Sleep Therapy

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Excess Body Weight and OSA

• Cross sectional associations with neck morphology, general obesity, and central obesity cross-sectionally associated with OSA in multiple studies

• No consensus on particular body habitus phenotype in OSA pathophysiology

• Measurements of body habitus may have varying degrees of accuracy making “a most important “ body habitus in association with OSA unclear
## OSA Prevalence

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

<table>
<thead>
<tr>
<th>Study Location</th>
<th>n</th>
<th>Age Range (years)</th>
<th>Estimated Prevalence of AH1 ≥ 5 events/hour (% [95% CI])</th>
<th>Estimated Prevalence of AH1 ≥ 15 events/hour (% [95% CI])</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>Wisconsin*</td>
<td>626</td>
<td>30–60</td>
<td>24</td>
<td>9 (6–12)</td>
</tr>
<tr>
<td>Pennsylvania†</td>
<td>1,741</td>
<td>20–99</td>
<td>17</td>
<td>Not given</td>
</tr>
<tr>
<td>Spain‡</td>
<td>400</td>
<td>30–70</td>
<td>26</td>
<td>28 (20–35)</td>
</tr>
</tbody>
</table>
Sleep Disordered Breathing and Age

AJRCCM 2002:1217-1239
Weight Loss and Estimated Reduction in AHI

AJRCCM 220;165:1217-1239
Perioperative Safety in the Longitudinal Assessment of Bariatric Surgery

• Composite end points of 30 day major adverse outcome (including death, venous thromboembolism; percutaneous, endoscopic, or operative re-intervention and failure to be discharged from the hospital)

• OSA, prior DVT/PE or impaired functional status each independently associated with an increased risk of composite end point
Adverse Outcomes 30 Days Post Bariatric Surgery (N = 4,610)

Table 2. Adverse Outcomes within 30 Days after Surgery, According to Surgical Procedure.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Total (N = 4610)*</th>
<th>Laparoscopic Adjustable Gastric Banding (N = 1198)</th>
<th>Laparoscopic Roux-en-Y Gastric Bypass (N = 2975)</th>
<th>Open Roux-en-Y Gastric Bypass (N = 437)</th>
<th>P Value†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>15 (0.3)</td>
<td>0</td>
<td>6 (0.2)</td>
<td>9 (2.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Deep-vein thrombosis or venous thromboembolism</td>
<td>20 (0.4)</td>
<td>3 (0.3)</td>
<td>12 (0.4)</td>
<td>5 (1.1)</td>
<td>0.05</td>
</tr>
<tr>
<td>Tracheal reintubation</td>
<td>20 (0.4)</td>
<td>2 (0.2)</td>
<td>12 (0.4)</td>
<td>6 (1.4)</td>
<td>0.004</td>
</tr>
<tr>
<td>Endoscopy</td>
<td>51 (1.1)</td>
<td>1 (0.1)</td>
<td>45 (1.5)</td>
<td>5 (1.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tracheostomy</td>
<td>11 (0.2)</td>
<td>0</td>
<td>6 (0.2)</td>
<td>5 (1.1)</td>
<td>0.001</td>
</tr>
<tr>
<td>Placement of percutaneous drain</td>
<td>16 (0.3)</td>
<td>0</td>
<td>13 (0.4)</td>
<td>3 (0.7)</td>
<td>0.48</td>
</tr>
<tr>
<td>Abdominal operation</td>
<td>118 (2.6)</td>
<td>9 (0.8)</td>
<td>94 (3.2)</td>
<td>15 (3.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Failure to be discharged by day 30</td>
<td>17 (0.4)</td>
<td>0</td>
<td>13 (0.4)</td>
<td>4 (0.9)</td>
<td>0.02</td>
</tr>
<tr>
<td>Composite end point‡</td>
<td>189 (4.1)</td>
<td>12 (1.0)</td>
<td>143 (4.8)</td>
<td>34 (7.8)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
Adverse Outcomes in Bariatric Surgery by Risk Factor
(OSA Third Curve)
Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

• Objective: Determine the impact of continuous positive airway pressure (CPAP) on weight change in persons with obstructive sleep apnea (OSA).

• The Apnea Positive Pressure Long-term Efficacy Study (APPLES) was a 6-month, randomized, double-blinded sham-controlled multicenter clinical trial conducted at 5 sites in the United States. Of 1,105 participants with an apnea hypopnea index ≥ 10 events/hour initially randomized, 812 had body weight measured at baseline and after 6 months of study.
Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

**Intervention:** CPAP or Sham CPAP.  
**measurements:** Body weight, height, hours of CPAP or Sham CPAP use, Epworth Sleepiness Scale score.  
**Results:** Participants randomized to CPAP gained 0.35 ± 5.01 kg, whereas those on Sham CPAP lost 0.70 ± 4.03 kg (mean ± SD, p = 0.001). Amount of weight gain with CPAP was related to hours of device adherence, with each hour per night of use predicting a 0.42 kg increase in weight. This association was not noted in the Sham CPAP group. CPAP participants who used their device ≥ 4 h per night on ≥ 70% of nights gained the most weight over 6 months in comparison to non-adherent CPAP participants (1.0 ± 5.3 vs. -0.3 ± 5.0 kg, p = 0.014).

JCSM 2013:9(10):989-993
Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

• **Conclusions:** OSA patients using CPAP may gain a modest amount of weight with the greatest weight gain found in those most compliant with CPAP.
Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

Figure 1—Weight change over 6 months in CPAP and Sham CPAP groups

Mean weight change in CPAP = 0.35 ± 5.01 kg vs. Sham = -0.71 ± 4.03 kg, p = 0.001. N = 425 (CPAP) and 387 (Sham).

JCSM 2013:13(9):989-993
Directions and Collaborations with Bariatric and Sleep Medicine

• Sleep Disordered Breathing Collaboration Summit sponsored by AASM November 2018 and Dr. Dan Eisenberg representing ASMBS
• Multiple areas in discussion for consensus and optimal patient care and efficiency
Possible Collaborative Directions

• Defining when and how OSA screening occurs

• In the era of home sleep apnea testing and auto titrating CPAP with remote data download and programming access should a home study and auto titrating CPAP be the working pre-operative model in conjunction with support from the Sleep Center?

• Given issues in weight gain with CPAP should any CPAP accommodation time be necessary preoperatively?

• Should post operative Bariatric Surgery care routinely trigger a follow up home sleep study in reassessment after maximum weight loss?