



Obstructive Sleep Apnea and Stroke Risk

Stroke Symposium December 2013

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**Disclosure of Potential for Conflict of Interest
Stroke Symposium
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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)



Epidemiology

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

Young *N Engl J Med* 1993; Mohensin *Arch Phys Med Rehab* 1995; Dyken *Stroke* 1996; Bassetti *Sleep* 1999



Risk Factors

- **Obesity**
- **Male gender**
- **Age > 50**
- **BMI > 35**
- **Neck circumference > 40cm**
- **Family history**
 - Small oropharyngeal airway

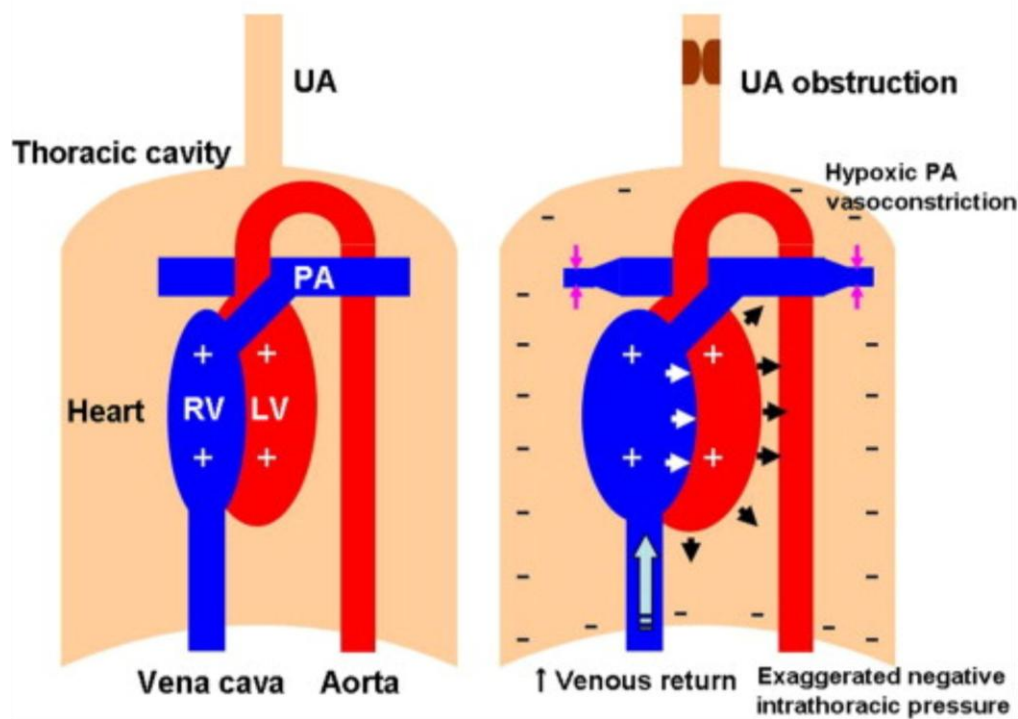


Video 1



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%**

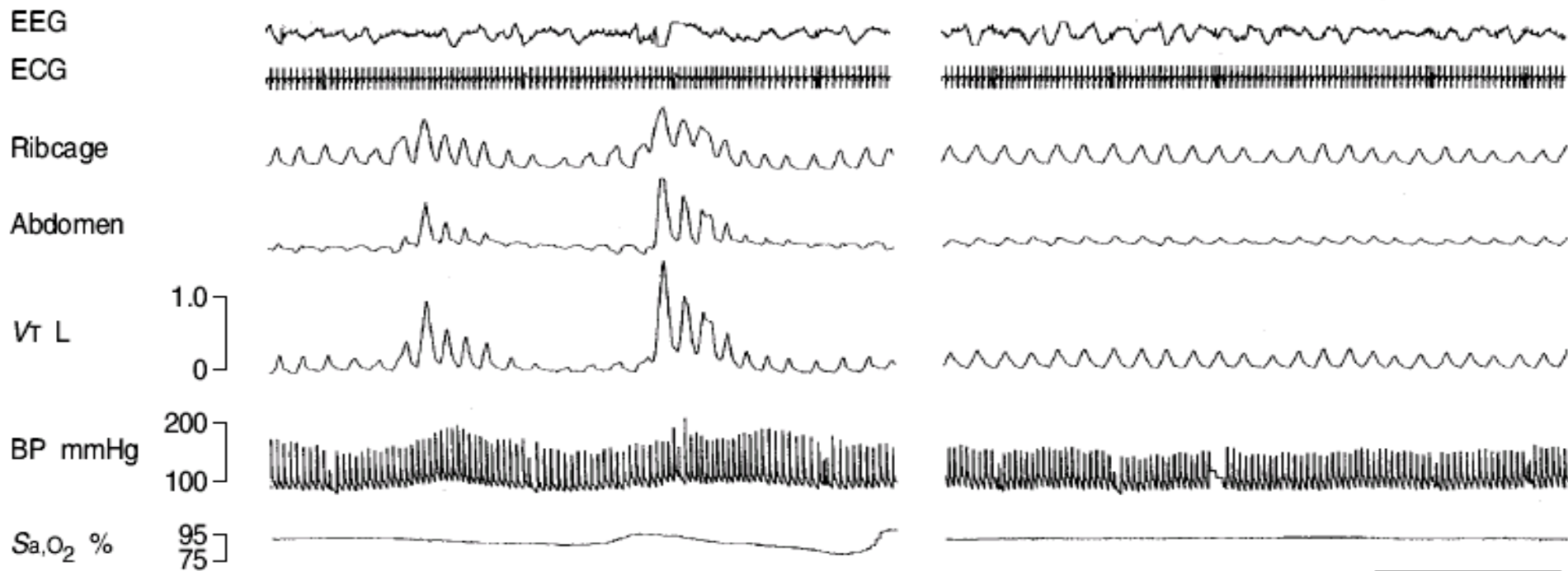
OSA and Hypertension

- 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



Off CPAP

On CPAP





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)



Stroke Exacerbates OSA

- **58%-62%** of patients post-stroke or TIA snore
- **AHI 27** vs. **12%**(AHI 6) in general population

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

- **Clinical history**

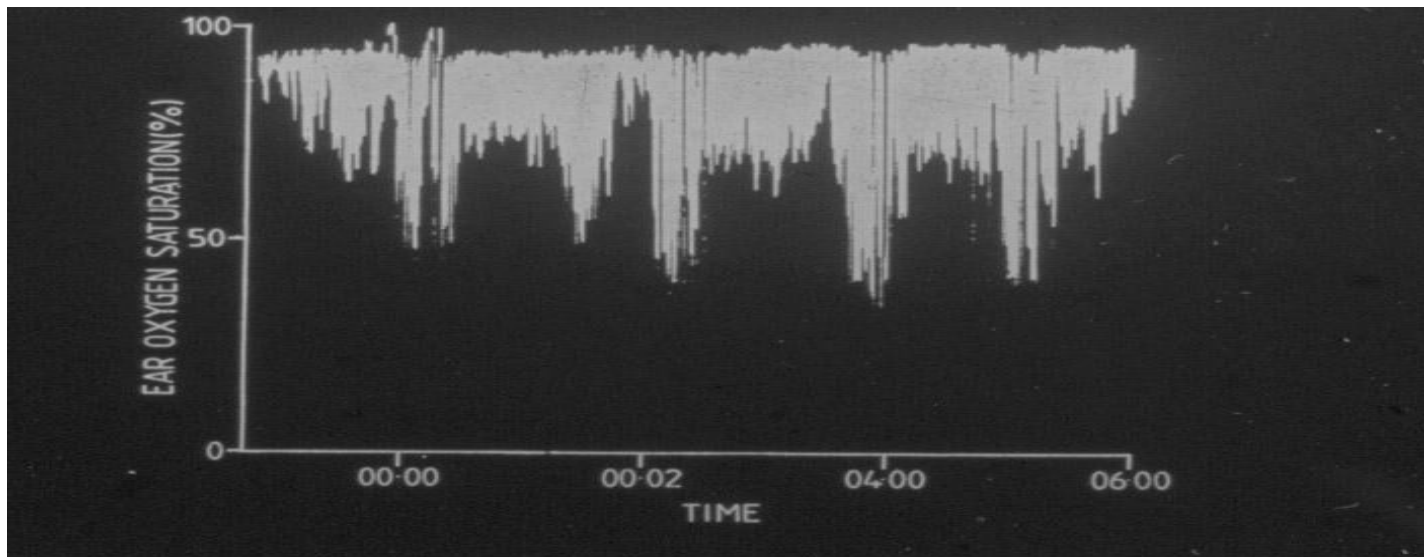
- “Elbow Test”
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- **Questionnaires**

- STOP / STOP-Bang
- Berlin Questionnaire
- Wisconsin Sleep Questionnaire

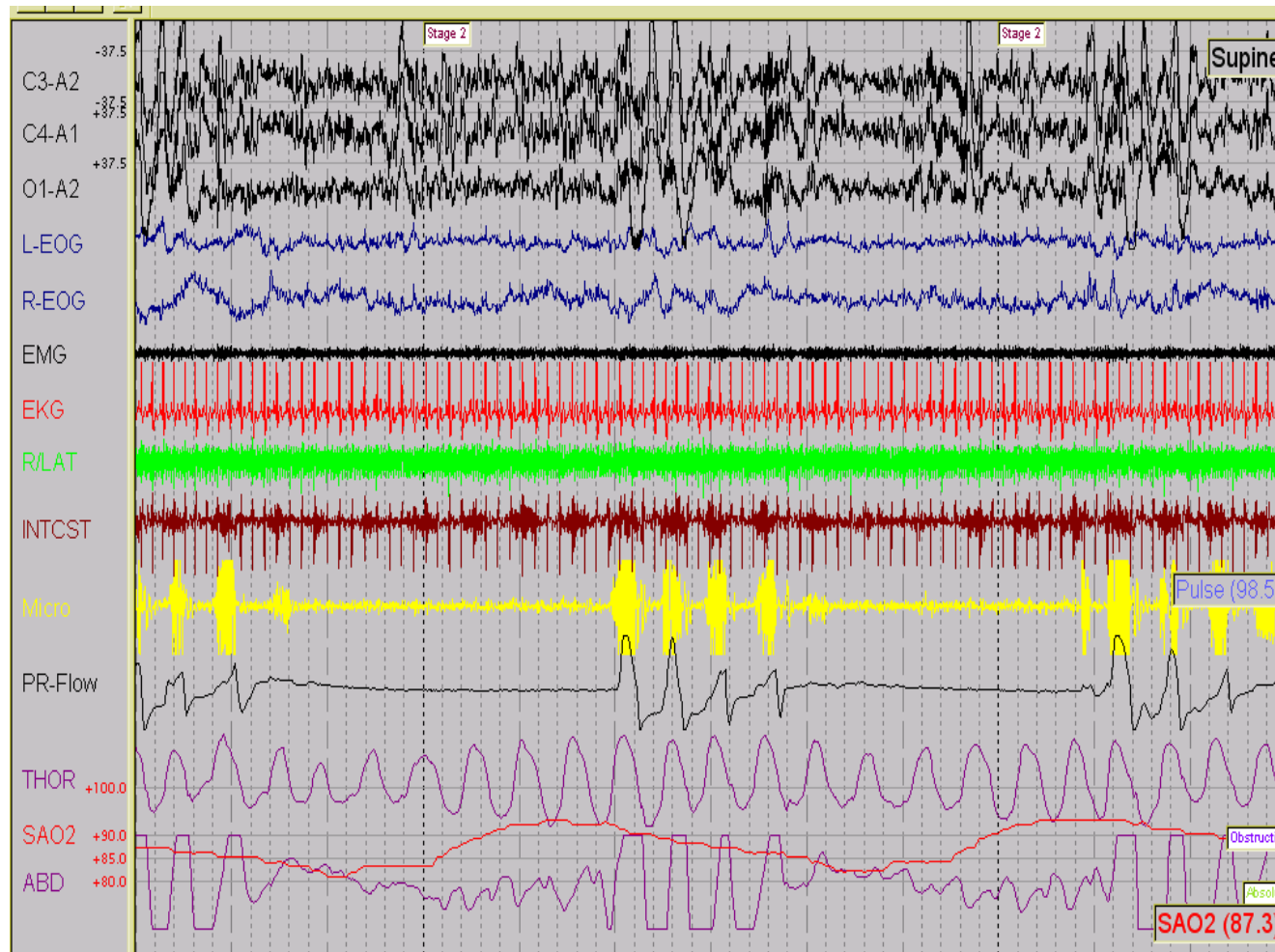


Screening Tools: Overnight Oximetry





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)**

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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