Disclosures

• No payment or service was received from any part for any aspect of the presented work
Background

- Obstructive sleep apnea (OSA) has been identified as an important risk factor in perioperative orthopaedic surgery outcomes.
- Preoperative screening of patients for OSA has become routine in many centers.
- OSA is present in 2–10% of the population.
- The current literature lacks data concerning the risks of OSA specifically in patients undergoing shoulder arthroplasty.
Goals of our Study

• To determine the risk of in-hospital postoperative mortality, length-of stay, complications and postoperative charges in patients undergoing shoulder arthroplasty on a national level

Relevance

• Shoulder arthroplasty is on the rise with over 27,000 total shoulder arthroplasties and 20,000 hemiarthroplasties in North America per year
• OSA has been identified in other populations as a risk factor following prosthetic joint replacement
Patients and Methods

- National Inpatient Sample (NIS)
- *In hospital data only*
- 22,988 patients undergoing TSA or Hemiarthroplasty between 2005 and 2008
  - Percent OSA: 5.9%
  - Mean Age: 68.8 years
  - Percent TSA: 48.5%
  - Percent Male: 40%
- Data analyzed using Logarithmic transformation within multivariate analysis with SPSS modeling.
## Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample</th>
<th>No OSA</th>
<th>OSA</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>68.81 (SD = 11.59)</td>
<td>68.99 (SD = 11.7)</td>
<td>66.06 (SD = 9.48)</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Female gender</strong></td>
<td>19,984 (60.3% of population)</td>
<td>95.6% of females did NOT have OSA; 91.3% of males did NOT have OSA</td>
<td>4.4% of females had OSA; 8.7% of males had OSA</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Payer</strong></td>
<td>66.1% Medicare 2.6% Medicaid 26.6% Private 0.7% Self-pay 0.1% No charge 3.9% Other</td>
<td>94.4% Medicare 94.1% Medicaid 92.7% Private 96.3% Self-pay 96.2% No charge 93.5% Other</td>
<td>5.6% Medicare 5.9% Medicaid 7.3% Private 3.7% Self-pay 3.8% No charge 6.5% Other</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>LOS (days)</strong></td>
<td>2.88 (SD = 3.02)</td>
<td>2.89 (SD = 3.07)</td>
<td>2.60 (SD = 3.03)</td>
<td>0.000***</td>
</tr>
<tr>
<td><strong>Total Charges ($)</strong></td>
<td>$39,904 (SD = $28,650)</td>
<td>$39,933 (SD = $28,964)</td>
<td>$39,468 (SD = $23,238)</td>
<td>0.395</td>
</tr>
<tr>
<td><strong>Mortality</strong></td>
<td>54 (0.2%)</td>
<td>52 (0.2% of all patients WITHOUT OSA died)</td>
<td>2 (0.1% of patients WITH OSA died)</td>
<td>0.356</td>
</tr>
<tr>
<td><strong>Calendar Year</strong></td>
<td>2005 = 21.3% 2006 = 23.7% 2007 = 26.2% 2008 = 34.4%</td>
<td>2005 = 96.0% 2006 = 94.1% 2007 = 93.4% 2008 = 92.8%</td>
<td>2005 = 4.0% 2006 = 5.9% 2007 = 6.6% 2008 = 7.2%</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Deyo Score</strong></td>
<td>0.35 (SD = 0.84)</td>
<td>0.35 (SD = 0.04)</td>
<td>0.44 (SD = 0.03)</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Results: Mortality

- Patients with OSA had similar mortality to those without OSA (odds ratio 1.083).
- 54 patients overall and 2 with OSA
Results: Cost

- No meaningful increase in cost in patients with OSA
- $39,741 in patients with OSA vs $39,334 in those without OSA
Results: Length of Stay

- *Shorter* length of stay in patients with OSA

- Mean, 2.61 vs 2.91 days; P<0.0001
## Results: Complications

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample</th>
<th>No OSA</th>
<th>OSA</th>
<th>P</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematoma/Seroma</td>
<td>179 (0.5%)</td>
<td>0.5%</td>
<td>0.3%</td>
<td>0.144</td>
<td>0.629 (NS)</td>
</tr>
<tr>
<td>Implant</td>
<td>67 (0.2%)</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.219</td>
<td>0.582 (NS)</td>
</tr>
<tr>
<td>Infection</td>
<td>25 (0.1%)</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.196</td>
<td>0.000 (NS)</td>
</tr>
<tr>
<td>PE</td>
<td>88 (0.3%)</td>
<td>0.3%</td>
<td>0.2%</td>
<td>0.376</td>
<td>0.795 (NS)</td>
</tr>
<tr>
<td>Cardiac</td>
<td>187 (0.6%)</td>
<td>0.6%</td>
<td>0.2%</td>
<td>0.027</td>
<td>0.431 (NS)</td>
</tr>
<tr>
<td>Peripheral Vascular Disease</td>
<td>17 (0.1%)</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.345</td>
<td>0.000 (NS)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>216 (0.6%)</td>
<td>0.6%</td>
<td>0.8%</td>
<td>0.239</td>
<td>1.313 (NS)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>88 (0.3%)</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.285</td>
<td>1.417 (NS)</td>
</tr>
<tr>
<td>Genital–Urinary</td>
<td>174 (0.5%)</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.488</td>
<td>1.075 (NS)</td>
</tr>
<tr>
<td>Central Nervous System</td>
<td>52 (0.2%)</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.382</td>
<td>0.633 (NS)</td>
</tr>
</tbody>
</table>

*No significant difference in in-hospital complication rate between groups*
Discussion

- Is blanket application of screening appropriate within the realm of shoulder surgery and especially shoulder arthroplasty?

- OSA may not be as relevant for the shoulder surgery as it is for hip and knee surgery

- A diagnosis of OSA does not increase perioperative morbidity and mortality following shoulder arthroplasty

- Monitoring may be increased for those patients with OSA though costs do not appear higher
Limitations

- NIS does not take into account other preoperative factors or other clinical concerns
- Considerations such as mortality upon discharge are not accessible in this model
- NIS relies on clinical coding and entering diagnoses so under coding or diagnosing may alter results
- Patients who have this diagnosis may have greater access to medical care and take better care of themselves
Conclusion

- This study does not support OSA as a significant risk factor for in-hospital morbidity and mortality following shoulder arthroplasty.

- Patients with OSA have a shorter relative length of stay and no increased in hospital costs following shoulder arthroplasty.

- Further research is warranted to optimize outcomes while keeping screening costs down.
References