1. Please be concise and use only the space provided.
2. Please cite sources as necessary.
3. You may use your textbook, the pocket resource, and drugs.com

Patient History: Miss R is a 12 year old Hispanic female referred to you by her PCP for “fatty liver”. Miss R. is accompanied by her mother who does most of the talking as the patient is embarrassed and withdrawn. Patient is an only child who enjoys watching movies and reading books. Patient has recently complained of being tired, falling asleep at school, and mild abdominal pain. She was born LGA at 10 lbs 2 oz. Mother states she has always been a ‘big girl’.

PMH: LGA, Childhood Obesity
Meds: none
Family hx: mother and father have Type 2 Diabetes

Physical History:
General Exam: obese female
Vitals: Temp 98.6 F, BP 138/89 mm Hg, HR 84 BPM, RR 23
Ht: 57” (25th %tile) Wt: 152lb (>95th %tile) BMI 32.9 (>95th %tile)

Nutrition History:
General: Reports adequate appetite. Miss R. will eat some vegetables and fruit but prefers starchy and high fat foods. She sneaks candy from her cousins after school. Mom cooks traditional Hispanic meals at home, but a couple times per week they will go to fast food and get a burger or pizza.

Usual Dietary Intake:
- Breakfast: 2 breakfast burritos with cheese, eggs, sausage, beans, and homemade tortillas (made with lard), and a large glass of juice
- Snack: granola bar
- Lunch: school lunch (pizza or burger, with fries, maybe a fruit, chocolate milk or juice, with a cookie
- Snack: she is offered fruit but prefers candy and dried cereal (Fruit Loops) with regular soda
- Dinner: 3-4 tortillas (made with lard), cheese, beef or chicken, maybe a vegetable (corn or peas), and a glass of whole milk
- Snack: microwavable popcorn with butter or ice cream

Food allergy/intolerance: NKFA
**Treatment Plan**

**Weight Management:**
- Reduce simple sugar intake
- Reduce portions at meals
- Aim for half plate fruits and vegetables at meals
- Choose low fat foods
- Increase physical activity, 30 minutes daily

Weight loss of 5-10% over 3-6 month period

Reassess labs in 3 months

**Fasting Labs 12/20/2013**

<table>
<thead>
<tr>
<th>Lab</th>
<th>Value</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT</td>
<td>80 U/L</td>
<td>↑ (NTP pg. 443)</td>
</tr>
<tr>
<td>GGT</td>
<td>28 U/L</td>
<td>WNL (NTP pg. 443)</td>
</tr>
<tr>
<td>Glucose</td>
<td>115 mg/dL</td>
<td>↑ (NTP pg. 494)</td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td>6.8%</td>
<td>↑ (NTP pg. 494)</td>
</tr>
<tr>
<td>Total Cholesterol</td>
<td>245 mg/dL</td>
<td>↑ (NTP pg. 301)</td>
</tr>
<tr>
<td>LDL Cholesterol</td>
<td>148 mg/dL</td>
<td>↑ (NTP pg. 301)</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>22 mg/dL</td>
<td>↓ (NTP pg. 301)</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>198 mg/dL</td>
<td>↑ (NTP pg. 301)</td>
</tr>
</tbody>
</table>

CT scan (12/20/2013) shows the presence of a hepatic steatosis

1. **In the table of laboratory values above, for the column labeled “Interpretation”, indicate whether the values are high (↑), low (↓) or within normal limits (WNL).** (4 points)

2. **Briefly explain how Insulin Resistance can lead to Non-Alcoholic Fatty Liver Disease (NAFLD).** (6 points)

   Nonalcoholic fatty liver disease (NAFLD) refers to a spectrum of liver damage ranging from simple statuses to nonalcoholic steatohepatitis (NASH), advanced fibrosis and cirrhosis. NAFLD is considered the hepatic component of the metabolic syndrome and insulin resistance represents its pathophysiological hallmark. Insulin resistance in NAFLD is characterized by reduced whole-body, hepatic, and adipose tissue insulin sensitivity. Insulin resistance causes a decrease in the inhibitory ability of insulin on hormone sensitive lipase (HSL), causing an increase in triglyceride lipolysis and increase in free fatty acid release. This then causes the circulating levels of free fatty acids to increase and be taken up into the liver. Insulin resistance can also cause hyperinsulinemia, which can cause an increase in the de novo synthesis of fatty acids. Triglyceride synthesis increases due to the increase of hepatocyte free fatty acids. Insulin resistance is often associated with chronic low-grade inflammation, and numerous mediators released from immune cells and adipocytes may contribute liver damage and liver disease progression. Understanding the molecular mediators of liver injury would promote the development of mechanism-based therapeutic interventions.  

   (From: *Dr. Braun’s Liver Disease I lecture & Insulin Resistance in Nonalcoholic Fatty Liver Disease.*)
3. Which foods in Miss R’s diet are contributing most to: (2 points)
   a. **Triglyceride level:**
      Cheese, lard, butter from popcorn, ice-cream, sausage, whole milk, beef, pizza, burger, fries, cookies.
   b. **Fasting blood glucose level:**
      Juice, chocolate milk, tortillas, cookies, granola bar, candy, dry cereal, Fruit Loops, soda, ice cream

4. Explain the rationale for the following interventions: (4 points)
   a. **Reduce simple sugar intake**
      The Pt. is at risk for T2DM due to her family history of T2DM, so she need to learn how to control her blood sugar. Simple sugars will raise blood sugar and triglyceride levels more rapidly. Reduce simple sugar intake will help lower glucose levels and reduce the risk of diabetes. Also, it can reduce her weight reduction; help prevent the progression of liver problems.
   b. **Reduce portions**
      Reducing her portion sizes at meals and snacks can help with decreasing the unnecessary increased energy intake that results in a positive energy intake that ultimately leads to weight gain. This can help her lose weight and reach a healthier BMI. This will in turn help with preventing the onset of diabetes as well as the progression of liver disease.
   c. **Choose low fat foods**
      Lower fat food intake can help decrease triglyceride levels and cholesterol to reach healthier BMI in order to avoid future complications. Lowering fat intake will also aid in weight reduction, improving lipid levels, and blood pressure. It can help in reversing the presence of hepatic statuses as well as prevent the onset of diabetes. Also the lower fat in food can help reduce pt.'s risk of CVD.
   d. **Increase physical activity**
      Increasing physical activity can help lower cholesterol, triglyceride and glucose levels. In addition, physical activity helps lower BMI and keep patient healthier. It also can decrease insulin resistance, help reverse the presence of hepatices steatosis, and lower high blood pressure.

5. **Write 2 PES statements using the Intake domain. (4 points)**
   1. Excessive carbohydrate intake (NI-5.8.2) related to consumption of simple sugars and fast food AEB diet history as elevated elevated hemoglobin A1c of 6.8%, and glucose of 115 mg/dL.
   2. Excessive fat intake (NI-5.6.2) related to consumption of high fat foods and fast food AEB diet history as elevated total cholesterol of 248 mg/dL, triglyceride level of 198mg/dL, LDL cholesterol 148 mg/dL.