SNORING & OSAHS SURGERY

International Workshop

Epidemiology of SRDB
(15 min)
Epidemiology in SRDB

**Brief history of Undiagnosed OSAHS**

- **Burwell C. et al. 1956**
  

**Controversial Epidemiological Data**

- Methodological Variability
  - Definition
  - Measurement
  - Statistical technique

- Heterogeneous Population-Based Studies

- Wide Spectrum of Sleep Related Obstructed Breathing
**Epidemiological Studies**

**OSAHS PREVALENCE**

- **Stradling** analyzed 12 studies of Obstructive Sleep Apnea (OSA) prevalence in Western populations: 1% – 5% adult men
  
  (Thorax 1996;51:S65-70.)

- **Lindberg and Grisalon** estimated prevalence of 0.5% – 5% from 9 studies
  
  (Sleep Med Rev 2000;4:411-433.)

- **Wisconsin Sleep Cohort**: 4% of middle-aged men, 2% of women
  
  (NEJM 1993;328:1230-1235.)

- **Composite of Wisconsin, Pennsylvania, and Spain**: 1/5 adults with mild OSA, 1/15 at least moderate OSA
  
  (Young et al Am J Respir Crit Care Med 2002;165:1217-1239.)

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**OSAHS PREVALENCE**

- **2% + 4%**

- **7% + 16%**
Epidemiological Studies

OSAHS PREVALENCE

Table 1. Prevalence of Obstructive Sleep Apnea from Three Studies with Similar Design and Methodology

<table>
<thead>
<tr>
<th>Study Location</th>
<th>Age Range (years)</th>
<th>Men AHI = 5 (% 95% CI)</th>
<th>Women AHI = 5 (% 95% CI)</th>
<th>Men AHI = 15 (% 95% CI)</th>
<th>Women AHI = 15 (% 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin*</td>
<td>626 30-60</td>
<td>24 (19-28) 9 (6-12)</td>
<td>9 (6-11) 4 (2-7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pennsylvania†</td>
<td>1,741 20-99</td>
<td>17 (15-20) Not given</td>
<td>7 (6-9) 2 (2-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spain*</td>
<td>400 30-70</td>
<td>26 (20-32) 28 (20-35)</td>
<td>14 (10-18) 7 (3-11)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Definition of abbrevation: AHI = apnea-hypopnea index.
* Young and coworkers (11).
† Bixler and coworkers (15, 16).
‡ Durán and coworkers (17).

Prevalence of Snoring by Age

- Men: 24%
- Women: 14%

E. Lugaresi et al. Sleep, 1980
Prevalence of OSAHS by Age

OSAHS PREVALENCE: Older Adults

Higher Prevalence in Older Adults

- Ancoli-Israel, age 65-95
  - Apnea Hypopnea Index (AHI) > 10 in 70% of men, 56% of women
  - (3 times higher than in middle-aged estimates)

- Bixler showed higher prevalence of AHI >15 in age 65-100 than middle-aged

- Sleep Heart Health: 1.7 times higher in age 60-99 than 40-60

Epidemiological Studies

OSAHS PREVALENCE

40 million Americans suffer from chronic sleep disorders
- 95% are undiagnosed

An additional 20-30 million suffer from intermittent problems

18 million Americans have OSA
- 80-90% remain undiagnosed

National Commission on Sleep Disorders Research 1992
Young T, et al. Sleep 1997;20:705-706
60% of all patients evaluated for bariatric surgery have OSA

OSA increases the risk for respiratory complications in obese patients undergoing laparotomy

72-87% of bariatric surgery patients with symptoms of OSA will have AHI >5

Some Epidemiological Data on Snoring and Cardiocirculatory Disturbances

E. Lugaresi, F. Cirignotta, G. Coccagna, and C. Piana

Institute of Clinical Neurology, University of Bologna, Italy

OSAHS & Cardiovascular Disease

Hypertension and Snoring

* * * p < 0.001
* p < 0.05

30.7

9.1
27

13.1
9.0

4.0

2

7

increase over 30%

increase between 15%-30%

increase below 15%

BODY WEIGHT

% Habitual Snorers

% Non Snorers

OSAHS & Cardiovascular Disease

Hypertension and Snoring

307

40

Lugaresi et al. - Sleep 1980
Hypertension and OSAHS

Wisconsin Sleep Cohort Study
Prospective population based study of the association between objectively measured initial severity of sleep disordered breathing and hypertension
N = 893 subjects followed 4-8 years
N = 709 4 year follow up
N = 184 8 year follow up

Peppard PE et al. NEJM 2000;342:1378-1384
Wisconsin Sleep Cohort Study

Odds ratio for hypertension according to AHI

Peppard PE et al. NEJM 2000;342:1378-1384
Wisconsin Sleep Cohort Study
OSAHS & Cardiovascular Disease

Congestive Heart Failure and OSAHS

- N = 450 patients (consecutive)
- Refractory congestive heart failure (CHF) or symptoms of apnea
- 52% with AHI greater than 20 (central apnea 25%, obstructive apnea 27%)
- CPAP as ‘novel’ treatment for refractory CHF

Sin, AJRCCM, 1999.

OSAHS & Cardiovascular Disease

Congestive Heart Failure and OSAHS

[Bar chart showing odds ratios for different AHI ranges: 0-1.3, >1.3-4.4, >4.4-11, >11]

OSAHS & Cardiovascular Disease

Stroke and OSAHS

![Bar chart showing odds ratio for different AHIs (0-1.3, >1.3-4.4, >4.4-11, >11)]


OSAHS & Cerebrovascular Disease

Stroke and OSAHS

- N=128 patients who had either stroke (N=75) or transient ischemic attack (N=53)
- Clinical interviews and polysomnogram in 82
- Compared with a control group of 25 age, gender matched healthy volunteers

Bassetti and Aldrich. SLEEP, 1999.
OSAHS & Cerebrovascular Disease

Stroke and OSAHS

Bassetti and Aldrich. SLEEP, 1999.

OSAHS & Cerebrovascular Disease

Stroke and OSAHS

Association of Sleep-disordered Breathing and the Occurrence of Stroke

Michael Arzt, Terry Young, Laurel Finn, James B. Skatrud, and T. Douglas Bradley

Sleep Research Laboratory of the Toronto Rehabilitation Institute, Center for Sleep Medicine and Circadian Biology, University of Toronto, Toronto, Ontario, Canada; and Departments of Population Health Sciences and Medicine, University of Wisconsin School of Medicine, Madison, Wisconsin.

OSAHS Pts (AHI > 20 ev/h) : ↑↑↑ 4.31
OSAHS & Cardiovascular Disease

Cardiovascular Events and OSAHS


Epidemiology in SRDB

RISK FACTORS

Cardiovascular Mortality

He J. et al: Chest 94: 9-14;1988
28% report sleepiness interferes with their daily activities at least a few days a month

45% report moderate chance of dozing in afternoon when lying down in the afternoon

37% report moderate chance of dozing while sitting and reading
OSAHS & Excessive Daytime Sleepiness

Clinical Impact of EDS

Excessive Daytime Sleepiness

- Neurobehavioral Deficits
- Performance Deficits
- Increased Morbidity/Mortality
- Decreased Quality of Life

Frequency of Driving Drowsy in Past Year:

- 3* times/week: 4%
- 1-2 times/week: 9%
- 1-2 times/month: 22%
- Less than once/month: 32%
- Never: 34%
- Don't drive/no license: 1%
- Don't know/Refused: <1%

- Nodded Off or Fallen Asleep While Driving:
  - Yes: 36%
  - No: 84%

- Had an Accident or Near Accident Due to Drowsiness While Driving in the Past Year:
  - Yes: 2%
  - No: 98%
OSAHS & Excessive Daytime Sleepiness

Clinical Impact of EDS

- EDS score and oxygen desaturation during sleep also affected the QOL
- Quality of Life of patients with severe OSA was decreased compared with normal control subjects
- Quality of Life was strongly associated with the depression scale

Akashiba et al. Chest 2002

Changes in Extreme Reaction Time
OSAHS & Excessive Daytime Sleepiness

Driving When You Have Sleep Apnea

1999
NHTSA in estimated 1.5% of 100,000 police-reported crashes, and 4% of all traffic crash fatalities involved drowsiness and fatigue as principal causes

1994
Estimated cost $83,000 lifetime per fatality; total of $12.5 billion and 85% of cost from workplace loss and loss of productivity

www.nhtsa.dot.gov
Traffic Accidents:
N = 102 Subjects with AHI of >10 had 6.3 times greater odds of having a traffic accident compared to 152 case-matched control with AHI < 10 in Spain

...March 24th 1989,  
The Oil tanker  
EXXON VALDEZ is stranded against Bligh Reef, in Prince William strait,  
Alaska, pouring 250,000  
barrels of crude oil scattered over 6700 sq Km, causing a damage for the amount of 2000 milliards, and covering 2100 Km of beaches and killing at least 5000 marine otters...
January 28th 1986, Cape Kennedy, CHALLENGER disintegrates in a ball of fire at 46,000 feet at Mach 1.92 speed, 73 seconds after the launch...

There are serious suspects that the space disaster of CHALLENGER and the marine one of EXXON VALDEZ, in addition to the nuclear ones of THREE MILE ISLAND and CHERNOBIIL are somehow to be connected with people affected by severe OSAHS.

*National Commission on Sleep Disorders Research, 1992 Report*
THANK YOU FOR YOUR ATTENTION ... and
Acute Hemodynamic Effects of OSA

Occlusion of the upper airway

Forceful inspiratory effort against a closed airway

Decrease in intrathoracic pressure

Increased BP

Reflex bradycardia

Hypoxemia

Arousal and apnea termination

Rebound tachycardia

BP increase in myocardial oxygen demand at time when oxyhemoglobin saturation lowest

Release of catecholamines and increase in the sympathetic nervous system activity
Acute Hemodynamic Effects of OSA

- Increase in nocturnal blood pressure compared to normals
- Increase in serum and urinary catecholamines
- Increase in sympathetic nervous system activity

Hypoxia/Reoxygenation - OSA

ROS

Endothelial dysfunction

Cardiovascular morbidity

Mortality

Age

20 - 30

~ 50