Obstructive Sleep Apnea and Stroke Risk

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DISCLOSURE: No conflicts of interest
Objectives

• Obstructive Sleep Apnea (OSA)

• Discuss link between OSA and Stroke

• OSA screening tools

• Treatment
Obstructive Sleep Apnea (OSA)

- Cyclic collapse of upper airway during sleep
- Cessation of airflow with hypoxemia or hypercapnia
- Can result in arousal which terminates the event
- AHI (Apnea/hypopnea index)
  - AHI < 5 (normal)
  - AHI 5 -15 (mild)
  - AHI 15 - 30 (moderate)
  - AHI > 30 (severe)

Calvin Curr Opin Cardiol 2009; AASM Manual for the Scoring of Sleep and Associated Events 2007
Epidemiology

- Affects 2-15% of middle aged population
- 24% men 9% women
- >80% untreated/undiagnosed

Risk Factors

- Obesity
- Male gender
- Age > 50
- BMI > 35
- Neck circumference > 40cm
- Family history
  - Small oropharyngeal airway
From: Obstructive Sleep Apnea and Heart Failure: Pathophysiologic and Therapeutic Implications

J Am Coll Cardiol. 2011;57(2):119-127
Untreated OSA Increases Stroke Risk

- **4x the risk of general population**
  - 3x increased risk of MI
- **Compared to patients with AHI<5**
  - Adjusted for risk factors such as age, gender, BMI, smoking, HTN, hypelipidemia, diabetes, left ventricular function
- **1 unit increase in AHI increases stroke risk by 6%**

OSA and Hypertension

- OSA is associated with drug-resistant hypertension
- Correlation INDEPENDENT of other comorbidities
- TREATMENT of OSA can lower BP in patients with resistant HTN
  - 9.8mm Hg systolic
  - 6.8 mmHg diastolic

Peppard NEJM 2000; Duran-Cantolla BMJ 2010; Lozano J Hypertension 2010; Demede 2011
Cardiac arrhythmias occur as a result of OSA

- Paroxysmal atrial fibrillation
- Non-sustained ventricular tachycardia
- Premature atrial complex
- Sinus bradycardia
- Sinus pauses
- Premature ventricular complexes
Cardiac Arrhythmia and OSA

- Increased sympathetic tone
- Atrial Fibrillation
  - Pts with A fib more likely to have OSA
  - 81.6% vs. 60%
- Presence of obstructive sleep apnea increased the risk of atrial fibrillation recurrence after catheter ablation
- Increased risk of nocturnal death
- Increased risk of death overall (4x)

Gami NEJM 2005; Leung Am J Respir Crit Care Med 2001; Yaggi 2005; Abe 2010
Stroke Exacerbates OSA

- 58%-62% of patients post-stroke or TIA snore

- AHI 27 vs. 12%(AHI 6) in general population

Chan Stroke 2010; Bassetti 1996
OSA Worsens Post-Stroke Recovery

• **Acute/Subacute**
  – Early neurologic worsening in hemispheric stroke
  – Treatment improves NIH Stroke Scale score 30 days post-stroke (-3 vs. -1)

• **Chronic**
  – Decrease in functional independence
  – 30% longer time in hospital
  – Increased stroke recurrence
  – OSA and neurocognitive impairment

Screening for OSA

• Clinical history
  – “Elbow Test”
  – Witnessed snoring/apnea
  – Day time somnolence
  – Nocturia
  – Waking with a feeling of choking/gasping
  – AM headache
Screening for OSA

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• Questionnaires
  – STOP / STOP-Bang
  – Berlin Questionnaire
  – Wisconsin Sleep Questionnaire
Screening Tools: Overnight Oximetry

- 100%
- 90%
- 80%

Diagram showing overnight oximetry data with time on the x-axis and ear oxygen saturation (%) on the y-axis.
Polysomnography (Overnight Sleep Study)
Treatment

• 2” x 4” under head of the bed
• Positional treatment
  – Rematee Bumper Belt
Treatment

- 2” x 4” under head of the bed
- Positional treatment
  - Rematee Bumper Belt
  - Football in children’s backpack
- Breathe Right Nasal Strips
- Provent nose plugs
- Oral appliance
- Surgical alteration of soft palate
Treatment

Continuous Positive Airway Pressure (CPAP)

- CPAP Treatment reduces stroke risk by 60-70%
- NNT 5 over 7 years (CV events or sudden death)

Martinez-Garcia 2005 and 2012
CPAP Treatment

- Trouble shooting is key!
- CPAP Education Centre working with patient
Conclusion

• OSA is an independent risk factor for:
  – Stroke
  – HTN
  – Cardiac arrhythmia

• Can be screened for

• Treatment reduces stroke risk by 60-70%
  – Reduces systolic and diastolic blood pressure
  – Reduces risk of sudden death
Questions?
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