Risks That Result in Future Heart Disease in Children
Geetha Raghuveer, MD, MPH
Jennifer Picard, RN, BSN, CPN
Whitney Haas, MS, RD, LD
Jessica Watson, MS, CEP

Disclosure
We have no relevant financial relationships with the manufacturers(s) of any commercial products(s) and/or provider of commercial services discussed in this CME activity.

We do not intend to discuss an unapproved/investigative use of a commercial product/device in my presentation.

Regional Centers

Managing Dyslipidemia in Children
- Healthy Lifestyle for ALL family members
  - Heart Healthy Diet
  - Physical Activity
  - Avoiding Smoke Exposure

Referral Criteria
- Total Cholesterol > 220 and/or LDL >130
- Triglycerides >200
- Must have TWO sets of labs 3-6 months apart
- Family History - Parent or grandparent had a premature cardiac event (heart attack or stroke) before the age of 45

When to Refer to Adult Preventive Cardiologist
- Any patient 17.5 years or older who have not previously been seen in Preventive Cardiology
  - Helps maintain consistency for families
  - Decreases stress of transitioning
What labs will be followed?

**Every Appointment**
- Lipid Profile
- AST/ALT
- HgbA1c
- CK
- Vitamin D

**Every 3 Years**
- TSH, BUN, Crt

**One Time Only**
- Lipoprotein A

What are these labs?

- **Lipoprotein A**: An inherited lipid that can cause early build up on the blood vessel walls and premature heart disease.
- **Hemoglobin A1c**: A test that measures the average sugar present in blood from food digested over a 3 month period.
- **AST/ALT (Liver Enzymes)**: These can be elevated with obesity, and can lead to liver disease.

What are these labs?

- **LDL (Low-Density Lipoprotein)**: Also known as “bad” cholesterol. LDL causes build-up on the blood vessel walls. It is good to have **LOW** LDL.
- **HDL (High-Density Lipoprotein)**: Also known as “good” cholesterol. HDL prevents build-up on the blood vessel walls. It is good to have **HIGH** HDL.
- **Triglycerides**: Can be made in the body from eating more carbohydrates (starches and sugars) than your body needs. It is good to have **LOW** Triglycerides.

What are these labs?

- **Vitamin D**: A vitamin that is needed for bone and teeth formation. A low Vitamin D is linked to heart disease and diabetes. You can get Vitamin D from some foods and sunlight.
- **TSH (Thyroid Stimulating Hormone)**: When this level is high, your body is producing too little thyroid hormone, which can lead to increased appetite and weight gain.
Once a year for patients 10 years of age or older

Carotid Intima-Media Thickness (CIMT) & Pulse Wave Velocity (PWV)

Left Ventricular Mass Index (LVMI)
- If BMI greater than or equal to 95%
- Hypertension
- Unclear family history

Patient Example

10 year old male patient presents to Preventive Clinic

- Family History:
  - Father had an MI at 36 years of age requiring triple coronary artery bypass surgery. Father is currently on Atorvastatin 40mg.
  - Mother is a Type II DM and states her lipids were “a little high when checked a few years ago”. Mother smokes half a pack of cigarettes per day.
  - Paternal grandfather passed away at age 47 from a cardiac related death

Patient Example

Physical Exam: acanthosis

- Total Cholesterol = 310
- LDL = 234
- HDL = 34
- Triglycerides = 356
- LPa = 95
- AST/ALT = 20/33
- HgbA1C = 5.7%
- Vitamin D = 17
- TSH WNL
- BUN/Creatinine WNL

24 Hour Diet Recall Example

- Breakfast:
  - None
  - Drinks water or juice
- Lunch:
  - Eats at school with friends.
  - KC public school, hot lunch varies
  - Usually eats a fruit during lunch
  - Drinks chocolate milk
- Snack:
  - Doritos from QuikTrip on the way home from school
- Dinner:
  - Fast food 2x/week
  - Mom cooks dinner, usually a pot roast or casserole.
  - Drinks sweet tea and water

Nutrition Counseling

- Triglycerides
  - Reduce excessive sugar and refined carbohydrates
  - Soda, juice, sports drinks, sweet tea, flavored milks
  - Desserts
  - Chips, crackers, cereal, granola
  - Review appropriate portion sizes
  - Plate Model

- LDL cholesterol
  - Increase unsaturated fat in the diet
    - Plant oils, fish, avocado, nuts, seeds, flaxseed, chia seeds
  - Switch to whole grains
  - Increase fruits and vegetables in the diet
  - Increase food sources of soluble fiber
    - Beans, peas, nuts, seeds, fruits and vegetables
  - Avoid excessive saturated fat
  - Found in animal products
  - Encourage a variety of protein options
  - Avoid trans fat
  - Fried food, processed foods
Nutrition Counseling

• Setting goals
  • Patient and family guided goal setting
  • Goals are measurable, realistic and attainable

• After goal is set, brainstorm ideas to meet goal
  • Provide handouts and/or ideas to assist patient in reaching goals

Nutrition Goal Setting

Goal 1: Decrease sugar-sweetened beverages
Goal 2: Decrease added sugars
Goal 3: Increase whole fruits and vegetables
Goal 4: Improve the amount and type of fat you eat
Goal 5: Adopt a heart-smart eating pattern
Weight Status - BMI Percentile

Ask permission to discuss weight status and review the growth chart with patient and family

Describe the growth chart in detail
- If the parent does not understand how we quantify 'overweight' and 'obesity' status, they are less likely to take it seriously (Jones, 2011)

Physical Activity Recall Example

Physical Activity
- Football: 5 days/week, 60 minutes/day, self-rated intensity of 8/10
- PE: 5 days/week, 25 minutes/day, self-rated intensity of 5/10
- Unstructured play: 2 days/week, 30 minutes/day, self-rated intensity of 4/10

Weekly physical activity dosage: 485 minutes/week

Sedentary Time
- Weekdays: 4 hours/day
- Weekends: 10-12 hours/day

Physical Activity Counseling

Association of Physical Activity with:
- HDL Cholesterol
- Triglycerides
- Weight management in overweight and obese patients

Physical Activity Recall
- Type of activity
- Days per week
- Duration of activity
- Perceived intensity

Physical Activity Goal Setting

Goal 1: Commit to _ minutes of physical activity every day

Goal 2: Commit to _ organized physical activity per year

Goal 3: Participate in physical activities at a medium to hard level _ times per week for _ minutes

Goal 4: Commit to decrease leisure sitting time to less than _ hours per day
YMCA Step Test

• 3 minute step test, goal is to keep pace with 96 bpm metronome
• Monitor heart rate at rest, peak exertion, and for 5 minutes of recovery period
• Norms are validated for adults, but not in pediatrics currently

Medications

• Statin medications
• Vitamin D
  • 2,000iu Daily
  • 5,000iu Daily

Lab Tested

<table>
<thead>
<tr>
<th>Lab Tested</th>
<th>What's Normal?</th>
<th>Before (12/2020)</th>
<th>Today (05/2021)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL</td>
<td>Below 110</td>
<td>Not Reported</td>
<td>224</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>Below 100</td>
<td>452</td>
<td>256</td>
</tr>
<tr>
<td>HDL</td>
<td>Above 45</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>AST/ALT</td>
<td>Below 50</td>
<td>20/31</td>
<td>20/33</td>
</tr>
<tr>
<td>CK</td>
<td>Below 320</td>
<td>80</td>
<td>94</td>
</tr>
<tr>
<td>Hemoglobin A1C</td>
<td>Below 5.5</td>
<td>5.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Above 30</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Lp(a)</td>
<td>Below 30</td>
<td>2.49</td>
<td>95</td>
</tr>
</tbody>
</table>

Other Measurements

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Before 12/2020</th>
<th>Today 05/2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Weight</td>
<td>Obese</td>
<td>Obese</td>
</tr>
<tr>
<td>Waist Circumference</td>
<td>Normal</td>
<td>High</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Smoke Exposure</td>
<td>Present</td>
<td>Present</td>
</tr>
</tbody>
</table>

End of Appointment

• Dr. Raghuvirer
  • Meets with family
  • Review all imaging and labs results
  • Review Plan of Care
  • Prescriptions
  • Coordinator
  • Schedules follow up with family in person or telehealth
  • 6-12 months
  • Provides contact information