Sleep Apnea...
The Not so Silent Killer

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Today’s Goals

✓ What is obstructive sleep apnea (OSA)

✓ Understand diagnosis and treatment

✓ Understand the basic pathophysiology

✓ Know three conditions highly associated with OSA
What is Obstructive Sleep Apnea (OSA)

Insidious condition of repetitive partial or complete airway collapse during sleep

Frequently associated with:

- obesity
- diabetes
- heart disease
The Obstructed Airway

- Chin
- Nose
- Throat
- Tongue
- Blocked airway
Spectrum of Disease

- Snoring
- Upper Airway Resistance Syndrome - (UARS)
- Sleep Apnea
  - Obstructive
  - Central
- Obesity Hypoventilation Syndrome - (OHS)
Pulmonary Disease and Obesity

Simple Obesity

- Eucapnic
- Frequent OSA
- Likely increased respiratory drive

Obesity Hypoventilation

- Exercise intolerance
- Dyspnea on exertion
- Increased post-op risk
  1. pneumonia
  2. atelectasis

Obesity

- Hypercapnic
- Frequent OSA
- Abnormal respiratory drive
Scope of the Problem

• 20 - 30 million Americans
• Wisconsin sleep cohort study
  – 626 subjects age 30-60
  – AHI >5 in 9% of women
  – AHI >5 in 24% of men

Young T, N Engl J Med 1993;328
• OSA Prevalence in other disease states
  – Obesity - 75%
  – Type II DM - 72% (moderate & severe - 66%)
  – Hypertension - 50 to 75%
  – CAD & A. Fib. - 50%
  – CHF - 50 to 75%
  – Depression - 40 to 45%
Obstructive Sleep Apnea

- Most common symptoms
  - Loud snoring
  - Witnessed apnea
  - Excessive daytime sleepiness
  - Waking up choking & gasping
  - Cognitive impairment
Obstructive Sleep Apnea

- Most common signs
  - Obesity
  - Neck size ≥ 17 men ≥ 16 women
  - Nasopharyngeal narrowing
  - Maxillo-mandibular anomalies
  - Hypertension
  - Stroke
  - Heart failure
How to Diagnose Obstructive Sleep Apnea

- Clinical suspicion
- Consistent signs and symptoms
- Overnight sleep study looking for respiratory events (HST or PSG)
What are Respiratory Events

**Apnea** – no airflow ≥ 10 seconds

**Hypopnea** – reduced airflow ≥ 10 seconds, usually associated with oxygen desaturation or evidence of arousal
Diagnosing OSA
Consequences of Untreated OSA

Consequences of Untreated OSA

Consequences of Untreated OSA

Calculation of LV transmural pressures

150 - 0 = 150
200 - 0 = 200
150 - (-50) = 200
Consequences of Untreated OSA

Calculation of LV transmural pressures

150 - 10 = 140
200 - 0 = 200
150 - (-50) = 200
Effects of the *Supine Position*

- V/Q mismatch
- Shunting
- Lung bases well perfused but poorly ventilated
- Reduced lung volumes
Effects of the Supine Position

- Practical consequence during general anesthesia
  - More rapid decline in oxygen saturation during apnea,
    <2 minutes vs. 6 minutes when breathing 100% oxygen
Severity Scale of OSA

**Apnea Hypopnea Index - (AHI)**
- Mild sleep apnea - 5 - 15 events / hour
- Moderate sleep apnea - 16 - 30 events / hour
- Severe sleep apnea - > 30 events / hour

**Who to Treat?**
- AHI ≥ 30
- AHI 5 - 29 ⇒ if symptomatic or if co-morbidities present
Consequences of Untreated OSA

OSA is associated with:

• Nocturnal blood pressure elevation
• Independent risk factor for hypertension
• Changes in LV geometry and function
• Metabolic Syndrome
Increasing prevalence of childhood obesity and its complications could actually result in the current generations of children living less well and for a shorter time than previous generations.

* Daniels, Future Child. 2006 Spring;16(1):47-67
Treatment Options for OSA

- Permanent weight loss
- Continuous positive airway pressure (CPAP)
- Oral appliances
- Oral and/or maxillo-facial surgeries
- Tracheostomy
CPAP Therapy for OSA

- Applied via nasal mask
- Acts as pneumatic splint
- Compliance limits utility
- Mask fit crucial
Thank You!

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