Performing Vascularized Groin Lymph Node Transfer with Confidence: The Use of Four Anatomic and Physiologic Modalities for Safe and Effective Flap Harvest

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Introduction: Vascularized groin lymph node transfer (VGLNT) involves transfer of superficial inguinal lymph nodes supplied by the superficial circumflex iliac artery (SCIA) to the affected extremity. While VGLNT has been successfully used to treat lymphedema, lack of familiarity with the anatomy and concern regarding donor site lymphedema have limited its widespread use. The purpose of this study was to demonstrate the use of four separate modalities to localize the lymph nodes draining the abdomen and avoid lymph nodes draining the lower extremity.

Methods: An anatomic study based on MRA data from 117 patients marking 1,938 lymph nodes was performed to provide guidelines for localizing lymph nodes targeted for harvest. A Doppler was used to identify the superficial circumflex iliac vein (SCIV) and superficial inferior epigastric vein (SIEV) prior to incision. Finally, Reverse Lymphatic Mapping using injection of indocyanine green into the lower abdomen and filtered technetium into the lower extremity was employed to provide a physiologic map differentiating lymph nodes draining the lower abdomen from those draining the lower extremity. This technique was employed in 28 clinical cases. (Figure 1.)

Results: Based on the MRA anatomic study, the targeted SCIA-based lymph nodes are located one-third the distance from the pubic tubercle toward the anterior superior iliac spine (ASIS) and 3 centimeters below this line (Figure 2). MRA data also confirmed these nodes are located at the junction of the SIEV and SCIV. Handheld Doppler was used to identify these vessels pre-operatively. Finally, the indocyanine green injected into the lower abdomen consistently drained the target SCIA-based lymph nodes. Filtered technetium injected into the lower extremity became concentrated into lymph nodes along the femoral vessels inferior and medial to the SCIA-based lymph nodes. Intraoperatively, the average 10 second gamma probe count of the extremity sentinel node was 1,137, compared to an average count of 197 of the lymph node flap. This indicates that majority of the technetium injected into the lower extremity did not drain into the lymph node flap.
Figure 2. Illustration clarifying the location of the superficial transverse inguinal lymph nodes in relation to the ASIS, pubic tubercle, SCIV, and SIEV.

**Conclusion:** An integrated anatomic and physiologic approach using MRA, Doppler, and Reverse Lymphatic Mapping provides a precise and safe means for performing VGLNT.