Obstructive Sleep Apnea and Heart Disease

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Tonight’s Agenda

1. What is Cardiovascular Disease
2. What is the BIG DEAL?
3. Cardiovascular Risk Factors
4. Cardiovascular Conditions Associated with Obstructive Sleep Apnea (OSA)
5. How Does OSA Affect Traditional Cardiovascular Risk Factors?
6. What Should You Do?
What is Cardiovascular Disease?
Percentage Breakdown of Deaths from Cardiovascular Diseases

- **Coronary Heart Disease**: 54%
- **Stroke**: 18%
- **Congestive Heart Failure**: 6%
- **Diseases of the Arteries**: 4%
- **Rheumatic Fever/Rheumatic Heart Disease**: 4%
- **High Blood Pressure**: 5%
- **Congenital Cardiovascular Defects**: 0.4%
- **Other**: 13%
- **Other**: 13%

In Affiliation with Sacred Heart Medical Center
What is the BIG DEAL?
Leading Causes of Death for All Males and Females
United States: 2002

A Total CVD
B Cancer
C Accidents
D Chronic Lower Respiratory Diseases
E Diabetes Mellitus
F Alzheimer’s Disease

Source: CDC/NCHS
The Risk

• **Coronary Artery Disease:**
  #1 cause of death in women and men in America and in most industrialized nations

• **Stroke:**
  #3 cause of death of Americans
Risk Factors
Risk Factors

Non-modifiable versus Modifiable
Your #1 Risk Factor:

*Family History of Premature Heart Disease*

**Father with Heart Disease < age 55**

**Mother with Heart Disease < age 65**
Non-modifiable Risk Factors

SEX
Non-modifiable Risk Factors

AGE
Menopause
Modifiable Risk Factors for Cardiovascular Disease

- Diabetes/Glucose Intolerance
- Tobacco
- High Blood Pressure
- High Cholesterol
- Obesity
- Lack of Exercise
- Obstructive Sleep Apnea
- Drug Use
- Dental Disease
- Hostility/Anger
- Stress
How Does Sleep Apnea Contribute to Cardiovascular Disease?
Cardiovascular Conditions Associated with Obstructive Sleep Apnea

- Hypertension
- Cardiac Arrhythmias
  - Bradycardia
    - Sinus Bradycardia
    - Atrioventricular Block
  - Tachydysrhythmia
    - SVT
      - Atrial Fibrillation Ventricular Tachycardia
- Left Ventricular Systolic Dysfunction
- Left Ventricular Diastolic Dysfunction
- Congestive Heart Failure
- Stroke
- Coronary Heart Disease
- Pulmonary Hypertension
Mr. S
73 year old grumpy obese man
- High Blood Pressure
- Diabetes
- Coronary Artery Disease
- Congestive Heart Failure

Presents for further evaluation of shortness of breath and lower extremity swelling despite optimal heart failure therapy

At night . . .
At 3:00 in the Morning . . .

• Mr. S. awakens with chest discomfort which is unrelieved by nitroglycerin.

• 911

• At the hospital, a heart attack is confirmed and Mr. S. is emergently taken to the cardiac catheterization laboratory.
Coronary Artery Disease and OSA

Image courtesy of Andrew Bourne, M.D.
Coronary Artery Disease and OSA

- Nocturnal chest discomfort
- Nocturnal ECG changes
  - Increased myocardial oxygen demand
  - Post apneic surges in blood pressure and heart rate
  - Blood oxygen levels low
Coronary Artery Disease and OSA

- Abnormal function of cells within the coronary blood vessels
- Enhanced constriction of the vessels
- Abnormalities of coagulation
- Abnormalities in inflammatory and metabolic factors associated with dysfunction of the vessel lining
- Elevated CRP levels
Coronary Artery Disease and OSA

- OSA is an independent risk factor for ischemic heart disease
- In patient with heart attacks, OSA is as strong a risk factor as obesity, smoking and hypertension
- Clinically important OSA has been found in up to 50% of patients with coronary artery disease
The Rest of the Story . . .

• The right coronary artery was successfully stented, the patient’s medications were adjusted, and he remained free of angina/chest discomfort.

• While in the hospital, the nursing staff noted the patient’s aberrant breathing and a sleep study was performed.

• The patient was found to have severe obstructive sleep apnea which was treated with Bipap therapy.
One Month Later . . .

- The patient remains free of angina.
- He is no longer crabby, his blood pressures have improved, his lower extremity swelling has resolved, his blood sugars have improved and he has lost 3 pounds.
Mrs. B.

- 88 y/o woman with hypertension presents for evaluation of hypertension and prominent fatigue.
- Medication adjustments were made and a sleep consultation was requested.
- 2 weeks later . . .
- Admitted to the hospital with congestive heart failure and rapid atrial fibrillation
Congestive Heart Failure and OSA

- OSA is an independent risk factor for congestive heart failure Quan, et al, 1997
- 11-37% of patients with congestive heart failure found to have OSA Javaheri, et al, 1998 and Sin, et al, 1999; other authors have quoted 50-60%
Ms. P.

31 year old mildly obese woman

- High Blood Pressure

Presents for further cardiovascular evaluation in light of difficult to control hypertension.

Conservative therapy

- Salt restriction
- Exercise

Medical therapy

- 4 antihypertensives

Secondary causes of hypertension explored
The Rest of the Story . . .

- Dietary changes
- 30 pound weight loss
- Daily exercise
- OSA now treated with CPAP
- BP 122/78 mmHg
Hypertension and OSA

OSA is an Independent Risk Factor for Hypertension

80% of patients with difficult to control hypertension have underlying OSA
Ms. A

61 year old woman

- High Blood Pressure
- Mild Obesity

Presents to the ER at 11:30 pm with complaints of intermittent palpitations often awakening her from sleep.

She notes shortness of breath and panic with her palpitations.

Initial ECG . . .
Normal ECG
Ms A’s ECG

Rapid Atrial Fibrillation
The Rest of the Story . . .

- Paroxysmal atrial fibrillation
- Anticoagulant therapy
- Antiarrhythmic therapy
- Obstructive sleep apnea
- The complication . . .
Stroke and OSA

• Relative risk of stroke in snorers 10.3 Partinen and Palomaki, 1985

• In patients recovering from a hemispheric stroke, 80% had OSA Mohsenin and Valor, 1995

• A significant decrease in blood flow to the brain and an increase in pressure in the brain has been found during obstructive apneas
Mr. G.
34 year old mildly obese African American man

Admitted to the hospital for a blood clot in his leg complicated by a blood clot in his lung.

Telemetry

In the middle of the night . . .
The Rest Of The Story . . .

- Patient successfully resuscitated
- 6 months of anticoagulation
- 40 pound weight loss
- CPAP therapy
- No recurrent arrhythmias
Cardiac Arrhythmias and OSA

• Severe slow heart beats and heart block are seen frequently in association with OSA
  − Usually reversible with CPAP
• Ventricular rhythms and supraventricular rhythms are more common in patients with OSA
  − May improve with CPAP
Mrs. J.

- 56 y/o obese woman with hypertension who presents for further evaluation of progressive weight gain and significant lower extremity edema. The patient denies a h/o tobacco use, diabetes, or dyslipidemia.
- ECG is normal
- Laboratory studies notable for elevated fasting glucose, bicarbonate level, blood count, and CRP levels.
Mrs. J. cont.

- Echocardiography demonstrates normal left ventricular systolic function with impaired relaxation, enlarged right heart with reduced function, a leaky tricuspid valve, and moderate pulmonary hypertension.

- Additional questions to ask: snoring, snorting, apnea, restless legs, dry mouth, morning headache, morning fatigue, daytime drowsiness?
The Rest of the Story . . .

- Morning hypertension
- Impaired glucose tolerance
- Sleep evaluation consistent with OSA
- 3 months later:
  - Weight loss of 37 pounds
  - Edema resolved
  - Blood pressure improved
  - Blood sugars improved, but still closely monitored
  - Blood count normal
Sleep Apnea and Cardiovascular Risk Factors
How Does OSA Affect The Traditional Cardiovascular Factors?

- Obesity
- Hypertension
- Insulin Resistance
- Lipid Abnormalities
- Cognitive Abnormalities
- Depression/anxiety/irritability
- Stress
What Should YOU Do?
YIKES!

DON’T PANIC
Prevention Is the Key

- Be Proactive
- Identify and Treat Your Risk Factors
- Educate Yourself/Ask Questions
- Talk With Your Family and Friends
- Get Moving
Always Remember . . .

A GOOD NIGHT’S SLEEP IS GOOD FOR YOUR HEART
Thank You