Dietary recommendations in Obesity, Hypertension, Hyperlipidemia, and Diabetes

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Objectives

• To review dietary recommendations in the following conditions:
  • Obesity
  • Hypertension
  • Diabetes
  • Hyperlipidemia

Disclosures

• None

Part 1: Obesity

A 37-year-old man presents for physical examination. Body mass index is 32 kg/m². This man’s weight is categorized as:

A. Normal
B. Overweight
C. Class I obesity
D. Class II obesity
E. Class III obesity

Classification of obesity

<table>
<thead>
<tr>
<th>Classification</th>
<th>Body Mass Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5 kg/m²</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5-24.9 kg/m²</td>
</tr>
<tr>
<td>Overweight</td>
<td>25-29.9 kg/m²</td>
</tr>
<tr>
<td>Class I obese</td>
<td>30-34.9 kg/m²</td>
</tr>
<tr>
<td>Class II obese</td>
<td>35-39.9 kg/m²</td>
</tr>
<tr>
<td>Class III obese</td>
<td>≥40 kg/m²</td>
</tr>
</tbody>
</table>
Q: What other physical finding is useful in predicting morbidity and mortality in the overweight and obese individual?

A: Waist circumference
(>88cm/34in in women)
(>102cm/40in in men)

Role of waist circumference and risk

<table>
<thead>
<tr>
<th>Waist Circumference</th>
<th>Normal</th>
<th>Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>Increased disease risk</td>
<td>High disease risk</td>
</tr>
<tr>
<td>Class I obesity</td>
<td>High disease risk</td>
<td>Very high disease risk</td>
</tr>
<tr>
<td>Class II obesity</td>
<td>Very high disease risk</td>
<td>Very high disease risk</td>
</tr>
<tr>
<td>Class III obesity</td>
<td>Extremely high disease risk</td>
<td>Extremely high disease risk</td>
</tr>
</tbody>
</table>

Hypertension, diabetes, and dyslipidemia are all well-known consequences of obesity. Which of the following is not a consequence of obesity?

A. Pancreatic cancer
B. Pulmonary embolism
C. Polycystic ovarian syndrome
D. End-stage renal disease
E. None of the above

Obesity-associated health problems

<table>
<thead>
<tr>
<th>Body System</th>
<th>Associated Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endocrine</td>
<td>Type 2 diabetes; polycystic ovarian syndrome; dyslipidemia</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Hypertension; coronary artery disease; heart failure; atrial fibrillation</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>GERD; erosive gastritis; gallstones; non-alcoholic fatty liver disease</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Obstructive sleep apnea; pulmonary embolism</td>
</tr>
<tr>
<td>Renal</td>
<td>Nephrolithiasis; chronic kidney disease; ESRD</td>
</tr>
<tr>
<td>Malignancy</td>
<td>Liver; stomach; pancreas; esophagus; gallbladder; rectum; multiple myeloma</td>
</tr>
</tbody>
</table>

A 43-year-old man has a BMI of 32kg/m², but no other complications of obesity. The first step in management of this patient should be:

A. Assess his desire to lose weight
B. Prescribe a weight-loss pill
C. Refer to a Nutritionist
D. Set a goal of 5kg weight reduction in the next month

Assessing readiness

• Before engaging in a weight loss program, doctors and patients should:
  • Agree that weight loss is appropriate
  • Assess whether the patient is prepared to undertake the measures necessary to lose weight
  • Determine the priorities in preventing illness (i.e., smoking cessation; diabetes control)

• Things to ask about:
  • Past weight history
  • Factors associated with weight gain/loss in the past
  • Past efforts to lose weight
The most effective strategy that results in weight reduction is:

A. Carbohydrate-restricted diets
B. Extreme calorie-reduction (1000 kcal/day) diets
C. Self-monitoring of weight, food and exercise
D. Vigorous exercise programs

Behavior and weight loss

• Self-monitoring of weight, diet, and exercise is the most effective behavior strategy that results in weight loss
• Portion control also has a role in weight loss
• Meal planning can control portion size, guide shopping, and prevent overeating

Your 42 y.o. man with BMI 32 kg/m² (weight 100 kg) wants to lose weight. He has never tried to lose weight before. Your best advice to him is:

A. Lose 5 kg in the next month
B. Lose 5 kg in the next two months
C. Lose 10 kg in the next three months
D. Lose 10 kg in the next six months

Recommendations for pace of weight loss

• General initial goal: 5–10% loss of body weight over 6 months
• Overweight/Class I Obese patients: 0.5 – 1 pound/week
• Class II/Class III Obese patients: 1 – 2 pounds/week

Your patient asks you how many calories he needs to cut out of the average day to lose 0.5 – 1 pound/week. The correct answer is:

A. 50 – 100 kcal/day
B. 100 – 250 kcal/day
C. 300 – 500 kcal/day
D. 700 – 1000 kcal/day

Caloric restriction and weight loss

• Reduce calories 300-500 kcal/day for 0.5 – 1 pound/week weight loss
• Reduce calories 500-750 kcal/day for 1 – 2 pound/week weight loss
• Popular diets (e.g., Atkins; South Beach etc.) result in similar weight loss after 2 years and should be tailored to individual preferences
How many calories are in this popular food item?

Your 100kg patient wants to exercise by walking on a treadmill at 3mph for one hour/day. How many calories will he burn in that hour?

A. About 100kcal
B. About 200kcal
C. About 300kcal
D. About 500kcal

Exercise and weight loss

• Exercise is less effective at causing weight loss, unless sustained at high levels (i.e., >300 minutes/week)
  • Mean weight loss of 0.1kg/week

• However, people who exercise and reduce calories are more successful at maintaining weight loss

• Exercise has other benefits (e.g., lipid metabolism; blood pressure; reduced frailty) that are important
Exercise recommendations

<table>
<thead>
<tr>
<th>Organization (year)</th>
<th>General Recommendation</th>
<th>Additional Benefits With...</th>
<th>Weight Loss With...</th>
</tr>
</thead>
<tbody>
<tr>
<td>World Health Org. (2011)</td>
<td>• 150min/wk moderate or • 75min/wk vigorous</td>
<td>• 300min/wk moderate • 150min/wk vigorous</td>
<td>More duration of vigorous may be needed</td>
</tr>
<tr>
<td>US Dept. of HHS (2008)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Part 2: Diet and blood pressure

For the average person who eats a diet of packaged/prepared foods, eliminating adding salt to food will reduce salt intake by:

A. 25%
B. 35%
C. 50%
D. 75%

The stated goal in controlling salt intake is to limit sodium intake to no more than:

• 1000mg/day
• 1500mg/day
• 2000mg/day
• 2400mg/day
• 4800mg/day

Recommendations on sodium

• Consume no more than 1500mg of sodium/day
• If this goal is not achievable, try to reduce sodium intake by 1000mg/day

The DASH diet
Three groups studied over 3-week periods:

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typical American diet</td>
<td>Diet rich in fruits and vegetables</td>
<td>Diet rich in fruits and vegetables + low-fat dairy products</td>
</tr>
</tbody>
</table>

Group 1

No change in BP

Group 2

Systolic BP lowered 3 points

Group 3

Systolic BP lowered 11 points

The Mediterranean Diet

• ‘Seven Countries Study’ done in 1984 showed fewer cardiovascular deaths in Southern European countries

• Diet in these countries thought to be a contributor

• Quickly became known as the Mediterranean Diet

• Many studies since have confirmed CV benefits from this diet

Components of the Mediterranean diet

<table>
<thead>
<tr>
<th>Macronutrient</th>
<th>Diet</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increase</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Macronutrient</td>
<td></td>
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</tr>
<tr>
<td>Measured</td>
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</table>

ACC/AHA lifestyle management guidelines

<table>
<thead>
<tr>
<th>Lifestyle Intervention</th>
<th>Blood pressure change</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight loss in obese</td>
<td>-101 mm Hg</td>
<td>For overweight/obese patients, expect 1 mm Hg reduction per 1 kg weight lost.</td>
</tr>
<tr>
<td>DASH-type diet</td>
<td>-11 mm Hg</td>
<td>Diet rich in fresh fruits, vegetables, whole grains, low-fat dairy, low in saturated and total fat.</td>
</tr>
<tr>
<td>Sodium restriction</td>
<td>-9 mm Hg</td>
<td>Optional daily intake is 1000mg sodium. Alternatively, reduce sodium intake by 1000mg/day.</td>
</tr>
<tr>
<td>High-potassium diet</td>
<td>-4.5 mm Hg</td>
<td>Ideally through foods high in potassium. Caution in patients with CKD.</td>
</tr>
<tr>
<td>Aerobic exercise</td>
<td>-6 mm Hg</td>
<td>50-150 minutes/week at 65-75% maximal predicted heart rate.</td>
</tr>
<tr>
<td>Resistance exercise</td>
<td>-4 mm Hg</td>
<td>90-150 minutes/week</td>
</tr>
</tbody>
</table>

Which of the following raises LDL (‘bad’) cholesterol the most?

A. Dietary carbohydrates  
B. Dietary cholesterol  
C. Dietary saturated fat  
D. Dietary unsaturated fat

Part 3: Diet and cholesterol
An individual with elevated cholesterol eliminates all fat from her diet. What will be the result in her LDL ('bad') and HDL ('good') cholesterol?

A. LDL will go down; HDL will go down
B. LDL will go down; HDL will go up
C. LDL will go up; HDL will go down
D. LDL will go up; HDL will go up

Diet and cholesterol

• Diet is a contributor to your lipid profile
• There are secondary benefits to a healthful diet, so recommendations should be followed even if medications are prescribed
• In many individuals, diet alone is not enough to control lipids

Controlling diet is proven to reduce the risk of heart disease

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

A 52-year-old man begins a routine of 30-minutes of aerobic exercise daily. Expected changes in his lipids will be:

A. LDL cholesterol goes down a little
B. LDL cholesterol goes down a lot
C. HDL cholesterol goes up a little
D. HDL cholesterol goes up a lot
A 52-year-old woman weighs 80kg has Class I obesity. How many kg will she need to lose to significantly reduce her risk of diabetes?

A. 5kg  
B. 10kg  
C. 15kg  
D. 20% of body weight

**Exercise and lipids**

<table>
<thead>
<tr>
<th>Exercise type</th>
<th>Lipid component</th>
<th>Impact</th>
</tr>
</thead>
</table>
| Aerobic       | LDL-C and non-HDL-C | • Lowers LDL-C 3-4mg/dL  
• Lowers non-HDL-C 5-9mg/dL |
|               | HDL-C             | • No effect |
|               | TG                | • No effect |
| Resistance    | LDL-C and non-HDL-C | • Lowers LDL-C 6-9mg/dL  
• Lowers non-HDL-C 6-9mg/dL |
|               | HDL-C             | • No effect |
|               | TG                | • Lowers TG 6-9mg/dL |

**Part 4: Diet and diabetes**

Patients with borderline blood sugar given intensive counseling on diet and exercise

- 4.2kg weight loss
- Increase in exercise from baseline
- 58% reduced risk of diabetes

Patients with borderline blood sugar given usual care

- 0.8kg weight loss
- No change in exercise

Diet and diabetes

- The most important risk factor for diabetes is BMI
- Lack of exercise is another risk factor for diabetes
- Modest weight loss and regular exercise dramatically reduce risk of diabetes
Complex carbohydrates and simple carbohydrates

<table>
<thead>
<tr>
<th>Complex carbohydrates</th>
<th>Simple carbohydrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vegetables</td>
<td>• Sodas</td>
</tr>
<tr>
<td>• Whole grains</td>
<td>• Cakes</td>
</tr>
<tr>
<td>• Legumes</td>
<td>• Cookies</td>
</tr>
<tr>
<td>• Dairy products</td>
<td>• Potatoes</td>
</tr>
<tr>
<td>• High-fiber fruit</td>
<td>• White bread</td>
</tr>
</tbody>
</table>

Conclusions

- Diet, typically in combination with regular exercise, is very effective at reducing:
  - Obesity
  - Blood pressure
  - Hyperlipidemia
  - Diabetes