New diagnostic modalities in the evaluation of lymphedema

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DISCLOSURES
CURRENTLY
CONSULTANT
*TACTILE MEDICAL
*AMSEL
*RADIUS VENTURES

LYMPHEDEMA IS USUALLY DIAGNOSED ON CLINICAL GROUNDS
No simple, non-invasive test accepted for the diagnosis of lymphatic dysfunction

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DEVELOPER OF LYMPHOGRAPHY, CLASSIFICATION & CLINICAL EVALUATION OF LYMPHEDEMA

FUNCTIONS OF A DIAGNOSTIC TEST

- Is disease present?
- Determine severity of the disease
- Define the pathophysiology
- Is intervention possible?
- Assess the response to therapy

Distribution of LED Causes in 27,000 Patients with Lymphedema (Blue Cross/Blue Shield Administrative Database)

- Pelvic Cancer (3.9%)
- Breast Cancer (2.1%)
- Uterine Cancer (1.9%)
- Cervical Cancer (1.9%)
- Prostate Cancer (1.8%)
- Melanoma (0.6%)

Transport Index (TI)
Score of 0 (normal) → 9 (Abnormal) for each
Lymphedema = mean TI of 23.8 +/- 1.5
Swelling (other cause) TI = 1.9 +/- 0.4
p < 0.001

Diagnostic Method Recommended by Guidelines

DUPLEX ASSESSMENT OF EDEMA
IS LYMPHEDEMA PRESENT? GRADES SEVERITY? (ISL)

ASSESSING THE EFFECT OF TREATMENT ABOVE PRE (LEFT) AND POST (RIGHT) MLD BELOW PRE (LEFT) AND POST (RIGHT) IPC

ROLE OF CT SCAN
- SECONDARY LED → R/O OBSTRUCTING MASS E.G. NEOPLASTIC CAUSE
- DX → "HONEYCOMB" SUBCUTANEOUS TISSUE

MAGNETIC RESONANCE IMAGING
- IN INFANCY
- ? ROLE

MRI FINDINGS
36-year-old woman with primary lymphedema (LED) of LLE
 Shin SU, ET AL. Int J Cardiovasc Imaging 2013;29[Suppl 2]:135-43

(A) LLE numerous tortuous and dilated lymph vessels (arrowheads) right limb → no edema and a few light lymphatic vessels (arrows)

thickness and edema of the subcutis (high signal intensity)
Near-infrared fluorescence lymphatic imaging

Device: NIRF imaging device based upon military night goggle vision with unprecedented non-invasive imaging sensitivity.

Initial drug: Indocyanine green administered at a fraction (microdose) of approved dose in an off-label route of administration.

NIRF rivals nuclear imaging due to advantages of sensitivity, rapid acquisition, and non-radioactivity.

- 0.46 +/- 0.3 lymphatic contractions/min in normal subjects
- Diminished contractile events too infrequent to be quantified in VLU patients → DECREASED PUMPING

MAY BE UNDERLYING PATHOPHYSIOLOGY

Autonomous control of lymphatic “pumping”? 

THE EFFECT OF SPC ON LYMPHATIC FLOW IN VLU

SPC IN BOTH → INTRA-LYMPHATIC & INTERSTITIAL SPACE MOVEMENT OF FLUORESCENCE TO THE INGUINAL REGION

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