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EVALUATION OF SECONDARY AND PRIMARY LYMPHEDEMA BY COMBINED LYMPHOSCINTIGRAPHIC STUDIES OF SUPERFICIAL AND DEEP SYSTEM

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BACKGROUND-AIM

Lymphedema can be caused by a variety of factors: primary or secondary to surgical and radiation treatment for cancer. Arm lymphedema is a frequent complication of breast cancer therapy and axillary lymph node dissection, with an estimated frequency of 5%–30%. This incidence is based primarily on studies that use volume and circumference criteria in the first years after surgery. In the extremities, the lymphatic system consists of a superficial system that collects lymph from the skin and subcutaneous tissue, and a deeper system that drains subfascial structures such as muscle, bone, and deep blood vessels. The superficial and deep systems drain at markedly different rates. In the normal arm, subfascial transport is slower than the superficial system and transports less lymph.

METHODS

We evaluated 90 patients with breast cancer-related lymphedema (group A) and 14 subjects with primary lymphedema (group B). The ages of the patients ranged from 18 to 81 years old with a mean of 55 (group A) and 50 (group 9). They underwent both subcutaneous and subfascial injections in order to differentiate various mechanisms of edema. Superficial system was studied injecting two aliquots of tracer in the web space between the first and second and the second and third digits of the hand (37 MBq of 99mTc-Nanocoll per arm). Both arms receive injections to use one side as a control for patients with unilateral lymphedema. Deep system was studied injecting a single dose of 99mTc-Nanocoll (48 MBq) by two different ways: in aponeurotic sites of the palms or inferiorly at the styloid process of the ulna. Time for transport to regional lymph nodes, appearance of lymph vessels and nodes and distribution pattern were scored. These scores were compiled into a modified Kleinhans transport index (TI) in order to quantitate visual findings in lymphoscintigraphy. This method designes a numeric index of transport kinetics by combining visual assessment of five criteria: temporal and spatial distribution of the radionuclide, appearance time of lymph nodes, and graded visualization of lymph nodes and vessels. For assessment, scores were used ranging from 0 to 9. Thus, the resulting transport index (TI) ranged from 0 (normal) to 36 (pathological).

RESULTS

In group A average TI for superficial and deep systems was respectively 19.8 and 20.5. Dermal flow was observed in 42 patients (46%). The dermal back flow ranged in magnitude from small and localized to circumferential involving the whole arm. TI was normal in 15% and 10% of the affected arms and in healthy extremities was abnormal in 5 subjects following superficial study and only in 1 in the study of deep circuit. In group B average TI for superficial and deep circuits was respectively 12.5 and 10 in the affected arms with appearance of dermal flow in only two patients (15%) and 5.2 and 4 in the clinically normal arms.

CONCLUSION

The lymphoscintigraphic evaluation of superficial and deep circuits in the arms affected by secondary lymphedema shows similar results. In healthy arms the study of superficial circulation shows more frequently clinical or subclinical lymphatic disorders than the deep circulation evaluation. The higher rate of dermal flow in secondaries lymphedema correlates with the severity score of the disfunction and it could be explained with a drastic lymphatic interruption combined with fibrous scarring induced by radiotherapy reducing regrowth of ducts.