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Pathological Transport Index on Lymphoscintigraphy Guides Microsurgical Planning

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Objective: Microsurgery for lymphedema is becoming firmly established as an effective long-term treatment for peripheral lymphedema. It is important now to clarify which type of microsurgery is the most appropriate for which patient. The authors examined the lymphatic flows in affected limbs by lymphoscintigraphy in order to develop a surgical treatment algorithm based on grade of lymphatic impairment.

Method and Materials: 258 patients with lymphedema underwent segmental lymphoscintigraphy with ^{99m}Tc -labeled antimony sulfur colloid or ^{99m}Tc -nanocolloid human serum albumin. The transport index (TI) was calculated to categorize the flow of the superficial and deep vessels as normal (<10) or pathological (greater or equal to 10). Patients with normal scans were excluded from the study. The scores from the remaining 248 (48 unilateral arm, 86 unilateral leg, 114 bilateral leg) were tested with a 3-way ANOVA to examine the relationship between affected limb, deep or superficial pathways, and primary or secondary lymphedema. The relationship between clinical presentation and TI was also investigated.

Results: For unilateral arms and bilateral leg lymphedema there was no difference between primary and secondary lymphedema for TI scores ($F(1, 46) = 2.49$, $p = \text{ns}$, $F(1, 112) = 0.38$, $p = \text{ns}$, respectively). In general, the deep lymphatic pathways were more adversely affected with worse TI for the lower limbs and the superficial pathways for arm lymphedema. Patients with unilateral clinical presentation can have bilateral TI abnormalities. The vast majority of patients (88-98%) had either the deep vessels alone or both the superficial and deep vessels with pathological TI.

Conclusions: Given that most patients have a pathological TI for the deep lymphatic vessels, a surgical approach that anastomoses only the superficial vessels is unlikely to be effective. The authors propose a new treatment algorithm for lymphatic microsurgery based on the pattern of pathological lymphoscintigraphy TI.