Functional Performance Following Outpatient Radiation in Head and Neck Cancer

September 7, 2018
Background:

- The population of older Americans (>65 years) is expected to double to 80 million by 2040.
- Aging population has a decrease in functional and physiological deficits.

“Frailty is defined as a decrease in physiological reserves, as well as multisystem impairments that are separate from the normal aging process.”
Frailty as a Predictor of Morbidity and Mortality in Inpatient Head and Neck Surgery

Complications with increasing Modified Frailty Index (mFI), CL4 indicates Clavien-Dindo grade IV

- History of diabetes mellitus
- Functional status 2 (not independent)
- History of chronic obstructive pulmonary disease or pneumonia
- History of congestive heart failure
- History of myocardial infarction
- History of percutaneous coronary intervention, stenting, or angina
- History of hypertension requiring medication
- History of peripheral vascular disease or ischemic rest pain
- History of impaired sensorium
- History of transient ischemic attack or cerebrovascular accident
- History of cerebrovascular accident with neurological deficit
Purpose:

1. To identify changes in dependence or independence
2. To identify changes in physical performance
3. To classify frailty status

In patients receiving 7 weeks of outpatient radiation for head and neck cancer
Methods:

1. Design: Cross-sectional (n=103 patients)

2. Protocol: Patients tested on their first and last day of treatment
   a) ADL (Katz)
   b) iADL (OARS)
   c) Functional Performance: Short Physical Performance Battery (SPPB)
   d) Frailty

3. Pre-Post design (n=26)
Methods:

1. Katz ADL [bathing, dressing, toileting, transfers, continence, feeding and a total score]
   1. Scored: 0 = dependent and 1 = independent
   2. Scored from 0 – 6 points
   3. Higher score better (ref)

2. OARS iADL [cell phone, shopping, go places, meal prep, housework, medications, money, and a total score]
   1. Scored: 0 = dependent, 1 = needs help, and 2 = independent
   2. Scored from 0 – 14 points
   3. Higher score better (ref)
Methods:

Short Physical Performance Battery (SPPB)
1. Gait speed (4 meter) (0-4 points)
2. Sit-to-Stand x 5
3. Balance (0-4 points)
   1. Side-by-side
   2. Semi-Tandem
   3. Tandem
4. Total all points
5. Score from 0-12 points
   (more points are better)

<table>
<thead>
<tr>
<th>Gait Speed (sec)</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;8.70</td>
<td>1</td>
</tr>
<tr>
<td>6.21-8.70</td>
<td>2</td>
</tr>
<tr>
<td>4.82-6.20</td>
<td>3</td>
</tr>
<tr>
<td>&lt;4.82</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chair Stand (sec)</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable</td>
<td>0</td>
</tr>
<tr>
<td>&gt;16.7</td>
<td>1</td>
</tr>
<tr>
<td>13.7-16.69</td>
<td>2</td>
</tr>
<tr>
<td>11.2-13.69</td>
<td>3</td>
</tr>
<tr>
<td>&lt;11.19</td>
<td>4</td>
</tr>
</tbody>
</table>

Reference
Methods:

Fried Frailty Status
1. Gait Speed (15 feet walk test)
2. Grip Strength
3. Exhaustion
4. Physical Activity
5. Weight loss (>10% body weight)

<table>
<thead>
<tr>
<th>Status</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robust</td>
<td>0/5</td>
</tr>
<tr>
<td>Pre-Frail</td>
<td>1-2/5</td>
</tr>
<tr>
<td>Frail</td>
<td>≥3/5</td>
</tr>
</tbody>
</table>

“Do you engage in low or moderate amounts of physical activity or sports aimed at improving health”

“In the previous week, have you had feelings like you couldn't get going through the day?”

“In the previous week, have you had feelings like everything you did was an effort”

1 = rarely
2 = 1-2 days
3 = 3-4 days
4 = most days

Fried LP, J Gerontol. 56(3): 146-156, 2001
## Results: Demographics

<table>
<thead>
<tr>
<th></th>
<th>Beginning (n=49)</th>
<th>End (n=54)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>63.6 ± 11.2</td>
<td>64.5 ± 10.6</td>
<td>0.89</td>
</tr>
<tr>
<td>Ht. (in)</td>
<td>67.9 ± 4.0</td>
<td>68.5 ± 3.8</td>
<td>0.48</td>
</tr>
<tr>
<td>Wt. (lbs)</td>
<td>186 ± 46</td>
<td>179 ± 46</td>
<td>0.71</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>28.1 ± 5.9</td>
<td>26.7 ± 6.1</td>
<td>0.45</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>75</td>
<td>76</td>
<td>--</td>
</tr>
</tbody>
</table>
Results: ADLs

Katz: Total score 6.0 ± 0.2 vs. 5.8 ± 0.5, p=0.18
Results: iADLs

OARs: Total score $13.4 \pm 1.4$ vs. $11.6 \pm 3.1$, p=0.001

* p<0.05
Results: Function

**SPPB Points**

- **Gait:** Pre: 4.0, Post: 3.9
- **Sit-to-Stand:** Pre: 4.0, Post: 3.9
- **Balance:** Pre: 4.0, Post: 3.9

Total score: 10.6 ± 2.2 vs. 10.7 ± 1.9, p=0.95
Results: Frailty

Frailty Scores

* p=0.05
Results: Frailty

Total Frailty Score 0.9 ± 1.0 vs. 1.9 ± 1.1 Beginning vs. End, respectively. P<0.001
Results: Demographics

<table>
<thead>
<tr>
<th></th>
<th>Pre (n=26)</th>
<th>Post (n=26)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>65.3 ± 10.3</td>
<td>65.4 ± 10.2</td>
<td>0.95</td>
</tr>
<tr>
<td>Ht. (in)</td>
<td>67.9 ± 3.9</td>
<td>68.1 ± 3.9</td>
<td>0.88</td>
</tr>
<tr>
<td>Wt. (lbs)</td>
<td>188 ± 48</td>
<td>180 ± 47</td>
<td>0.53</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>28.5 ± 6.4</td>
<td>27.1 ± 6.3</td>
<td>0.45</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>65</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
Results: ADL

Katz: Total score 6.0 ± 0.2 vs. 5.9 ± 0.4, p=0.38
Results: iADL

OARs: Total score 13.5 ± 1.3 vs. 12.4 ± 2.3, p=0.042
* p<0.05
Results: Function

Total score 10.6 ± 2.2 vs. 10.7 ± 1.9, p=0.95
Results: Frailty

![Frailty Scores Graph]

* p=0.05
Results: Frailty

Total Frailty Score 0.8 ± 0.8 vs. 1.5 ± 0.9 Pre vs. Post, respectively. P=0.008
Summary

1. Outpatient head and neck cancer patients become frail following treatment
2. The frailty is predominantly related to weight loss and physical inactivity
3. No changes in grip strength and SPPB
4. More patients need to be evaluated
5. Interventions needed to attenuate the decline