ONCOLOGY REHABILITATION AND SECONDARY LYMPHEDEMA
THE PROSPECTIVE SURVEILLANCE MODEL

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Prospective Surveillance Model

- Pre-Operative Rehab: Assessment and Intervention
- Early Rehab: During Disease Treatment
- Ongoing Surveillance and Continued Interval Functional Assessment

Referral to/Initiation of Rehabilitation Interventions

Adapted from Stout et al, Cancer, 2012
Prospective Surveillance Model

- Surveillance *enables early detection of and intervention* for treatment-related impairments.
- Surveillance and intervention will *decrease severity or prevent impairment and functional loss* at all stages of disease management.
- A population-based approach.
- *Consistent* methodology of *ongoing* functional assessment in parallel with medical management.
Pre-Operative Assessment

**Subjective**
- *Understanding of disease process*
  - Opportunities for patient education
- *Establish baseline levels*
  - HRQOL
  - Self-reported upper extremity function
  - Presence of pain
  - Presence of fatigue
  - Functional Performance

**Objective Measurements**
- Range of motion
- Strength
- Muscular endurance
- Posture and flexibility
- Limb volume (involved and uninvolved)
- Gait speed
- Balance
Pre-Operative Assessment

- Assessment and Plan
  - Provide education
    - Lymphedema risk reduction
    - What to expect following surgical treatment
    - Post operative follow up
  - Address impairments with program tailored to patient
    - Post operative exercises
Early Post-operative Rehabilitation

- First follow-up visit recommended 1-2 weeks post-operatively
  - Generally outpatient facility
  - Can be home based if patient is homebound

- Purpose:
  - Identify new impairments that need to be addressed following surgical treatment

- Compare current measurements with baseline measurements
Continued Interval Surveillance and Rehabilitation Triage

*Throughout the first post-operative year*

- Subsequent visits at 3, 6, 9 and 12 months for reassessment
  - Trigger via a screen in follow-up visits with physician
  - Regularly scheduled at the first post-op visit

- Impairments presentation variable depending upon treatment
  - Chemotherapy induced peripheral neuropathy
  - Chemotherapy related cognitive impairment
  - Fatigue
  - Changes in mobility
  - Persistent strength deficits
Continued Interval Surveillance and Rehabilitation Triage

Survivorship beyond the first year

- Referral made by
  - Patient
  - Nurse care manager
  - Physician

- Screening
  - Early identification to promote triage to rehabilitation

- Triage to physical therapy episode of care based on persistent impairment or emergence of new late effects
Screening: Since the diagnosis of your breast cancer have you experienced arm swelling?” Yes/no
- Sensitivity (65.1%) and specificity (76.9%)

Assessment:
- Circumferential measures
  - 5% volume change if preoperatively assessed
- Bioimpedance analysis (BIA) (L-Dex™)
  - Sensitivity – 0.66-1.00
  - Specificity – 0.84-0.98
- MoistureMeterD Compact
  - Tissue dielectric constant is an emerging diagnostic tool

Diagnosis and Treatment of Sub-Clinical Lymphedema

- 3 % diagnostic criteria
- Conservative intervention with compression garments 4 week trial
- Intermittent garment use during high risk activities


- The peri-cubital segments of the limb (10-20 cm and 20-30 cm) show a significant increase in volume as compared to other segments prior to the onset of lymphedema \( (r^2 = 0.951) \)

PSM Evidence: Lymphedema

  - Current data support the development of surveillance programs geared toward the early detection and management of BCRL in part due to newer, more sensitive diagnostic modalities.

  - PSM enabled early identification of LE in a high risk group and early management prevented progression of swelling.
PSM Evidence: Lymphedema

  - 5 years post breast cancer incidence of LE in surveillance patients (6.4%) vs usual care group (15.1%)
  - *Initiating PSM within first month post surgery was optimal for early identification.*

Implementing the Prospective Surveillance Model (PSM) of Rehabilitation for Breast Cancer Patients with 1-Year Postoperative Follow-up, a Prospective, Observational Study

Lisa Lai, MD1,2, Jill Binkley, MSc, PT, CLT3, Veronica Jones, MD4, Stephanie Kirkpatrick, PT, DPT, CLT5, Cathy Furbish, PT3, Paul Stratford, PT, MS6, Winifred Thompson, PhD, MSW7, Amanjot Sidhu, MBBS, MPH8, Clara Farley, MD1, Joel Okoli, MD, MPH2,9, Derrick Beech, MD9, and Sheryl Gabram, MD, MBA1,2

<table>
<thead>
<tr>
<th>TABLE 2 Early postoperative patient self-assessment results according to intervention type</th>
<th>Intervention (n = 36)</th>
<th>No intervention (n = 74)</th>
<th>p value</th>
</tr>
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<tbody>
<tr>
<td>Mean Upper Extremity Function Index (UEFI)</td>
<td>36</td>
<td>52</td>
<td>0.002</td>
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<tr>
<td>Mean Quick Disabilities of the Arm Shoulder and Hand (QuickDASH) score</td>
<td>50</td>
<td>37</td>
<td>0.047</td>
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<tr>
<td>Mean pain score</td>
<td>5</td>
<td>3</td>
<td>0.028</td>
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</table>
Feasibility

  - Less Severe Arm morbidity at 1 year post op in prospective surveillance group
  - *Costs were low and covered by health care insurance*
An early warning surveillance programme for detecting upper limb deterioration after treatment for breast cancer: A novel technology supported system

Delva Shamley and Karen Robb

**Fig. 1** Summary of an Early Warning System to detect deterioration of the upper limb after treatment for breast cancer
Dissemination and Implementation

Putting the pieces together
Calls for Prospective Functional Assessment

Cancer and Aging Research Group (CARG)

Improving the Quality of Survivorship for Older Adults With Cancer

Supriya G. Mohile, MD, MS¹; Arti Hurria, MD²; et al. Cancer Aug 15, 2016

<table>
<thead>
<tr>
<th>Priority</th>
<th>Research Gaps</th>
<th>Mechanisms to Close the Gaps</th>
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<tbody>
<tr>
<td>Function</td>
<td>Which specific pretreatment functional measures best predict toxicity to cancer treatment?</td>
<td>Capture measures of function prior to initiating treatment</td>
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<tr>
<td></td>
<td>How can we develop interventions to improve outcomes in patients with functional impairment?</td>
<td>Develop and test interventions (mobility, fall prevention, and exercise) tailored for older patients with cancer</td>
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<tr>
<td></td>
<td>How do specific cancers and treatment regimens influence long-term functional outcomes?</td>
<td><strong>Capture measures of function longitudinally after or during treatment</strong></td>
</tr>
<tr>
<td>Comorbidity</td>
<td>How do specific comorbidities and their interactions influence cancer treatment toxicity, cancer outcomes, and survivorship?</td>
<td>Capture changes in comorbidity over the course of treatment and in survivorship period</td>
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<td></td>
<td>How do we estimate life expectancy in older patients with cancer and comorbidities, with or without cancer treatment?</td>
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</tbody>
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Developing High-Quality Cancer Rehabilitation
Timely Need

Catherine M. Alfano, PhD, Andrea L. Cheville, MD, MSCE, and Karen Mustian,

A PROSPECTIVE MODEL OF SURVEILLANCE FOR COMPREHENSIVE CANCER REHABILITATION
A prospective model of surveillance has been developed by a team of stakeholders as a best practice model for cancer rehabilitation. In this model, rehabilitative efforts begin at the time of cancer diagnosis and continue through treatment and after treatment ends, using a multidisciplinary team approach. The model specifies that a multidimensional, comprehensive assessment is conducted at the preoperative evaluation to establish baseline functioning, identify patients with pre-existing conditions that may place them at higher risk for the development of treatment toxicities and impairments during/after treatment, and refer patients with current problems for interventions to improve their symptoms and function. Ideally, this is a clinical evaluation that includes a history focusing on symptoms and current exercise and a physical examination that objectively assesses the patient’s range of motion, strength, sensation, reflexes, and gait accompanied by performance testing (e.g., The Timed Up and Go, Repeated Sit to Stand tests, and Short Physical Performance Battery). This may be obtained or supplemented with patient-reported outcome (PRO)–based measurement of survivors’ symptoms and functioning, al-
A Precision Medicine Approach to Improve Rehabilitation’s Impact and Integration and Optimize Patient Wellness

Catherine M. Alfano 1, David S. Zucker 2, Mackenzie Pergolotti 3,4, Lee W. Jones 5, Nathan D. Price 6, Kathryn H. Schmitz 7, Jennifer

Goal 1: Improve Understanding of the Progression of Toxocities and Disability

Goal 2: Use Multilevel System Models to Identify Individuals Who Need Interventions

Goal 3: Build a Patient Screening and Monitoring System to Facilitate Provider Discussions About Patient Needs, and Generate Rehabilitation Referrals for Personalized Interventions

In order to deploy these personalized rehabilitation interventions to prevent or treat toxicities early, we need to develop and test a system of assessment and referral from oncology and from diagnosis forward. We propose building on the Prospective Model of Surveillance [100], where rehabilitative efforts begin at the time of cancer diagnosis and continue through and beyond treatment, with referral to a multidisciplinary team of providers [32]. Building a precision medicine approach of this model builds on a system of personalized cancer rehabilitation.
Rehabilitation is inherently Reactive

Rehabilitation services can be effectively Proactive

- Responds to events that have already happened such as injuries and accidents
- Actively seek to identify risk for and preliminary onset of adverse conditions
Thank you