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Patterns, Staging and Clinical Application of Lymphoscintigraphy for Gynecologic Cancer-Related Lymphedema

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Background: Approximately10-49% of patients develop gynecological cancer-related lymphedema (GCRL) after gynecological cancer treatment. Despite different tools have been described for the diagnosis and staging of lymphedema, many controversies remain among the experts. This study was to investigate the correlation between lymphoscintigraphy and objective clinical findings in GCRL and to further inform the patient's selection for surgical treatment.

Methods: Patients with GCRL who underwent lymphoscintigraphy were reviewed between 2012 and 2017.

Based on the presence of proximal-intermediate lymph nodes, distal lymphatic ducts and dermal backflow, Taiwan Lymphoscintigraphy Staging (TLS) was used to classify the lymphoscintigraphy images into three patterns and seven stages: normal-drainage (L-0) partial obstruction (P-1, P-2, and P-3), and total-obstruction (T4, T-5, and T-6).Clinical severity of lymphedema was determined by circumferential difference, CT volumetric difference, and episodes of cellulitis. Relationship between clinical lymphedema severity and TLS was evaluated using ANOVA, post-hoc and multivariable linear regression analyses.

Results: One-hundred-forty-one patients with unilateral GCRL were included. Patients were divided as follows: 6(4.3%) L-0, 9(6.4%) P-1, 25(17.7%) P-2, 22(15.6%) P-3, 36(25.5%) T-4, 34(24.1%) T-5, and 9(6.4%) T-6. A significant difference was found between lymphoscintigraphy stages and clinical findings ($p<0.001$ for all). Total-obstruction stages T-4, T-5 and T-6 were the most significant factors associated with the severity of circumferential difference ($\beta=19.72, 25.54, 32.42$, respectively; $p <0.05$) and CT volumetric difference ($\beta=36.04, 45.12, 52.78$, respectively; $p <0.01$).

Conclusion: Lymphoscintigraphy and objective clinical findings showed substantial correlation in unilateral GCRL. Lymphoscintigraphy patterns and stages could represent an accurate and first-line diagnostic tool in GCRL.

Keywords: Lymphoscintigraphy, lower limb lymphedema, lymphedema diagnosis, gynecologic cancer-related lymphedema, lymphatic microsurgery, Lymphedema Grading System