoined V-Y flaps end to side that are advanced to fill the defect.

Surgeons at the Sydney Melanoma Unit modified the flap by dividing the lateral deep fascia margin to allow for adequate advancement of the flap and to improve vascularity. For larger defects, two opposing Keystone flaps can be used to fill the defect. In all three types, once the skin is incised, the subcutaneous tissue is divided by blunt dissection to preserve the integrity of the vascular network, including the fascial and muscular perforators.

Because the skin is taken from the surrounding tissue, the color match is superior to that of split-thickness skin grafts, which are typically taken from the abdomen, and can result in a crocodile-like appearance of the skin and lengthy rehabilitation, Dr. Moncrieff said.

Dr. Michael Sabel, session moderator, acknowledged that the Keystone flap is "a great improvement" over the split-thickness skin graft, but that the full-thickness skin graft is a simple and widely used technique that provides well-matched tissue from the sentinel lymph node biopsy site or abdomen, with its main disadvantage being that patients are typically immobilized for 5 days.

Dr. Moncrieff responded that the Keystone flap can be performed in the same amount of time as a full-thickness graft and that most patients elevate their limb overnight and return home and walk the next day. Of the 176 patients, 39 (22%) had the procedure performed in a day-case setting.

An audience member questioned whether the technique can be used to fill larger defects or upper limb defects. The modified Keystone flap has been used to reconstruct distal upper limb defects, and requires no special allowances when closing larger defects, said Dr. Moncrieff, who reported no conflicts of interest. ■