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Validity in the Application of the Novel Taiwan Lymphoscintigraphy Staging and Clinical Grading Systems for Unilateral Extremity Lymphedema

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Objective: Approximately 200 million people worldwide suffer from extremity lymphedema. Accurate diagnosis and staging to guide decision-making process are fundamental to successful treatment. The purpose of this study was to validate the new Taiwan Lymphoscintigraphy Staging (TLS) System for unilateral extremity lymphedema based on a precision medicine concept. **Methods:** Patients with unilateral extremity lymphedema were included. Lymphoscintigraphy was performed on all patients and divided into three groups: normal lymphatic drainage, partial-obstruction, and total-obstruction based on the visualization of proximal lymph nodes, linear lymphatic ducts, and dermal backflow. Clinical severity of extremity lymphedema was determined using a 5-grade Lymphedema Grading System based on the circumferential difference between the lymphedematous limb and the healthy limb. **Results:** We present the largest series in the world of 285 patients with unilateral extremity lymphedema who underwent complex decongestive therapy and lymphedema microsurgery. Lymphoscintigraphy found 11 patients (3.9%) with normal lymphatic drainage, 128 (44.9%) with partial obstruction, and 146 (51.2%) with total obstruction. The TLS System showed high inter-observer agreement. Strong correlation was found between the TLS and circumferential difference (r=0.77, P <0.001), computed tomography volumetric difference (r=0.66, P<0.001), and Lymphedema Grading System (ICC: 0.79 (95% CI 0.72-0.84)). Patients with total obstruction of the lymphatics should be treated with lymph node transfer, whereas those with partial obstruction can be managed with lymphovenous bypass. **Conclusions:** The new TLS System is a reliable and comprehensive tool for the assessment of lymphatic obstruction. For refractory extremity lymphedema, the TLS system should be applied to guide appropriate treatment options.

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