Ambulating Patients with PA Catheters Who are Awaiting Heart Transplant in the Cardiac ICU

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**Background**

**Pulmonary Artery (PA) Catheter**

- Used to assess for type of shock and monitor responses to treatment
- Is a flow-directed balloon-tipped catheter
- Inserted into vein - floated through right atrium and right ventricle into pulmonary artery
Chamber waveforms viewed on monitor screen during insertion process.
Traditional care for patients with PA catheters is bedrest leading to:
- Social isolation & depression
- Physical deconditioning
- Higher risk for post-transplant complications

But – can hemodynamically stable patients be ambulated safely with a PA catheter?

Important to help stable patients awaiting transplant maintain optimal physical & emotional condition, while ensuring safety.
Current Ambulation Protocol
Patients Awaiting Heart Transplant

- UNOS 1A Status
- Wait for donor heart
- MD order to ambulate
- PT & OT evaluations
- Ambulate on monitor with RN – each lap around Cardiac ICU 225 feet
- Patient determines distance & duration of walk
- Is this safe? No evidence to support practice of ambulating patients with PA catheters
Purpose & Specific Aims

- **Purpose:** To describe the physiologic & emotional responses to ambulation in patients with a PA catheter awaiting heart transplant

- **Specific aims to determine:**
  1. If there were changes in PA catheter position while ambulating (catheter migration)
  2. If ambulation is associated with patients’ feeling of exertion & fatigue
  3. Patients’ perception of how ambulation affects their sense of well-being
Methods

**Design:** Prospective descriptive

**Sample:** Patients with PA catheter awaiting heart transplant

**Setting:** Cardiac ICU, HVC, YNHH

**Human Subjects:** IRB approved by Yale HRPP
Measures

Catheter Migration

Documents measurement on the catheter as it exits the insertion site

Observes PA waveform for changes
# Measures (cont’d)

## Exertion

<table>
<thead>
<tr>
<th>Score</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Nothing at all</td>
</tr>
<tr>
<td>0.5</td>
<td>Very, very, weak / light</td>
</tr>
<tr>
<td>1</td>
<td>Very weak / light</td>
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<tr>
<td>2</td>
<td>Weak / light</td>
</tr>
<tr>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>4</td>
<td>Somewhat strong / hard</td>
</tr>
<tr>
<td>5</td>
<td>Strong / hard</td>
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<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Very strong / hard</td>
</tr>
<tr>
<td>8</td>
<td></td>
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<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Very, very strong / hard</td>
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</tbody>
</table>

## Fatigue

<table>
<thead>
<tr>
<th>Fatigue Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>
• Well-being Scale: (1=strongly disagree to 5=strongly agree)

*Having the opportunity to walk around the unit . . . .*

1. helps me deal with being in the hospital waiting for a transplant
2. is inconvenient because it interrupts my schedule
3. is something I look forward to doing
4. upsets me because it makes me see that I can no longer do what I used to do
5. is not enjoyable
6. helps to lift my spirits
7. helps to keep me in better physical condition

• How does walking make you feel emotionally and physically?
Procedure

• Obtain written informed consent
• Ambulate patient on portable monitor with RN
• Collect data before, during and after each walk
  – Vital signs
  – Evidence of change in PA catheter position
  – Patient’s perception of exertion (Borg Scale)
  – Level of fatigue
• Assess patient’s perception of how walking affects sense of well being (weekly)
Sample Description
(N = 148 Walks by 8 Patients)

<table>
<thead>
<tr>
<th>Patient #</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>Age</td>
<td>38</td>
<td>61</td>
<td>53</td>
<td>65</td>
<td>51</td>
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<td>64</td>
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<tr>
<td>Gender</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td># of Walks (1-10 laps)</td>
<td>2</td>
<td>62</td>
<td>68</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>1</td>
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</tbody>
</table>

Characteristics

<table>
<thead>
<tr>
<th>Gender - Male</th>
<th>87.5%</th>
</tr>
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<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Median</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>53.9 (± 12.3)</td>
<td>57</td>
<td>34 – 65</td>
</tr>
<tr>
<td># Walks</td>
<td>29.4 ± 20.4</td>
<td>28.5</td>
<td>1-68</td>
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</table>
Research Question #1

Are there changes in PA catheter position while ambulating?

- 1 of 147 patient walks (0.7%) had change in catheter position (2 cm)
- No catheter-induced arrhythmias
- No changes in PA catheter waveform
Research Question #2a

Is ambulation associated with a patient’s feeling of exertion?

<table>
<thead>
<tr>
<th>Borg Scale</th>
<th>Score</th>
<th>Definition</th>
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<tbody>
<tr>
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$p < .001$

Pre-Walk: 0.2
Post-Walk: 0.51
Research Question #2b

Is ambulation associated with a patient’s feeling of fatigue?

Pre-Walk

Post-Walk

p < .001

0.28

0.58

Pre-Walk

Post-Walk

Yellow

Red
Research Question #3

How does ambulation affect a patient’s sense of well-being?

• Well-being Scale: Maximum score = 35

<table>
<thead>
<tr>
<th>Pt #</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
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<tbody>
<tr>
<td>2</td>
<td>35</td>
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<td>32</td>
<td>33</td>
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<tr>
<td>7</td>
<td>27</td>
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</tbody>
</table>
Research Question #3 (Cont’d)

How does walking make you feel emotionally and physically?

- Helps deal with hospitalization, gives patients something to look forward to, and helps lift spirits
- Appreciate opportunity to increase physical activity
- Expressed feelings of improved physical well-being
Outcomes

8 Patients

- 4 Transplanted
- 3 LVADs
- 1 Died

1 Transplanted
2 Died
Conclusions & Implications

- In stable patients awaiting heart transplant, ambulating with PA catheter is safe & patients maintained a good sense of well-being
- Patients should be better prepared to undergo transplant surgery & have an easier recovery