Screening and Treatment of Obstructive Sleep Apnea (OSA) in Stroke Patients

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2. Screening and Treatment of OSA in Stroke Patients

3. No disclosures / No relevant financial relationship(s) exist
Mission
To provide excellent stroke care across eastern North Carolina by coordinating and optimizing care cross the entire stroke care continuum, from primary prevention to rehabilitation.

Vision
To become the national model for rural stroke systems of care by creating a reliable and effective network of regional stroke care that addresses all aspects of stroke care.
Stroke in Eastern North Carolina

Source: CDC Interactive Atlas of Heart Disease
Stroke Deaths per 100,000
2013-2015

Source: CDC Interactive Atlas of Heart Disease

• The coastal plain of North Carolina is in the nation’s “Stroke Buckle”

• Stroke is the third leading cause of death in the state

• Death rate from stroke is twice as high as the national average
- 8 hospitals
- 70+ physician practices
- Critical care transports
- 728 ED visits on any given day
- Serving 1.4 million people in 29 counties, 1/3 of NC
### Annual Stroke Volumes

<table>
<thead>
<tr>
<th>Stroke Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ischemic Stroke</td>
<td>1000</td>
</tr>
<tr>
<td>Transient Ischemic Attack (TIA)</td>
<td>160</td>
</tr>
<tr>
<td>Intracranial Hemorrhage (ICH)</td>
<td>200</td>
</tr>
<tr>
<td>Subarachnoid Hemorrhage (SAH)</td>
<td>90</td>
</tr>
</tbody>
</table>

App. 1500 stroke discharges a year
Stroke in Eastern North Carolina

- 80% Ischemic / TIA
- 20% ICH

ICH Population ---
  - Higher than national
  - Regional transfers

Type of Stroke

- Ischemic 68%
- ICH 14%
- SAH 7%
- TIA 11%
Advanced Disease-Specific Care for Stroke

Demographics - Medical History

- Hypertension: 70%
- Dyslipidemia: 34%
- Diabetes: 34%
- Smoker: 27%
- Previous Stroke: 26%
- CAD/Prior MI: 21%
- Obese: 15%
- Atrial Fibrillation/Flutter: 12%
- Heart Failure: 12%
- Sleep Apnea: 11%
- Family History of Stroke: 10%
- Depression: 10%
- Renal Insufficiency: 10%
Obstructive sleep apnea is an independent risk factor for stroke.

Stroke and Sleep Apnea

Treatment for OSA after stroke has been shown to improve functional outcomes.

Obstructive sleep apnea is an independent risk factor for stroke.

Stroke patients with untreated OSA have greater functional impairments and higher mortality post stroke.

Effects of Continuous Positive Airway Pressure on Cognitive and Functional Outcome of Stroke Patients with Obstructive Sleep Apnea: A Randomized Controlled Trial

Justine A. Aaronson, PhD; Winni F. Hofman, PhD; Coen A.M. van Beren, MD, PhD; Tij Tij van Beze, MD; Joost G. van den Aardwag, MD, PhD; Erny Groet, MSc; Wytske A. Kylstra, MSc; Ben Schmand, PhD

Journal of Clinical Sleep Medicine

Frequency of Sleep Apnea in Stroke and TIA Patients: A Meta-analysis

Kare G. Johnson, M.D.; Douglas C. Johnson, M.D.

Frequency of Sleep Apnea in Stroke and TIA Patients: A Meta-analysis

Kare G. Johnson, M.D.; Douglas C. Johnson, M.D.

Obstructive Sleep Apnea in Acute Stroke

A Role for Systemic Inflammation

Gal Ifegane, MD; Andrey Ovanyan, MD; Ronen Toledano, MD; Aviv Goldbart, MD; Ibrahim Abu-Salame, MD; Asher Tal, MD; Moshe Stavsky, MD; Victor Novack, MD, PhD
Project Aim

- Evaluate if implementation of OSA protocol results in an increase in the number of stroke patients screened and treated for OSA.
• Sharon Johnson-Cowan, BS, RRT/RCP, RPSGT, RST completed additional OSA evaluation through chart review and at the bedside.

• Based on evaluation, further recommendations were made.
## STOP-Bang Tool

<table>
<thead>
<tr>
<th>Obstructive Sleep Apnea Screening Tool Questions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong> Do you Snore loudly (loud enough to be heard through closed doors or your bed-partner elbows you for snoring at night)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>T</strong> Do you often feel Tired, Fatigued, or Sleepy during the daytime (such as falling asleep during driving or talking to someone)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>O</strong> Has anyone Observed you Stop Breathing or Choking/Gasping during your sleep?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P</strong> Do you have or are being treated for High Blood Pressure?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B</strong> Body Mass Index more than 35 kg/m2?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>A</strong> Age older than 50?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N</strong> Neck size large? Male, 17 inches/43cm or larger?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female, 16 inches/41cm or larger?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>G</strong> Gender = Male?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**STOP-BANG Scoring:**

“**Yes**” = 1 point

- **Low Risk:** 0 - 2
- **Intermediate Risk:** 3 – 4
- **High Risk:** 5 – 8
# Patient Demographics

<table>
<thead>
<tr>
<th>Total Number of Patients</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Pts Screened (n, %)</strong></td>
<td><strong>140 (96%)</strong></td>
</tr>
<tr>
<td><strong>Age (median, years)</strong></td>
<td><strong>66</strong></td>
</tr>
<tr>
<td><strong>Age (mean, years)</strong></td>
<td><strong>66</strong></td>
</tr>
<tr>
<td><strong>Male (n, %)</strong></td>
<td><strong>75 (51%)</strong></td>
</tr>
<tr>
<td><strong>Female (n, %)</strong></td>
<td><strong>71 (49%)</strong></td>
</tr>
<tr>
<td><strong>White (n, %)</strong></td>
<td><strong>84 (58%)</strong></td>
</tr>
<tr>
<td><strong>African American (n, %)</strong></td>
<td><strong>57 (39%)</strong></td>
</tr>
<tr>
<td><strong>Hispanic (n, %)</strong></td>
<td><strong>1 (.01%)</strong></td>
</tr>
<tr>
<td><strong>American Indian (n, %)</strong></td>
<td><strong>1 (.01%)</strong></td>
</tr>
<tr>
<td><strong>Other / Unknown (n, %)</strong></td>
<td><strong>3 (.02%)</strong></td>
</tr>
</tbody>
</table>
82 % of patients screened had a positive STOP-Bang (≥ 3)
Of the positive screens, 35% (40/115) received recommendations for additional follow-up.
35% (15/40)

63% (25/40)

12% (3/25)

44% (11/25)

attended clinic appointment

no-show / cancelled appointment

pending appts
### Outpatient Sleep Study

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received sleep study</td>
<td>29% (4/15)</td>
<td></td>
</tr>
<tr>
<td>PAP therapy initiated</td>
<td>8% (3/40)</td>
<td></td>
</tr>
</tbody>
</table>

![Image of woman sleeping with CPAP device](https://cdn2.hubspot.net/hubfs/299691/DME/woman_sleeping_in_bed_with_CPAP_device.png?width=1000&height=1000&name=woman_sleeping_in_bed_with_CPAP_device.png)
Case Study

- Male in his mid-30’s with PMHx of HTN, obesity and tobacco abuse

- Complaints of headache with numbness and weakness on left side

- MRI shows right posterior MCA and PCA territory scattered infarcts
  - MRA showed intracranial stenosis
  - TTE and TEE negative
  - ILR placed
  - Hemoglobin A1c and lipid panel unremarkable
  - Hypercoagulable work up negative
Case Study Cont.

• Patient’s STOP-Bang score

S - do you Snore? YES.
T - are you excessively Tired? YES.
O - has anyone Observed you to stop breathing while asleep? NO.
P - do you have high blood Pressure? YES.
B - is BMI > 35? YES, 51.6.
A - is Age > or = 50 years? NO.
N - is Neck circ > 40 cm (16 in)? YES.
G - is Gender male? YES.

**TOTAL SCORE: 6**

Recommendation: *Outpatient Sleep Study*
• Polysomnography showed a total of 129.0 apneas and hypopneas which led to an apnea hypopnea index (AHI) of 27.2 events per hour

• Patient was diagnosed with moderate OSA

• Continuous Positive Airway Pressure (CPAP) therapy was recommended and initiated
Screening Challenges

• limited human and time resources to complete screens

• discharged home before further OSA screening or evaluation

• patients with aphasia or dysarthria and no family present

• patients with cognitive impairments or difficulty understanding questions on tool and no family present
Challenges to outpatient sleep clinic follow-up

- 44% (11/25) attended clinic appointment
- 44% (11/25) no-show / cancelled appointment
- 12% (3/25) pending appts

- Uninsured or underinsured
- Distance from sleep center
- Lack of education on sleep apnea
- Fear of OSA treatment
Challenges to outpatient continued

Outpatient follow-up and insurance

- Attended
- Cancelled / No-Show
- Pending / Lost to follow-up

- Medicare / Medicaid Primary
- Private Insurance
- Self-Pay
Next Steps

1. Establish formal process for implementing OSA screen on all strokes patients admitted to VMC

2. Evaluate the feasibility of a sleep navigator to complete screens and coordinate necessary follow-up

3. Investigate screening tool for aphasic and dysarthric patients

4. Further investigate the barriers for OSA post-acute follow up evaluation

5. Further investigate the barriers for OSA treatment initiation
• Aaronson, J.A., et.al. Schmand, B. (2016). Effects of continuous positive airway pressure on cognitive and functional outcome of stroke patients with obstructive sleep apnea: a randomized controlled trial. *Journal of Clinical Sleep Medicine, 12*(04), 533-541. doi:10.5664/jcsm.5684