Cardiac Rehabilitation and Exercise Therapy in Pediatric and Adult Patients with Congenital Heart Disease

Yvette Gerdes, MS, RCEP, CCRP
Nothing to Disclose
Multidisciplinary program that strives to decrease modifiable risk factors, relieve symptoms, aids in the development of a healthy lifestyle and promotes self efficacy
Referring Diagnosis

- Recent Myocardial infarction
- Coronary Bypass
- Valve Surgery
- Coronary Angioplasty
- Cardiac Transplantation
- Angina
- Compensated CHF (EF<35%)
- Peripheral Artery Disease
Program Components

- Patient Assessment
- Exercise Training
- Physical Activity Counseling
- Nutrition Counseling
- Psychosocial Management

Disease Management
- Diabetes
- Lipid
- Blood Pressure
- Weight
- Smoking Cessation
- Education

SELF MANAGEMENT
Congenital Heart Patients

• Reduced exercise capacity
• Relatively sedentary lifestyles
• “likely to be exacerbated by obesity, which is independently associated with endothelial dysfunction and hypertension”

J Rhodes, TJ Curran, L Camil, et al “Sustained Effects of Cardiac rehabilitation in children with Serious Congenital Heart Disease” Ped 2006; 118; e586-e593
J Rhodes, AU Tikkanen, K. Jenkins “Exercise testing and Training in Children with Congenital Heart Disease” Cir210; 122:1957-1967
Pinto, N.M. et al.
Prevalence

Congenital Heart Defects

– 2010 census, it was estimated that over 2 million Children and Adults
– Occurs 1 in 110 births

http://circ.ahajournals.org/content/early/2013/12/18/01.cir.0000441139.02102.80.full.pdf
Chronic Disease Continuum

Deconditioning → Disease → Disability → Health Risks

Qualifying Criteria for Referral

- ↓ Functional status
- ↓ Quality of life
- Difficulty with ADLs and/or activities
- ↑ Symptoms
- ↑ Use of medical resources
- Nutrition
- Overweight
- Goal to increase physical activity
Insurance Coverage

72% Reimbursement rate

52% Private Pay
38.89% Medicare/Medicaid
8.33% Other

<table>
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<td>90.9%</td>
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No EKG monitored

EKG monitor
Referral to Rehab

Request for Consult
Graded Exercise Test
Cardiac Rehab Evaluation/Assessment

Rehab Program
12-18 Weeks Long
36 Sessions 2-3 days a week
Multidisciplinary Team
*Exercise Physiologist
*Registered Nurse
*Social Worker
*Registered Dietician
*Physical Therapy
*Occupational Therapy

Discharge Reassessment
Post Rehab Graded exercise test
Outcome Assessments

- 6MWT
- Circumference
- Sit and Reach
- Hand Grip Dynamometer
- Body Fat
- Push-up
- Time Up and Go

- Arm Curl
- Sit to Stand
- Ferrans and Powers QOL
- PHQ-9 / PHQ-9A
- Rate your plate
- Duke Activity Score Index
Case Study 1

Case Study 1

- Sudden Cardiac Arrest-aborted with successful CPR and AED prior to arrival to CCHMC; secondary to Ventricular fibrillation
- ICD placed 2/2/2015
- Enlarged LV- DCM; Atrial tachycardia; Hypotonia, Hypermobility, Muscular incoordination
- Genetics- phenotype positive for DCM, Sodium Channel Tachycardias
### Case Study 1

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<th>Test</th>
<th>Pre</th>
<th>Post</th>
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<tr>
<td>Six Minute Walk Test</td>
<td>505</td>
<td>600</td>
<td>19 ↑</td>
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<tr>
<td>Waist Circumference</td>
<td>34</td>
<td>32.75</td>
<td>-4 ↓</td>
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<tr>
<td>Hip Circumference</td>
<td>37.42</td>
<td>37.75</td>
<td>1</td>
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<tr>
<td>Sit to Stand</td>
<td>12</td>
<td>27</td>
<td>125 ↑</td>
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<tr>
<td>Arm Curl</td>
<td>7</td>
<td>22</td>
<td>214 ↑</td>
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Case Study 2

- Ebstein’s Anomaly, Sinus node dysfunction, CHB, s/p Pacemaker, s/p Melody Valve 1/2013 (completed CR)
- SOB, Fatigue, Depression, Anxiety, Sedentary, unable to complete ADLs
Case Study 2

GXT Heart Rate Data

GXT VO2 Data

- Pre CR Post Melody Valve 1/2013
- Post CR post Melody Valve 7/2013
- Pre CR 10/2014
- Post CR 3/2015
- Pre CR3-after intervention 8/2015
Case Study 3

- HLHS, Sinus node dysfunction, Complete Heart Block, s/p Pacemaker, Stroke in infancy, Hemiparesis of right arm and leg,
- Overweight, Fatigue, Depression, Anxiety, Sedentary
### Case Study 3

#### Pre and Post GXT Heart Rate
![Graph showing heart rate changes over time](image)

#### Pre and Post GXT VO2
![Graph showing VO2 changes over time](image)

<table>
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<tr>
<th></th>
<th>Pre</th>
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<tr>
<td>6MWT</td>
<td>425</td>
<td>625</td>
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<tr>
<td>Waist</td>
<td>40.67</td>
<td>36.25</td>
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<tr>
<td>Hip</td>
<td>42.33</td>
<td>40.25</td>
<td>-5%</td>
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<tr>
<td>Mod. Pushup</td>
<td>4</td>
<td>14</td>
<td>250%</td>
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<tr>
<td>Sit to stand</td>
<td>10</td>
<td>14</td>
<td>40%</td>
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Case Study 4

- Severe Dyspnea
- Decompensated Heart failure LVEF 10.6%; DCM, Asthma, Morbidly Obese
- LVAD placed 7/21/2015
- Start CR 8/13/2015
- Transplant 10/6/2015
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<tr>
<td>Weight</td>
<td>106.2</td>
<td>97.3</td>
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<tr>
<td>BMI</td>
<td>45.6</td>
<td>43.7</td>
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<tr>
<td>Total CHL</td>
<td>114</td>
<td>98</td>
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<tr>
<td>LDL</td>
<td>68</td>
<td>48</td>
<td>29%</td>
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<tr>
<td>HDL</td>
<td>26*</td>
<td>28*</td>
<td>7.7%</td>
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<tr>
<td>TG</td>
<td>101</td>
<td>109</td>
<td>7.9%</td>
</tr>
<tr>
<td>Hem. A1C</td>
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<td>Glucose</td>
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<tr>
<td>6MWT</td>
<td>180</td>
<td>300</td>
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<tr>
<td>Waist</td>
<td>45.75</td>
<td>42.17</td>
<td>7.8%</td>
</tr>
</tbody>
</table>
• Dr. Shoreman
• Dr. Chin
• Dr. Knilans
• Dr. Hirsch
• Dr. Rick Czosek
• Wayne Mays

• Exercise Physiology Staff:
  – Sandy Knecht
  – Michelle Amos
  – Leigh Schuckert
  – Shelby Collins

• The HI leadership and Care Teams