



Lymphoscintigraphy and SPECT-CT Imaging: An Effective Method to Evaluate Surgical Outcomes in Lymphedema Surgery

Jose M Lasso*, Esther Deleyto and Michele Castellano

Department of Plastic and Reconstructive Surgery, Hospital General Universitario Gregorio Marañón, Madrid, Spain

Clinical Image

Lymphoscintigraphy is the standardized tool for the evaluation of limb lymphedema, it is the generalized imaging technique used for its diagnosis and classification and also for pre-surgical planning [1-4].

Lymphoscintigraphy is a specific, simple and reliable technique that offers useful information of lymphatic function, allowing the examiner to detect lymphatic flow obstructions, dilated vessels, collateral lymphatic flow and the presence, malfunction or absence of lymph nodes. Dermal activity uptake is a fundamental finding related to lymphedema [5,6]. However, conventional lymphoscintigraphy has limitations related to its two-dimensional view, which does not allow a detailed spatial localization of tracer accumulation. Also, it cannot interpret secondary changes in connective-tissue such as fibrosis, nor can it accurately distinguish between dermal backflow and deeper lymph vessel accumulation [7].

SPECT-CT is currently used with lymphoscintigraphy for sentinel node detection in breast cancer [8]. In lymphedema, combined SPECT-CT/lymphography systems provide integrated functional and morphological information, allowing a better localization in depth of vessels and lymph nodes, an accurate distinction between lymph vessels and veins and a correct interpretation of dermal backflow [9].

Combined CT-imaging has allowed a better comprehension of the physiopathology of lymphedema and many studies have proposed taking SECT-CT imaging beyond diagnosis reported its value also in microsurgical treatment. The incorporation of SPECT-CT in lymphedema staging might prove useful to predict treatment efficacy [10-12].

OPEN ACCESS

*Correspondence:

Jose M Lasso, Department of Plastic and Reconstructive Surgery, Hospital General Universitario Gregorio Marañón, Madrid, Spain,
E-mail: josemaria.lasso@salud.madrid.org

Received Date: 24 Aug 2016

Accepted Date: 21 Sep 2017

Published Date: 27 Sep 2017

Citation:

Lasso JM, Deleyto E, Castellano M. Lymphoscintigraphy and SPECT-CT Imaging: An Effective Method to Evaluate Surgical Outcomes in Lymphedema Surgery. Clin Surg. 2017; 2: 1640.

Copyright © 2017 Jose M Lasso. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

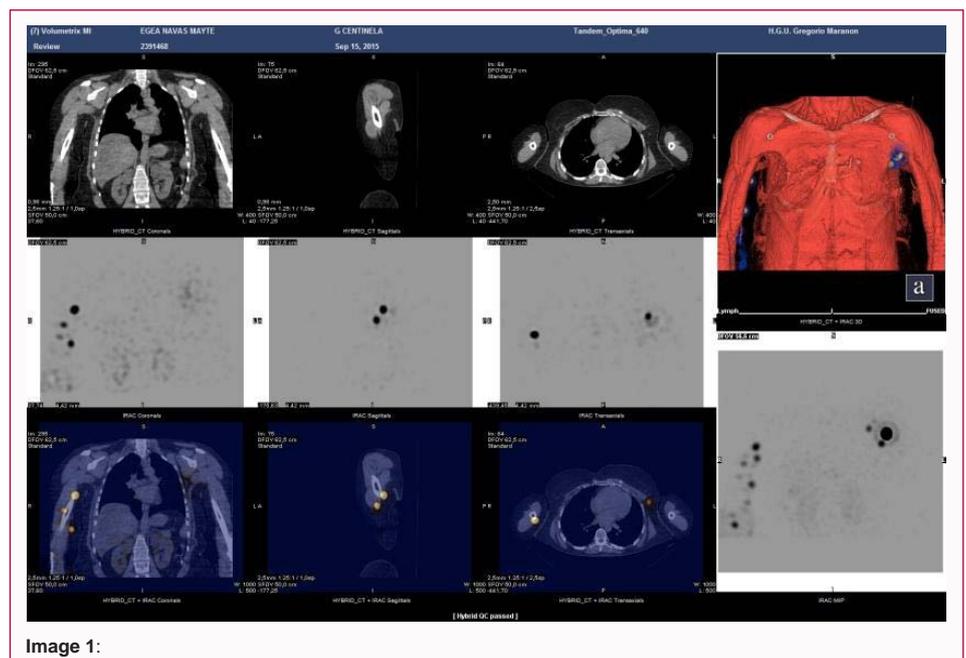


Image 1:

At our center, combined lymphoscintigraphy and SPECT-CT imaging is used routinely in all patients that are eligible for surgical treatment of limb lymphedema. Images are obtained before surgery, for diagnosis, evaluation and treatment planning – and 1 year after the procedure. Studying all pre and postsurgical images obtained to the date, we have been able, as well as to classify the disease and decide the optimal treatment, to relate clinical outcomes to anatomic and functional images.

For patients who present with limb lymphedema secondary to surgical lymphadenectomy clinically classified as stages III or IV and with SPECT-lymphography imaging that suggests absence of functioning lymph nodes associated to dermal backflow patterns, we propose microsurgical lymph node transfer. Surgery is followed by a course of progressive bandaging and physiotherapy.

Image 1 shows the postoperative findings of a secondary lymphedema of the right upper limb one year after a right breast reconstruction with simultaneous lymph node transfer (a composite free flap with two microvascular pedicles, DIEP flap and superficial groin nodes). We can observe on the left axilla a group of lymph nodes, on the other hand, at the right arm there are several lymph nodes along the arm and blue marks corresponding to functional lymphatic vessels. Preoperative lymphography showed abolished activity of the lymphatic system of the right upper limb. Lymph node transfer activated the lymphatic flow which was abolished after the breast cancer surgery; this fact was confirmed clinically and objectively.

Our aim is to correlate clinical outcomes with SPECT-lymphography imaging findings and to compare them with the preoperative images, therefore being able to study our results based on technique and stage of lymphedema, to choose the best surgical option for every patient and to predict results after surgery.

References

1. Szuba A, Shin WS, Strauss HW, Rockson S. The third circulation: radionuclide lymphoscintigraphy in the evaluation of lymphedema. *J Nucl Med.* 2003;44:43-57.
2. Williams WH, Witte CL, Witte MH, McNeill GC. Radionuclide lymphangiography in the evaluation of peripheral lymphedema. *Clin Nucl Med.* 2000;25:451-64.
3. Yamamoto T, Narushima M, Doi K, Oshima A, Ogata F, Mihara M, et al. Characteristic indocyanine green lymphography findings in lower extremity lymphedema: the generation of a novel lymphedema severity staging system using dermal backflow patterns. *Plast Reconstr Surg.* 2011;127(5):1979-86.
4. Maegawa K, Miami T, Yamamoto Y, Satake T, Kobayashi S. Types of lymphoscintigraphy and indications for lymphaticovenous anastomosis. *Microsurgery.* 2010;30:437-42.
5. Witte CL, Witte MH, Unger EC, Williams WH, Bernas MJ, McNeill GC, et al. Advances in imaging of lymph flow disorders. *Radiographics.* 2000;20:1697-19.
6. International Society of Lymphology. The diagnosis and treatment of peripherallymphedema: 2013 Consensus Document of the International Society of Lymphology. *Lymphology.* 2013;46:106-19.
7. Baulieu F, Bourgeois P, Maruani A, J.P. Belgrado, V. Tauveron, G. Lorette, et al. Contributions of SPECT/CT imaging to the lymphoscintigraphic investigations of the lower limb lymphedema. *Lymphology.* 2013;46(3):106-19.
8. Cheville AL, Brinkmann DH, Ward SB, Jolanta Durski, Laack NN, Elizabeth Yan, et al. The addition of SPECT/CT lymphoscintigraphy to breast cancer radiation planning spares lymph nodes critical for arm drainage. *Intl J Rad Onc Bio Phys.* 2013;85(4):971-7.
9. Iimura T, Fukushima Y, Kumita S, Rei Ogawa, Hiko Hyakusoku. Estimating Lymphodynamic Conditions and Lymphovenous Anastomosis Efficacy Using ^{99m}Tc-phytate Lymphoscintigraphy with SPECT-CT in Patients with Lower-limb Lymphedema. *Plast Reconstr Surg Glob Open.* 2015;3(5): e404.
10. Weiss M, Baumeister RG, Frick A, Jens Wallmichrath, Peter Bartenstein, Axel Rominger. Primary Lymphedema of the Lower Limb: The Clinical Utility of Single Photon Emission Computed Tomography/CT. *Korean journal of radiology.* 2015;16(1):188-95.
11. Pecking AP, Albrini JL, Wartski M, Edeline V, Cluzan RV. Relationship between lymphoscintigraphy and clinical findings in lower limblymphedema (LO): toward a comprehensive staging. *Lymphology.* 2008;41(1):1-10.
12. Campisi C, Boccardo F. Microsurgical technique for lymphedema treatment: Derivative lymphatic-venous microsurgery. *World J Surg.* 2004;28:609-13.