

Comparison of lymphoscintigraphy and indocyanine green lymphography for the diagnosis of extremity lymphedema

S. Akita, N. Mitsukawa, T. Kazama, M. Kuriyama, Y. Kubota, N. Omori, T. Koizumi, K. Kosaka, T. Uno, K. Satoh

Department of Plastic, Reconstructive and Aesthetic Surgery, Chiba University Graduate School of Medicine, Chiba, Japan

▲ Background

Lymphedema of the extremities is a chronic, debilitating disease. Early diagnosis and treatment is crucial to reduce the risk of progression and the development of complications. Lymphoscintigraphy is the gold standard examination for extremity lymphedema. Indocyanine green lymphography may be useful for diagnosis as well. We compared the utility of these two examination methods for patients with suspec-

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ted extremity lymphedema, and for those in whom surgical treatment of lymphedema was under consideration.

Methods

A total of 169 extremities with lymphedema secondary to lymph node

dissection and 65 extremities with idiopathic edema (suspected primary lymphedema) were evaluated. To evaluate the utility of indocyanine green lymphography, its results were compared with those of the gold standard, lymphoscintigraphy, using the assumption that the sensitivity and specificity of lymphoscintigraphy is 1.00. Accuracy was defined as the ratio of (number of true positives + number of true negatives) to (number of true positives + number of false positives + number of true negatives + number of false negatives). Regression analysis between lymphoscintigraphy type and indocyanine green lymphography stage was conducted in the secondary lymphedema group.

Results

In secondary edema, the sensitivity of indocyanine green lymphography, compared with lymphoscintigraphy, was 0.972, the specificity was 0.548, and the accuracy was 0.816. When patients with lymphoscintigraphy type I and indocyanine green lymphography stage I were regarded as negative, the sensitivity of the indocyanine green lymphography was 0.978, the specificity was 0.925, and the accuracy was 0.953. There was a significant positive correlation between the lymphoscintigraphy type and the indocyanine green lymphography stage. When lymphoscintigraphy stage was regarded as the dependent variable (y) and indocyanine green lymphography stage was regarded as the independent variable (x), the regression formula was as follows: $y = 0.882x - 0.076$. This regression formula and the regression coefficient were statistically significant based on the analysis of variance table; the determination coefficient

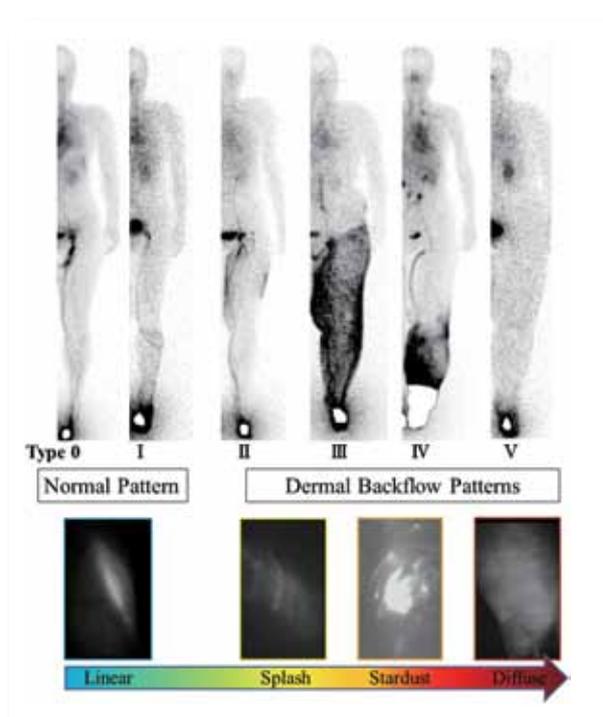


Fig. 1: In patients with secondary lymphoedema after lymph node dissection, lymphoscintigraphy findings are categorized into 6 types. Indocyanine green lymphography findings are categorized into 4 patterns.

(R2) was 0.829. In idiopathic edema, the sensitivity of indocyanine green lymphography was 0.974, the specificity was 0.778, and the accuracy was 0.892.

Conclusion

Indocyanine green lymphography is recommended to evaluate the suitability of patients with secondary lymphedema for surgical treatment. The diagnostic ability of the test, and its capability to evaluate the severity of edema, is similar to lymphoscintigraphy while the invasiveness and examination costs are less.

To detect primary lymphedema in patients with idiopathic extremity edema, we recommend that indocyanine green lymphography to be conducted first as a screening

examination. When the results are negative, lymphoscintigraphy is not always necessary because it is usually also negative. When the results of indocyanine green lymphography are positive, lymphoscintigraphy is then useful to give further information.

Correspondence address

Shinsuke Akita
Department of Plastic and Reconstructive
Surgery
Chiba Cancer Center
Chiba city, Japan
E-Mail: shinsukeakitapr@gmail.com

